The University of New South Wales

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

1979 Faculty Handbook
How to use this Handbook

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

**General Information** (the blue 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 alphabetically.

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.**

For detailed reference, see the list of Contents.
The address of the University of New South Wales is:

PO Box 1, Kensington,
New South Wales, Australia 2033

Telephone: (02) 663 0351

Telegraph: UNITECH, SYDNEY

Telex AA26054

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Handbook of the Board of Studies in Science and Mathematics, the Faculty of Biological Sciences, and the Faculty of Science.

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University of New South Wales—Faculty of Biological Sciences—Periodicals
University of New South Wales—Faculty of Science—Periodicals

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

Information in this Handbook has been brought up to date as at 11 September 1978, but may be amended without notice by the University Council.

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* Formerly Department of Behavioural Science; new name effective from 1 January 1979.
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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. The 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 the University and its activities you should consult the University Calendar.

Now, see the following pages for other general information which may be of value to you.

Some people who can help you

Note: All phone numbers below are University extension numbers. If you are outside the University, dial 6630351 and ask for the extension or dial 662— and then the extension number. This prefix should only be used when you are certain of the extension that you require. Callers using 662 cannot be transferred to any other number.

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 students who need advice and who have problems and are not sure whom they should see. As well as dealing with general enquiries they are especially concerned with the problems of physically handicapped and disabled students and those in need of financial assistance. The latter students should see Mrs Beaumont. Enquire at room 148E, phone 2482 (general enquiries) or 3164 (financial assistance).

The Officer-in-Charge (Admissions and Higher Degrees Section), Mr Peter Wildblood, is located on the ground floor of the Chancellery. General enquiries should be directed to 3711.

The Officer-in-Charge (Examinations and Student Records Section) Mr Ross Woodham is located on the ground floor of the Chancellery. For particular inquiries regarding the Student Records Unit, including illness and other matters affecting performance in examinations, academic statements, graduation ceremonies, prizes, release of examination results and variations to enrolment programs, phone 3711. For information regarding examinations, including examination timetables and clash of examinations, phone 2143.
The Adviser for Prospective Students, Mrs Fay Lindsay, is located on the ground floor of the Chancellery and is available for personal interview. For an appointment phone 3453.

The Assistant Registrar (Student Employment and Scholarships), Mr Jack Foley, is located on the ground floor of the Chancellery. Enquiries should be directed to 2086 (undergraduate scholarships), 2525 (graduate scholarships), and 3259 (employment).

The Housing Officer, Mrs Judy Hay, is located in the Student Amenities and Recreation Unit in Hut B at the foot of Basser Steps. For assistance in obtaining suitable lodgings phone 3260.

The Student Health Unit is located in Hut E on College Road. The Director is Dr Max Napthali. For medical aid phone 2679 or 3275.

The Student Counselling and Research Unit is located at the foot of Basser Steps. The Head is Mr George Gray. For assistance with educational or vocational problems ring 3681, 3685 or 2696 for an appointment.

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

The Chaplaincy Centre is located in Hut F at the foot of Basser Steps. For spiritual aid phone Anglican—2684; Catholic—2379; Church of Christ—2683; The Uniting Church—2683; Seventh Day Adventist—2683; Jewish—3273; Baptist—398 4065.

The Students' Union is located on the second floor of Stage III of the University Union, where the SU full-time President, Education Vice-President, Welfare-Research Officer, and Director of Overseas Students are available to discuss any problems you might have. In addition the SU offers a range of diverse services including legal advice (full-time solicitor available), clubs and societies services, second-hand bookshop (buy or sell), new records/tapes at discount, food shop (The Nuthouse), a professional nursery-kindergarten (House at Pooh Corner), a typesetting service, electronic calculators (bulk purchasing), AUS insurance (including health), an information referral centre (the Infakt Bus), a bail fund and publications such as Tharunka, Orientation Magazine, Concessions Book and counter-course handbooks. For information about these phone 2929.

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.

1979

**Session 1**

(14 weeks)

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<td>21 May to 17 June</td>
<td>19 June</td>
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<td>4 July</td>
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<td>23 July to 26 August</td>
<td>August Recess: 27 August to 2 September</td>
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<td>3 September to 4 November</td>
<td>Study Recess: 5 November to 11 November</td>
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<td>Monday 12 November</td>
<td>Examinations begin</td>
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<td>Friday 1 December</td>
<td>Examinations end</td>
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**January**

- Monday 1: New Year’s Day — Public Holiday
- Friday 5: Last day for application for review of results of annual examinations
- Friday 12: Last day for acceptance of applications by Admissions Office for transfer to another course within the University
- Monday 29: Australia Day — Public Holiday

**February**

- Monday 5: Enrolment period begins for new students and students repeating first year
- Monday 19: Enrolment period begins for second and later year students
General Information

**March**
- **Monday 5**
  - Session 1 commences
  - List of graduands for April/May ceremonies published in daily press
- **Tuesday 6**
  - Last day for acceptance of enrolment by students re-enrolling in second and later years (late fee payable)
  - Last day for students other than those attending the University for the first time to discontinue without failure subjects which extend over Session 1 only
- **Friday 30**
  - Students to amend enrolment programs following receipt of June examination results

**April**
- **Friday 6**
  - Confirmation of Enrolment forms despatched to all students
- **Friday 13 to Monday 16**
  - Easter
  - Last day for acceptance of corrected Confirmation of Enrolment forms
- **Wednesday 25**
  - Anzac Day — Public Holiday
- **Friday 27**
  - Midyear Recess ends
  - Session 2 begins
  - Last day for acceptance of enrolment by students re-enrolling in second and later years (late fee payable)
  - Last day for students other than those attending the University for the first time to discontinue without failure subjects which extend over Session 1 only

**May**
- **Monday 7**
  - Last day for students completing requirements for degrees or diplomas at the end of Session 1 to submit Application for Admission to Degree
- **Monday 14**
  - May Recess begins
  - Publication of provisional timetable for June/July examinations
- **Friday 18**
  - Last day for students other than those attending the University for the first time, to discontinue without failure subjects which extend over the whole academic year
- **Sunday 20**
  - May Recess ends
  - Last day for students to advise of examination timetable clashes
- **Friday 25**
  - Last day for students completing requirements for degrees or diplomas at the end of Session 1 to submit Application for Admission to Degree

**June**
- **Tuesday 5**
  - Publication of timetable for June/July examinations
  - Session 1 ends
- **Sunday 17**
  - Queen's Birthday — Public Holiday
- **Monday 18**
  - Midyear Recess begins
- **Tuesday 19**
  - Examinations begin

**July**
- **Wednesday 4**
  - Examinations end
  - Examination results mailed to students
  - Examination results displayed on University notice boards
- **Friday 13**
- **Monday 16**

**August**
- **Friday 6**
  - Confirmation of Enrolment forms despatched to all students
- **Monday 10**
  - Last day for applications from students completing requirements for degrees or diplomas at the end of Session 2 to submit Application for Admission to Degree
- **Wednesday 12**
  - List of graduands for October graduation ceremony published in daily press
- **Friday 14**
  - Last day for students attending the University for the first time to discontinue without failure subjects which extend over Session 2 only
  - Confirmation of Enrolment form forwarded to all students
- **Monday 17**
  - Last day to notify intention of attending October graduation ceremony

**September**
- **Sunday 2**
- **Monday 10**
- **Wednesday 12**
- **Friday 14**
- **Monday 17**
- **Friday 27**

**October**
- **Monday 1**
  - Last day to apply to MUAC for transfer to another University in New South Wales
  - Eight Hour Day — Public Holiday
- **Thursday 4**
  - Publication of provisional examination timetable
- **Thursday 11**
  - Graduation ceremony
- **Friday 12**
  - Last day for students to advise of examination timetable clashes
- **Tuesday 23**
  - Publication of timetable for examinations

**November**
- **Sunday 4**
- **Monday 5**
- **Sunday 11**
- **Monday 12**

**November**
- **Session 2 ends**
- **Study Recess begins**
- **Study Recess ends**
  - Examinations begin
In 1978 the University had 18,562 students and over 4,000 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 coat of arms of the University is reproduced on the front cover of this handbook. The arms were granted by the College of Heralds in London, on 3 March 1952, and its 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 SCI ENTIA 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 SCI ENTIA 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 in 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 43 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, and the Deputy Chancellor is Dr F.M. Mathews.

The Professorial Board

The Professorial Board is one of the two chief academic units 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.

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.
The Faculties/Boards of Study

The Dean, who is also a professor, is the executive head of the Faculty or Board of Study. 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. Each Faculty is 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 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.

Executive Officers

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

He is assisted in this task by three Pro-Vice-Chancellors, Professor John Thornton, Professor Rex Vowels and Professor Raymund Golding; 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 Keith Jennings, the Bursar, Mr Tom Daly, and the Business Manager (Property), Mr R.K. Fletcher.

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.

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/Board. Elections are for a one-year term of office.

Open Faculty/Board Meetings

If you wish you may attend a Faculty/Board meeting, you should seek advice at the office of the Faculty whose meeting you wish to attend, as different 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 on completion of their final year.

Identification of Subjects by Numbers

For information concerning the identifying number of each subject taught in this 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 no longer published in the Faculty handbooks. Separate lists are issued prior to the beginning of each session and are available at key points on the campus.

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**

**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.

There are also library services at other centres:

The Water Reference Library situated at Manly Vale (phone 9480261) 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. Phone Broken Hill (080) 6022.

The library at the Royal Military College, Duntroon, ACT, serving the Faculty of Military Studies. Phone (062) 730427.

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.

**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 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 students from Australia and up to twenty other countries. Preference is given to more senior undergraduates and graduate students. Apply in writing to the Warden, International House, PO Box 88, Kensington, NSW 2033.

New College

This Church of England College is open to all students without regard to race or religion. It has accommodation for approximately 220 students and is co-educational. Enquiries should be addressed to the Master, New College, Anzac Parade, Kensington, NSW 2033.

Shalom College

Shalom College 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. 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. A comprehensive tutorial program is offered along with a wide variety of activities and opportunities to meet informally with members of the University staff. Non-resident membership is available to male students who wish to participate in College activities and make use of its facilities. Warrane is directed by the International Catholic lay association Opus Dei. Apply in writing to the Master, Warrane College, PO Box 123, Kensington, NSW 2033.

Creston Residence

Creston, associated with Warrane College, offers residence for 25 full-time undergraduate and graduate women students of all nationalities and denominations. It is directed by the Women’s Section of Opus Dei, a Catholic lay association. Further information: The Principal, 36 High Street, Randwick, NSW 2031.

**Other Accommodation**

**Off-campus Accommodation**

Students requiring other than College accommodation may contact the Housing Officer in the Student Amenities and Recreation Unit for assistance in obtaining suitable lodging in the way of full board, room 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.

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, list of estate agents and hints on house-hunting are available on request.
Location: The Student Accommodation Service is located in Hut B, near the foot of Basser Steps. Phone 6630351, extension 3260.

Student Employment and Scholarships

The Student Employment and Scholarships Unit offers assistance with career employment for final year students and graduates of the University. This service includes the mailing of regular job vacancy notices to registered students, and a Careers Library containing information on various careers and employers.

Careers advice and assistance are also available to undergraduates. Students undertaking courses in Applied Science or Engineering which require course-related industrial or professional training experience are assisted to find such employment over the long vacation. Information and advice regarding cadetships, undergraduate and graduate scholarships is also available.

The service is located in Room G19 of the Chancellery. Phone extension 3259 for employment and careers advice, extension 2525 for details of graduate awards and grants, and extension 2086 for undergraduate scholarship, cadetship and industrial training information.

Student Health

A student health clinic and first aid centre is situated within the University. It is staffed by three qualified medical practitioners, assisted by two nursing sisters. The medical service, although therapeutic, is not intended to entirely 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 for specialist opinion and/or treatment. 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 as well as first aid service in the case of injury or illness on the campus are available.

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

Appointments may be made by calling at the centre or by telephoning extension 2679 or 3275 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. These clinics are open to staff and students and appointments may be made for the Student Health Unit clinic by telephoning 6989499, or for The Prince of Wales Hospital clinics by telephoning 3990111.

Student Counselling and Research

The Student Counselling and Research Unit provides individual and group counselling for all students—prospective, established and graduate. Self-help programs are also available. Opportunities are provided for parents and others concerned with student progress to see members of the counselling staff.

The service which is free, informal and personal is designed to help students with planning and decision making, and a wide variety of concerns and worries which may be affecting personal, educational and vocational aspects of their lives.

The Unit pursues research into factors affecting student performance, and the published results of its research and experience are helpful in improving University and other counselling services, and the quality of student life.

Counselling appointments may be arranged during sessions and recesses between 9 am and 7 pm. Phone 6630351, extension 3681, 3685 and 2696, or call at the Unit which is located at the foot of Basser Steps. Urgent interviews are possible on a walk-in basis between 9 am and 5 pm. Group counselling programs are offered both day and evening between 9 am and 9 pm by special arrangement. Self-help programs are arranged to suit the student's time and convenience.

Student Amenities and Recreation

In general the Student Amenities and Recreation Unit seeks ways to promote the physical, social and educational development of students through their leisure time activities and to provide some services essential to their day-to-day University life.

The Unit provides, for example, a recreational program for students and staff at the Physical Education and Recreation Centre; negotiates with the Public Transport Commission of NSW on student travel concessions and supplies concession forms for bus, rail, ferries and planes; assists students with off-campus housing; makes bookings for use of sports facilities; and, in consultation with the Sports Association, assists various recognized clubs.

The Unit is located in Hut B at the foot of Basser Steps. The various services may be contacted by phone on the following extensions: Recreation Program 3271; Travel 2617; Accommodation 3260; Ground Bookings 2235; Sports Association 2673.

Physical Education and Recreation Centre

The Student Amenities and Recreation Unit provides a recreational program for students and staff at the Physical Education and Recreation Centre. The Centre consists of eight...
squash courts and a main building, the latter containing 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, and fitness testing. The Centre is located on the lower campus adjacent to High Street. The Supervisor at PERC may be contacted on extension 3271.

**The Sports Association**

The Sports Association caters for a variety of competitive sports for both men and women. Membership is compulsory at $6 per year for all registered students and is open to all members of staff and graduates of the University.

The Sports Association office is situated in Hut G, near the bottom of Basser Steps, and the control of the Sports Association is vested in the General Committee. The Executive Officer of the Sports Association may be contacted on extension 2673.

**Student Travel Concessions**

The Student Amenities and Recreation Unit arranges distribution of bus, rail and ferry concessions. For the peak period during the week preceding and the first week of Session 1 distribution is at a location to be decided. Students should watch for notices around the campus announcing the distribution centre.

For the rest of the year students seeking authorization for travel concessions, including planes, should enquire at SARU, Hut B, (extension 2617) or the Enquiry Desk, Chancellery, (extension 2251).

**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 (Stage 2) and the Squarehouse (Stage 3). Membership of the Union is compulsory at $45 per year for all registered students and is open to all members of staff and graduates of the University.

The full range of facilities provided by the Union includes a cafeteria service and other dining facilities, a large shopping centre, cloak room, banking and hairdressing facilities, showers, a women's lounge, common, games, reading, meeting, music, practice, craft and dark rooms. 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. Exhibitions are held in the John Clark Gallery.

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.

**The Students' Union**

The Students' Union is run by students and represents them on and off campus. Presidential elections are by popular vote and all students who have completed two years at the University are eligible for election. The full-time President directs the entire administration of the Students' Union and its activities.

Other full-time officers include 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; Director of Overseas Students who deals with specific problems these students may encounter while in Australia.

Membership is compulsory at $14 per annum for full-time students and $11 for part-time students.

The activities of the Students' Union include:

1. Infakt: a student-run information referral service. If you want someone to talk to or need help of any kind see the people at Infakt located in the bus at the foot of Basser Steps.
2. A casual employment service.
3. Organization of Orientation Week.
4. Organization of Foundation Day.
6. Publication of the student paper Tharunka.
7. A free legal service run by a qualified lawyer employed by the Students' Union Council.
8. Students' Union Record Shop which sells discount records and tapes.
9. The Nuthouse which deals in bulk and health foods.
10. Secondhand Bookshop for cheap texts.
11. Clubs and societies which receive money from the Students' Union through CASOC (Clubs and Societies on Campus).
12. The sale of electronic calculators and accessories at discount rates.

* Subject to revision at time of publication.
The Students' Union is affiliated with the Australian Union of Students (AUS) which represents students on the national level. The Students' Union is located on the second floor, Stage 3, the Union.

Chaplaincy Centre

This service is provided for the benefit of students and staff of various religious and spiritual beliefs. Chaplains are in attendance at the University at regular times. A Chapel is also available for use by all denominations. For further details, turn to page 2.

Other Services and Activities

CASOC All clubs and societies on campus (except sporting clubs) are loosely organized under the umbrella of CASOC, which is a committee of the Students' Union. Some of these clubs are: the Motor Cycle Club; Chess Club; Dramsoc; Opunka; Kite Club and the Jazz Society.

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

University Co-operative Bookshop Limited Membership is open to all students, on initial payment of a fee of $10, refundable when membership is terminated. Members receive an annual rebate on purchases of books.

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 notice boards for details.

Australian Armed Forces Enquiries should be directed to: Royal Australian Navy: Royal Australian Navy Liaison Officer, Ementu's Professor J.S. Ratcliffe, Commander, RANR (Rtd), International House. Phone extension 3093 or 663 0473.

University of New South Wales Regiment: The Adjutant, Regimental Depot, Day Avenue (just west of Anzac Parade). Phone 663 1212.

Royal Australian Air Force: Undergraduates interested in the RAAF Undergraduate Scheme should contact The Recruiting Officer, Defence Forces Recruiting Centre, 323 Castlereagh Street, Sydney. Phone 212 1011.

Financial Assistance to Students

Tertiary Education Assistance Scheme

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

Benefits

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

1978 Higher School Certificate candidates and tertiary students receiving an allowance are sent forms in December/January. Other students may obtain forms from the Admissions Section or Student Employment and Scholarships Unit, or from the Regional Director, Department of Education, 323 Castlereagh Street, Sydney, NSW 2000 (phone 218 8800).

Continuing students should submit application 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 1979, otherwise benefits will not be paid for the earlier months of the year.

Scholarships, Cadetships, Prizes

1. Undergraduate Scholarships In addition to finance provided under the Commonwealth Government's Tertiary Education Assistance Scheme there are a number of scholarships, cadetships, prizes and other forms of assistance available to undergraduate students. Details of procedures for application for these awards are contained in the Calendar.

There are also special scholarships not administered by the University, information about which may be obtained from the School office.

Further information and advice regarding scholarships is available from the Student Employment and Scholarships Unit in the Chancellery Building.
2. **Graduate Awards** An honours degree is generally an essential requirement for gaining one of the many graduate scholarships which are available at the University. Therefore gifted students should not neglect the opportunity to qualify for honours and thus become eligible for an award.

Details of graduate awards are contained in the University Calendar.

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### Other Financial Assistance

In addition to the Tertiary Education Assistance Scheme financed by the Commonwealth 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 the Students' Union, the University Union and other 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.

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 Australian Government's Aboriginal Study Grant Scheme. Furthermore, the University may assist Aboriginal students with loans to meet some essential living expenses.

All enquiries relating to this scheme 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 the 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 some agreed ways of doing things in order to operate for the benefit of all members. The rules and procedures listed below will affect you at some time or another. In some cases there are penalties (e.g. fines or exclusion from examinations) for failure to observe these procedures and therefore they should be read with care.

### Admission

**Where can I get information about admission?**

The Admission Office, located in the Chancellery on the upper campus, provides information for students on admission requirements, undergraduate and graduate courses and enrolment procedures. The Admission Office is open from 9 am to 5 pm Monday to Friday (excluding the lunch hour 1 pm to 2 pm). During enrolment the office is also open for some part of the evening.

The Office provides information about special admission (including mature age entry), admission with advanced standing and admission on overseas qualifications. The Office also receives applications 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 lodgment of applications are adhered to. For further details see the sections below on Enrolment and Fees.

Applications for admission to undergraduate courses from students who do not satisfy the requirements for admission (see section on Admission Requirements in the Calendar), from
students seeking admission with advanced standing, or from students who have a record of failure at another university, are referred by the Admissions Office to the Admissions Committee of the Professorial Board.

Students seeking to register as higher degree candidates should first consult the Head of the School in which they wish to register. An application is then lodged on a standard form and the Admissions Office, 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 Admissions Office or the Metropolitan Universities Admissions Centre.

How do I qualify for admission?

In order to enter an undergraduate course you must qualify for matriculation to the University, and be selected for admission to the faculty or course you wish to enter. Full details of matriculation and admission requirements are contained in a pamphlet obtainable at the Admissions Office and in the Calendar.

Enrolment

How do I enrol?

All students, except those enrolling in graduate research degrees (see below), must lodge an authorized enrolment form with the Cashier on the day the enrolling officer signs the form or on the day their General Studies electives are approved if their course requires this.

All students, except those enrolling in graduate research degrees and those exempted (see below), should on that day also either pay the required fees or lodge an enrolment voucher or other appropriate authority.

What happens if I am unable to pay fees at the time of enrolment?

If you are unable to pay fees by the due date you may apply in writing to the Deputy Registrar (Student Services) for an extension of time, which may be granted in extenuating circumstances.

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 that time (see Fees below). Payment may be made through the mail in which case it is important that the student registration number be given accurately.

New Undergraduate Enrolments

Persons who are applying for entry in 1979 must lodge an application for selection with the Metropolitan Universities Admissions Centre, PO Box 7049, GPO, Sydney 2001, by 3 October 1978.

Those who are selected will be required to complete enrolment at a specified appointment time before the start of Session 1. Compulsory fees must be paid on the day of the appointment. In special circumstances, however, and provided class places are still available, students may be allowed to complete enrolment after the prescribed week, subject to the payment of a penalty (see page 15).

Application forms and details of the application procedures may be obtained from the Admissions Office.

Re-enrolment

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 Admissions Office 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 Metropolitan Universities Admissions Centre, PO Box 7049, GPO, Sydney 2001, by 3 October 1978.

Restrictions Upon Re-enrolling

Students enrolled in the first year of any undergraduate course in the University who failed more than half their program in 1978, students who have failed more than once a subject prescribed as part of their course, and students required by the Re-enrolment Committee to show cause should not attempt to re-enrol but should follow the written instructions they will receive from the Registrar.

For the purpose of calculating a student's program, all subjects taken during the year, including repeat subjects, are counted.

Miscellaneous Subject Enrolments

Students may be permitted to enrol for miscellaneous subjects (ie as students not proceeding to a degree or diploma) provided the Head of the School offering the subject considers it will be of benefit and there is accommodation available. Only in exceptional cases will subjects taken in this way count towards a degree or diploma. Students who are under exclusion may not be enrolled in miscellaneous subjects which may be counted towards courses from which they have been excluded.

Students seeking to enrol in miscellaneous subjects should obtain a letter of approval from the Head of the appropriate School or his representative permitting them to enrol in the subject concerned. The letter should be given to the enrolling officer at the time of enrolment.

For details of the locations and hours for enrolment see Enrolment Procedures 1979, a free booklet obtainable from your School or Faculty Office or from the Admissions Office.
Final Dates for Completion of Enrolments

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 (16 March 1979) 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 (30 March 1979) except with the express approval of the Deputy Registrar (Student Services) and the Heads of Schools concerned. No enrolments for courses in Session 2 only will be accepted after the end of the second week of Session 2 (3 August 1979) except with the express approval of the Deputy Registrar (Student Services) and the Heads of Schools concerned.

How do assisted students (eg scholarship holders) enrol?

Scholarship holders or sponsored students who have an enrolment voucher or letter of authority from their sponsor should present it at the time of enrolment. 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 must pay the 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.

What special rules apply
If I wish to be considered for admission with advanced standing?

If you make application to register as a candidate for any degree or other award granted by the University you may be admitted to the course of study with such standing on the basis of previous attainments as may be determined by the Professorial Board. For complete details regarding ‘Admission with Advanced Standing’ consult the University Calendar.

Can I change my course program?

If you wish to seek approval to substitute one subject for another, or add one or more subjects to your program or discontinue part or all of your program, you must make application to the Registrar through the Head of the School responsible for the course on forms available from School offices or at the Enquiry Desk in the main entrance of the Chancellery. The Registrar will inform you of the decision. Application to enrol in additional subjects must be submitted by 30 March 1979 for Session 1 only and Whole Year subjects and by 17 August 1979 for Session 2 only subjects.

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 Registrar.

Withdrawal from courses and subjects

Courses
1. Students withdrawing from courses (see also Subjects, below) are required to notify the Registrar in writing.

For details see the Calendar.

Subjects
2. Students are permitted to withdraw from subjects without being regarded as having failed, provided they apply by the dates indicated.

Students enrolled in the University for the first time (in any undergraduate course):

1. for one session subjects, the end of the eighth week of that session (27 April or 14 September)
2. for whole year subjects the end of the second week of Session 2 (3 August)

Students who have been enrolled in the University prior to 1979:

1. for one session subjects, the end of the fourth week of that session (30 March or 17 August)
2. for whole year subjects, the end of the eleventh week of Session 1 (18 May)

How do I enrol after an absence of twelve months or more?

If you have had an approved leave of absence for twelve months or more and wish to resume your course you should follow the instructions about re-enrolling given in the letter granting your leave of absence. If you do not fully understand or have lost these instructions, then you should contact the Admissions Office before November in the year preceding the one in which you wish to resume your course.
If you have not obtained a leave of absence from your course and have not been enrolled in the course over the past twelve months of more, then you should apply for admission to the course through the Metropolitan Universities Admission Centre before October in the year preceding that in which you wish to resume studies.

Are there any 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-enroll and retain valuable class places.

First-year Rule

1. A student enrolled in the first year of any undergraduate course of study in the University as set out in the relevant faculty handbook shall be required to show cause why he/she should be allowed to continue the course if he/she fails more than half the program in which he/she is enrolled. In order that students may calculate half their program, the weighting of subjects in each course is defined in Schedule A,* which may be varied from time to time by the Professorial Board.

Repeated-failure Rule

2. A student shall be required to show cause why he/she should be allowed to repeat a subject which that student has failed more than once. Where the subject is prescribed as part of the student's course he/she shall also be required to show cause why he/she should be allowed to continue that course.

General Rule

3. A student shall be required to show cause if, in the opinion of the faculty or board of studies his/her academic record is such as to demonstrate the student's lack of fitness to pursue a subject or subjects and/or course or courses.

The Session-unit System

4. (1) A student who infringes the provision of Rules 1. or 2. at the end of Session 1 of any year will not be required to show cause at that time but 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 that course.

(2) Such a student will be required to show cause at the end of the year, except that a student who has infringed Rule 2. at the end of Session 1, repeats the subject(s) in question in Session 2, and passes it/them, will not be required to show cause on account of any such subject.

Exemption from Rules by Faculties

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

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

'Showing Cause'

6. (1) A student wishing to show cause must apply for special permission to re-enrol. Application should be made on the form available from the Examinations and Student Records Section 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 Re-enrolment Committee which shall determine whether the cause shown is adequate to justify the granting of permission to re-enrol.

Appeal

7. (1) Any student who is excluded by the Re-enrolment Committee from a course and/or subject(s) under the provisions of the Rules 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 he 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.

(2) The notification to any student of a decision by the Re-enrolment Committee to exclude him/her from re-enrolling in a course and/or subject(s) shall indicate that the student may appeal against that decision to the Appeal Committee. In lodging such an appeal with the Registrar the student should provide a complete statement of all grounds on which the appeal is based.

*For details of Schedule A see Restrictions upon Re-enrolling in the University Calendar.
Exclusion

8. (1) A student who is required to show cause under the provisions of Rules 1, or 3, and either does not attempt to show cause or does not receive special permission to re-enrol from the Re-enrolment Committee (or the Appeal Committee on appeal) shall be excluded from re-enrolling in the subject(s) and course(s) on account of which he was required to show cause. Where the subjects failed are prescribed as part of any other course (or courses) he/she shall not be allowed to enrol in any such course.

(2) A student who is required to show cause under the provisions of Rule 2, and either does not attempt to show cause or does not receive special permission to re-enrol from the Re-enrolment Committee (or the Appeal Committee on appeal) shall be excluded from re-enrolling in any subject he/she has failed twice. Where the subject failed is prescribed as part of the student’s course he/she shall also be excluded from that course. Where the subject failed is prescribed as part of any other course (or courses) he/she shall not be allowed to enrol in any such course(s).

(3) A student excluded from a course or courses under the provisions of (1) of (2) may not enrol as a miscellaneous student in subjects which may be counted towards any such course.

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.

How do I apply for admission to degree or diploma?

If your current program will enable you to complete all requirements for a degree or diploma, including industrial training where necessary, you should complete the form Application for Admission to a Degree by the dates shown in the Calendar of Dates and on the Notification of Examination Results. The forms are available from the Enquiry Counter at the Chancellory and will be mailed to all potential graduates.

The completion and submission of the form ensures that:

1. The correct spelling and sequence of names is recorded on the degree certificate.
2. Any previous academic qualifications are shown in the graduation ceremony program.
3. All correspondence relating to the ceremony is forwarded to the correct address. Note: If notifying change of address after the form has been submitted an additional form Final Year Students’ Graduation: Change of Address should be submitted.

If you meet all the requirements, the degree or diploma will be conferred without the necessity for further action by you. Students should advise the Registrar, in writing, if they do not wish to have the degree or diploma conferred for any reason, including the decision to proceed to an honours degree. To ensure that the degree is not conferred advice should reach the Registrar no later than 24 July for students completing at the end of Session 1, and 24 February for those completing at the end of Session 2.

Fees

Fees and penalties quoted are current at the time of publication but may be amended by the University Council without notice.
Do I have to pay fees for tuition?

No tuition fees are charged.

What other fees and charges are payable?

There are other fees and charges which include those charges raised to finance the expenses incurred in operating student activities such as the University Union, the Students' Union, the Sports Association and the Physical Education and Recreation Centre. Penalties 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 which are lent to students for personal use during attendance in certain subjects. Accommodation charges, costs of subsistence on excursions, field work etc, and for hospital residence (medical students) are payable in appropriate circumstances.

How much is my contribution to student activities and services on campus?

All students (with the exceptions noted below) will be required to pay the following fees if enrolling for a program involving two sessions. Those enrolling for only one session will pay one-half of the Student Activities Fees, and the full University Union entrance fee, if applicable.

University Union Entrance Fee, payable on first enrolment $25

Student Activities Fees

<table>
<thead>
<tr>
<th>Activity</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>University Union, annual subscription</td>
<td>$45</td>
</tr>
<tr>
<td>Sport Association, annual subscription</td>
<td>$6</td>
</tr>
<tr>
<td>Students' Union</td>
<td></td>
</tr>
<tr>
<td>Students enrolling in full-time courses, annual subscription</td>
<td>$14</td>
</tr>
<tr>
<td>Students enrolling in part-time courses and miscellaneous subjects, annual subscription</td>
<td>$11</td>
</tr>
<tr>
<td>Miscellaneous annual fee</td>
<td>$25</td>
</tr>
</tbody>
</table>

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

Are fees charged for examinations?

Generally, there are no charges associated with examinations; however two special examination fees are applied:

Examinations conducted under special circumstances—for each subject $11
Review of examination result—for each subject $11

What penalties exist for late payment of fees?

The following additional charges will be made in 1979 when fees are paid late:

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.

Locations and Hours of Cashier

Cashier's Offices are open during the enrolment periods. Details of locations and hours are listed in Enrolment Procedures 1979, a free booklet obtainable from your School or Faculty Office or from the Admissions Office.

Who is exempt from payment of fees?

1. Life members of University Union, 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. 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.
4. 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 in a miscellaneous subject or 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.
5. 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.
6. 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.
7. Graduate students resubmitting a thesis or project only are exempt from all Student Activities Fees.

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

Is exemption from membership possible?

The Registrar is empowered to grant exemption from membership of the Students’ Union and the Sports Association to students who have a genuine religious objection to such membership, subject to payment of the prescribed fees to the University.

How much will textbooks and special equipment (If any) cost?

You must 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 second-hand bookshop. Information about special equipment costs, accommodation charges and cost of subsistence on excursions, field work, etc, and for hospital residence (medical students) are available from individual schools.

Will I receive any refund if I withdraw from a course?

Yes. The following rules apply:

1. If you withdraw from courses you are required to notify the Registrar in writing.
2. Where notice of withdrawal from a course is received by the Registrar before the first day of Session 1 a refund of all fees paid will be made. After that time only a partial refund will be made. See the Calendar for details.

What happens if I fail to pay the prescribed fees or charges?

If you fail to pay prescribed fees or charges or become otherwise indebted to the University and you fail to make a satisfactory settlement of your indebtedness upon receipt of due notice then you cease to be entitled to the use of University facilities. You will not be permitted to register for a further session, to attend classes or examinations, or be granted any official credentials. In the case of a student enrolled for Session 1 only or for Sessions 1 and 2 this disbarment applies if any portion of fees is outstanding after the end of the eighth week of Session 1 (27 April 1979). In the case of a student 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 (31 August 1979).

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

Can I get an extension of time to pay?

If you apply before the due date and extenuating circumstances exist, an extension of time may be granted. Apply to the Deputy Registrar (Student Services).

Examinations

When are examinations held?

Examinations for Session 2 and for Full Year subjects are held in November/December. Examinations for Session 1 subjects are held during the Midyear Recess. Provisional timetables indicating the dates and times of examinations and notices of the location of examinations are posted on the University notice boards on the campus, including the Western Grounds Area. Final timetables indicating the dates, times, locations and authorized aids are available for students two weeks before the end of each session. You must advise the Examinations Unit (the Chancellery) of any clash in examinations. Details of dates are published in the Calendar of Dates (see pages 2-4 for May/June and October/November).

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

In the assessment of your progress in University courses, 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.

How are examination passes graded?

Passes are graded: High Distinction, Distinction, Credit and Pass. Satisfactory indicates the satisfactory completion of a subject for which graded passes are not available. A Pass Conceded may be granted to a student whose mark in a subject is slightly below the standard required for a pass but whose overall satisfactory performance warrants this concession.

A Terminating Pass may be granted where the mark for the subject is below the required standard. A Terminating Pass will not permit a student to progress further in the subject or to enrol in any other subject for which a pass in the subject is a co-requisite or prerequisite. A student given a Terminating Pass may attempt a deferred examination, if available, to improve his performance but should he fail in such attempt, the Terminating Pass shall stand.
When are examination results available?

Final examination results will be posted to your term address (which can be altered up to 30 November) or to your vacation address (fill in a form obtainable at the Information Desk, Chancellery, also by 30 November). Results are also posted on School notice boards and in the foyer of the Sir John Clancy Auditorium. No examination results are given by telephone.

Can examinations results be reviewed?

Examination results may be reviewed for a fee of $11 a subject, which is refundable in the event of an error being discovered. This review consists mainly of ensuring that all questions attempted have been marked and of checking the total of the marks awarded. Applications for review must be submitted on the appropriate form to the Examinations and Student Records Section together with the necessary fee by the dates printed on the reverse side of Notification of Results.

Are allowances made if students are sick before or during an examination?

A student who through serious illness or other cause outside his control is unable to attend an examination is required to bring the circumstances (supported by a medical certificate or other evidence) to the notice of the Registrar not later than seven days after the date of the examination.

A student who believes that his performance in a subject has been affected by serious illness during the year or by other cause outside his control, and who desires these circumstances to be taken into consideration in determining his standing, is required to bring the circumstances (supported by a medical certificate or other evidence) to the notice of the Registrar as soon as the circumstances are known but not later than seven days after the date of the examination.

A student who attempts an examination, yet claims that his performance is prejudiced by sickness on the day of the examination must notify the Registrar or Examinations Supervisor before, during, or immediately after the examination, and may be required to submit to medical examination.

When submitting a request for consideration candidates are required to give details of their registration number, address, course, specialization, year or stage, full or part-time and subject number, title and date of the examination affected.

A student suffering from a physical disability which puts him at a disadvantage in written examinations should apply to the Assistant Registrar, Examinations and Student Records Section (Ground Floor, the Chancellery) immediately the disability is known. If necessary, special arrangements will be made to meet the student’s requirements.

Use of linguistics dictionaries

All answers must be in English unless otherwise directed. Foreign students who have the written approval of the Assistant Registrar, Examinations and Student Records Section, may use standard linguistic dictionaries. Dictionaries should be presented for approval, not later than 14 days before the commencement of the examination period.

How are examinations conducted?

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 10 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. No candidate shall be admitted to an examination after 30 minutes from the time of commencement of the examination.
5. No candidate shall be permitted to leave the examination room before the expiry of 30 minutes from the time the examination commences.

Examinations including deferred 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 Unit, immediately the location of the industrial training is known. Special forms for this purpose are available at the Examinations and Student Records Section, Chancellery.

Arrival at Examinations

Examination rooms will be open to students 25 minutes before the commencement of the examination. Candidates are requested to be in their places at least 15 minutes before the commencement to hear announcements. The examination paper will be available for reading 10 minutes before commencement.

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.
6. No candidate shall be re-admitted to the examination room after he has left it unless during the full period of his absence he has been under approved supervision.

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

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

9. 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.

Abolition of Deferred Examinations

The system of formal deferred examinations administered by the Registrar's Division was abolished from 1 March 1978. Schools and Faculties may carry out whatever additional assessment may be considered appropriate, including assessment or additional assessment on medical or compassionate grounds.

Can I buy copies of previous examination papers?

Yes—for 5¢ each from the University Union's Upper Campus Shop in the Commerce Building.

Essays

Should I list my sources?

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

Student Conduct on Campus

Is there a detailed code of rules related to the general conduct of students?

No. The University has not considered it necessary to formulate a detailed code of rules relating to the general conduct of students.

Now that you have become a member of the University you should understand that this involves an undertaking on your part to observe its rules, by-laws and other requirements, and to pay due regard to any instructions conveyed by any officer of the University.

What are the rules related to attendance at classes?

You are expected to be regular and punctual in attendance at all classes in the course or subject in which you are enrolled. All applications for exemption from attendance at lectures or practical classes must be made in writing to the Registrar.

In the case of illness or of absence for some other unavoidable cause you may be excused by the Registrar for non-attendance at classes for a period not more than one month or, on the recommendation of the Dean of the appropriate Faculty, for a longer period. Applications should be addressed to the Registrar and, where applicable, should be accompanied by a medical certificate. If assessment procedures have been missed, this should be stated in the application.

If you attend less than 80 per cent of possible classes, you may be refused final assessment in that subject.

Why is my University and Union card important?

All students enrolled for courses leading to degrees and/or diplomas, except those exempt from fees, are issued with a University and Union membership card. Your card must be carried during attendance at the University and shown on request.

The number appearing on the front of the card above your name is your 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 some inconvenience in completing re-enrolment.

If you lose your card it is important to notify the University Union as soon as possible.

New students will be issued with cards on enrolment.

Why should I inform the University if I change my address?

If you change your address you should notify the Student Records Section of the Registrar's Division as soon as possible. Failure to do this could lead to important correspondence (including examination results) not reaching you. The University cannot accept responsibility if official communications fail to reach students who have not notified their change of address. Change of Address Advice Forms are available at Faculty and School offices and at the Enquiry Desk on the Ground Floor of the Chancellery Building.
All communications from the University, including examination results, will be sent to the session address. Change of address advice will be accepted up to 30 November, except for final-year students wishing to change their Submission of Details Associated with Graduation form. Changes to this form will be accepted up to a date four weeks before the student’s graduation ceremony.

Will the University release information to third parties without my permission?

In general, no. The University treats examination results 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, there are sometimes accusations made that the University has revealed information, including addresses (especially to insurance companies).

All students should be aware that students’ addresses are eagerly sought by various commercial agents and that sometimes tricks are used to obtain them. For example, from time to time 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 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.

How are student records kept up to date?

Enrolment details forms will be sent to all students on 28 April and 15 September. It is not necessary to return these forms unless any information recorded thereon is incorrect. Amended forms must be returned to the Examinations and Student Records Section 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 14 days.

Is there any rule related to the ownership of students’ work?

Yes. 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 you as part of your courses, or submitted for any award or competition conducted by the University.

Can I get a permit to park on campus?

Only a limited amount of parking is available on campus. Copies of the University’s parking rules may be obtained on application to Room 240, Chancellery Building.

Lost Property?

All enquiries concerning lost property should be made to the Superintendent on extension 3580 or to the Lost Property Office at the Union.

Further Information

Where can I get further information concerning courses, admission requirements, scholarships and enrolment procedure?

General

Any student who requires information on the application of these rules or any service which the University offers, may make enquiries in the Chancellery and in case of difficulties should visit the office of the Deputy Registrar (Student Services).

Notices

Official University notices are displayed on the notice boards 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), Electrical Engineering Building, Main Building (Physics and Mining Engineering) and in the Western Grounds Area.

Notices are placed on the University notice boards each month detailing forthcoming important dates. Any change to the Calendar of Dates is included in these notices.

Appeals

Section 5(c) of Chapter III of the By-laws provides: “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.

The Calendar

Please consult the Calendar if you want a more detailed account
of the information contained in this section.

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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:
Monday 26 February 1979
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:
Tuesday 27 February 1979
11 am in the Clancy Auditorium

Part-time Students
Tuesday 27 February 1979
6.30 pm in the Clancy Auditorium

Meeting for Parents of New South Wales
Friday 2 March 1979
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 interrelated groups within the university, namely the Board of Studies in Science and Mathematics, the Faculty of Biological Sciences and the Faculty of Science. The Board is responsible for the undergraduate studies of students majoring in disciplines associated with the two faculties and several schools from other faculties. The regulations governing the award of the degree of Bachelor of Science form a substantial part of the handbook.

Several specialist courses of study, also leading to 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:

Mrs E. S. Rossi, Graduate Assistant
Associate Professor K. G. Rienits, 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.

Enrolment Procedures

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

All students re-enrolling in 1979 or enrolling in graduate courses should obtain a copy of the free booklet Enrolment Procedures 1979 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.

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 and 3 of the Science 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 serves the information needs of senior undergraduate students, graduate students, and members of the academic staff. It contains books, a large collection of journals, guides to the use of the literature such as abstracting and indexing journals in the subject areas of pure and applied science, technology, engineering and architecture. The library also houses a growing map collection and some microform material. All material housed in the library bears the prefix ‘P’ and is indexed in the library’s central catalogue on Level 2. There is also a catalogue in the Physical Sciences Library. The library seats approximately 300 and a number of room carrels and seminar rooms are available for use. Photocopying facilities are provided. Journals may not be borrowed from the collection. Library staff are ready 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. Last year a highly successful careers seminar was held, in which speakers from various areas of psychological practice discussed requirements and opportunities in their respective fields. In a School so large it is difficult to develop a meaningful degree of personal contact between students of different years and students 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 include such items as 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 recognised course of study which includes Statistics. The subscription for a student member is $11 per annum.

The regular general meetings of the Branch are held usually on the second Tuesday of each month from March to November. 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 K. G. Russell, Department of Statistics, the University of NSW, PO Box 1 Kensington, 2033.
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:
### 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 a number of specific Schools in other faculties contributing to the Science and Mathematics Course.

The Co-Deans, serving alternately, are Professor S. J. Angyal† (Dean of the Faculty of Science) and Professor B. J. F. Ralph (Dean of the Faculty of Biological Sciences).

The Chairman is Professor R. M. Golding.

The Co-ordinator of Studies in Science and Mathematics is Associate Professor K. G. Rienits. The Graduate Assistant is Emma S. Rossi (Faculty of Science).

### Associated and Servicing Schools

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 Technology, Geography, Metallurgy (Applied Science); History and Philosophy of Science, Philosophy, Sociology, Political Science (Arts); Economics (Commerce); Electrical Engineering, 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).

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‡ See text of Introduction, on previous page.

* See Staff, listed later in this handbook.

† For 1978-79.
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 for 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 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 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 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.

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. three General Studies electives, usually one in Year 2 and two in Year 3 or 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.

If a student meets all the requirements for the award of the degree, the degree will be conferred without the necessity for further action by the student. Students should advise the Registrar, in writing, if they do not wish to have the degree conferred for any reason, including the decision to proceed to an honours degree.  

The four year program

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

1. at least 23 units at Level I, II, II/III, III as specified in an individual program, with the following requirements:
   (1) not less than eight nor more than ten units may be from Level I;
   (2) two of the Level I units must be 10.001 Mathematics I, 10.011 Higher Mathematics I or 10.021B and 10.021C;
   (3) not less than eight units from Level III or as specified in individual programs;

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. four General Studies electives, usually one in Year 2, two in Year 3 and one in Year 4 or 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.

† 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 for the purpose of obtaining a double degree

1. Undergraduates* of the University of New South Wales who have satisfied the examiners in at least the first two years of a degree course extending over four or more years and approved by the Board of Studies in Science and Mathematics for the purpose of double degrees, may be admitted to the Science and Mathematics course (3970) with advanced standing. Such undergraduates' performance shall have been of a high standard and their admission shall be subject to the approval of the Dean.

2. Students so admitted who have satisfied the examiners in General Studies subjects and/or Science and Mathematics course units shall be given advanced standing in such General Studies subjects and no more than 14 such Science and Mathematics course units.

3. Students so admitted may be granted exemption from two other Level II Science and Mathematics units on the basis of other subjects completed by them.

4. In order to qualify for the award of the degree of BSc, students so admitted with advanced standing 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 Bachelor's degree under these regulations must include at least four Level III units chosen from related disciplines in accordance with the Science and Mathematics course regulations. Two units of Mathematics 10.011, 10.001 or 10.021B and 10.021C† must be included in the course.

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

1. 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 upon 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.

2. Rules and requirements relating to the requirements for the Science and Mathematics course (course 3970) may be waived or amended by the Board of Studies in Science and Mathematics.

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, namely,

Anatomy see programs 7001, 7002, 7003, 1270, 4170, 4570, 6270, 7073
Biochemistry see programs 4101, 0241, 4142, 4134, 4144, 4145, 4162, 4170, 4173

* In Rule 1, the word 'undergraduates' includes graduands, i.e. 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 for the first degree.

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

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 4301, 4302, 4305, 4306, 4307, 4308, 2743, 4143, 4344, 4345

Chemistry

see programs 0201, 0202, 0203, 0204, 0241, 0242, 0262, 7302

Chemical Physics

units available in some programs
(the identifying number is 79)

Community Medicine

see programs 6851, 6852, 6853

Computer Science

see programs 0601, 0602, 0603, 0604, 0605, 0610, 0611

Genetics

see program 6840

Geography

see programs 2701, 2702, 2703, 2725, 2743

Geology

see programs 2501, 2502, 2725

History and Philosophy

of Science

see programs 6201, 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, 1068, 1069, 0610, 0611

Metallurgy

see programs 0401, 0402, 0403

Microbiology

see programs 4401, 4402, 4403, 4404, 4414, 4244, 4344

Philosophy

units available in some programs
(the identifying number is 52)

Physics

see programs 0101, 0102, 0103, 0105, 0106, 0162

Physiology

see programs 7301, 7302, 7303, 7312, 7345, 7073, 4173

Psychology

see programs 1201, 1270, 7312

Zoology

see programs 4501, 4502, 4503, 4504, 4505, 4506, 4507, 4508, 4509, 4510, 4511, 4512, 4513, 4415, 4345, 4357, 7345

In addition to Course 3970 programs are also included for Courses 4770 (Science/Law), 3730 (Science/Civil Engineering), 3970/3640 (Science/Electrical Engineering).

0102

Physics

Single Major†

Year 1

1.001 or 1.011
10.001 or 10.011
Choose 4 Level I units from Table 1

Year 2

1.012*, 1.022*, 1.032
10.1113 & 10.1114, 10.2111 & 10.2112
1 General Studies elective
Choose 3 units from:
6.620
10.111A, 10.411A, 10.331

Year 3

1.013*, 1.023*, 1.033*, 1.043
2 General Studies electives
Choose at least 3 units from:
1.133, 1.143, 1.153, 1.163, 1.173, 1.313, 1.323
10.212A, 10.412D

Year 4

1.104
1 General Studies elective

* Students seeking passes with distinction may be required to take additional material.

† Under exceptional circumstances students taking this program may be eligible for transfer into Year 4 of program 0101 or 0103 or 0105, the latter if the student reaches a satisfactory level in a number of mathematics units at Level II and III.

0103

Applied Physics

Year 1

1.001 or 1.011
10.001 or 10.011
Choose 2 of
2.111, 2.121, 2.131
Choose 2 Level I units from:
5.010, 5.030
17.031, 17.021
25.011
0105  
Theoretical Physics

Year 1  
1.001 or 1.011  
10.001 or 10.011  
Choose 2 of 2.111, 2.121, 2.131  
Choose 2 Level I units from:  
5.010, 5.030  
17.031, 17.021  
25.011  

Year 2  
1.012*, 1.022*, 1.032  
10.1113, 10.1114, 10.2111, 10.2112  
1 General Studies elective  
Choose 3 units from:  
6.620  
10.111A, 10.331, 10.411A  

Year 3  
1.013*, 1.023*, 1.033*, 1.043  
2 General Studies electives  
Choose at least 3 units from:  
1.133, 1.313, 1.323, 1.333  

Year 4  
1.304  
1 General Studies elective  

* See 0101 footnote.

0106  
Biophysics

Year 1  
1.001 or 1.011  
2.121, 2.131  
10.001 or 10.011  
17.031, 17.021  

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, 1.033, 1.333, 1.143, 1.153  
10.111A, 10.212  
2 General Studies electives  
Choose at least 1 unit from:  
17.012  
42.101  
43.101, 43.111, 43.121, 43.131  
44.101  
45.101, 45.201, 45.301  
73.012A, 73.012B  

Year 4  
1.604  
1 General Studies elective  

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

0162  
Physics with Science Studies†

Year 1  
1.001 or 1.011  
10.001 or 10.011  
Choose 4 Level I units from Table 1  

Year 2  
1.012*, 1.022*, 1.032  
10.2111, 10.2112  
1 General Studies elective**  
62.052, 62.062  
Choose 1 unit from:  
62.012, 62.022, 62.032  
Choose 1 unit from Table 1  

Year 3  
1.013*, 1.023*, 1.033*, 1.043  
½ General Studies elective**  
Choose 3 units from:  
Choose 1 unit from Table 1  

Year 4  
62.014  
1 General Studies elective**  

† Under exceptional circumstances students taking this program may be eligible for transfer into Year 4 of program 0101 or 0103 or 0105, the latter if the student reaches a satisfactory level in a number of mathematics units at Level II or Level III.  
* See 0101 footnote.  
** 26.561, 26.564, 26.817 may not be included in the program.
0201
Chemistry
Single major

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

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

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

Year 4
2.004
1 General Studies elective

0202
Chemistry

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

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

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

Year 4
2.004
1 General Studies elective

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.

0204
Chemistry/Chemical Engineering Science

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011
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
3.113
10.031
or
10.111A and 10.2111 and 10.2112
1 General Studies elective
Choose either
1. 5.030 or
2. 1 Level II unit from Table 1

Year 3
3.127
2 General Studies electives
Choose 4 Level III Chemistry units from Table 1
Choose two units from Table 1

Year 4
2.004
1 General Studies elective

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

0241
Chemistry/Biochemistry

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

Year 2
2.002A, 2.002B, 2.042C, 2.002D
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
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
2 General Studies electives
Choose either 41.102B or both 41.102C and 41.102D
Choose 4 Chemistry Level III units from Table 1

Year 4
1 General Studies elective
41.103 or 2.004

0242
Chemistry/Biotechnology

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011
or 10.021B & 10.021C
17.031, 17.021

Year 2
2.002A, 2.002B
41.101
42.101
44.101, 44.121
1 General Studies elective
Choose 1 unit from:
2.042C, 2.002D

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

Year 4
1 General Studies elective
2.004 or 42.103

0262
Chemistry with Science Studies

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011
2 Level I units from Table 1

Year 2
2.002A, 2.002B, 2.042C, 2.002D
62.052, 62.062
1 General Studies elective*
Choose 1 unit from:
Choose 1 unit from Table 1

Year 3
4.031, 4.032, 4.033
2 General Studies electives
Choose 4 Chemistry Level III units from Table 1 or 3 Level II units from Table 1 and 1 unit from Table 2 for program 0401

Year 4
1 General Studies elective
4.004

0401
Physical Metallurgy

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011
Choose 2 Level I units from Table 1

Year 2
2.002A
4.402, 4.502
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, 4.503
2 General Studies electives
Choose 4 Chemistry 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
1 General Studies elective

7302
Chemistry/Physiology

See 7302 Physiology/Chemistry
0402
Chemical Metallurgy

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011
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*
2 General Studies electives
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
1 General Studies elective

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

0601
Computer Science

Year 1
10.001 or 10.011
Choose 6 units from:
1. Table 1 &/or
2. The BA course* &/or
3. Table 2 for program 0601.

Year 2
6.620, 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
2 General Studies electives
Choose 3 units from:
1. Table 1 &/or
2. The BA course* &/or
3. Table 2 for program 0601*

* The program may include up to 8 units that are not in Table 1. Units 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. Each Upper Level unit so chosen counts as 1½ units. Upper level units from the School of Economics are restricted to all those in Economic History plus 15.062, 15.072, 15.263 and 15.273.

0602
Computer Science Honours

Year 1
10.001 or 10.011
Choose 6 units from:
1. Table 1 &/or
2. The BA course* &/or
3. Table 2 for program 0601
3970  Science and Mathematics Course: Programs

0603  Computer Systems Programming

Year 1
10.001 or 10.011
Choose 6 units from Table 1

Year 2
6.620, 6.631, 6.641
10.331
1 General Studies elective
Choose 4 units from Table 1

Year 3
6.613, 6.632, 6.642, 6.643
2 General Studies electives
Choose 1 unit from Table 1

0604  Scientific Computing

Year 1
10.001 or 10.011
Choose 6 units from Table 1

Year 2
6.620, 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, 10.2113 or 10.2213, 10.2114 or 10.2214, 10.331
1 General Studies elective

Year 3
6.642, 6.646
10.212A or 10.222A, 10.212L or 10.222L
2 General Studies electives
Choose 3 units from Table 1, including at least 2 Level III Computer Science units

0605  Commercial Computing

Year 1
10.001 or 10.011
Choose 6 units from Table 1

Year 2
6.620, 6.631, 6.641
10.2113 (or 10.2213), 10.2114 (or 10.2214), 10.331
1 General Studies elective
Choose 3 units from Table 1

Year 3
6.632, 6.633, 6.642, 6.646, 6.647, 6.649
2 General Studies electives
Choose 1 unit from Table 1

* The program may include up to 8 units that are not in Table 1. Units 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. Each Upper Level unit so chosen counts as 1/3 units. Upper Level units from the School of Economics are restricted to all those in Economic History plus 15.092, 15.072, 15.263 and 15.273.

0610  Computer Science/Mathematics

Year 1
10.001 or 10.011
Choose 6 units from Table 1

Year 2
6.620, 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 Table 1

Year 3
2 General Studies electives
Choose 4 (or 3) Level III Computer Science units
Choose 3 (or 4) Level III Mathematics units

0611  Computer Science/Statistics

Year 1
10.001 or 10.011
Choose 6 units from Table 1

Year 2
6.620, 6.631, 6.641
10.311A (or 10.321A), 10.311B (or 10.321B), 10.111A (or 10.121A), 10.1113 (or 10.1213), 10.2112 (or 10.2212)
1 General Studies elective

Year 3
Choose 4 (or 3) Level III Computer Science units
Choose 3 (or 4) Level III Statistics units
2 General Studies electives.
1001
Mathematics

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

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 from Table 1 (or choose 5 if only 3 Level II Mathematics units taken)
2 General Studies electives
Choose 3 (or 2) units from:
1. Table 1 &/or
2. The BA course*† &/or
3. Table 2† for program 1001

* The program may include up to 8 units from the BA course offered by the following Schools: Drama, Economics, English, French, German, History, Political Science, Russian, Sociology, Spanish and Latin American Studies. Each Upper Level unit so offered by these Schools shall count as 1½ units. Upper Level units 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
Choose 6 units from:
1. Table 1 &/or
2. The BA course*† &/or
3. Table 2† for program 1001

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

*† See 1001 footnotes.
† This unit may be taken in Year 2 or Year 3 of the program.

1003
Pure Mathematics Honours

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

Year 2
10.121A, 10.121C, 10.1213, 10.1214, 10.2211, 10.2212
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
10.122A, 10.122B, 10.122C, 10.122E
2 General Studies electives
Choose 3 units from:
1. Table 1 &/or
2. The BA course*† &/or
3. Table 2† for program 1001

Year 4
10.123
1 General Studies elective

† See 1001 footnotes.
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
Choose 6 units from:
1. Table 1 &/or
2. The BA course*† &/or
3. Table 2† for program 1001
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), 10.2114 (or 10.2214)
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
2 General Studies electives
Choose 3 units from:
1. Table 1 &/or
2. The BA course*† &/or
3. Table 2† for program 1001

*† See 1001 footnotes.
† 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.

1005
Applied Mathematics Honours

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

Year 2
10.121A, 10.1213, 10.1214, 10.2211, 10.2212, 10.2213, 10.2214
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
10.2212A, 10.222M
Choose 1 unit from:
10.222L, 10.222L, 10.222F
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
2 General Studies electives
Choose 2 Level III§ units from:
1. Table 1 &/or
2. The BA course*† &/or
3. Table 2† for program 1001

Year 4
10.223
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 1001 footnotes.

1006
Statistics

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

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)
2 General Studies electives
Choose 3 Level III Mathematics and/or Computer Science units from Table 1

† See 1001 footnotes.

1007
Statistics Honours

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

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
2 General Studies electives
Choose 3 Level III Mathematics and/or Computer Science units from Table 1

Year 4
10.323
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 1001 footnotes.
1008
Theoretical Mechanics

Year 1
10.001 or 10.011
1.001 or 1.011
Choose 4 units from:
1. Table 1 &/or
2. The BA course*† &/or
3. Table 2† for program 1001

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

10.412A (or 10.422A), 10.412B (or 10.422B), 10.412D (or 10.422D)
Choose 1 unit from:
10.212A (or 10.222A), 10.212L (or 10.222L), 10.212M (or 10.222M),
10.1125 and 10.1126,
or
10.122E
2 General Studies electives
Choose 3 units from:
1. Table 1 &/or
2. The BA course*† &/or
3. Table 2† for program 1001

*† See 1001 footnotes.

1009
Theoretical Mechanics Honours

Year 1
10.011, 1.001 or 1.011
Choose 4 units from:
1. Table 1 &/or
2. The BA course*† &/or
3. Table 2† for program 1001

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

*† See 1001 footnotes.

1010
Applied Mathematics and Theoretical Mechanics

Year 1
10.001 or 10.011, 1.001 or 1.011
Choose 4 units from:
1. Table 1 &/or
2. The BA course*† &/or
3. Table 2† for program 1001

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), 10.2114 (or 10.2214)
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
10.422A, 10.422B, 10.222C, 10.422D
Choose 2 units from:
10.412A, 10.222A (or 10.212A), 10.222M (or 10.212M), 10.2223 (or 10.2123), 10.2214 (or 10.2114), 10.122B, 10.122E (or 10.1125 and 10.1126)
2 General Studies electives
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 1001 footnotes.

1011
Mathematics and Liberal Studies

Year 1
10.001 or 10.011
Choose 6 units* from:
1. Table 1 &/or
2. The BA course§ &/or
3. Table 2 for program 1011

*† See 1001 footnotes.
### 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§ &/or
3. Table 2 for program 1011

#### 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§ &/or
3. Table 2 for program 1011

#### Year 3

Choose 4 Level III‡ Mathematics units 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§ &/or
3. Table 2 for program 1011

Note: The program shall consist of at least 25 units; there is no General Studies requirement.

* Except for mathematics units, not more than 2 Level I units may be taken in one subject.
† Units in Geography, History and Philosophy of Science, and Philosophy shall be those from the BA course.
‡ The program shall include at least 6 units from the BA course 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. Each Upper Level unit so offered by these schools shall count as 1 §/ units. Upper Level units from the School of Economics are restricted to all those in Economic History plus 15.062, 15.072, 15.263 and 15.273.
§ Not to include more than one Level II/III unit.

### 1013

**Pure Mathematics Honours and Liberal Studies**

#### Year 1

10.011

Choose 6 units* from:
1. Table 1† &/or
2. The BA course§ &/or
3. Table 2 for program 1011

#### Year 2

10.121A, 10.1213, 10.1214, 10.2211, 10.2212, 10.121C

Choose 4 units from:
1. Table 1† &/or
2. The BA course§ &/or
3. Table 2 for program 1011

#### Year 3

10.122A, 10.122B, 10.122C, 10.122E

Choose 5 units from:
1. Table 1† &/or
2. The BA course§ &/or
3. Table 2 for program 1011

#### Year 4

10.123

Notes: 1. The first three years of the program shall consist of at least 25 units; 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 1011 footnotes.

### 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§ &/or
3. Table 2 for program 1011

#### 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§ &/or
3. Table 2 for program 1011

#### Year 3

10.111†, 10.111‡, 10.1121, 10.1128

Choose 2 units from:
10.1122, 10.1123, 10.1124, 10.1125, 10.1126, 10.1127, 10.1129, 10.112C

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§ &/or
3. Table 2 for program 1011

Note: 1. The program shall consist of at least 25 units; 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 1011 footnotes.
† This unit may be taken in Year 2 or Year 3 of the program.
1015
Applied Mathematics Honours and Liberal Studies

Year 1
10.011
Choose 6 units* from:
1. Table 1† &/or
2. The BA course§ &/or
3. Table 2 for program 1011

Year 2
10.121A, 10.1213, 10.1214, 10.2211, 10.2212, 10.2213, 10.2214
Choose 4 units from:
1. Table 1† &/or
2. The BA course§ &/or
3. Table 2 for program 1011

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§ &/or
3. Table 2 for program 1011

Year 4
10.223
Notes:
1. The first three years of the program shall consist of at least 25 units; 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 1011 footnotes.

1016
Statistics and Liberal Studies

Year 1
10.011 or 10.001
Choose 6 units* from:
1. Table 1† &/or
2. The BA course§ &/or
3. Table 2 for program 1011

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§ &/or
3. Table 2 for program 1011

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)
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§ &/or
3. Table 2 for program 1011
Note: The program shall consist of at least 25 units; there is no General Studies requirement.
*†‡§ See 1011 footnotes.

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§ &/or
3. Table 2 for program 1011

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§ &/or
3. Table 2 for program 1011

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§ &/or
3. Table 2 for program 1011

Year 4
10.323
Notes:
1. The first three years of the program shall consist of at least 25 units; 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 1011 footnotes.

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§ &/or
3. Table 2 for program 1011

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§ &/or
3. Table 2 for program 1011

Note: The program shall consist of at least 25 units; there is no General Studies requirement.
*†‡§ See 1011 footnotes.
Year 3
10.412A (or 10.422A), 10.412B (or 10.422B), 10.412D (or 10.422D)
Choose 1 unit from:
10.212A (or 10.222A), 10.212L (or 10.222L), 10.212M (or 10.222M), (10.1125 and 10.1126) or 10.122E
Choose 5 units from:
1. Table 1 &/or
2. The BA course &/or
3. Table 2 for program 1011
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 10.122E
Choose 5 units from:
1. Table 1 &/or
2. The BA course &/or
3. Table 2 for program 1011

Notes: The three year program shall consist of at least 25 units; there is no General Studies requirement.

*§ See 1011 footnotes.

1019
Theoretical Mechanics Honours and Liberal Studies§

Year 1
10.011
10.001 or 10.111
Choose 4 units* from:
1. Table 1 &/or
2. The BA course &/or
3. Table 2 for program 1011
Year 2
10.121A (or 10.111A), 10.1213, 10.1214, 10.2211, 10.2212, 10.2214
Choose 3 units from:
1. Table 1 &/or
2. The BA course &/or
3. Table 2 for program 1011
Year 3
10.422A, 10.422B, 10.422C, 10.422D
Choose 2 units from:
10.412A, 10.412B (or 10.422A), 10.422M (or 10.212M), 10.4223 (or 10.2123), 10.4224 (or 10.2124), 10.1223, 10.1224 (or 10.1125 and 10.1126)
Choose 3 units from:
1. Table 1 &/or
2. The BA course &/or
3. Table 2 for program 1011
Year 4
10.423

Notes: 1. The first three years of the program shall consist of at least 25 units; 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 1011 footnotes.

1021
Applied Mathematics Honours (Economic Optimization)

Year 1
10.011
15.001, 15.011
Choose 4 units from:
1. Table 1 &/or
2. The BA course &/or
3. Table 2 for program 1021
Year 2
10.121A (or 10.111A), 10.1213, 10.1214, 10.2211, 10.2212, 10.2214, 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
1 General Studies elective
Year 4
10.233
15.024, 15.034

Notes: 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.
1022
Mathematics of Management

Year 1
10.001 or 10.011
14.501, 14.511
15.001, 15.011

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), 10.2114 (or 10.2214), 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
14.553

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), 10.311B (or 10.321B), 10.312A (or 10.322A)

Choose at least one unit from:
1 General Studies elective

Choose any remaining units from:
1. Table 1 &/or
2. Table 2 for program 1022

Year 4
10.233
14.852, 14.851

Choose at least one from:
15.062 and 15.072
1 General Studies elective

1068
Mathematics/Marine Science

Year 1
1.001 or 1.011
10.001 or 10.011

Choose 4 units from:
1. 17.031, 17.021
2. 27.801 or 27.811
3. 2.121, 2.111 or 2.131
4. 5.010, 5.030

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), 10.2114 (or 10.2214)

Choose at least 2 other units from the groups 1., 2., 3. or 4. chosen in year 1
1. 17.012
43.111
45.201
2. 2.5633
3. 2.002A, 2.002D
4. 3.114
1 General Studies elective

Year 3
1.913
10.411A or 10.421A, 10.412A, 10.412D or 10.422D

Choose at least 4 units from:
(10.1125 & 10.1126) or 10.122E
10.2113 (or 10.2213), 10.2114 (or 10.2214) or 10.222C
10.212A (or 10.222A), 10.212L (or 10.222L), 10.212M (or 10.222M), 10.331 or 10.311A or 10.321A, 10.422A
1. 43.172
45.112
3. 2.043A
4. 3.128
1 General Studies elective

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 and 15.611 (Table 2) may be substituted for a General Studies electlve 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.

* May be taken in third year.
1069
Mathematics/Marine Science Honours

Year 1
10.011
1.001 or 1.011
Choose 4 units from:
1. 17.031, 17.021
2. 25.011 or (27.801 & 27.811)
3. 2.121, 2.111 or 2.131
4. 5.010, 5.030

Year 2
10.121A or 10.111A, 10.1213, 10.2211, 10.2212,
10.421B, 10.421A
68.302
Choose 2 units from the groups 1., 2., 3. or 4.

Year 3
10.012
43.111
45.201
2. 25.633
3. 2.002A, 2.002D
4. 3.114
1 General Studies elective

Year 4
10.412A, 10.422A, 10.422D
1.913
10.412B, 10.422B,
10.422C
Choose 3 units from:
(10.1125 & 10.1126) or 10.122E, 10.222A, 10.222L,
10.222M, 10.311A or 10.321A
1. 43.172
45.112
2. 2.043A
3. 3.128†
2 General Studies electives

1270
Psychology/Anatomy**

Year 1*
2.121, 2.131
10.001 or 10.011
or
10.021B and 10.021C
12.007
17.031, 17.021

Year 2
12.052, 12.062, 12.072
1 General Studies elective
Choose 5 units from Table 1

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

Year 4
1 General Studies elective
12.014 or 12.044

Students may also take the four-year full-time course in Psychology which leads to the award of the degree of Bachelor of Science (3430).

The Psychology Course is described in detail later in this handbook (Faculty of Biological Sciences) and allows a specialization in Psychology.

* Students taking Honours in Psychology must have completed 8 level III units of Psychology including 12.153 from Group A and at least 3 units from Group B. Additionally, students intending to take the research alternative in Psychology IV are required to include 12.163 from Group A.

1201
Psychology

Year 1
10.001 or 10.011
or
10.021B and 10.021C
12.007
Choose 4 Level I units from Table 1

* In Year 1, students must enroll in program 8801. Enrollment 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.

*** Students taking Honours in Psychology must have completed at least 8 Psychology units at Level III. This requires one elective unit chosen from 70.011B or 70.012B or choose 1 unit from Table 1

Year 3
70.012A, 70.012C, 70.303
2 General Studies electives
Choose at least 4 Psychology Level III units† or
Choose*** 4 Psychology Level III units and 70.011B or 70.012B or 70.304

Year 4
1 General Studies elective
12.014 or 12.044 or 70.013***
2501
Geology
Double major

| Year 1 | 1.001 or 1.011  
| 2.121, 2.131  
| 10.001 or 10.011  
| or  
| 10.021B & 10.021C  
| 25.011  
| Year 2 | 25.012, 25.022  
| 1 General Studies elective  
| Choose 5 units from Table 1  
| Year 3 | 25.013, 25.023, 25.033  
| 2 General Studies electives  
| Year 4 | 25.404  
| 1 General Studies elective  

2701
Science Geography

Year 1
10.001 or 10.011  
or  
10.021B & 10.021C  
27.801, 27.802  
Choose 4 Level I units from Table 1  

Year 2
27.811, 27.812, 27.813  
1 General Studies elective  
Choose 4 units from Table 1 including not more than 2 Level I units  

Year 3
2 General Studies electives  
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  
1 General Studies elective  

2702
Science Geography with Botany

Year 1
10.001 or 10.011  
or  
10.021B & 10.021C  
17.031, 17.021  
27.801, 27.802  
Choose 2 units from:  
2.111, 2.121, 2.131  

Year 2
25.012, 25.022  
1 General Studies elective  
Choose 5 units from Table 1  

Year 3
25.013, 25.023  
2 General Studies electives  
Choose 4 units from Table 1  

Year 4
25.404  
1 General Studies elective  

2725
Science Geography/Geology

See 2725 Geology/Science Geography
### 2703

**Science Geography with Geology**

**Year 1**
- 2.121, 2.131
- 10.001 or 10.011
- or
- 10.021B & 10.021C
- 25.011
- 27.801, 27.802

**Year 2**
- 1.001
- 25.012, 25.022
- 27.811, 27.812, 27.813
- 1 General Studies elective

**Year 3**
- 25.013
- 27.183, 27.133
- 2 General Studies electives
- Choose 3 units from:
  - 25.1333
  - 27.153, 27.143, 27.862

**Year 4**
- 27.604
- 1 General Studies elective

### 2743

**Science Geography/Botany**

**Year 1**
- 10.001 or 10.011
- or
- 10.021B & 10.021C
- 17.031, 17.021
- 27.801, 27.802
- Choose 2 units from:
  - 2.111, 2.121, 2.131

**Year 2**
- 1.001
- 27.811, 27.812, 27.813
- 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
- 2 General Studies electives
- Choose 3 units from:
  - 27.183, 27.133
  - 43.102, 43.152

**Year 4**
- 1 General Studies elective
- 27.604 or 43.103

### 4101

**Biochemistry**

**Year 1**
- 1.001 or 1.011
- 2.121, 2.131
- 10.001 or 10.011
- or
- 10.021B & 10.021C
- 17.031, 17.021

**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 either 41.102B &/or both 41.102C and 41.102D
- 2 General Studies electives
- Choose 2 or 3 other units from Table 1

**Year 4**
- 41.103
- 1 General Studies elective

### 0241

**Biochemistry/Chemistry**

See 0241 Chemistry/Biochemistry
4142
Biochemistry/Biotechnology

Year 1
2.121, 2.131
10.001 or 10.011

or
10.021B & 10.021C
17.031, 17.021
Choose 2 Level I units from Table 1

Year 2
2.002B
41.101, 41.111
42.101
44.101, 44.121
1 General Studies elective

Year 3
41.102A
42.102A, 42.102B
2 General Studies electives
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
1 General Studies elective
41.103 or
42.103

4144
Biochemistry/Microbiology

Year 1
2.121, 2.131
10.001 or 10.011

or
10.021B & 10.021C
17.031, 17.021
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
2 General Studies electives
Choose either 41.102B or both 41.102C and 41.102D

Year 4
1 General Studies elective
41.103 or Choose 10 units including either:
44.563 or 44.573 or 44.583
and from:
44.513, 44.523, 44.533, 44.543, 44.553

4143
Biochemistry/Botany

Year 1
2.121, 2.131
10.001 or 10.011

or
10.021B & 10.021C
17.031, 17.021
Choose 2 Level I units from Table 1

Year 2
2.002B
41.101, 41.111
43.121
1 General Studies elective
Choose 2 units from:
43.101, 43.111, 43.131

Year 3
41.102A, 41.102C, 41.102D
43.122, 43.182
2 General Studies electives
Choose 2 units from:
43.102, 43.112, 43.132, 43.142, 43.172

Year 4
1 General Studies elective
41.103 or 43.103

4145
Biochemistry/Zoology

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011

or
10.021B & 10.021C
17.031, 17.021
Choose 1 unit from:
2.002A, 2.002D, 2.042C
17.012
43.101

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

Year 4
1 General Studies elective
41.103 or
45.103
4162
Biochemistry with Science Studies

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011
17.031, 17.021

Year 2
41.101, 41.111
2.002B
1 General Studies elective*
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
41.102C & 41.102D
½ General Studies elective*
Choose 3 units from:
Choose 1 unit from Table 1

Year 4
1 General Studies elective*
41.103 or 62.014

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

4170
Biochemistry/Anatomy†

Year 1*
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.021, 17.031
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 choose 1 or 2 units from:
2.002A, 2.002D, 2.042C, 70.011B

Year 3
41.102A, 41.102B
70.012B, 70.304
2 General Studies electives
Choose 2 units from:
70.011B, 70.012A, 70.012C, 70.303

Year 4
1 General Studies elective
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.
† Owing to timetabling difficulties this program may take longer than minimum time to complete.

4173
Biochemistry/Physiology

Year 1*
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.021
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
1 General Studies elective
41.103 or 73.103

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 4173 is based on academic performance in Year 1.

4201
Biotechnology (General)

Year 1
2.121, 2.131
10.001 or 10.011
or
10.021B and 10.021C
17.021, 17.031
Choose 2 Level I units from Table 1

Year 2
2.002B
41.101
42.101
44.101, 44.121
1 General Studies elective
Choose 1 unit from Table 1

Year 3
42.102A, 42.102B
2 General Studies electives
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
1 General Studies elective
0242
Biotechnology/Chemistry
See 0242 Chemistry/Biotechnology

4142
Biotechnology/Biochemistry
See 4142 Biochemistry/Biotechnology

4244
Biotechnology/Microbiology

Year 1
2.121, 2.131
10.001 or 10.011
or
10.021B and 10.021C
17.021, 17.031
Choose 2 Level I units from Table 1

Year 2
2.002B
41.101
42.101
44.101, 44.121
1 General Studies elective
Choose 1 unit from Table 1

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

Year 4
1 General Studies elective
Choose 10 units including either:
44.563 or 44.573 or 44.583
and from:
44.513, 44.523, 44.533, 44.543, 44.553

4302
Mycology — Plant Pathology

Year 1
2.121, 2.131
2 units of Level I Mathematics
17.031, 17.021
Choose 2 units of 1.001 or other Level I units in Table 1

Year 2
41.101
43.101, 43.111, 43.121, 43.131
44.101
45.201
1 General Studies elective

Year 3
43.132
2 General Studies electives
Choose at least 6 Level III units of Botany from Table 1

Year 4
43.103
1 General Studies elective

4301
Systematic Botany

Year 1
2.121, 2.131
2 units of Level I Mathematics
17.031, 17.021
Choose 2 Level I units from Table 1

4305
Botany — Applied Plant Physiology

Year 1
2.121, 2.131
2 units of Level I Physics
2 units of Level I Mathematics
17.031, 17.021
**Year 2**

- 41.101
- 43.101, 43.111, 43.121
- 44.101
- 45.101, 45.201

1 General Studies elective

**Year 3**

- 43.131, 43.102, 43.132, 43.142, 43.182
- 45.402, 45.412, 45.422

2 General Studies electives

**Year 4**

- 43.103

1 General Studies elective

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**4306**  
**Botany with Zoology**

**Year 1**

- 2.121, 2.131
- 2 units of Level I Mathematics
- 17.031, 17.021

Choose 2 Level I units from Table 1

**Year 2**

- 41.101
- 43.101, 43.111, 43.121
- 45.201, 45.301

1 General Studies elective

Choose 1 unit from:

- 17.012
- 43.131
- 45.101

**Year 3**

2 General Studies electives

Choose at least 7 units from Table 1 including at least 4 Level III Botany units

**Year 4**

- 43.103

1 General Studies elective

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**4307**  
**Plant Physiology**

**Year 1**

- 2 units of Level I Physics
- 2.121, 2.131
- 2 units of Level I Mathematics
- 17.031, 17.021

**Year 2**

- 41.101
- 43.111, 43.121

Choose 4 units from Table 1

1 General Studies elective

**Year 3**

- 43.122, 43.142, 43.182

Choose at least 4 units from Table 1, at least one of which must be at Level III

2 General Studies electives

**Year 4**

- 43.103

1 General Studies elective

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**4308**  
**Botany — Ecology**

**Year 1**

- 2 units of Level I Chemistry
- 10.001 or 10.011
- 17.031, 17.021

Choose 2 other Level I units from Table 1

**Year 2**

- 6.620
- 10.031
- 17.012
- 43.111
- 44.101
- 45.201, 45.301
- 10.331 or 10.301

1 General Studies elective

**Year 3**

- 10.032
- 43.142, 43.152, 43.172
- 45.112

Choose at least 2 units from Table 1

2 General Studies electives

**Year 4**

- 43.103

1 General Studies elective

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**2743**  
**Science Geography/Botany**

See 2743 Botany/Geography

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**4143**  
**Botany/Biochemistry**

See 4143 Biochemistry/Botany
4344
Botany/Microbiology

Year 1
2.121, 2.131
2 units of Level I Mathematics
17.031, 17.021
Choose 2 units of 1.001 or other Level I units in Table 1

Year 2
41.101
43.101, 43.121
44.101, 44.121
1 General Studies elective
Choose 1 unit from:
43.111, 43.131
Choose 1 unit from:
17.012
45.201

Year 3
43.132, 43.142, 43.172
44.102
2 General Studies electives
Choose at least 2 from:
43.102, 43.182
44.112, 44.122, 44.132
43.112 or 43.162

Year 4
1 General Studies elective
43.103 or Choose 10 units including either:
44.563 or 44.573 or 44.583
and from: 44.513, 44.523, 44.533, 44.543, 44.553

4401
Microbiology

Year 1
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.021
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
2 General Studies electives
Choose 1 unit from:
42.102
44.122

Year 4
1 General Studies elective
Choose 10 units including either:
44.563 or 44.573 or 44.583
and from: 44.513, 44.523, 44.533, 44.543, 44.553

4345
Plant Pathology/Entomology

Year 1
2.121, 2.131
2 units of Level I Mathematics
17.031, 17.021
Choose 2 units of 1.001 or other Level I units in Table 1

Year 2
41.101
43.101, 43.121, 43.131
44.101
45.101, 45.201
1 General Studies elective

Year 3
43.132
45.402, 45.412, 45.422
2 General Studies electives
Choose at least 3 Botany units from Table 1

Year 4
1 General Studies elective
43.103 or 45.103

4402
Microbiology (Immunology)

Year 1
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.021
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
70.304
2 General Studies electives

Year 4
1 General Studies elective
Choose 10 units including either:
44.563 or 44.573 or 44.583
and from: 44.513, 44.523, 44.533, 44.543, 44.553
4403 Microbiology (Ecology)

Year 1
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.021
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
2 General Studies electives

Year 4
1 General Studies elective
Choose 10 units including either:
44.563 or 44.573 or 44.583
and from:
44.513, 44.523, 44.533, 44.543, 44.553

4404 Microbiology (General)

Year 1
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.021
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
2 General Studies electives
Choose 4 units from Table 1

Year 4
1 General Studies elective
Choose 10 units including either:
44.563 or 44.573 or 44.583
and from:
44.513, 44.523, 44.533, 44.543, 44.553

See 4244 Biochemistry/Microbiology

4244 Microbiology/Biotechnology

See 4244 Biotechnology/Microbiology

4403 Microbiology/Botany

See 4344 Botany/Microbiology

4344 Microbiology/Botany

See 4344 Botany/Microbiology

4501 Zoology (General)

Year 1
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.021
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 of Biochemistry, Chemistry, Physics, Geography, Geology or Mathematics

Year 3
2 General Studies electives
Choose 8 units from Table 1 including at least 4 units from:
45.112, 45.121, 45.122, 45.132, 45.142, 45.202, 45.302

Year 4
45.103
1 General Studies elective
4502
Entomology

Year 1
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.021
Choose 2 Level I units from Table 1

Year 2
41.101
45.101, 45.402
1 General Studies elective
Choose 4 Level II units from: Zoology, Botany, Microbiology or Mathematics

Year 3
45.412, 45.422, 45.432
2 General Studies electives
Choose 5 Level III units from: Zoology, Botany, Microbiology, Mathematics or 79.201

Year 4
45.103
1 General Studies elective

4503
Zoology with Botany

Year 1
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.021
Choose 2 Level I units from Table 1

Year 2
41.101
43.111, 43.121
45.101, 45.201, 45.301
1 General Studies elective
Choose 1 unit from:
17.012
43.131, 43.101
45.402

Year 3
2 General Studies electives
Choose at least 7 units from Table 1 including at least 4 Level III Zoology units

Year 4
45.103
1 General Studies elective

4504
Zoology (Functional)

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.021

Year 2
41.101, 41.111
45.101, 45.301
73.111 or 73.121
1 General Studies elective
Choose either 45.201 or 45.402

Year 3
45.132, 45.142
2 General Studies electives
Choose either 45.202 or 45.412
Choose 5 units from Table 1

Year 4
45.103
1 General Studies elective

4505
Zoology (Environmental)

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.031, 17.021

Year 2
17.012
41.101
43.111
45.101, 45.201, 45.301
1 General Studies elective
Choose 1 Level II unit from Table 1

Year 3
43.142, 43.152, 43.172
45.112, 45.132, 45.302
2 General Studies electives
Choose at least 1 unit from:
45.122, 45.202

Year 4
45.103
1 General Studies elective
### 4506 Zoology (Zoogeography and Ecology)

**Year 1**
- 2.121, 2.131
- 10.001 or 10.011
  - or
- 10.021B & 10.021C
- 17.031, 17.021
- 25.011

**Year 2**
- 17.012
- 43.101, 43.111
- 45.101, 45.201, 45.301
  - 1 General Studies elective

Choose 2 Level II units from:
- Biochemistry, Chemistry, Geology or Mathematics in Table 1

**Year 3**
- 43.152
- 45.112, 45.121, 45.122, 45.302
- 25.022

- 2 General Studies electives

Choose at least 1 unit from Table 1

**Year 4**
- 45.103
  - 1 General Studies elective

### 4508 Zoology (Population Biology)

**Year 1**
- 2.121, 2.131
- 10.001 or 10.011
- 17.031, 17.021

Choose 2 units from Table 1

**Year 2**
- 17.012
- 43.101
- 45.301
  - 1 General Studies elective

Choose either 45.101 or 10.331
Choose either 45.201 or 45.402
Choose 3 units from:
- 1.922, 1.932
- 6.620
- 10.031
- 43.111
- 44.101

**Year 3**
- 45.121, 45.122, 45.302
- 79.201

- 2 General Studies electives

Choose 3 units from:
- 6.646, 6.643
- 10.032
- 43.102, 43.172
- 45.112, 45.202, 45.402
- 79.302

**Year 4**
- 45.103
  - 1 General Studies elective

### 4507 Zoology (Ecology)

**Year 1**
- 2.121, 2.131
- 10.001 or 10.011
- 17.031, 17.021

Choose 2 other Level I units

**Year 2**
- 10.031, 10.331
- 17.012
- 41.101
- 43.111
- 45.201, 45.301
  - 1 General Studies elective

**Year 3**
- 10.032
- 43.152
- 45.112, 45.121, 45.122, 45.132, 45.302
  - 2 General Studies electives

Choose at least 1 unit from Table 1

**Year 4**
- 45.103
  - 1 General Studies elective

### 4509 Zoology with Mathematics

**Year 1**
- 2.121, 2.131
- 10.001 or 10.011
- 17.031, 17.021

Choose 2 Level I units from Table 1

**Year 2**
- 10.111A, 10.111B & 10.111C, 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**
- 2 General Studies electives

Choose 4 Level III Zoology units
Choose 4 Level III Mathematics units

**Year 4**
- 45.103
  - 1 General Studies elective
4510  
**Entomology and Plant Physiology**

**Year 1**
- 2.121, 2.131
- 1.001 or 10.011
- or
- 10.021B & 10.021C
- 17.031, 17.021

Choose 2 Level I units from Table 1

**Year 2**
- 41.101
- 43.111, 43.121
- 45.101

1 General Studies elective

Choose 3 units from Botany, Zoology or Biochemistry.

**Year 4**
- 45.103

1 General Studies elective

4512  
**Entomology and Ecology**

**Year 1**
- 2.121, 2.131
- 1.001 or 10.011
- or
- 10.021B & 10.021C
- 17.031, 17.021

Choose 2 Level I units from Table 1

**Year 2**
- 41.101
- 43.101, 45.201, 45.402

1 General Studies elective

Choose 3 units from Botany, Zoology or Biochemistry.

**Year 3**
- 43.102, 43.112, 45.412, 45.422, 45.432

2 General Studies electives

Choose 2 units from:
- 43.112, 43.162

**Year 4**
- 45.103

1 General Studies elective

4513  
**Entomology and Plant Pathology**

**Year 1**
- 2.121, 2.131
- 1.001 or 10.011
- or
- 10.021B & 10.021C
- 17.031, 17.021

Choose 2 Level I units from Table 1

**Year 2**
- 41.101
- 43.101, 43.131, 43.132
- 44.101
- 45.402

1 General Studies elective

Choose 1 unit from:
- 45.201, 45.301

**Year 3**
- 45.101, 45.412, 45.422, 45.432

2 General Studies electives

Choose 4 Level III Zoology or Botany units

**Year 4**
- 45.103

1 General Studies elective

4145  
**Zoology/Biochemistry**

See 4145 Biochemistry/Zoology

4345  
**Entomology/Plant Pathology**

See 4345 Plant Pathology/Entomology
4570 Science and Mathematics Course: Programs

Zoology/Anatomy

Year 1
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.021, 17.031
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 Biochemistry, Chemistry, Geology, Mathematics or Physics

Year 3
70.012B
2 General Studies electives
Choose 4 units from:
70.011B, 70.012A, 70.012C, 70.303, 70.304
Choose 4 Level III Zoology units from Table 1

Year 4
1 General Studies elective
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.

7345 Zoology/Physiology

See 7345 Zoology/Physiology

6201 History and Philosophy of Science

Year 1
10.001 or 10.011
or
10.021B & 10.021C
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:

Year 4
62.014
1 General Studies elective

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 6201 is based on academic performance in Year 1.

1068 Mathematics/Marine Science

See 1068 Marine Science/Mathematics
1069
Mathematics/Marine Science Honours
See 1069 Marine Science Honours/Mathematics

6801

Year 1
10.001 or 10.011
or
10.021B and 10.021C
Choose 6 appropriate Level I units from Table 1
Enrolment in Year 2 of 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.

6831
Marine Science (Physical Oceanography)

Year 1
1.001 or 1.011
10.001 or 10.011
Choose 4 units from two of the groups 1., 2. and 3.
1. 17.021, 17.031
2. 25.011
or 27.801 and 27.811
3. 2.121, 2.131

Year 2
68.302
10.211 and 10.2112
1.012 or
10.411B, 10.1113 and 10.1114
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. At least 1 unit from 17.012
43.111
45.201
2. 25.633
3. 2.002A

Year 3
1.913
10.411A, 10.412A
2 General Studies electives
Choose 5 units from Table 1 which may include units from 2 of the groups 1., 2. and 3. chosen in Year 1:
1. 43.172
45.112
2. None
3. 2.043A

Year 4
68.304
1 General Studies elective

6832
Marine Science (Biological Oceanography)

Year 1
10.001 or 10.011
or
10.021B & 10.021C
17.021, 17.031
Choose 4 units from 2 of the groups 1., 2. and 3.
1. 1.001 or 1.011
2. 25.011
or 27.801 and 27.811
3. 2.121, 2.131

Year 2
68.302
43.111
44.101
45.201
1 General Studies elective
Choose at least 3 units from:
10.331 or 10.301
17.012
41.101
and including the units required from 2 of the groups 1., 2. and 3. chosen in Year 1:
1. 10.031
2. 25.633
3. 2.002A

Year 3
43.172
45.112
2 General Studies electives
Choose at least 6 units from Table 1 which may include units from 2 of the groups 1., 2. and 3. chosen in Year 1:
1. 10.032, 10.412A
2. 25.623
3. 2.043A

Year 4
68.304
1 General Studies elective

6833
Marine Science (Earth Science Oceanography)

Year 1
10.001 or 10.011
or
10.021B & 10.021C
25.011
Choose 4 units from 2 of the groups 1., 2. and 3.
1. 1.001 or 1.011
2. 17.021, 17.031
3. 2.121, 2.131
### Year 2
- 68.302
- 25.022
- 27.801, 27.811

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

### Year 3

2 General Studies electives
Choose 4 units from Table 1 which may include units from 2 of the groups 1., 2. and 3. chosen in Year 1:
1. 10.032, 10.412A
2. 43.172
3. 45.112
4. 2.043A

### Year 4
- 68.304

1 General Studies elective

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### 6834 Marine Science (Environmental Chemistry)

#### Year 1
- 2.121, 2.131 10.001 or 10.011

Choose 4 units from 2 of the groups 1., 2. and 3.
1. 1.001 or 1.011
2. 17.021, 17.031
3. 25.011 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
2. At least 1 unit from:
   - 17.012
   - 43.111
   - 45.201
3. 2.003A

#### Year 3
- 2.043A, 2.003D

2 General Studies electives
Choose 6 units which may include units required from 2 of the groups 1., 2. and 3. chosen in Year 1:
1. 10.032, 10.412A
2. 43.172
3. 45.112
4. None

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### 6840 Genetics

#### Year 1
- 2.121, 2.131
- 10.001 or 10.011
- 17.021, 17.031

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
- 45.201, 45.301, 45.401

Choose 1 unit from:
- 9.811
- 10.331
- 45.101

Choose 2 units from one of the groups 1., 2. or 3.
1. 2.002B
2. 6.620
3. 9.801
4. 17.012
5. 43.111, 43.131
6. 45.201 or 45.401
7. 45.301
8. 62.012 or 62.032

#### Year 3
- 70.304

2 General Studies electives
Choose 4 units from:
- 79.201, 79.302

Choose 4 units from:
- 6.646
- 41.102A
- 43.112
- 44.122
- 62.053
- 70.304
- 79.202

#### Year 4
- 68.404

1 General Studies elective
6851
Chemical Physics (Chemistry/Physics)

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011
Choose 2 Level I 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
2 General Studies electives
Choose at least 3 Level III units, offered by Schools of
Chemistry and Mathematics, from Table 1*

Year 4
1 General Studies elective
68.504
* The minimum of 7 Level III units may not include 1.013 or 2.003A.

6852
Chemical Physics (Chemistry/Mathematics)

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011
Choose 2 Level I units from Table 1

Year 2
1.012, 1.022
2.002B or 2.002D or 2.042C,
2.002A, 2.013A
10.111A or 10.121A,
10.1113 and 10.1114,
or 10.1213 and 10.1214,
or 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
2 General Studies electives
Choose at least 3 Level III units, offered by Schools of Physics,
Chemistry and Mathematics, from Table 1*

Year 4
1 General Studies elective
68.504
* The minimum of 7 Level III units may not include 1.013 or 2.003A.

7001
Anatomy

Year 1*
2.121, 2.131
10.001 or 10.011
or 10.021B or 10.021C
17.031, 17.021
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
70.012A, 70.012B, 70.012C, 70.303, 70.304
2 General Studies electives
Choose at least 3 units from Table 1

Year 4
70.013
1 General Studies elective

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program
7001 is based on academic performance in Year 1.
### 7002 Anatomy Single Major

**Year 1**
- 10.001 or 10.011
- or 10.021B & 10.021C
- 17.031, 17.021

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**
- 2 General Studies electives

Choose 8 units, including at least 4 units from:
- 70.011B, 70.012A, 70.012B, 70.012C, 70.303, 70.304
- and the remainder from Table 1.

**Year 4**
- 70.013
- 1 General Studies elective

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

+ Table 2 Anatomy units only.

### 7003 Anatomy (Kinesiology)

**Year 1**
- 2.121, 2.131
- 10.001 or 10.011
- or 10.021B & 10.021C
- 17.031, 17.021

Choose 2 units from 1 of the groups 1. and 2.
- 1. 1.001, 1.021
- 2. 12.001

**Year 2**
- 70.011A, 70.011B, 70.011C
- 73.121

1 General Studies elective

Choose 1 unit from Table 1.

Choose 2 units from the appropriate group:
- 1. 1.001, 1.021
- 2. 12.001

**Year 3**
- 70.012A, 70.012B, 70.012C, 70.303

2 General Studies electives

Choose at least 3 units from Level II or Level III Table 1, or

70.304

**Year 4**
- 70.013
- 1 General Studies elective

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 7003 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 Physiotherapy course.

### 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
- 10.001 or 10.011
- or 10.021B & 10.021C
- 17.031, 17.021

Choose 2 units from 1 of the groups 1. and 2.
- 1. 1.001, 1.021
- 2. 12.001

**Year 2**
- 41.101
- 41.111
- 70.011A, 70.011C
- 73.111

1 General Studies elective

Choose 1 unit from Table 1.

Choose 4 units from:
- 70.011B, 70.012A, 70.012B, 70.012C, 70.303, 70.304

**Year 3**
- 73.012

2 General Studies electives

Choose 4 units from:
- 70.011B, 70.012A, 70.012B, 70.012C, 70.303, 70.304

**Year 4**
- 1 General Studies elective
- 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.
7301
Physiology
Single Major

Year 1*
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.021, 17.031
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
2 General Studies electives
Choose 6 units from Table 1, including
41.102A and 41.102B or
2.003J and 2.033A or
73.012

Year 4
73.013
1 General Studies elective

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 7301 is based on academic performance in Year 1.

7303
Pharmacology

Year 1*
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.021, 17.031
Choose 2 Level I units from Table 1

Year 2
41.101, 41.111
73.111 or 73.121
1 General Studies elective
Choose 3 units from Table 1

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

Year 4
73.013
1 General Studies elective

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 7303 is based on academic performance in Year 1.

7302
Physiology/Chemistry

Year 1*
2.121, 2.131
1.001 or 1.011
10.001 or 10.011 or 10.021B & 10.021C
17.021, 17.031

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
2 General Studies electives

Year 4
73.013 or
2.004
1 General Studies elective

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 7302 is based on academic performance in Year 1.

7312
Physiology/Psychology

Year 1*
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.021, 17.031
12.001

Year 2
73.111
12.052, 12.062, 12.152
41.101, 41.111
1 General Studies elective

Year 3
73.012
2 General Studies electives
Choose 4 Level III units of Psychology†

Year 4
73.013 or
12.014
1 General Studies elective

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 7312 is based on academic performance in Year 1.

† Students taking honours in Psychology must have completed 8 Level III units of Psychology including 12.153 from Group A and at least 3 units from Group B. Additionally, students intending to take the research alternative in Psychology IV are required to include 12.163 from Group A.
7345
Physiology/Zoology

Year 1*
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.021, 17.031
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
2 General Studies electives
Choose 2 units from:
45.202, 45.121, 45.122

Year 4
73.013 or
45.103
1 General Studies elective

* In Year 1 students must enrol in program 6801. Enrolment in Year 2 of program 7345 is based on academic performance in Year 1.

4173
Physiology/Biochemistry

See 4173 Biochemistry/Physiology

7073
Physiology/Anatomy

See 7073 Anatomy/Physiology
Undergraduate Study
Board of Studies in Science and Mathematics

4770
Programs in the
Combined Science/Law
Degree Course

For details of the Combined Science/Law Degree Course refer to the Faculty of Law Handbook.
Below are approved programs for Years 1, 2 and 3 only. Years 4 and 5 are detailed in the Faculty of Law Handbook.
Note that where the levels of elective units are not specified they must be chosen so that the maximum number of Level I units, viz 8, is not exceeded.

**Physics**

**Year 1**
1.001 or 1.011
10.001 or 10.011
90.112, 90.711
Choose 2 Level I units from Table 1

**Year 2**
1.012, 1.022, 1.032
10.2111 & 10.2112
90.141, 90.161
Choose 2 Level I or Level II units from Table 1

**Year 3**
1.013, 1.023, 1.033, 1.043
90.213, 90.214, 90.301
Choose 2 units of appropriate levels from Table 1

**Computer Science**

**Year 1**
10.001 or 10.011
90.112, 90.711
Choose 4 Level I units from Table 1

**Year 2**
6.620, 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**
90.213, 90.214, 90.301
Choose 4 Level III Computing Science units from Table 1
Choose 2 other units of appropriate levels from Table 1

**Chemistry**

**Year 1**
1.001 or 1.011
2.121, 2.131
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**
90.213, 90.214, 90.301
Choose 2 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

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.111A or 10.121A, 10.1113 &amp; 10.1114</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>10.1213 &amp; 10.1214, 10.2111 &amp; 10.2112</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>10.2211 &amp; 10.2212, 90.141, 90.161</td>
</tr>
</tbody>
</table>

Choose 1 Level II unit from Table 1
Choose 2 Level I or Level II units from Table 1

### Year 3

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>90.213, 90.214, 90.301</td>
</tr>
</tbody>
</table>

Choose 4 Level III Mathematics units from Table 1
Choose 2 other units of appropriate levels from Table 1

### Economics

<table>
<thead>
<tr>
<th>Year 1</th>
</tr>
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<tbody>
<tr>
<td>10.001 or 10.011</td>
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</table>

or

<table>
<thead>
<tr>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.052, 12.062, 12.152</td>
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</table>

90.141, 90.161

Choose 1 Level II unit from Table 1
Choose 2 Level I or Level II units from Table 1

### Geology

<table>
<thead>
<tr>
<th>Year 1</th>
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<tbody>
<tr>
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</table>

10.001 or 10.011

or

<table>
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<tbody>
<tr>
<td>25.011</td>
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</table>

90.112, 90.711

Choose 1 Level II units from Table 1
Choose 2 Level I or Level II units from Table 1

### Geography

<table>
<thead>
<tr>
<th>Year 1</th>
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<tbody>
<tr>
<td>10.001 or 10.011</td>
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</table>

or

<table>
<thead>
<tr>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.611, 27.612, 27.813</td>
</tr>
</tbody>
</table>

90.141, 90.161

Choose 1 Level II unit from Table 1
Choose 2 Level I or Level II units from Table 1

### Psychology

<table>
<thead>
<tr>
<th>Year 1</th>
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<td>10.001 or 10.011</td>
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or

<table>
<thead>
<tr>
<th>Year 2</th>
</tr>
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<tbody>
<tr>
<td>12.001</td>
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90.112, 90.711

Choose 2 Level I units from Table 1

### Botany

<table>
<thead>
<tr>
<th>Year 1</th>
</tr>
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<tbody>
<tr>
<td>2.121, 2.131</td>
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10.001 or 10.011

or

<table>
<thead>
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<tbody>
<tr>
<td>43.101, 43.111</td>
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</tbody>
</table>

90.141, 90.161

Choose 2 Level II units from Table 1
Choose 2 Level I or Level II units from Table 1

### Biochemistry

<table>
<thead>
<tr>
<th>Year 1</th>
</tr>
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<tbody>
<tr>
<td>2.121, 2.131</td>
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</table>

10.001 or 10.011

or

<table>
<thead>
<tr>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.101</td>
</tr>
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</table>

90.141, 90.161

Choose 2 Level I units from Table 1

<table>
<thead>
<tr>
<th>Year 3</th>
</tr>
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<tbody>
<tr>
<td>41.102A, 41.102B</td>
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or

<table>
<thead>
<tr>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>41.102C &amp; 41.102D</td>
</tr>
</tbody>
</table>

90.213, 90.214, 90.301

Choose 2 other units of appropriate levels from Table 1

### Marine Science

<table>
<thead>
<tr>
<th>Year 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.001 or 1.011</td>
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</table>

25.012, 25.022

90.141, 90.161

Choose 1 Level II units from Table 1

<table>
<thead>
<tr>
<th>Year 3</th>
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<tbody>
<tr>
<td>25.013, 25.023</td>
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</tbody>
</table>

90.213, 90.214, 90.301

Choose 2 Level II or Level III units from Table 1

### Microbiology

<table>
<thead>
<tr>
<th>Year 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.021B &amp; 10.021C</td>
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</tbody>
</table>

27.801, 27.802

90.112, 90.711

Choose 2 Level I units from Table 1

<table>
<thead>
<tr>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.611, 27.612, 27.813</td>
</tr>
</tbody>
</table>

90.141, 90.161

Choose 1 Level II unit from Table 1
Choose 2 Level I or Level II units from Table 1

<table>
<thead>
<tr>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>27.103, 27.203, 27.413, 27.423 or 27.863, 27.872</td>
</tr>
</tbody>
</table>

Choose 2 units of appropriate levels from Table 1

### Zoology

<table>
<thead>
<tr>
<th>Year 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.001 or 10.011</td>
</tr>
</tbody>
</table>

or

<table>
<thead>
<tr>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.021B &amp; 10.021C</td>
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</tbody>
</table>

17.021, 17.031

90.112, 90.711

Choose 1 Level II unit from Table 1
Choose 2 Level I or Level II units from Table 1

<table>
<thead>
<tr>
<th>Year 3</th>
</tr>
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<tbody>
<tr>
<td>43.102A, 43.111</td>
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</tbody>
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90.141, 90.161

Choose 2 Level II units from Table 1
Choose 2 Level I or Level II units from Table 1

<table>
<thead>
<tr>
<th>Year 4</th>
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<tbody>
<tr>
<td>43.102C &amp; 43.102D</td>
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90.213, 90.214, 90.301

Choose 2 other units of appropriate levels from Table 1

<table>
<thead>
<tr>
<th>Year 5</th>
</tr>
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<tbody>
<tr>
<td>43.102E &amp; 43.102F</td>
</tr>
</tbody>
</table>

90.141, 90.161

Choose 2 Level II units from Table 1
Choose 2 Level I or Level II units from Table 1

<table>
<thead>
<tr>
<th>Year 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.102G &amp; 43.102H</td>
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</table>

90.213, 90.214, 90.301

Choose 2 other units of appropriate levels from Table 1

### Botanical Science

<table>
<thead>
<tr>
<th>Year 1</th>
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<tbody>
<tr>
<td>2.121, 2.131</td>
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</table>

10.001 or 10.011

or

<table>
<thead>
<tr>
<th>Year 2</th>
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<tbody>
<tr>
<td>25.011</td>
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</tbody>
</table>

90.112, 90.711

Choose 1 Level II units from Table 1
Choose 2 Level I or Level II units from Table 1

<table>
<thead>
<tr>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.013, 25.023</td>
</tr>
</tbody>
</table>

90.213, 90.214, 90.301

Choose 2 Level II or Level III units from Table 1

### Agriculture

<table>
<thead>
<tr>
<th>Year 1</th>
</tr>
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<tbody>
<tr>
<td>43.101, 43.111</td>
</tr>
</tbody>
</table>

90.141, 90.161

Choose 2 Level II units from Table 1
Choose 2 Level I or Level II units from Table 1

<table>
<thead>
<tr>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.102A, 43.102B</td>
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</tbody>
</table>

or

<table>
<thead>
<tr>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.102C &amp; 43.102D</td>
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</tbody>
</table>

90.213, 90.214, 90.301

Choose 2 other units of appropriate levels from Table 1

<table>
<thead>
<tr>
<th>Year 4</th>
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<tbody>
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<td>43.102E &amp; 43.102F</td>
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</tbody>
</table>

90.141, 90.161

Choose 2 Level II units from Table 1
Choose 2 Level I or Level II units from Table 1

<table>
<thead>
<tr>
<th>Year 5</th>
</tr>
</thead>
<tbody>
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<td>43.102G &amp; 43.102H</td>
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</table>

90.213, 90.214, 90.301

Choose 2 other units of appropriate levels from Table 1

<table>
<thead>
<tr>
<th>Year 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.102I &amp; 43.102J</td>
</tr>
</tbody>
</table>

90.141, 90.161

Choose 2 Level II units from Table 1
Choose 2 Level I or Level II units from Table 1
**Microbiology**

**Year 1**
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.021, 17.031
90.112, 90.711

**Year 2**
41.101
44.101
90.141, 90.161
Choose 1 Level II units from Table 1
Choose 2 Level I or Level II units from Table 1

**Year 3**
44.102, 44.112
90.213, 90.214, 90.301
Choose 2 units of appropriate levels from Table 1

---

**Zoology**

**Year 1**
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.021, 17.031
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**
90.213, 90.214, 90.301
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
10.001 or 10.011
or
10.021B & 10.021C
17.021, 17.031
90.112, 90.711

**Year 2**
17.012
43.111
44.101
45.101, 45.201, 45.301
90.141, 90.161

**Year 3**
90.213, 90.214, 90.301
Choose 4 units from:
43.152, 43.172
45.112, 45.122, 45.302
(Note that 45.302 requires 45.122 as co-requisite)
Choose 2 other units of appropriate levels from Table 1

---

**Biotechnology**

**Year 1**
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
17.021, 17.031
90.112, 90.711

**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
90.213, 90.214, 90.301
Choose group 1, or 2, or 3.
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

---

**Marine Science**

**Year 1**
10.001 or 10.011
or
10.021B & 10.021C
17.021, 17.031
90.112, 90.711

Choose one of the following:
1.001 or 1.011
2.121 & 2.131
25.011
27.801 & 27.811
Year 2
43.111
44.101
45.201
68.302
90.141, 90.161
Choose: 41.101 or two of the following:
2.002A
10.031,
10.331 or 10.301
17.012
25.633

Year 3
43.172
45.112
90.213, 90.214, 90.301
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, 10.41^ 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
17.021, 17.031
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
90.213, 90.214, 90.301
Choose 4 Level III Anatomy units from Table 1
Choose 2 other units of appropriate levels from Table 1
Undergraduate Study
Board of Studies in Science and Mathematics

3730
Programs in the Combined Science/Civil Engineering Degree Course

For details of the Combined Science/Civil Engineering Degree 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, 8.670
10.001***

Year 2
2.002A, 2.042C
4.402, 4.502
8.172, 8.181, 8.272
10.022
1 elective†

Year 3
4.403, 4.703
8.173, 8.174, 8.182, 8.351, 8.571
29.441, 29.491
2 electives†

Year 4
2.003A, 2.003C, 2.013C
4.503
8.273, 8.301, 8.572, 8.581, 8.582, 8.671, 8.672
1 elective†

Year 5
2 electives†
Choose 2 units from Table 1 in the Combined Sciences Handbook at Level II or higher
8.001, 8.191, 8.274, 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 1.981 Physics 1CE (i.e. 2 or 4 unit Science including Physics or Chemistry at HSC Exam percentile range 31-100, with results in the range 11-70 at a standard acceptable to the Professorial Board) 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.

† Of the six electives, four must be in General Studies and two must be technical electives. The technical electives are listed in the footnote in the Faculty of Engineering Handbook at the end of Course 3620. The choice of the technical electives 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, 8.670
10.001

Year 2
2.002A, 2.002D, 2.042C
8.172, 8.181, 8.272
10.022
27.801, 27.802

Year 3
2.043A
8.173, 8.174, 8.182, 8.351, 8.571
27.811, 27.813
29.441, 29.491
2 electives

Year 4
8.273, 8.301, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
27.103
2 electives
Choose 2 from:
27.203, 27.413, 27.423, 27.812, 27.813

Year 5
2 electives
Choose 2 units from Table 1 in the Combined Sciences Handbook at Level II or higher
8.001, 8.191, 8.274, 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.

Physics with Mathematics

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

Year 2
2.012
1.022, 1.032
8.172, 8.181, 8.272
10.1113 or 10.1213,
10.1114 or 10.1214,
10.2111 or 10.2211,
10.2112 or 10.2212
2 electives

Year 3
1.023, 1.043,
1.133 or 1.313 or 1.323
8.173, 8.174, 8.182, 8.351, 8.571
10.111A or 10.121A
29.441, 29.491
1 elective

Year 4
1.033,
1.133 or 1.313 or 1.323
8.273, 8.301, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
1 elective
Choose 2 Level II or Level III Mathematics units from Table 1 in the Combined Sciences Handbook

Year 5
2 electives
Choose 1 or 2 units from Table 1 in the Combined Sciences Handbook at Level II or higher
8.001, 8.191, 8.274, 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.

Mathematics

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

Year 2
8.172, 8.181, 8.272
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 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,
10.211D or 10.221D,
10.1111,
10.1112 or 10.121C

Year 3
8.173, 8.174, 8.182, 8.351, 8.571
29.441, 29.491
2 electives

Year 4
Choose 4 units of Mathematics from Table 1 in the Combined Sciences Handbook (at least one must be Level III)

Year 5
2 electives
Choose 1 or 2 units from Tables 1 or 3 in the Combined Sciences Handbook at Level II or higher
8.001, 8.191, 8.274, 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.
Sciences

Geology with some Mathematics

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

**Year 2**
8.172, 8.181, 8.272
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
25.011
3 electives†

**Year 3**
2.042C
8.173, 8.174, 8.182, 8.351, 8.571
25.012, 25.022
29.441, 29.491
1 elective†

**Year 4**
8.273, 8.301, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
25.013, 25.023

**Year 5**
2 electives†
Choose 1 or 2 units from Table 1 in the Combined Sciences Handbook at Level II or higher
8.001, 8.191, 8.274, 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.

Computing with some Mathematics

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

**Year 2**
6.620, 6.631, 6.641
8.172, 8.181, 8.272
10.111A or 10.121A,
10.1113 or 10.1213,
10.1114 or 10.1214
2 electives†

**Year 3**
6.642, 6.643
8.173, 8.174, 8.182, 8.351, 8.571
10.2111 or 10.2211,
10.2112 or 10.2212
29.441, 29.491
1 elective†
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
8.273, 8.301, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
1 elective†
Choose 1 Level II or Level III Mathematics unit from Table 1 in the Combined Sciences Handbook

**Year 5**
2 electives†
Choose 1 or 2 units from Table 1 in the Combined Sciences Handbook at Level II or higher
8.001, 8.191, 8.274, 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

3970/3640 Programs in the Combined Science/Electrical Engineering Degree Course

**Year 1**
1.961
2.121
5.030
6.010
10.001
Choose one unit of:
2.131
5.010

**Year 2**
1.972, 1.982, 1.992
10.111A, 10.111B, 10.114, 10.2111, 10.2112
1 General Studies elective
6.641 (or if Head of School approves 6.022)

**Year 3†**
Either
1. 6.613, 6.632, 6.633, 6.646
2 General Studies electives
Choose at least 3 Mathematics units at Levels II or III
or
Choose 6.641, 6.643 and at least one Mathematics unit
or
2. Choose at least 2 Level II or III Mathematics units from Table 1
2 General Studies electives
Choose at least 2 Level III units from Table 1
or
3. 1.013+, 1.023, 1.033
2 General Studies electives
Choose at least 4 Level II or III units from Table 1, at least one of which must be at Level III

Note: If 6.641 is passed in Year 2 extra options are possible in Computer Science
†Year 3 refers to Course 3970 units and Table 1 in this handbook. Elective 1, is a major in Computer Science. Elective 2, is a major in a branch of Mathematics. Elective 3, is a major in a branch of Physics. Each elective may be supported with substantial studies in a second school.
* Students electing to take a major in Theoretical Physics may substitute 10.222F.
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

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Level</th>
<th>Unit Value</th>
<th>When Offered</th>
<th>Hpw</th>
<th>Prerequisites</th>
<th>Co-requisites</th>
<th>Excluded</th>
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<td>Physics I</td>
<td>I</td>
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<td>F</td>
<td>6</td>
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<td>F</td>
<td>6</td>
<td>(for 1.001 only) 10.021B and 2 unit Science (incl. Physics and/or Chem.) (at HSC Exam percentile range 31-100)</td>
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<td>Introductory Physics I*</td>
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<td>2</td>
<td>F</td>
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<td>4 unit Science (incl. Physics and/or Chem.) (at HSC Exam percentile range 31-100)</td>
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# Results in the percentile range 1-10 at a standard acceptable to the Professorial Board.
## Results in the percentile range 11-30 at a standard acceptable to the Professorial Board.
### Results in the percentile range 31-70 at a standard acceptable to the Professorial Board.
* For students who enrol in and successfully complete the subjects 1.021 Introductory Physics I (2 units) and 1.001 Physics I (2 units) the total unit value of the combined subjects be counted as 3 units.
### Table 1: Board of Studies in Science and Mathematics (Units offered)

#### School of Physics (continued)

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<th>Level</th>
<th>Unit</th>
<th>Value</th>
<th>When Offered</th>
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#### Physics Level III

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#### Physics Level III Supplementary Units

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<td>2.002A, 10.2111 &amp; 10.2112</td>
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<tr>
<td>2.023B</td>
<td>Natural Product Chemistry</td>
<td>III</td>
<td>1</td>
<td>*</td>
<td>6</td>
<td>2.003B</td>
<td></td>
<td>2.013L, 2.043L, 2.053L</td>
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<tr>
<td>2.023L</td>
<td>Biological and Agricultural Chemistry</td>
<td>III</td>
<td>1</td>
<td>*</td>
<td>6</td>
<td>2.002B</td>
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<tr>
<td>2.033A</td>
<td>Physical Chemistry of Macromolecules</td>
<td>III</td>
<td>1</td>
<td>S2</td>
<td>6</td>
<td>2.003J or 2.002B, 1.012 or 2.002A</td>
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### School of Chemistry (continued)

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<th>Prerequisites</th>
<th>Co-requisites</th>
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<tr>
<td>2.043A</td>
<td>Environmental Chemistry</td>
<td>III</td>
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<td>2.002A, 2.002D</td>
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<tr>
<td>2.043L</td>
<td>Chemistry and Enzymology of Foods†</td>
<td>III</td>
<td>2</td>
<td>F</td>
<td>6</td>
<td>2.002B</td>
<td></td>
<td>2.013L, 2.023L, 2.053L</td>
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<tr>
<td>2.053A</td>
<td>Chemical Kinetics and Reaction Mechanisms</td>
<td>III</td>
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<td>F or SS</td>
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<tr>
<td>2.053L</td>
<td>Biological and Agricultural Chemistry†</td>
<td>III</td>
<td>2</td>
<td>F</td>
<td>6</td>
<td>2.002B</td>
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<td>2.013L, 2.023L, 2.043L</td>
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<td>2.063A</td>
<td>Advanced Molecular Spectroscopy</td>
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<td>6</td>
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* These courses may be offered either Full year, one session, or both.
† Only one of these double units may be chosen.

### School of Metallurgy

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<th>No.</th>
<th>Name</th>
<th>Level</th>
<th>Unit Value</th>
<th>When Offered</th>
<th>Hpw</th>
<th>Prerequisites</th>
<th>Co-requisites</th>
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<tbody>
<tr>
<td>4.302</td>
<td>Chemical and Extraction Metallurgy I</td>
<td>II</td>
<td>1</td>
<td>F</td>
<td>3</td>
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<td>2.002A*</td>
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<td>4.422</td>
<td>Metallurgical Phases — Structure and Equilibrium Part II</td>
<td>II</td>
<td>1</td>
<td>S2</td>
<td>6</td>
<td>4.412</td>
<td>4.303</td>
<td>4.402</td>
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<td>4.502</td>
<td>Mechanical Properties of Solids</td>
<td>II</td>
<td>1</td>
<td>S2</td>
<td>4</td>
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<td>4.402</td>
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<td>4.602</td>
<td>Metallurgical Engineering I</td>
<td>II</td>
<td>1</td>
<td>S1</td>
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<tr>
<td>4.303</td>
<td>Chemical and Extraction Metallurgy II</td>
<td>III</td>
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<td>F</td>
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<td>4.403</td>
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<td>9</td>
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<td>4.503</td>
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<td>4.502</td>
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<td>4.613</td>
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<td>4.602</td>
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<td>4.703</td>
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* This unit must be taken in Session 1.
### School of Mechanical and Industrial Engineering

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<th>Prerequisites</th>
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<tr>
<td>5.010</td>
<td>Engineering A</td>
<td>I</td>
<td>1</td>
<td>SS</td>
<td>6</td>
<td>Either 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)</td>
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<tr>
<td>5.030</td>
<td>Engineering C</td>
<td>I</td>
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<td>SS</td>
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<td>Students who wish to enroll in this subject can make up for the lack of the prerequisite by work taken in Physics in the first half of first year.</td>
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### School of Electrical Engineering

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<th>When Offered</th>
<th>Hpw</th>
<th>Prerequisites</th>
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<tr>
<td>6.010</td>
<td>Electrical Engineering I</td>
<td>I</td>
<td>1</td>
<td>SS</td>
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<td>1.001 or 1.011</td>
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<td>6.600</td>
<td>Introduction to Computers</td>
<td>II</td>
<td>1</td>
<td>S2</td>
<td>5</td>
<td>6.620, 6.601A, 6.602A, 6.601E, 6.021D</td>
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<td>6.620</td>
<td>Introduction to Computer Science</td>
<td>II</td>
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<td>S1</td>
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<td>6.631</td>
<td>Assembler Programming II and Digital Logic</td>
<td>II</td>
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<td>S2</td>
<td>5</td>
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<td>6.641</td>
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<td>II</td>
<td>1</td>
<td>S2</td>
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<td>6.620*</td>
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<td>6.613</td>
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<td>S1</td>
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<td>6.632</td>
<td>Operating Systems</td>
<td>III</td>
<td>1</td>
<td>S2</td>
<td>5</td>
<td>6.631, 6.641</td>
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<td>6.633</td>
<td>Data Management and Networks</td>
<td>III</td>
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<td>S1</td>
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<td>6.642</td>
<td>Programming II</td>
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<td>S1</td>
<td>5</td>
<td>6.641</td>
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<td>6.643</td>
<td>Compiling Techniques and Programming Languages</td>
<td>III</td>
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<td>S2</td>
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<td>6.646</td>
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<td>III</td>
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<td>6.647</td>
<td>Business Information Systems</td>
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<td>S2</td>
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<td>6.649</td>
<td>Computing Practice‡</td>
<td>III</td>
<td>1 **</td>
<td>**</td>
<td>5</td>
<td>6.641, 6.633 or 6.643 or 6.647</td>
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* Students completing 6.600 at a grade of credit or better, may be enabled to undertake this course with permission.
** Not offered in 1979.
‡ Can only be counted with at least 3 other Computer Science Level III units.
## Table 1: Board of Studies in Science and Mathematics (Units offered)

### School of Mathematics

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Level</th>
<th>Unit Value</th>
<th>When Offered</th>
<th>Hpw</th>
<th>Prerequisites††</th>
<th>Co-requisites††</th>
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<td><strong>Mathematics</strong></td>
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<tr>
<td>10.001</td>
<td>Mathematics I</td>
<td>I</td>
<td>2</td>
<td>F</td>
<td>6</td>
<td>2 unit Mathematics (at HSC Exam percentile range 71-100) or 3 unit Mathematics (at HSC Exam percentile range 11-100#) or 4 unit Mathematics (at HSC Exam percentile range 1-100#) or 10.011 10.021A 10.021B 10.021C</td>
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<td>10.011</td>
<td>Higher Mathematics I</td>
<td>I</td>
<td>2</td>
<td>F</td>
<td>6</td>
<td>3 unit Mathematics (at HSC Exam percentile range 71-100) or 4 unit Mathematics (at HSC Exam percentile range 1-100#) or 10.001 10.021A 10.021B 10.021C</td>
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<tr>
<td>10.021B</td>
<td>General Mathematics IB</td>
<td>I</td>
<td>1</td>
<td>S1 or S2</td>
<td>6</td>
<td>2 unit Mathematics (at HSC Exam percentile range 31-100#) 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**</td>
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<tr>
<td>10.041</td>
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<td>I</td>
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<td>Not offered 1979</td>
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<tr>
<td>10.032°</td>
<td>Mathematics</td>
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<td>F</td>
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<td>10.031</td>
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</table>

†† 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.

** 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.

# Results in the percentile range 1-10 at a standard acceptable to the Professorial Board.

## Pure Mathematics

### Pure Mathematics Level II

<table>
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<tr>
<th>No.</th>
<th>Name</th>
<th>Level</th>
<th>Unit Value</th>
<th>When Offered</th>
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<th>Prerequisites††</th>
<th>Co-requisites††</th>
<th>Excluded*</th>
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<tbody>
<tr>
<td>10.111A</td>
<td>Linear Algebra</td>
<td>II</td>
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<td>F</td>
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<td>10.121A</td>
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### School of Mathematics (continued)

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<th>Level</th>
<th>Unit</th>
<th>Value</th>
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<th>Co-requisites††</th>
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<tbody>
<tr>
<td>10.1111</td>
<td>Group Theory</td>
<td>II/III</td>
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<td>S1</td>
<td>2</td>
<td>10.001</td>
<td>10.111A, 10.1113, 10.121A, 10.1114, 10.2111, 10.2112§</td>
<td>10.121C</td>
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</table>

| 10.1112 Geometry | II/III | ½ | S2 | 2 | 10.001 |
| 10.1113§ Multivariable Calculus | II | ½ | S1 | 2½ | 10.001 |
| 10.1114§ Complex Analysis | II | ½ | S2 | 2½ | 10.001 |

| Higher Pure Mathematics Level II† | |
| 10.121A Algebra | II | 1 | F | 2½ | 10.011 |

| 10.121C Number Theory and Geometry | II/III | 1 | F | 2½ | 10.011 |

| 10.1213§ Multivariable Calculus | II | ½ | S1 | 2½ | 10.011 |
| 10.1214§ Complex Analysis | II | ½ | S2 | 2½ | 10.1213§ |

| Pure Mathematics Level III*** | |
| 10.112C Differential Geometry | III | 1 | F | 2 | 10.111A, 10.1113§ |

| 10.1121 Number Theory | III | ½ | S1 or S2 | 2 | 10.1111 |
| 10.1122 Algebra | III | ½ | S2 | 2 | 10.111A |
| 10.1123 Set Theory | III | ½ | S1 | 2 | 10.1111 |
| 10.1124 Combinatorial Topology | III | ½ | S1 or S2 | 2 | 10.1111 |
| 10.1125 Ordinary Differential Equations | III | ½ | S1 | 2 | 10.1111 |
| 10.1126 Partial Differential Equations | III | ½ | S2 | 2 | 10.1113, 10.1114§ |
| 10.1127 History of Mathematics | III | ½ | S2 | 2 | 10.1113, 10.1114, 10.2111, 10.2112§ |
| 10.1128 Foundations of Calculus | III | ½ | S1 | 2 | 10.1113, 10.1114§ |
| 10.1129 Real Analysis | III | ½ | S2 | 2 | 10.2112*, 10.1128 |

| Higher Pure Mathematics Level III** | |
| 10.122A Algebra | III | 1 | F | 2½ | 10.121A |
| 10.122B Integration and Functional Analysis | III | 1 | F | 2½ | 10.1213§ |
| 10.122C Topology and Differential Geometry | I | 1 | F | 2½ | 10.121A, 10.1213§ |
| 10.122E Complex Analysis and Differential Equations | III | 1 | F | 2½ | 10.1213, 10.1214§ |

†† 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.
† 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.
‡ 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.
§ 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, and are concurrently attempting the remaining unit.
** Students wishing to attempt Higher Level III units should consult with the School of Mathematics prior to enrolment. 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 and are concurrently attempting the remaining unit.
§ The half units 10.1113 (10.1213) and 10.1114 (10.1214) together replace the unit 10.111B (10.121B). The half units 10.2111 (10.2111) and 10.2112 (10.2212) together replace the unit 10.211A (10.221A). The half units 10.2113 (10.2213) and 10.2114 (10.2214) together replace the unit 10.211D (10.221D).
### School of Mathematics (continued)

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Level</th>
<th>Unit Value</th>
<th>When Offered</th>
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<th>Co-requisites‖</th>
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<td>Vector Calculus</td>
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<td>10.2211§</td>
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<td>S1</td>
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<td>10.001</td>
<td>10.2213</td>
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<td>Linear and Non-Linear Optimization Techniques</td>
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<td>10.2113§</td>
<td>10.2214</td>
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<tr>
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<td>Mathematical Methods for Differential Equations</td>
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<td>Introduction to Linear Programming</td>
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*For footnotes, see overleaf
### School of Mathematics (continued)

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<th>Co-requisites††</th>
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| 10.222M | Optimal Control Theory | III   | 1    | F     | 2            | 10.1213 or 10.1113 Dist,**  
10.1214 or 10.1114 Dist,**  
10.121A or 10.111A Dist,**  
or 10.2213 or 10.2113 Dist,** | 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 1½ further units chosen from the following: 10.121A or 10.111A Dist., 10.1214 or 10.1114 Dist, 10.2211 or 10.2111 Dist, 10.2212 or 10.2112 Dist, 10.2213 or 10.2113 Dist, 10.2214 or 10.2114 Dist.

§ The half units 10.1113 (10.1213) and 10.1114 (10.1214) together replace the unit 10.111B (10.121B). The half units 10.2111 (10.2211) and 10.2112 (10.2212) together replace the unit 10.211A (10.221A). The half units 10.2113 (10.2213) and 10.2114 (10.2214) together replace the unit 10.211D (10.221D).

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### Statistics

#### Theory of Statistics Level II

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10.311B Basic Inference | II/III | 1½ | S2 | 7 | 10.311A |

10.331 Statistics SS | II | 1 | F | 2 | 10.001 or 10.021C (C) |

#### Higher Theory of Statistics Level II

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10.321B Basic Inference | II/III | 1½ | S2 | 8 | 10.321A |

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<td>Probability and Stochastic Processes (Applications) and Sampling</td>
<td>III</td>
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<td>S1</td>
<td>4</td>
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10.312B Experimental Design (Theory) | III | 1 | S2 | 4 | 10.311B or 10.331 (Nor C) | 10.322B |

10.312C Experimental Design (Applications) and Sampling | III | 1 | S1 | 4 | 10.311B, 10.111A, 10.1113, 10.2112 § | 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, 10.2112 § | 10.322E |

†† 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.
### Higher Theory of Statistics Level III

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<td>10.322E</td>
<td>Statistical Inference</td>
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<td>S2</td>
<td>4½</td>
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†† 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 half units 10.1113 (10.1213) and 10.1114 (10.1214) together replace the unit 10.111B (10.121B). The half units 10.2111 (10.2211) and 10.2112 (10.2212) together replace the unit 10.211A (10.221A). The half units 10.2113 (10.2213) and 10.2114 (10.2214) together replace the unit 10.211D (10.221D).

‡ The evening course for 10.311A will, subject to a sufficient enrolment, run at 3½ hours per week throughout the year.

### Theoretical and Applied Mechanics

#### Theoretical Mechanics Level II

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<th>Unit</th>
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<th>Co-requisites††</th>
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<td>Hydrodynamics</td>
<td>II/III</td>
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<td>10.411B or 1.012, 10.421A 10.1114§</td>
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<td>Principles of Theoretical Mechanics</td>
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#### Higher Theoretical Mechanics Level II

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<td>10.2111, 10.2112, 10.1113, 10.1114§, 10.111A</td>
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* For footnotes, see overleaf.
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** 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 1.913.

§ The half units 10.1113 (10.1213) and 10.1114 (10.1214) together replace the unit 10.111B (10.121B). The half units 10.2111 (10.2211) and 10.2112 (10.2212) together replace the unit 10.211A (10.221A). The half units 10.2113 (10.2213) and 10.2114 (10.2214) together replace the unit 10.211D (10.221D).

* 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

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| **Psychology Level II** | | | | | | | | | |
| 12.052 | Basic Psychological Processes II | II | 1 | S1 | 4 | 12.001 |
| 12.062 | Complex Psychological Processes II | II | 1 | S2 | 4 | 12.001 |
| 12.072 | Human Relations II | II | 1 | S1 | 4 | 12.001 |
| 12.082 | Individual Differences II | II | 1 | S2 | 4 | 12.001 |
| 12.152 | Research Methods II | II | 1 | F | 3 | 12.001 |

| **Psychology Level III: Group A** | | | | | | | | | |
| 12.153 | Research Methods III A | III | 1 | S1 | 4 | 12.152 |
| 12.163 | Research Methods III B | III | 1 | S2 | 4 | 12.152, 12.153 |

| **Psychology Level III: Group B** | | | | | | | | | |
| 12.253 | Learning III A | III | 1 | S1 | 4 | 12.052, 12.152 |
| 12.373 | Psychological Assessment III A (Testing) | III | 1 | S1 | 4 | 12.152 & 1 other Psych Level II course |

12.042 (Psych BSc)
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* Reserved for approved potential Psychology IV candidates. Applicants must have completed 12.001, 12.052, 12.062 and 12.152 at an average level of Credit or better.

** May be co-requisite.

**Notes:**

1. A student may not enrol in more than three Level III Psychology units unless 12.152 Research Methods III has been passed.
2. A student may not enrol in more than five Level III Psychology units unless 12.153 Research Methods IIIA has been passed.
3. A major in Psychology is minimally satisfied by the completion of 12.001, two Psychology Level II units and four Psychology Level III units.
4. A double major in Psychology adds an additional four Psychology Level III units to the four required for a single major. The double major is available to students in the three year program and the four year program.
5. Not all Level III units will necessarily be offered in each year.
### Biological Sciences

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† Terminating pass acceptable.
* Students with percentile range 31-100 in HSC Examination 4 unit Science with Biology, or 2 unit Biology may apply to enrol in 43.101, 45.101, 45.201 or 45.301 in lieu of 17.021 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 17.021 Biology of Higher Organisms for all units.

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### School of Applied Geology

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* Three field tutorials, up to five days in all, are an essential part of the course. Attendance is compulsory.
** Field work of up to ten days in each case is a compulsory part of this course.
*** A geological survey camp of 10 days' duration is a compulsory part of this course.
**** Field tutorials constitute an essential part of this course.
† Compulsory field work to be arranged.

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### School of Geography

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### School of Geography (continued)

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* Field work of up to 2 days is a compulsory part of this course.
† 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 this course.

### School of Biochemistry†

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For footnotes, see overleaf
### School of Biochemistry (continued)

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* 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.

### School of Biological Technology

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

### School of Botany (continued)

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<td>43.111 or 43.121**</td>
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Note: A student shall not be admitted to Level III Botany units, without special permission of the Head of School, unless Chemistry 2.001 or 2.121 and 2.131 has been completed. Students taking four or more units in the School of Botany must take at least two Level II units in Biochemistry, or Chemistry, or Physics, or Mathematics.

* Students with percentile range 31-100 in HSC Examination 4 unit Science with Biology, or 2 unit Biology may apply to enrol in 43.101, 45.101, or 45.201 or 45.301 in lieu of 17.021 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 17.021 Biology of Higher Organisms for all units.

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

** This unit may be taken as a co-requisite in some circumstances

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

§ These units will alternate each year. 43.162 The Plant Kingdom is offered in 1979. 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†

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† All units available only during the daytime.

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

** For students not intending to major in Microbiology and lacking Level I Biology. This unit is not acceptable as a prerequisite for Level III Microbiology, except on the recommendation of the Head of School.
### School of Zoology†

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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 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 of Biochemistry, or Chemistry, or Physics, or Mathematics, or Geology.

† 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 8 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

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For footnotes, see overleaf
### School of Philosophy (continued)

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* 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

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<th>Unit Value</th>
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* Not offered in 1979
# Table 1: Board of Studies in Science and Mathematics (Units offered)

## School of Physiology and Pharmacology

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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.

## School of Community Medicine

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### Course 3970
**Units available in specific programs**

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<td>15.433</td>
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<td>Geology for Geographers‡</td>
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<td>2 F</td>
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<td>25.013, 27.413, 27.423</td>
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‡ Special courses for Geographers only.
### Table 2: Course 3970 — units available in specific programs

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<th>No.</th>
<th>Name</th>
<th>Level</th>
<th>Unit Value</th>
<th>When Offered</th>
<th>Hpw</th>
<th>Prerequisites</th>
<th>Co-requisites</th>
<th>Specific Programs</th>
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<tr>
<td>25.201</td>
<td>Mineralogy†</td>
<td>II</td>
<td>½</td>
<td>F</td>
<td>2</td>
<td></td>
<td>0401, 0402, 0403</td>
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<tr>
<td>25.623</td>
<td>Estuarine Geology§</td>
<td>III</td>
<td>1</td>
<td>S2</td>
<td>6</td>
<td>25.011, 25.022</td>
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<td>6833</td>
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<tr>
<td>25.633</td>
<td>Hydrological &amp; Coastal Surveying§</td>
<td>II/III</td>
<td>1</td>
<td>F</td>
<td>3</td>
<td></td>
<td>6831, 6832, 6833, 6834, 1068, 1069, Course 4770 (Marine Science)</td>
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<td>25.643</td>
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<td>Introductory Marine Science</td>
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<td>S1</td>
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<td>1068, 1069, 6831, 6832, 6833, 6834</td>
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<td>68.503</td>
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<td>70.011A</td>
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<td>S1</td>
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<td>S2</td>
<td>6</td>
<td>70.011A</td>
<td>4402**</td>
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<td>S1</td>
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<td>70.011A, 70.011C</td>
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<tr>
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<td>6</td>
<td>70.011A</td>
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* 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.
† Excluded by 25.012.
‡ Compulsory field work to be arranged.
§ Field tutorials are an essential part of this unit.
* Unit 1.913 is excluded by this unit.
** 70.011A and 70.304 only.
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.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Level</th>
<th>Unit Value</th>
<th>When Offered</th>
<th>Prerequisites in Years 1, 2 or 3</th>
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<td>10</td>
<td>F</td>
<td>Program 0101, 0103, 0105‡</td>
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<tr>
<td>1.504</td>
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<td>F</td>
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<td>F</td>
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<td>Program 1005, 1015</td>
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<td>F</td>
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<td>F</td>
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<td>Program 1007 or 1017</td>
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<td></td>
<td>Program 1009, 1019, 1069</td>
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<td>F</td>
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<td>F</td>
<td>Programs 1201 and 1270; 12.001, 12.052, 12.062, 12.152 and 8 Psychology Level III units, including 12.153 from Group A and at least 3 units from Group B, at an average level of Credit or better</td>
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Table 3: Level IV units offered by the Board of Studies in Science and Mathematics

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<th>Unit Value</th>
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<th>Prerequisites in Years 1, 2 or 3</th>
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<td>F</td>
<td>4 Level III units in a discipline, or disciplines, related to Biotechnology</td>
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<td>F</td>
<td>or a closely related discipline</td>
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<td>F</td>
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</table>

* Higher level units of Mathematics must be included in Years 1, 2 and 3 in order to comply with the prerequisites for admission to Level IV Mathematics. Since entry to fourth year is only with approval of the Head of School, students should discuss their third year 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 intending to enter 1.104 will find it advantageous to have included either 10.212A or 10.412D in Year 3.

‡ Students entering 1.104 or 1.304 from the 0105 program will normally have included 1.043 in Year 3.

§ Students entering 1.504 from the 0101 program should have demonstrated adequate mathematical ability in Year 3.
Faculty of Biological Sciences
Faculty of Biological Sciences

Introduction

The Schools of the Faculty of Biological Sciences contribute programs to the Science and Mathematics Course (3970) and the Faculty supervises the undergraduate course in Psychology (3430). The Schools of the Faculty also offer facilities for students to proceed to the award of a Graduate Diploma in Biochemical Engineering (5320); Graduate Diploma in Biotechnology (5340); to masters degrees in Biological Technology (8260) and in Psychology (8250); and 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 P. J. Cleary
                          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.
Faculty of Biological Sciences

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 selected from the School's advanced electives. Electives are offered in the major areas of general psychology and in a number of applied fields, e.g., clinical, community, and psychological measurement. In addition, each student must complete a research thesis or project.

Details of the qualifications required for admission to the Psychology Course leading to the award of BSc, the course requirements for Pass and Honours at graduation and rules governing admission with advanced standing are given below.

Rules governing the Psychology Course

1. Applicants for admission to the Course must be matriculated to this University; and also have either satisfied the entrance requirements for 10.01 Mathematics I or 10.02 B General Mathematics IB and 10.02 C General Mathematics IC or 17.031 Cell Biology and 17.021 Biology of Higher Organisms.

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:

12.001 Psychology I
12.042 Psychology IIA
12.052 Basic Psychological Processes II
12.062 Complex Psychological Processes II
12.152 Research Methods II

A total value of 8 Level III units of Psychology including 12.153 Research Methods IIIA from Group A and at least three subjects from Group B (see Table 1). Additionally, students intending to take the research alternative in Psychology Level IV Honours are required to include 12.163 Research Methods IIIB from Group A (see Table 1).

(In special cases, the Head of the School of Psychology or his representative may approve of the substitution of any other appropriate course or equivalent units).

and

12.004 Psychology IV.

(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
10.021 B General Mathematics IB and 10.021 C General Mathematics IC or

98
or

or

(They may include both above alternatives.)

(ii) that they shall include at least one of:

53.001 Introduction to Sociology or
15.001 Economics IA and 15.011 Economics IB or
54.904 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 two Arts Upper Level units 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 A or B 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 Cell Biology and 17.021 Biology of Higher Organisms 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 Introductory Biochemistry (equivalent to 2 units)
  41.111 Biochemical Control
  43.101 Genetics
  45.101 Biometry
  45.301 Vertebrate Zoology
  73.121 Physiology IB (equivalent to 2 units)
  79.401 Genetics of Behaviour

- 53.001 Introduction to Sociology followed by two units value of Sociology Upper Level units

45.301 Vertebrate Zoology
30.212 Introduction to Sociology
79.401 Genetics of Behaviour

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 or to the Calendar for a statement of subject prerequisites and/or co-requisites.

4. The award of the degree of BSc in Psychology at graduation shall be 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 exemptions from no more than five subjects or their unit equivalents completed by them. No more than two Psychology subjects may be included in the subjects exempted.

2. Undergraduates of the University of New South Wales who transfer from another course to the Psychology Course may be admitted to the Psychology Course with exemption in no more than seven Psychology Course subjects or their unit equivalents.

3. Graduates or undergraduates of other universities may be admitted to the Psychology Course with advanced standing.

4. Students admitted under Rule 3 who have satisfied the examiners in subjects of the same title or subject matter as those permissible in the Psychology Course may, subject to the approval of the appropriate Heads of School, be granted exemption in no more than five subjects, of which no more than two may be Psychology subjects.

Recommended Psychology Course patterns

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

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

2. Some supporting studies in mathematics and/or biology, of which a minimum of one course is compulsory;

3. Some supporting studies in the social sciences, of which a minimum of one course is compulsory; and

* 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.
4. The special needs, interests and academic or vocational background of individual students when the balance of the five supporting subjects (or their equivalents in units) is selected, in consultation with the Head of School or his representative.

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 patterns of supporting subjects in consultation with the Head of the School or his representative before completing enrolment. For such students, some examples of patterns, based on supporting subject variants, are suggested below:

**Compulsory Psychology**
Subjects for all Courses

<table>
<thead>
<tr>
<th>Year</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>12.001</td>
</tr>
<tr>
<td>Year 2</td>
<td>12.042, 12.052, 12.062 and 12.152</td>
</tr>
<tr>
<td>Year 3</td>
<td>8 Psychology Level III units including 12.153 from Group A and at least three subjects from Group B. Additionally, if intending to take the research alternative in Psychology IV 12.163 must also be taken from Group A.</td>
</tr>
<tr>
<td>Year 4</td>
<td>12.004</td>
</tr>
</tbody>
</table>

**Main Supporting Subject**

**Pure Mathematics**

2 Years

<table>
<thead>
<tr>
<th>Year</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>10.001</td>
</tr>
<tr>
<td>Social Science Subject I*</td>
<td></td>
</tr>
<tr>
<td>Any approved Level I Subject*</td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td>2 Mathematics Level II unit value chosen from 10.111A, 10.1113, 10.1114, 10.2111 and 10.2112</td>
</tr>
<tr>
<td>An approved Level I or II Subject*</td>
<td></td>
</tr>
</tbody>
</table>

3 Years

<table>
<thead>
<tr>
<th>Year</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>10.001</td>
</tr>
<tr>
<td>A Social Science Subject I*</td>
<td></td>
</tr>
<tr>
<td>Any approved Level I Subject*</td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td>10.111A, 10.1113, 10.1114, 10.2111 and 10.2112</td>
</tr>
<tr>
<td>Year 3</td>
<td>3 Pure Mathematics Level III unit value</td>
</tr>
</tbody>
</table>

**Statistics**

2 Years

<table>
<thead>
<tr>
<th>Year</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>10.001</td>
</tr>
<tr>
<td>A Social Science Subject I*</td>
<td></td>
</tr>
<tr>
<td>Any approved Level I Subject*</td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td>10.311A, 10.311B</td>
</tr>
<tr>
<td>An approved Level I or II Subject*</td>
<td></td>
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</tbody>
</table>

**Biochemistry**

2 Years

<table>
<thead>
<tr>
<th>Year</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>10.001</td>
</tr>
<tr>
<td>A Social Science Subject I*</td>
<td></td>
</tr>
<tr>
<td>Any approved Level I Subject*</td>
<td></td>
</tr>
<tr>
<td>Year 2</td>
<td>10.311A, 10.311B</td>
</tr>
<tr>
<td>An approved Level I or II Subject*</td>
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**Zoology**

2 Years

<table>
<thead>
<tr>
<th>Year</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>17.031 and 17.021</td>
</tr>
<tr>
<td>2.121 and 2.131</td>
<td></td>
</tr>
<tr>
<td>10.001</td>
<td></td>
</tr>
<tr>
<td>or</td>
<td>10.021B and 10.021C</td>
</tr>
<tr>
<td>Year 2</td>
<td>45.301</td>
</tr>
<tr>
<td>43.101 or 45.101</td>
<td></td>
</tr>
<tr>
<td>A Social Science Subject I*</td>
<td></td>
</tr>
</tbody>
</table>

**Genetics**

2 Years

<table>
<thead>
<tr>
<th>Year</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>17.031 and 17.021</td>
</tr>
<tr>
<td>2.121 and 2.131</td>
<td></td>
</tr>
<tr>
<td>10.001</td>
<td></td>
</tr>
<tr>
<td>or</td>
<td>10.021B and 10.021C</td>
</tr>
<tr>
<td>Year 2</td>
<td>43.101</td>
</tr>
<tr>
<td>79.401</td>
<td></td>
</tr>
<tr>
<td>A Social Science Subject I*</td>
<td></td>
</tr>
</tbody>
</table>

For footnotes, see overleaf.
Physiology
2 Years

Year 1
17.031 and 17.021
2.121 and 2.131
10.001
or
10.021B and 10.021C

Year 2
73.121
A Social Science Subject I

Social Science Subject
2 Years

Year 1
A Social Science Subject (A) I
10.001
or
10.021B and 10.021C
or
17.031 and 17.021
Any approved Level I Subject

Year 2
Social Science Subject (A) II
An approved Level I or II Subject

3 Years

Year 1
A Social Science Subject (A) I
10.001
or
10.021B and 10.021C
or
17.031 and 17.021
Any approved Level I Subject

Year 2
Social Science Subject (A) II

Year 3
Social Science Subject (A) III

* Or equivalent units.

Notes: 1. For details of Psychology units, and Level II and Level III Science and Mathematics units, including pre- and co-requisites, refer to the Science and Mathematics Course details set out earlier in this handbook.
2. For details of Social Science (Arts) units, 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 undergraduate courses in Pure and Applied Chemistry (3910) and Optometry (3950) and the graduate diploma courses Food and Drug Analysis (5510) and Current Science (5520). 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 courses should contact the representative of the appropriate School:
School of Chemistry .. Mr W. J. Dunstan
School of Optometry .. Professor J. Lederer

Students requiring information about the postgraduate studies which are available should seek advice from:
Graduate Diploma in Current Science .. Associate Professor D. H. Morton
Graduate Diploma in Food and Drug Analysis .. Dr G. Crank

or

In the case of Masters and Doctors degrees from:
School of Chemistry .. Professor G. W. K. Cavill
School of Mathematics .. Associate Professor I. H. Sloan
School of Physics.. Associate Professor J. F. McConnell
Faculty of Science

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 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 Chemistry I 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 year 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 3 other Chemistry units

The remaining 3 units may be chosen from any of the Science and Mathematics course topics, but no more than 2 may be at Level I.

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

<table>
<thead>
<tr>
<th>Level No.</th>
<th>Title</th>
<th>Prerequisites</th>
<th>Co-requisites</th>
<th>Excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>II/III</td>
<td>2.003E Nuclear and</td>
<td>2.121 and</td>
<td>2.131</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Radiation Chemistry</td>
<td>10.001 or</td>
<td>10.011 or</td>
<td>10.021B</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10.021C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>No.</td>
<td>Title</td>
<td>Prerequisites</td>
<td>Co-requisites</td>
</tr>
<tr>
<td>-------</td>
<td>-------</td>
<td>------------------------------------------</td>
<td>--------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>II/III</td>
<td>2.003H</td>
<td>Molecular Spectroscopy and Structure</td>
<td>1.2121 and 2.131</td>
<td></td>
</tr>
<tr>
<td>II/III</td>
<td>2.003J</td>
<td>Fundamentals of Biological Chemistry</td>
<td>1.2121 and 2.013L, 2.131</td>
<td>41.101</td>
</tr>
<tr>
<td>II/III</td>
<td>2.003K</td>
<td>Solid State Chemistry</td>
<td>1.2121 and 2.131, 10.001 or 10.011</td>
<td></td>
</tr>
<tr>
<td>II/III</td>
<td>2.013A</td>
<td>Introductory Quantum Chemistry</td>
<td>1.011 or 1.2121 and 2.131</td>
<td>10.021B or 10.021C</td>
</tr>
<tr>
<td>III</td>
<td>2.003A</td>
<td>Physical Chemistry</td>
<td>2.002A</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>2.003B</td>
<td>Organic Chemistry</td>
<td>2.002B</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>2.003C</td>
<td>Inorganic Chemistry</td>
<td>2.042C</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>2.003D</td>
<td>Instrumental Analysis</td>
<td>2.002D and 2.033L</td>
<td>2.002A</td>
</tr>
<tr>
<td>III</td>
<td>2.003L</td>
<td>Applied Organic Chemistry</td>
<td>2.002B</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>2.003M</td>
<td>Organometallic Chemistry</td>
<td>2.002B</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>2.013B</td>
<td>Synthetic Organic Chemistry</td>
<td>2.003B</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>2.013C</td>
<td>Advanced Inorganic Chemistry</td>
<td>2.042C 2.003C</td>
<td>2.003C</td>
</tr>
<tr>
<td>III</td>
<td>2.013D</td>
<td>Advanced Analytical Chemistry</td>
<td>2.002D 2.003D</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>2.013E</td>
<td>Advanced Nuclear and Radiation Chemistry</td>
<td>2.003E Not available in Course 3910</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>2.013L</td>
<td>Chemistry and Enzymology of Foods</td>
<td>2.002B 2.003J, 2.043L, 2.023L, 2.053L</td>
<td>2.002A</td>
</tr>
<tr>
<td>III</td>
<td>2.023A</td>
<td>Quantum Theory of Atoms and Molecules</td>
<td>2.002A 10.2111 and 10.2112</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>2.023B</td>
<td>Natural Product Chemistry</td>
<td>2.003B</td>
<td></td>
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<tr>
<td>III</td>
<td>2.023L</td>
<td>Biological and Agricultural Chemistry</td>
<td>2.002B 2.053L, 2.013L, 2.043L</td>
<td></td>
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<tr>
<td>III</td>
<td>2.033A</td>
<td>Physical Chemistry of Macromolecules</td>
<td>2.003J or 2.002B 1.012 or 2.002A</td>
<td>2.002A</td>
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</tbody>
</table>

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

Year 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.001</td>
<td>Higher Physics I or I</td>
<td>6</td>
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<tr>
<td>1.002</td>
<td>Advanced Physics</td>
<td></td>
</tr>
<tr>
<td>2.121</td>
<td>Chemistry IA and IB</td>
<td>6</td>
</tr>
<tr>
<td>2.131</td>
<td>Chemistry IB</td>
<td></td>
</tr>
<tr>
<td>10.001</td>
<td>Higher Mathematics I or I</td>
<td>6</td>
</tr>
<tr>
<td>10.011</td>
<td>Advanced Mathematics I or I</td>
<td></td>
</tr>
<tr>
<td>10.021B</td>
<td>General Mathematics IB &amp; IC</td>
<td>6</td>
</tr>
<tr>
<td>10.021C</td>
<td>General Mathematics IC</td>
<td></td>
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Plus one of

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.010</td>
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<td>6</td>
</tr>
<tr>
<td>5.020</td>
<td>Engineering B or C</td>
<td></td>
</tr>
<tr>
<td>17.021</td>
<td>Biology of Higher Organisms and</td>
<td></td>
</tr>
<tr>
<td>17.031</td>
<td>Cell Biology</td>
<td>6</td>
</tr>
<tr>
<td>25.011</td>
<td>Geology I*</td>
<td>6</td>
</tr>
<tr>
<td>25.151</td>
<td>Geoscience IA or</td>
<td>6</td>
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<tr>
<td>27.801</td>
<td>Introduction to Physical Geography and</td>
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</tr>
<tr>
<td>27.802</td>
<td>Introduction to Human Geography</td>
<td>6</td>
</tr>
</tbody>
</table>

* Three field excursions, up to five days in all, are an essential part of the course.
**Year 2**

- 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

**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.

**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

**Year 4 Honours**

- 2.004 Chemistry Honours 24
  - One General Studies Elective 1½

---

* To be chosen from units in the Science and Mathematics course in accordance with Science course requirements. The following are recommended.

**Chemistry**

Any non-compulsory units for which prerequisites are held.

**Mathematics**

- 10.031 Mathematics 2
- 10.331 Statistics SS 2
- 10.111A
- 10.1113 and 10.1114
- 10.2111 and 10.2112

**Physics**

Choose 2 of
- 1.922 Electronics 3
- 1.932 Introduction to Solids
- 1.942 Introduction to Physics of Measurement

**Biological Sciences**

- 17.021 Biology of Higher Organisms and Cell Biology 6
- 41.101 Introductory Biochemistry 6
- 44.101 Introductory Microbiology 6

**Geology**

- 25.011 Geology I 6
- 25.012 Geology IA 6
- 25.022 Geology IB 3

**Year 4 Honours**

- 2.004 Chemistry Honours 24
  - One General Studies Elective 1½

---

* Field work (to be arranged by the School of Geography) is a compulsory component of each unit.
3950
Optometry—Full-time course
Bachelor of Optometry
BOptom

Year 1
1.011 Higher Physics I
1.001 Physics I
1.021 Introductory Physics I*
2.121 Chemistry IA
2.131 Chemistry IB
10.001 Mathematics I or
10.011 Higher Mathematics I or
10.021B General Mathematics IB and
10.021C General Mathematics IC
17.031 Cell Biology and
17.021 Biology of Higher Organisms

Hours per week
6
6
6
24

* Preferred course.

Optometry students are normally advised to take 1.021 Intro-
ductive Physics I, including the option Advanced Electronics,
and 10.021B and 10.021C Mathematics. Since some students
may wish to qualify for the double degree of BSc, BOptom
with Level II and/or Level III units in Physics and/or Mathemat-
ics, these students should take 1.011 or 1.001 Physics and
10.001 or 10.011 Mathematics.

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 Math-
ematics but cannot proceed to Year 2 of the Optometry Course
until all the requirements of 10.021A Mathematics have been satisfied.

Year 2
31.811 Optometry I
31.821 Special Anatomy and
Physiology
73.011A Principles of Physiology
General Studies Elective

Hpw
8
6
6
21½

Year 3
12.001 Psychology I
31.812 Optometry II
31.831 Diseases of the Eye
Two General Studies Electives

Hpw
5
15
3
26

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 bi-
ology 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.
Conditions for the award of the double degree 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 double degree 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, i.e., 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 for 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 1979 or enrolling in graduate courses should obtain a copy of the free booklet Enrolment Procedures 1979 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 Biological Technology 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 a Master of Psychology course with specializations in Experimental Clinical and Psychodynamic Clinical Psychology.

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 Biological Technology Honours
- 43.103 Botany Honours
- 44.103 Microbiology Honours
- 12.014 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 may be admitted as external qualifying students to a program equivalent to a standard Honours year. The following are the alternative qualifying subjects:

- 41.999G Biochemistry
- 42.999G Biological Technology
- 43.999G Botany
5340 Biotechnology Graduate Diploma Course

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.

### Obligatory Subjects

<table>
<thead>
<tr>
<th>Session 1</th>
<th>Hours per week</th>
<th>Session 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>S2</td>
<td>S1</td>
</tr>
<tr>
<td>3.481G Mass Heat and Momentum Transfer</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>3.482G Thermodynamics</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>42.211G Principles of Biology</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>42.212G Principles of Biochemistry</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>44.111G Microbiology</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**Obligatory Subjects Full Year**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Session 1 Hours</th>
<th>Session 2 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.215G</td>
<td>Practical Biotechnology</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>42.102A</td>
<td>Biotechnology A</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>42.101</td>
<td>Introduction to Biotechnology</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>42.104G</td>
<td>Graduate Seminars</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>42.111G</td>
<td>Reading List in Biological Technology (Microbiology)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>42.112G</td>
<td>Reading List in Biological Technology (Biochemistry)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>42.305G</td>
<td>Case Studies</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>44.111</td>
<td>Microbiology</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**Elective Subjects**

<table>
<thead>
<tr>
<th>Session 1</th>
<th>Hours per week S1</th>
<th>S2</th>
</tr>
</thead>
<tbody>
<tr>
<td>44.101</td>
<td>Introductory Microbiology</td>
<td>6</td>
</tr>
<tr>
<td>42.212G</td>
<td>Principles of Biochemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

**Session 2**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours per week S1</th>
<th>S2</th>
</tr>
</thead>
<tbody>
<tr>
<td>42.102B</td>
<td>Biotechnology B</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>44.121</td>
<td>Microbial Growth</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>42.104G</td>
<td>Graduate Seminars</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>42.111G</td>
<td>Reading List in Biological Technology (Microbiology)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>42.112G</td>
<td>Reading List in Biological Technology (Biochemistry)</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>42.305G</td>
<td>Case Studies</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>44.111</td>
<td>Microbiology</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**Hours per week**

<table>
<thead>
<tr>
<th></th>
<th>S1</th>
<th>S2</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>
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 who have reached honours level in biological technology or who have acquired equivalent qualifications by completion of the qualifying courses offered in the School. 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) MSc(Biotech)

<table>
<thead>
<tr>
<th>Hours per week</th>
<th>S1</th>
<th>S2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42.306G Project</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td><strong>Session 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42.303G Microbial Process Control</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>42.304G Biodeterioration and Biodegradation</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td><strong>Session 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42.301G Microorganism Productivity</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>42.302G Enzyme Technology</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>42.305G Case Studies</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>19</td>
</tr>
</tbody>
</table>

Psychology

Head of School
Professor S. H. Lovibond
Administrative Officer
Mr T. J. Clulow

The School of Psychology offers graduate training at the masters level (Master of Psychology).

Master of Psychology
The course is designed to provide professional training at an advanced level for honours graduates.

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 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.

The minimum period of registration before the award of the degree is three 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 200 hours in the second year.

Assessment of student performance is by sessional examinations, class tests, seminar papers and a project report.

It should be noted that the course requirements involve a full 18 months program rather than three academic sessions with vacation breaks.

8250 Master of Psychology MPsychol
Full-time
Year 1

<table>
<thead>
<tr>
<th>Hours per week</th>
<th>S1</th>
<th>S2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.220G The Theoretical Bases of Clinical and Community Psychology</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>12.221G Experimental Analysis and Modification of Problem Behaviour</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>
Facility of Science

Facilities are available in each of the Schools for research leading to the higher degrees of Master of Science and Doctor of Philosophy.

The following formal courses leading to graduate awards are also offered:

- **Faculty of Science**
  - Graduate Diploma in Current Science
- **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.

All Schools of the Faculty of Science and The Division of Postgraduate Extension Studies

The Faculty of Science offers to graduates and professional workers in science and science-based disciplines a course designed to enable them to renew their acquaintance with basic aspects of their subject and to learn of the latest developments in that area or in some other area or areas of science that have become of importance to their current work.

5520 Graduate Diploma Course in Current Science GradDip

In order to qualify for the award, a candidate must pursue a program of studies selected from the current list of the subjects offered in the Graduate Diploma course, and approved by the Higher Degree Committee of the Faculty on the recommendation of the Coordinator of Studies. A candidate must complete the approved course, comprising at least 12 units of study, within 2 years. The unit values of the subjects offered are stated in the table below. A unit comprises approximately 28 hours of tuition in the case of subjects not involving laboratory or similar exercises, or approximately 42 hours if laboratory, computing or other work is involved.

* The School of Mathematics also offers the pass degree of MA (see the Faculty of Arts Handbook).
An approved course normally extends over two years, but in special cases approval may be given to a course that would satisfy requirements for the award of the Graduate Diploma in one year of full-time study.

The subjects offered are in general designed so that any practising scientist (or engineer, etc.) can pursue any of them effectively and profitably. Dependent upon an adequate number of candidates in each, the subjects offered are:

<table>
<thead>
<tr>
<th>Unit value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.119G</td>
<td>Basic Solid-State Physics</td>
</tr>
<tr>
<td>1.129G</td>
<td>Solid-State Device Physics</td>
</tr>
<tr>
<td>1.139G</td>
<td>Biophysics</td>
</tr>
<tr>
<td>1.149G</td>
<td>Physical and Applied Acoustics</td>
</tr>
<tr>
<td>1.319G</td>
<td>Measurement and Data-Handling</td>
</tr>
<tr>
<td>1.329G</td>
<td>The Physics of Strong Materials</td>
</tr>
<tr>
<td>1.519G</td>
<td>Laser Physics and Applications</td>
</tr>
<tr>
<td>2.150G</td>
<td>Chemistry of Natural and Synthetic High Polymers</td>
</tr>
<tr>
<td>2.251G</td>
<td>Toxicology, Occupational and Public Health</td>
</tr>
<tr>
<td>2.153G</td>
<td>Recent Advances in Chemistry</td>
</tr>
<tr>
<td>2.154G</td>
<td>Advanced Analytical Chemistry</td>
</tr>
<tr>
<td>2.155G</td>
<td>and Chemical Instrumentation,</td>
</tr>
<tr>
<td>2.156G</td>
<td>Units A, B &amp; C</td>
</tr>
<tr>
<td>4.261G</td>
<td>Modern Microscopy of Materials</td>
</tr>
<tr>
<td>10.073G</td>
<td>Advanced Mathematical Analysis of Data</td>
</tr>
<tr>
<td>10.372G</td>
<td>Statistics and Experimental Design</td>
</tr>
<tr>
<td>10.401G</td>
<td>Seiches and Tides</td>
</tr>
<tr>
<td>42.211G</td>
<td>Principles of Biology</td>
</tr>
<tr>
<td>42.212G</td>
<td>Principles of Biochemistry</td>
</tr>
<tr>
<td>42.401G</td>
<td>Chemical Transformations in the Environment</td>
</tr>
<tr>
<td>44.111</td>
<td>Microbiology</td>
</tr>
<tr>
<td>97.004G</td>
<td>Psychology of Communication</td>
</tr>
<tr>
<td>97.010G</td>
<td>Basic FORTRAN IV Programming I &amp; II</td>
</tr>
</tbody>
</table>

To maintain the current nature of the Graduate Diploma course the Faculty from time to time may at short notice incorporate new or modified units offered by this or other Faculties and may delete existing units.

### Chemistry

**Head of School**
Professor S. E. Livingstone

**Executive Assistant to Head of School**
Mr W. J. Dunstan

**Senior Administrative Officer**
Mr R. Sutton

8770
**Master of Chemistry**
MChem

The Master of Chemistry Course should be of interest to chemistry graduates who are involved in the practice or teaching of analytical chemistry. The program consists of a number of lecture courses (examinable). In addition, each student undertakes a critical literature survey or review or a short research project. Laboratory instruction (experience) and visits to laboratories are also included in the course. The course is full-time. In future the course may also be extended to part-time students. Details of the program are:

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 (Experience) 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 or Critical Literature Survey**
   A short research project (with report) of approximately 4 months duration full-time (400 hours laboratory work) may be selected in relation to the combined interests of the student and his supervisor. If the student requires more varied experience, a series of shorter projects may be carried out in two or three areas of analytical chemistry. Alternatively, each student may undertake a survey of the literature in a field of interest to himself and present a critical review in the form of a report.

**Assessment**
Each lecture course is examined separately. Each report is assessed by two examiners. The students may also be required to undergo an oral examination.

5510
**Food and Drug Analysis Graduate Diploma Course**
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 practise 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**

<table>
<thead>
<tr>
<th>Unit Code</th>
<th>Course Title</th>
<th>Hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.231G</td>
<td>Foods and Drugs I</td>
<td>4*</td>
</tr>
<tr>
<td>2.371G</td>
<td>Treatment of Analytical Data</td>
<td>1†</td>
</tr>
<tr>
<td>2.281G</td>
<td>Instrumental Techniques in Food and Drug Analysis</td>
<td>4</td>
</tr>
</tbody>
</table>

### Year 2

<table>
<thead>
<tr>
<th>Unit Code</th>
<th>Course Title</th>
<th>Hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.242G</td>
<td>Food and Drugs II</td>
<td>4</td>
</tr>
<tr>
<td>2.251G</td>
<td>Toxicology, Occupational and Public Health</td>
<td>3</td>
</tr>
<tr>
<td>44.111</td>
<td>Microbiology</td>
<td>3</td>
</tr>
</tbody>
</table>

**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**
**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 4 core units are common to the programs of all candidates:

1. **62.701G** Philosophy and Methodology of Science
2. **62.709G** The Scientific Community
3. **62.713G** Interdisciplinary Seminars and Project*

* 2 units.

Candidates may select 4 further units from the following groupings:

1. **62.703G** Technology and Society in the Twentieth Century
   **62.712G** Science, War and the State
2. **62.710G** Science, Philosophy and Social Values
   **62.711G** Marxism and the Critique of Science
3. **62.714G** Science and Government
   **30.960G** Technology and Organizations
4. **15.715G** Science, Society and Institutions
   **15.716G** Science, Technology and Economic Development
5. **53.309G** Social and Technological Forecasting
t   (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.

**Mathematics**

**Head of School**
Professor V. T. Buchwald

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**
**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 10.1944, 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.

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:

- 10.212L Optimization Methods 3
- 15.423 Econometrics B 2
- 18.771G Simulation in Operations Research 2
- 24.017G Transport and Traffic Flow Theory 4
- 24.003G Theory of Land Use/Transport Interaction 2
- 24.005G Urban Transport Planning Practice 2

* To be arranged: e.g., biological statistics, further work on order statistics, population statistics, non-linear programming, discrete distribution theory.

The conditions for the award of the degree are set out later in this handbook.

8750
Master of Statistics
MStat

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

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.381G Experimental Design I</td>
<td>2</td>
</tr>
<tr>
<td>10.383G Stochastic Processes</td>
<td>2</td>
</tr>
<tr>
<td>10.385G Multivariate Analysis I</td>
<td>2</td>
</tr>
<tr>
<td>10.390G Statistical Inference</td>
<td>2</td>
</tr>
<tr>
<td>10.392G Project</td>
<td>2</td>
</tr>
</tbody>
</table>

Elective Subjects

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.382G Experimental Design II</td>
<td>2</td>
</tr>
<tr>
<td>10.384G Time Series</td>
<td>2</td>
</tr>
<tr>
<td>10.386G Multivariate Analysis II</td>
<td>2</td>
</tr>
<tr>
<td>10.387G Non-Experimental Statistics</td>
<td>2</td>
</tr>
<tr>
<td>10.388G Sequential Analysis</td>
<td>2</td>
</tr>
<tr>
<td>10.389G Non-Parametric Methods</td>
<td>2</td>
</tr>
<tr>
<td>10.391G Special Topic* A</td>
<td>2</td>
</tr>
<tr>
<td>10.393G Special Topic* B</td>
<td>2</td>
</tr>
</tbody>
</table>

Elective Graduate Subjects

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.702G Advanced Physiological Optics</td>
<td>4</td>
</tr>
<tr>
<td>31.703G Pleothoptics and Binocular Vision</td>
<td>4</td>
</tr>
<tr>
<td>31.704G Advanced Contact Lens Studies</td>
<td>4</td>
</tr>
<tr>
<td>31.705G Advanced Contact Lens Practice</td>
<td>4</td>
</tr>
<tr>
<td>31.706G Occupational Optometry</td>
<td>4</td>
</tr>
<tr>
<td>31.707G Clinical Photography</td>
<td>4</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Specialization</th>
<th>Graduate Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Lenses</td>
<td>1. Advanced Contact Lens Studies</td>
</tr>
<tr>
<td></td>
<td>2. Advanced Contact Lens Practice</td>
</tr>
<tr>
<td></td>
<td>3. Clinical Photography</td>
</tr>
<tr>
<td>Occupational Optometry</td>
<td>1. Occupational Optometry</td>
</tr>
<tr>
<td></td>
<td>2. Pleorthoptics and Binocular Vision</td>
</tr>
<tr>
<td></td>
<td>3. Advanced Physiological Optics</td>
</tr>
<tr>
<td>Orthoptics</td>
<td>1. Pleorthoptics and Binocular Vision</td>
</tr>
<tr>
<td></td>
<td>2. Clinical Photography</td>
</tr>
</tbody>
</table>

**Physics**

Head of School  
Professor K. N. R. Taylor

Executive Assistant to Head of School  
Dr P. R. Elliston

Senior Administrative Officer  
Mr C. C. Rosario

The School of Physics offers a graduate course leading to the award of the Master of Physics degree (MPhysics). The course is intended for honours graduates, but others may be admitted after completing a qualifying course. It may be completed in one year of full-time study or two years of part-time study. The conditions for the award are set out later in this handbook.

The course consists of two core subjects, six elective subjects and either a short research project or a critical literature survey in a specified field of physics. The core subjects each occupy two hours per week for two sessions and are treated primarily by formal lectures. The elective subjects each occupy the equivalent of one hour per week for two sessions and are treated in seminars. The critical literature survey or research project occupies a total of approximately 250 hours. All core and elective subjects are examined and, in addition, students are required to submit a report on their research project or literature survey.

**8730 Master of Physics MPhysics**


Not all the electives may be available in any one year.
Graduate Study

Conditions for the Award of Higher 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.

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: Faculty Table (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.

<table>
<thead>
<tr>
<th>Title</th>
<th>Abbreviation</th>
<th>Calendar/Handbook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor of Science</td>
<td>DSc</td>
<td>Calendar</td>
</tr>
<tr>
<td>Doctor of Letters</td>
<td>DLitt</td>
<td>Calendar</td>
</tr>
<tr>
<td>Doctor of Laws</td>
<td>LLD</td>
<td>Calendar</td>
</tr>
<tr>
<td>Doctor of Medicine in the Faculty of Medicine</td>
<td>MD</td>
<td>Calendar Medicine</td>
</tr>
<tr>
<td>Doctor of Philosophy</td>
<td>PhD</td>
<td>Calendar and all faculties</td>
</tr>
<tr>
<td>Master of Applied Science</td>
<td>MAppSc</td>
<td>Applied Science</td>
</tr>
<tr>
<td>Master of Architecture</td>
<td>MArch</td>
<td>Architecture</td>
</tr>
<tr>
<td>Master of Arts</td>
<td>MA(Hons)</td>
<td>Arts</td>
</tr>
<tr>
<td>Master of Biomedical Engineering</td>
<td>MBiomedE</td>
<td>Military Studies</td>
</tr>
<tr>
<td>Master of Building</td>
<td>MBuild</td>
<td>Arts</td>
</tr>
<tr>
<td>Title</td>
<td>Abbreviation</td>
<td>Calendar/Handbook</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
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</tr>
<tr>
<td>Master of Business Administration</td>
<td>MBA</td>
<td>AGSM</td>
</tr>
<tr>
<td>Master of Chemistry</td>
<td>MChem</td>
<td>Sciences*</td>
</tr>
<tr>
<td>Master of Commerce (Honours)</td>
<td>MCom(Hons)</td>
<td>Commerce</td>
</tr>
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<td>Master of Commerce</td>
<td>MCom</td>
<td>Commerce</td>
</tr>
<tr>
<td>Master of Education</td>
<td>ME</td>
<td>Professional Studies</td>
</tr>
<tr>
<td>Master of Educational Administration</td>
<td>MEdAdmin</td>
<td>Professional Studies</td>
</tr>
<tr>
<td>Master of Engineering</td>
<td>ME</td>
<td>Applied Science</td>
</tr>
<tr>
<td>Master of Engineering without Supervision</td>
<td>MEngSc</td>
<td>Engineering</td>
</tr>
<tr>
<td>Master of General Studies</td>
<td>MGenStud</td>
<td>Military Studies</td>
</tr>
<tr>
<td>Master of Health Administration</td>
<td>MHA</td>
<td>Professional Studies</td>
</tr>
<tr>
<td>Master of Health Personnel Education</td>
<td>MHP</td>
<td>Calendar</td>
</tr>
<tr>
<td>Master of Health Planning</td>
<td>MHP</td>
<td>Professional Studies</td>
</tr>
<tr>
<td>Master of Landscape Architecture</td>
<td>MLArch</td>
<td>Architecture</td>
</tr>
<tr>
<td>Master of Laws by Research</td>
<td>LLM</td>
<td>Law</td>
</tr>
<tr>
<td>Master of Librarianship</td>
<td>MLib</td>
<td>Professional Studies</td>
</tr>
<tr>
<td>Master of Mathematics</td>
<td>MMath</td>
<td>Sciences*</td>
</tr>
<tr>
<td>Master of Optometry</td>
<td>MOptom</td>
<td>Sciences*</td>
</tr>
<tr>
<td>Master of Physics</td>
<td>MPhysics</td>
<td>Sciences*</td>
</tr>
<tr>
<td>Master of Psychology</td>
<td>MPsycol</td>
<td>Sciences‡</td>
</tr>
<tr>
<td>Master of Public Administration</td>
<td>MPA</td>
<td>AGSM</td>
</tr>
<tr>
<td>Master of Science</td>
<td>MSc</td>
<td>Applied Science**</td>
</tr>
<tr>
<td>Master of Science without Supervision</td>
<td>MSc</td>
<td>Architecture</td>
</tr>
<tr>
<td>Master of Science (Acoustics)</td>
<td>MSc(Acoustics)</td>
<td>Sciences*</td>
</tr>
<tr>
<td>Master of Science and Society</td>
<td>MScSoc</td>
<td>Sciences*</td>
</tr>
<tr>
<td>Master of Science (Biotechnology)</td>
<td>MSc(Biotech)</td>
<td>Sciences‡</td>
</tr>
<tr>
<td>Master of Science (Building)</td>
<td>MSc(Building)</td>
<td>Architecture</td>
</tr>
<tr>
<td>Master of Social Work</td>
<td>MSW</td>
<td>Professional Studies</td>
</tr>
<tr>
<td>Master of Statistics</td>
<td>MStats</td>
<td>Sciences*</td>
</tr>
<tr>
<td>Master of Surgery</td>
<td>MS</td>
<td>Medicine</td>
</tr>
<tr>
<td>Master of Surveying</td>
<td>MSurv</td>
<td>Engineering</td>
</tr>
<tr>
<td>Master of Surveying without Supervision</td>
<td>MSurvSc</td>
<td>Architecture</td>
</tr>
<tr>
<td>Master of Surveying Science</td>
<td>MTP</td>
<td></td>
</tr>
</tbody>
</table>

**Graduate Diplomas**

<table>
<thead>
<tr>
<th>GradDip</th>
<th>Applied Science</th>
<th>Architecture</th>
<th>Engineering</th>
<th>Sciences*‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>DipArchivAdmin</td>
<td>DipEd</td>
<td>DipLib</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Faculty of Science
‡ Faculty of Biological Sciences
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:

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 he holds a degree without honours from the University of New South Wales or other approved university, has achieved by subsequent work and study a standard recognised by the appropriate Faculty or Board of Studies 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 Faculty or Board of Studies.

3. When the Faculty or Board of Studies is not satisfied with the qualifications submitted by a candidate, the Faculty or Board of Studies may require him, before he is permitted to register, to undergo such examination or carry out such work as the Faculty or Board of Studies may prescribe.

4. A candidate for registration for a course of study leading to the degree of Doctor of Philosophy shall:
   (1) apply to the Registrar on the prescribed form at least one calendar month before the commencement of the session in which he desires to register; and
   (2) submit with his application a certificate from the head of the University school in which he proposes to study stating that the candidate is a fit person to undertake a course of study and research leading to the degree of Doctor of Philosophy and that the school is willing to undertake the responsibility of supervising the work of the candidate and of reporting to the Faculty or Board of Studies at the end of the course on the merits of the candidate's performance in the prescribed course.

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 his degree, who before registration was engaged upon research to the satisfaction of the Faculty or Board of Studies, may be exempted from not more than two academic sessions;
   (2) in special circumstances the Faculty or Board of Studies may grant permission for the candidate to spend not more than one calendar year of his program in advanced study and research at another institution provided that his work can be supervised in a manner satisfactory to the Faculty or Board of Studies;
   (3) in exceptional cases, the Professorial Board on the recommendation of the Faculty or Board of Studies 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 himself for examination not later than ten academic sessions from the date of his registration. A candidate not fully engaged in research shall present himself for examination not later than twelve academic sessions from the date of his registration. In special cases an extension of these times may be granted by the Faculty or Board of Studies.

7. The candidate shall be required to devote his whole time to advanced study and research, save that:
   (1) the Faculty or Board of Studies may permit a candidate on application 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 Faculty or Board of Studies shall prescribe a minimum period for the duration of the program;

(3) in special circumstances, the Faculty or Board of Studies 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 his program in a school of the University. In such a case the Faculty or Board of Studies shall prescribe for the duration of his program a minimum period which, in its opinion, having regard to the proportion of his time which he 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 his program under the direction of a supervisor appointed by the Faculty or Board of Studies 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 Faculty or Board of Studies may permit candidates to conduct their 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 his research for approval by the Faculty or Board of Studies. After the topic has been approved it may not be changed except with the permission of the Faculty or Board of Studies.

10. A candidate may be required by the Faculty or Board or Studies to attend a formal course of study appropriate to his work.

**Thesis**

11. On completing his course of study every candidate must submit a thesis which complies with the following requirements:

(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;

(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 his research. In special cases work done conjointly with other persons may be accepted, provided the Faculty or Board of Studies is satisfied on the candidate’s part in the joint research.

13. Every candidate shall be required to submit with his thesis a short abstract of the thesis comprising not more than 600 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 his thesis any work or material which he has previously submitted for a university degree or other similar award.
15. The candidate shall give in writing two months' notice of his intention to submit his thesis and such notice shall be accompanied by the appropriate fee.

16. Four copies of the thesis shall be submitted together with a certificate from the supervisor that the candidate has completed the course of study prescribed in his case. The 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 he has 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 Faculty or Board of Studies, at least one of whom shall be an external examiner.

19. After examining the thesis the examiners may:

(1) decide that the thesis reaches a satisfactory standard; or

(2) recommend that the candidate be required to re-submit his thesis in revised form after a further period of study and/or research; or

(3) recommend without further test that the candidate be not awarded the degree of Doctor of Philosophy.

20. If the thesis reaches the required standard, the examiners shall arrange for the candidate to be examined orally, and, at their discretion, by written papers and/or practical examinations on the subject of the thesis and/or subjects relevant thereto, save that on the recommendation of the examiners the Faculty or Board of Studies may dispense with the oral examination.

21. If the thesis is of satisfactory standard but the candidate fails to satisfy the examiners at the oral or other examinations, the examiners may recommend the University to permit the candidate to represent the same thesis and submit to a further oral, practical or written examination within a period specified by them but not exceeding eighteen months.

22. At the conclusion of the examination, the examiners will submit to the Faculty or Board of Studies a concise report on the merits of the thesis and on the examination results, and the Faculty or Board of Studies shall recommend whether or not the candidate may be admitted to the degree.

23. 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.

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.

* See Conditions for the Award of Degrees in the Calendar.
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 term 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 write a critical review of the literature or 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.

Project

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.

Recommendation for admission to Degree

5. 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.

Fees

6. An approved candidate shall pay such fees as may be determined from time to time by the Council.

Master of Mathematics (MMath)

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.

Qualifications

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.

Registration

(3) In special circumstances a person may be permitted to register as a candidate for the degree if he submits 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.
Qualifications  
2. (1) An applicant for registration shall hold an approved degree of Bachelor with Class I or Class II Honours in Physics.

(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 if he submits evidence of such academic and professional attainments as may be approved by the Committee.

Registration  
3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two months before the commencement of the session in which the candidate desires to register.

(2) An approved applicant shall register as a student in full-time or part-time attendance at the University.

(3) A candidate for the degree shall be required to undertake the appropriate course of study and pass the prescribed examinations. Under the supervision of a member of the academic staff, a candidate shall be required to submit a report consisting of a critical review of the literature in an approved branch of Physics 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 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.

Recommendation for Admission to Degree  
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.

Fees  
5. An approved candidate shall pay such fees as may be determined from time to time by the Council.

Master of Psychology (MPsy chol)  
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.

Qualifications  
2. (1) An applicant for registration shall hold an approved degree of Bachelor with Honours Class I or Class II in Psychology.

(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 if he submits 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 undertake the specified courses 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 research 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 of three sessions for full-time students, and six sessions for part-time students.

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.

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 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.

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.

(2) In exceptional cases a person may be permitted to register as a candidate for the degree if he submits 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.

(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 in which the candidate is registered a report on the progress of the candidate. The Committee shall review the report and as a result of its review may 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 himself for examination not later than six academic sessions from the date of registration. A candidate not fully engaged in research shall present himself for examination not later than twelve academic sessions from the date of his registration. In special cases an extension of these times may be granted by the Committee.

Thesis

4. (1) 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 he has published whether or not such work is related to 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, if possible, shall be external to the University.

(3) It shall be understood that the University retains the three copies of the thesis submitted for examination and is free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act, 1968 the University may issue the thesis in whole or in part in photostat or microfilm or other copying medium.

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.

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 Higher Degree Committee of the appropriate Faculty (hereinafter referred to as the Committee) not less than six months before the intended date of submission of the thesis. A graduate who intends to apply in this way should in his own interest at an early stage, seek the advice of the appropriate School with regard to the adequacy of the subject matter for the degree. A synopsis of the work should be enclosed.

(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 he 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 his 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.
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 if he submits 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.

Recommendation for Admission to Degree 4. Having considered the candidate’s results in the prescribed course of study the Committee shall recommend whether the candidate may be admitted to the degree.

Fees 5. An approved candidate shall pay such fees as may be determined from time to time by Council.

Master of Statistics (MStats)

1. The degree of Master of Statistics may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Science (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.
2. (1) An applicant for registration for the degree 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.

(2) In special circumstances a person may be permitted to register as a candidate for the degree if he submits 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.

(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.

5. An approved applicant shall pay such fees as may be determined from time to time by the Council.

Graduate Diplomas

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

Each of the subjects taught in the University is identifiable both by number and by name. This is a fail-safe measure at the points of enrolment and examination against a student nominating a subject other than the one intended. Subject numbers are allocated by the Assistant Registrar, Examinations and Student Records, and the system of allocation is:

1. The School offering a subject is indicated by the number before the decimal point;

2. If a subject is offered by a Department within a School, the first number after the decimal point identifies that Department;

3. The position of a subject in a sequence is indicated by the third number after the decimal point. For example, 2 would indicate that the subject is the second in a sequence of subjects;

4. Graduate subjects are indicated by the suffix G.

As indicated above, a subject number is required to identify each subject in which a student is to be enrolled and for which a result is to be returned. Where students may take electives within a subject, they should desirably be enrolled initially in the particular elective, and the subject numbers allotted should clearly indicate the elective. Where it is not possible for a student to decide on an elective when enrolling or re-enrolling, and separate examinations are to be held in the electives, Schools should provide to the Examinations and Student Record Section in April (Session 1) and August (Session 2) the names of students taking each elective. Details of the actual dates in April and August are set out in the Calendar of Dates earlier in this volume.

Those subjects taught in each Faculty are listed in full in the handbook of that Faculty, together with the subject description in the section entitled Subject Descriptions.

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 numbers for each School are set out on the following page.

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); P (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), C (Credit).

HSC Exam Prerequisites

Subjects which require prerequisites for enrolment in terms of the HSC Examination percentile range, refer to the 1978 HSC Examination.

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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** Formerly Department of Behavioural Science; new name effective from 1 January 1979.
Undergraduate Study

70.013 Anatomy IV

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.

70.303 Kinesiology

Prerequisites: 70.012A, 70.012C.

Study of movement in vertebrates, kinesiological recording, anatomical factors affecting movement, mechanics of posture and locomotion, comparative vertebrate locomotion, development and organization of movement in the human, the facilitation of movement.

70.304 Histology II

Prerequisite: 70.011A.


Applied Geology

Undergraduate Study

25.011 Geology I

Prerequisites:

HSC Exam:

Percentile Range Required

2 unit Science (any strand) or 31-100
4 unit Science (any strands) 31-100

Excluded: 25.151.

Physical Geology: The origins, structure and main surface features of the earth; geological cycle — processes of erosion, transportation, sedimentation and lithification. Surface and sub-surface water. Weathering, lakes, rivers, glacial phenomena. Vulcanism, earthquakes, orogenesis and epeirogenesis, integrated theory of plate tectonics and continental drift.

Petrology: Field occurrence, lithological characteristics and structural relationships of igneous, sedimentary and metamorphic rocks. Introduction to coal, oil and ore deposits.

Stratigraphy and Palaeontology: Basic principles of stratigraphy; introductory palaeontology. The geological time scale. The geological history of the Australian continent and more specifically that of New South Wales in introductory outline.

Practical Work: Preparation and interpretation of geological maps and sections. Map reading and use of simple geological instruments. Study of simple crystal forms and symmetry. Applied stereoscopic projection. Identification and description of common minerals and rocks in hand specimen. Recognition and description of examples of important fossil groups. Supplemented by three field tutorials; attendance at which is compulsory.

25.012 Geology II A  F L3T3
Prerequisite: 25.011.

Structural Geology: Origin, classification and description of structures vs sedimentary, igneous, and metamorphic rocks. Introduction to the stereographic projection of structural elements, and analysis of simple fracture and fold systems. Introduction to tectonics.


Practical: Mesoscopic and microscopic examination of rock forming and ore minerals, igneous and metamorphic rocks.

Photogeology: The use of air photos for geological mapping and geomorphological evaluation of land. Techniques and principles of photo interpretation, multiband photography; landform genesis and photo interpretation of folds, faults, joints, bedding, limestone, intrusive igneous rocks, volcanics, alluvial fans and terraces, slopes, landslides, coastal and tropical landforms; relations between geology, drainage, soil and vegetation; orebody expression, gossans, colouration halos.

Field work of up to ten days is a compulsory part of the course.

25.022 Geology II B  F L1T2
Prerequisite: 25.011.

Stratigraphy: Flow regime and bedform properties including flume experiments, sedimentary structures. Modern and ancient environments of deposition: fluvial, deltaic coastal, shelf, slope and deep sea environments. The facies concept. Stratigraphic principles. Fold Belts, geosynclines and their interpretation by plate tectonics models. Stratigraphic and structural development of a fold belt (Lachlan Fold Belt) and an intracratonic basin (Sydney Basin).

Palaeontology: Morphology and stratigraphic distribution of the Protozoa, Porifera, Coelenterata, Bryozoa, Brachiopoda and Mollusca. Practical examination of representative fossils from each phyla.

Field work of up to ten days is a compulsory part of the course.

25.013 Geology III A  F L3T3
Prerequisites: 25.012, 25.022, 2.121, 2.131.


Laboratory: Hand specimen study of ores and associated features; introductory mineragraphy.

Mineralogy & Petrology

Field work of up to ten days is a compulsory part of the course.

25.023 Geology III B  F L3T3
Prerequisites: 25.012, 25.022, 2.121, 2.131.

Geophysics
Global Geophysics: The physics, shape, structure and constitution of the earth: seismology, gravity, geology, geothermy, geomagnetism, palaeomagnetism, geo-electricity and geochronology. Geotectonics and geodynamics: geophysical expression and relation to geology and geochemistry. Exploration Geophysics: Introductory course in exploration geophysics covering the following methods: seismic, electrical, electromagnetic, gravity, magnetic and radioactive with applications mining, petroleum, engineering, hydrology and well logging.

Stratigraphy & Palaeontology

Field Mapping
Geological mapping in a complicated geological terrain with emphasis on stratigraphical and structural interpretation. Geological report writing and cartography.

A geological survey camp of 10 days' duration is a compulsory part of the course.
25.033 Geology III C  F L6T6

Mathematical Geology and Geological Surveying

Mathematical Geology: An introduction to the mathematical techniques and concepts which may be applied to the analysis of geological data. Measurement scale, probability axioms, frequency analysis and basic geostatistics, sampling theory and techniques. FORTRAN computer programming forms a substantial part of the course with programming exercises in the analysis of map information and other geological data. Quantitative map interpretation with emphasis on trend surface analysis and automatic contouring techniques. Geological Surveying levels, tacheometers and theodolites. Field techniques. Precision of angular measurements. Stadia surveying. Levelling. Field computations. Topographic maps.

Geochemistry and Petrology


Advanced Structural Geology

Analysis of structural elements at the microscopic, mesoscopic and macroscopic scales. Modern methods of analysis, especially petrofabric analysis and A.V.A. Detailed studies of the analysis of metamorphic terrains, e.g. Otago Schists, Coona Complex.

Sedimentary Basin Analysis and Geology of Hydrocarbons


Field Mapping and Remote Sensing

Field Mapping: Field mapping in a complex geological terrain, with concentration on the structural geology of deformed and metamorphosed sequences. Writing geological reports, and drafting geological maps. Remote Sensing: Exercises in the combined use of aerial photos and ERTS imagery for the interpretation of regional and structural geology.

In addition, one of the following topics is selected after consultation with the Head of School:

1. Economic Geology B. Mineragraphy, Experimental Petrology


2. Micropalaeontology

Morphology, stratigraphic distribution and significance of the principal microfossil groups: foraminifera, ostracoda, conodonts, spores and pollen, dinoflagellates, coccoliths and chitinozoa. Extraction techniques.

3. Surficial Geology


Problems of mapping Quaternary geology. Quaternary geology: methods of dating, sea level change, glacial sequences, surficial geology of non-glaciated areas of Australia, especially the Riverine Plain. Quaternary sequences in Canada and Europe.

Field tutorials constitute an essential part of the course.

25.1333 Geology for Geographers III  F L3T3

Geological Surveying


Geochemistry


Clay Mineralogy

The structures 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.

Metamorphic Petrology


Practical

Macroscopic and microscopic study of igneous and metamorphic rocks.

Surficial Geology


Quaternary geology: methods of dating, sea level change, glacial sequences, surficial geology of non-glaciated areas of Australia, especially in the Riverine Plain. Quaternary sequences in Canada and Europe.

Field tutorials are an essential part of this course.

25.613 Geological Oceanography S1 L2T4

Prerequisite: 25.022.

The form and nature of ocean basins; the origin, transport and distribution of suspended matter, igneous and sedimentary rocks of the ocean floor and their distribution; the significance of oceanic igneous rocks, palaeontology, stratigraphical history and correlation of marine sedimentary rocks; magnetism and palaeomagnetism, tectonics of ocean basins.

Compulsory field work to be arranged.

25.623 Estuarine Geology S2 L2T4

Prerequisite: 25.022.


Field tutorials are an essential part of the course.

25.633 Hydrological and Coastal Surveying F L1T2

Prerequisites: None.


Field tutorials are an essential part of the course.

25.643 Marine Geology S2 L3T3


Ocean Basin Stratigraphy

Sediment types and distribution. Principal index fossil groups and systems of correlation and stratigraphical classification.

Basin Analysis

Continental margins and basin evolution. Analysis of sedimentary and palaeological systems in fluvial, deltaic, near-shore and deep-water environments. Boundary structures of sedimentary basins.

Marine Seismic Interpretation

Practical methods of interpretation of seismic reflection profile records; characteristic sedimentary and structural features of ocean basins.

Field tutorials are an essential part of the course.

25.404 Geology IV Honours

A field assignment with appropriate work in the laboratory on material collected, the results of both the field and laboratory investigations to be presented in a graduation thesis. Advanced lectures, practical work and seminars. Short laboratory assignments on specific problems may be given.

Further details of the Honours course may be had from the Head of School.

25.151 Geoscience IA F L3T3

Prerequisites:

HSC Exam
Percentile Range Required
2 unit Science (any strand) 31-100
or
4 unit Science (multi-strand) 31-100

Excluded: 25.011.

For students who do not intend studying geology beyond first year. The first part during Session 1 is identical to the first part of 25.011 Geology I, but during Session 2 certain additional topics are presented, while others are treated in less depth than in 25.011 Geology I. No further units in Geoscience are available after this course.


Petroleum: Field occurrence, lithological characteristics and structural relationships of igneous, sedimentary and metamorphic rocks. Introduction to coal, oil and ore deposits.

Stratigraphy and Palaeontology: Basic principles of stratigraphy; introductory palaeontology. The geological time scale. The geological history of the Australian continent and more specifically that of New South Wales in introductory outline.

Practical Work: Preparation and interpretation of geological maps and sections. Map reading and use of simple geological instruments. Study of simple crystal forms and symmetry. Identification and description of common minerals and rocks in hand specimen. Recognition and description of examples of important fossil groups. Supplemented by two half day and two full day field tutorials, attendance at all of which is compulsory.
Beahvioral Science

Renamed Department of Organisational Behaviour; new name effective from 1 January 1979.

Graduate Study
For students enrolled in the MScSoc degree course

30.960G Technology and Organizations S2 L3
The impact of technological change on organizations. The origins, nature, rate, industrial distribution and prevailing ideologies of technological innovation, adaptation and diffusion; their impact on 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 migrants and women; and 3. factors affecting the quality of working life such as industrial accidents and occupational health, work satisfaction, formal and informal learning and recurrent education.

A range of options in developing and applying future technology: eg social and environmental impact studies, technological assessment, alternative technologies, wider disclosure of information on technological change, design of socio-technical systems and alternative ideological bases such as the no-growth society.

Biochemistry

Undergraduate Study

41.101 Introductory Biochemistry S1 L4T8
Prerequisites: 17.021, and 2.121, 2.131. 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, 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, 2.002B.

41.102C Plant Biochemistry S2 L2T4
Prerequisites: 41.101, 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, 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, carotenoids 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.

41.103 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

80.111 Human Structure and Function I
80.112 Human Structure and Function II
In conjunction with School of Anatomy and School of Physiology and Pharmacology.
Graduate Study

41.999G Masters Qualifying Program

For students without an Honours degree or ineligible for the award of the BSc degree with honours. Full-time students follow a one-year program similar to 41.103. Part-time students follow a two-year program selected according to educational background and experience.

Undergraduate Study

17.031 Cell Biology S1 L2T4

Prerequisites: HSC Exam
Percentile Range Required
2 unit Science (any strand) 31-100
or 4 unit Science (any strands) 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, gene interaction, sex determination, mutation, selection and evolution; information transfer and protein synthesis.

Requirements for Practical Work
A list of equipment required for practical work is posted on the notice board in the ground floor of the Biological Sciences Building. Students must purchase this material before the first practical class.

17.021 Biology of Higher Organisms* S2 L2T4

Prerequisite: 17.011 or 17.031.

The diversity of living things and the ways in which they have adapted to varying environments. Stress on flowering plants and vertebrate animals, and the complex organ systems they possess. The structure and function of these organs, as well as their coordination and control, examined in practical experiments, as the basis of lecture and tutorial programs.

17.012 General Ecology S2 L2T4

Prerequisites: 17.011 & 17.021, or 17.031 & 17.021.

Evolution and environmental selection in the Australian continent; geo-

logical, 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.

Biological Technology

Undergraduate Study

42.101 Introduction to Biotechnology S2 L2T4

Prerequisites: 2.121, 2.131, 17.021, 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.

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.

* Students with percentile range 31-100 in HSC Examination 4 unit Science with Biology, or 2 unit Biology may apply to enrol in 43.101, 45.101, 45.201, or 45.301 in lieu of 17.021 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 17.021 Biology of Higher Organisms for all units.
42.102B Biotechnology B  S2 L2T4
Prerequisite: 42.101.
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 Biological Technology (Microbiology)

42.112G Reading List in Biological Technology (Biochemistry)

42.211G Principles of Biology  SS L3
A study of the characteristics of living systems, including a functional treatment of cytolgy, 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, amphoteric and anaerobic 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 fermentor design; control of the microbial environment involving computer/fermentor interactions. Industrial examples will be selected from: antibiotic and enzyme production, alcoholic beverages, single cell protein (SCP), microbial waste disposal and bacterial teaching.

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: entrainment 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; sterile; 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; enzymatic 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.

42.401G Chemical Transformations in the Environment  SS L2T0

The environment may be regarded as an array of dynamic chemical and physical systems which can be influenced by a wide variety of factors. Select topics illustrate some important aspects of environment systems: 1. microbial transformations of mineral and geochemical systems including the recovery of useful materials, control of metal pollution, recycling of organic wastes; 2. the chemistry of river and underground water systems; 3. the influence of new materials on the environment, including the effects of fungicides and other biocides.

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.

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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.

68.503 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.

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Botany

Undergraduate Study

43.101 Introductory Genetics  S2 L2T4

Prerequisites: 17.001 or 17.011 and 17.021 or 17.031 & 17.021*.

Various aspects of molecular, organisational and population genetics, including: meiotic and non-meiotic recombination, genome variations, mutagens and mutation rates, cytoplasmic inheritance, gene function, genetic code, gene structure, collinearity of polynucleotide and polypeptide, control of gene action, genes and development, population genetics, genetics and improvement of plants and animals.

43.111 Flowering Plants  S1 L2T4

Prerequisites: 17.001 or 17.011 and 17.021 or 17.031 & 17.021.

The vegetative and floral morphology of Angiosperms with special reference to variations in morphology. Elements of biological classification, nomenclature and identification of native plants. Weekend field work is part of the course.

* Students with percentile range 31-100 in HSC Examination 4 unit Science with Biology, or 2 unit Biology may apply to enrol in 43.101, 45.101, 45.201 or 45.301 in lieu of 17.021 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 17.021 Biology of Higher Organisms for all units.

Students should consult lecturers in the course before purchasing textbooks.
43.121 Plant Physiology S2 L2T4
Prerequisites: 17.001 or 17.011 and 17.021 or 17.031 & 17.021, 2.001 or any two (2) units of: 2.111; 2.121; 2.131. Students may apply to School for variations of the prerequisites.

The physiology of the whole plant including a consideration of photosynthesis, the role of phytochrome in plant morphogenesis and flowering, inorganic nutrition, transport, translocation, physiology of growth and development, seed physiology and plant growth substances and their application in agriculture.

43.131 Fungi and Man S1 L2T4
Prerequisites: 17.001 or 17.011 and 17.021 or 17.031 & 17.021.

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.

43.102 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; the use of these systems in constructing genetic maps, and as tools for probing aspects of microbial physiology and biochemistry. Genetic control of gene expression; the operon concept and its application to specific regulatory systems. Genetic code, collinearity between a gene and its product, genes within genes, suppression of mutations. Restriction and modification of DNA; genetic engineering — its implications and prospects. Genetics of nitrogen fixation.

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 Biochemical Approaches to Plant Physiology S1 L2T4
Prerequisites: 41.101 or 41.101A and 41.101B.

The physiology and biochemistry of plant lipids with special reference to developing tissues; development and ripening of fruit. Project work is an important part of the subject and some attendance is required outside the hours set down in the timetable. Reading and interpreting original scientific papers are an important part of these projects which relate to current work in the fields covered.

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 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 Ecology and Environmental Botany†‡ S1 L2T4
Prerequisites: 17.001 or 17.011 and 17.021 or 17.031 & 17.021.

The soil and atmospheric environments in which plants live and a study of the interaction of plants with their environment. Emphasis is placed on the role of environmental sciences in food production. Students are required to attend three week-day field excursions as part of the practical course.

43.152 Plant Community Ecology†‡ S2 L2T4
Prerequisites: 43.111 and 17.012.

Recognition and delimitation of plant communities. Ecology of selected Australian vegetative types. Use of numerical methods and application of community concept to palaeoecology. Fieldwork 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†‡ S1 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.

43.182 Cellular and Developmental Botany†‡ S2 L2T4
Prerequisite: 43.111 or 43.121. This latter unit may be taken as a co-requisite in some circumstances.

The physiology, organization and interrelations of higher plant cells. Emphasis is placed on the interactions between plant cells and cellular events which control such processes as the regulation of growth and division, the perception of gravity by plants, secretion, seed germination and senescence.

Servicing Subjects

43.202 Plant Structure and Function

†This unit alternates each year with 43.162 The Plant Kingdom. 43.162 is given in 1979. 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 course provided that prerequisites have been completed.

§ This unit alternates each year with 43.112 Taxonomy.
Chemical Engineering

Undergraduate Study

3.113 Chemical Engineering Science I

Prerequisites: 1.001, 10.001.

Flow of Fluids

Dimensions and Dimensional Analysis
Units and measures. Conversions of units and equations. Dimensions and Dimensional Analysis. Basic principles of modelling.

Heat Transfer I
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 formatting, dimensioned variables and sub-routines. Application to the solution of selected problems involving heat and mass balances, fluid flow and pumping. This course is intended to be complementary to other material in 3.111 and 3.112.

3.114 Chemical Engineering Principles I

Prerequisite: 1.001, 10.001.

The following topics, from 3.113 Chemical Engineering Science I: Flow of Fluids, Heat Transfer I, Pumps and Pumping.

3.127 Chemical Engineering Science II

Prerequisites: 2.002A, 3.113.

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 3.111, Unit 3, with an emphasis on the fundamentals of convection and condensation; unsteady state conduction; introduction to heat exchanger design.

Multicomponent Systems

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.

Thermodynamics II
The thermodynamic properties of pure fluids and homogeneous mixtures; an introduction to phase equilibrium; chemical reaction equilibrium.

Reaction Engineering I
A course comprising 28 hours of lectures together with weekly assignments covering the design and analysis of ideal reactor systems, involving single and multiple reactor types, in which simple or complex, single or multiple reactions are effected.

Thermodynamics III
Applications of thermodynamics, including power cycles, refrigeration and liquefaction. Thermodynamic analysis of processes.

Reaction Engineering II
A course of lectures comprising 14 hours together with assignments covering the concept of process rate and rate of change of process variables. Differential balances and examples in mass and heat transfer, and reactive systems.

Computations II

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.

3.128 Chemical Engineering Principles II

Prerequisite: 3.114.

The following topics, from 3.127 Chemical Engineering Science II: Mass Transfer (Theory), Heat Transfer II (Theory), Fluid-particle Systems, Multicomponent Systems.
Chemistry

Students wishing to take 8 or more Level III Chemistry units are required to transfer to the Pure and Applied Chemistry Course (391) before the commencement of Year 2. If Year 2 studied in the Science and Mathematics course is similar to Year 2 of Course 391, 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 Introduction to Chemistry†

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

Prerequisites:

- HSC Exam
- Percentile Range
- Required
- 2 unit Science (any strands) or 31-100
- 4 unit Science (multstrand) or 31-100

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

Prerequisite: 2.111 or 2.121.


2.002A Physical Chemistry

Prerequisites: 2.121 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

Prerequisite: 2.131

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 sulphonyl acids.

2.002D Analytical Chemistry

Prerequisites: 2.121, 2.131, 10.001, 10.011 or 10.021B & 10.021C.


2.042C Inorganic Chemistry

Prerequisites: 2.121, 2.131.

Chemistry of the non-metals including B, C, Si, N, P, S, Se, Te, halogens, and noble gases. 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.

2.003E Nuclear and Radiation Chemistry

Prerequisites: 2.121, 2.131 and 10.001, 10.011 or 10.021B & 10.021C.


† 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 enrolls in 2.111 he must pass 2.111 before he can proceed to 2.121 or 2.131.
2.003H Molecular Spectroscopy and Structure S2 L3T3
Prerequisite: 2.121, 2.131.
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 Chemistry L2T4
Prerequisites: 2.121, 2.131. 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; pH 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.
Trace elements in biological systems. Chemistry of common heterocyclic systems with emphasis on molecules of biological importance.

2.003K Solid State Chemistry L2T4
Prerequisites: 2.121, 2.131 and 10.001 or 10.011.
The determination of crystal structures by single crystal diffraction: X-ray and neutron diffraction methods. Practical and automated aspects of the solution of crystal structures: applications to inorganic, molecular and macromolecular crystals. Patterns of solid state structure: the structures of crystals with unusual and valuable chemical and physical properties. Solid state reactions, surface properties and catalysis. Applications of EPR, NMR and mass spectrometry.

2.013A Introductory Quantum Chemistry S1 L2T4
Prerequisites: 1.001 or 1.011, 2.121, 2.131 and 10.001, 10.011 or 10.021B & 10.021C.

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.
2.004  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 for 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  L2T4

Prerequisite: 2.003B.


2.013C  Advanced Inorganic Chemistry  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, carbyls, nitrosyls, ethylene complexes, and sandwich-type compounds; methods of preparation, reactions, evidence for structures and type of bonding involved.

2.013D  Advanced Analytical Chemistry  L2T4

Prerequisite: 2.002D. Co-requisite: 2.003D.


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 labeling techniques; radiation sources and their use; 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  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 enzymatic and autodissociation origin, antioxidants — natural and synthetic — theories on mechanisms of action, carbohydrates reactivity, role in reprocessing 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, methods 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 j-j 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  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  L1T2

Prerequisite: 2.002B. Excluded: 2.053L, 2.013L, 2.043L.


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.

* Only available to non-Chemistry majors. It may not be included in course programs 0201, 0202, 0203, 0204, 0241, 0242 and Course 3910.
2.043A Environmental Chemistry F or 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.

plus

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.

2.053A Chemical Kinetics and Reaction Mechanisms F or SS L3T3
Prerequisite: 2.002A.

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
2.011 Chemistry for Medical Students
2.021 Chemistry IE
2.951 Chemistry IME
2.981 Chemistry ICE
9.411 Agricultural Chemistry I

Graduate Study

2.150G The Chemistry of Natural & Synthetic High Polymers† S2 L2T4

2.153G Recent Advances in Chemistry† F L2T4
Prerequisites and Excluded: None.
Recent advances in a number of areas of fundamental experimental and theoretical chemistry. Four topics are covered but the selection of topics may vary from year to year. Although little or no previous knowledge of a topic is assumed in its presentation, each topic is developed to allow appreciation of recent advances in the area.
The course offered is a double unit comprising approximately 14 lectures in each of the four topical sections, together with relevant experimental demonstrations and/or practical and/or project work.
In a given year, areas of chemistry from which the topics are selected include:
Molecular spectroscopic techniques
Catalysis — homogeneous and heterogeneous
Theoretical chemistry
Inorganic chemistry
Lasers in chemistry
Molecular structure determination by spectroscopy
Mass spectrometry
Synthetic organic chemistry
Chemistry of natural products
Chemical kinetics and reaction mechanisms
Isotopes in chemistry

2.154G, Advanced Analytical Chemistry
2.155G, and Chemical Instrumentation†
Units A, B and C

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; carbo-hydrates, sugars, by physical and chemical methods, jams and pre-

* Students are given the choice of these two topics.
‡ Only one of these double units may be chosen.
† Units available to students enrolled in the Graduate Diploma in Current Science course.
serves, 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 course of 20 hours, progressing from relatively simple structures to the examination of adulterated mixtures.


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 are discussed under the headings: Description of sets of measurements, graphical representations, calculation of measures of location and spread; probability and random errors, binomial, normal and Poisson distributions; comparisons of sets of measurements, tests of significance; associated data, linear regression analysis; analysis of variance; biological assays, bacteriological counts, sampling problems.

2.581G Advanced Analytical Chemistry

**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.

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**Subject Descriptions**

**79.401 Genetics of Behaviour** S2 L2T3

*Prerequisite: 17.011 or 17.031.*

Behavioural traits in invertebrates and mammals, including man, in which genetic factors can be identified.

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**Economics**

**Graduate Study**

For students enrolled in the MScSoc degree course.

**15.715G Science, Society and Institutions** S1 L2

A conceptual and empirical examination of the changing relationships between the social structure of science, social and cultural institutions, and social values. Attention on England and Europe in the period 1750-1850, when intellectual advance in science was closely related to economic and social change in an ongoing manner.

**15.716G Science, Technology and Economic Development** S2 L2

1. Historical case studies at the industry or sectoral level.

2. Critical survey of the approach to science and economy via the economists' production function. The somewhat different approach of the development economist is used in an attempt to specify the problems involved in the application of science to technology in today's less developed countries.

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**Electrical Engineering**

**Computer Science**

**Undergraduate Study**

**6.010 Electrical Engineering I** SS L2T4

*Co-requisite: 1.001 or 1.011.*

An orientation subject to acquaint students with the various areas and problems of Electrical Engineering. Secondary school physics and maths applied to some aspects of energy conversion and transmission; electronics; logic, number systems, and computers; systems and circuit theory; probability, information and communication. Laboratory exercises and project work in these areas including instrumentation and device characteristics.

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**6.600 Introduction to Computers** S2 L3T2

*Excluded: 6.620, 6.601A, 6.021D.*

For those students who do not intend taking any further computing science subjects.

Introduction to programming: design and correctness of algorithms and data structures; programming in a higher level algorithmic language which provides simple, high level program control and data structuring facilities. Using computers: introduction to computing machinery, operating systems, command languages, and use of computer terminals. Applications: introduction to some of the application packages that are generally available on computing systems (eg inquiry, statistics, linear programming and text formatting packages).

**6.613 Computer Organization and Design** S1 L2T3


Data representation, coding, register transfer and micro operations, digital technology. CPU organization: arithmetic units, control units, microprogramming, control algorithms, memory organization. Input/output organization. Hardware/software interaction. Microprocessors.

**6.620 Introduction to Computing Science** S1 L3T2

*Prerequisites: 10.001. Excluded: 6.600, 6.601A, 6.021D.*

For those students who intend to take further subjects in computing science.

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. Introduction to dynamic data structures. Elementary logic. Introduction to computer organization: simple machine architecture. Introduction to operating systems and computing machinery.

**6.631 Assembler Programming and Digital Logic** S2 L3T2

*Prerequisites: 6.620 or 6.600 (C). Excluded: 6.602A, 6.021E, 6.031D.*

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; switching algebra, minimization, combinational logic design, integrated circuits, registers, counters, and other medium scale integration (m.s.i.) devices, clocked sequential circuits, computer arithmetic, codes.

**6.632 Operating Systems** S2 L3T2

*Prerequisites: 6.631, 6.641. Excluded: 6.602B.*

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

Prerequisites: 6.641.

Not offered before 1980.


6.641 Programming I  S2 L3T2

Prerequisites: 6.620 or 6.600 (C).

Design and correctness of algorithms and data structures. Data structures: abstraction, representation, manipulation and axiomatisation; basic data structures, sets, unions (variant records); dynamic data structures: lists, queues, stacks, trees, balanced trees. Recursion: backtracking algorithms. Key transformations (hashing). Files: sequential access, random access, merging, sorting, updating. String manipulation, pattern matching and associative algorithms.

6.642 Programming II  S1 L3T2

Prerequisites: 6.641.


6.643 Compiling Techniques and Programming Languages  S2 L3T2

Prerequisites: 6.641. Excluded: 6.602D.

1. Language description: phrase structure grammars, Chomsky classifications, context-free grammars, finite state grammars, Backus Naur Form, syntax graphs, LL(k), LR(k), SLR(k), LALR(k), simple precedence and weak-precedence grammars.

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.


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


The use of computers for solving problems with a substantial mathematical and operational research content, includes use of some standard software packages. Topics selected from: discrete event simulation; the SIMULA programming language; pseudo random number generation; simple queuing theory; applications of mathematical programming; statistical calculations; critical path methods; computer graphics.

6.647 Business Information Systems  S2 L3T2


6.649 Computing Practice*  S2 L3T2


Not offered before 1980.

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.

Geography

Undergraduate Study

27.801 Introduction to Physical Geography  S1 L2T2½

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.

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

Prerequisite: 27.813.


Laboratory classes: climatic analysis and mapping, and analysis of natural landscapes, including airphoto interpretation, together with appropriate statistical exercises.

27.812  Human Geography  S2 L2T2½

Prerequisite: 27.813.

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.

27.813  Geographic Methods  F L1T2

Prerequisites: 27.801, 27.802

An introductory course in statistical procedures and field methods as used in both human and physical geography, including: measures of dispersion; measures of spatial distribution; time series; probability distributions; samples and estimates; hypothesis testing; correlation and regression; tests for distribution in space; data collection and analysis; field observations.

Field work of up to 5 days is an essential part of the course.

27.153  Climatology  S2 L2T3

Prerequisites: 1.001, 27.811 or 25.011 or 17.031 & 17.021.


27.143  Biogeography  S1 L2T3

Prerequisites: 27.811 or 17.031 & 17.021.


Field work forms an integral part of the course.

27.183  Geomorphology  S2 L2T3

Prerequisite: 25.001 or 27.811.


27.133  Pedology  S1 L2T3

Prerequisites: any two of 2.111, 2.121, 2.131 and 27.811, or 25.012 or 25.022. Excluded: 27.863.

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.

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.

† In special circumstances a student may apply to the Head of School for permission to take 27.801 as a co-requisite.
27.825 Urban Activity Systems  S1 L2T2
Prerequisite: 27.812.

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.

27.826 Urban and Regional Development  S1 L2T2
Prerequisite: 27.812.

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.

27.860 Landform Studies  S1 L2T2½
Prerequisite: 27.811.

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: 27.811 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: 27.811 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  S2 L2T2
(Advanced)
Prerequisites: Graded passes in 27.812, 27.813.

Additional and more advanced work relating to the content of 27.824.

27.835 Urban Activity Systems  S1 L2T2
(Advanced)
Prerequisites: Graded passes in 27.812, 27.813.

Additional and more advanced work relating to the content of 27.825.

27.836 Urban and Regional Development  S1 L2T2
(Advanced)
Prerequisites: Graded passes in 27.812, 27.813.

Additional and more advanced work relating to the content of 27.826.

27.870 Landform Studies (Advanced)  S1 L3T3
Prerequisites: Graded passes in 27.811, 27.813.

As for 27.860 Landform Studies, 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 27.811 or 27.812.

As for 27.862 Australian Environment and Land Resources 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.

27.880 Advanced Geographic Methods  F L1T2
Prerequisites: Graded Passes in 27.811 or 27.812 and 27.813.

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.

27.412 Coastal Geomorphology†  S2 L2T3
Prerequisite: 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.

† Only students enrolled in the Marine Science program. Not offered in 1979.
An introductory subject dealing with the Scientific Revolution of the seventeenth century, the philosophical issues being discussed in this 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.

Undergraduate Study

62.012 The Origins of Modern Science S1 L2T4
Prerequisites: A pass in four Level I units from Table 1 excluding Philosophy and Engineering units.

The development of the scientific movement, in its social and cultural context, from the French Revolution to the 1930s includes consideration of the different national contexts of the scientific movement; its relations with the State, with the universities and other teaching institutions, and with the professions of medicine and engineering; the communications system in science and the nature and functions of scientific societies; the effects of science on technology and of technology on science; the institutionalization and professionalism of science.

62.022 The Social History of Science — From the French Revolution to the Second World War S2 L3T3
Prerequisites: As for 62.012.

The development of ideas concerning the nature and methods of the sciences from antiquity to the present day: Platonism and Aristotelianism; Descartes, Leibniz and Continental rationalism; Bacon, Locke, Berkeley, Hume and British empiricism; Kant and Kantians; Herschel, Whewell, Mill and the revival of inductivism; Comte, Mach and nineteenth-century positivism; Peirce, James and pragmatism; Poincaré and conventionalism; Duhem and instrumentalism; Meyerson and realism; Einstein and the relativists; Eddington’s selective subjectivism; Bridgman and operationalism; the Vienna Circle and logical positivism, Carnap and positivist reductionism; Popper and falsificationism; Hess and modelism; Peyerabend and methodological anarchism.

A set of notes is distributed each week and the subject is conducted by seminars.

62.032 The Scientific Theory S2 L2T4
Prerequisites: 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 subjects 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.

62.052 Scientific Knowledge and Political Power S1 L2T1
Prerequisites: 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
Prerequisites: 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.

62.013 History of the Philosophy and Methodology of Science F L2T1
Prerequisite: 62.012 or 62.022 or 62.032 or 62.052 or 62.062.

The development of ideas concerning the nature and methods of the sciences from antiquity to the present day: Platonism and Aristotelianism; Descartes, Leibniz and Continental rationalism; Bacon, Locke, Berkeley, Hume and British empiricism; Kant and Kantians; Herschel, Whewell, Mill and the revival of inductivism; Comte, Mach and nineteenth-century positivism; Peirce, James and pragmatism; Poincaré and conventionalism; Duhem and instrumentalism; Meyerson and realism; Einstein and the relativists; Eddington’s selective subjectivism; Bridgman and operationalism; the Vienna Circle and logical positivism, Carnap and positivist reductionism; Popper and falsificationism; Hess and modelism; Peyerabend and methodological anarchism.

A set of notes is distributed each week and the subject is conducted by seminars.

62.033 Development of Theories of Matter S1 L3T3
Prerequisite: As for 62.013.

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 Boeckovich, 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.

62.043 Historical Foundations of Experimental Biology S1 L2T4
Prerequisite: As for 62.013.

The development of experimental biology from the revival of anatomical investigation by Vesalius in the mid-sixteenth century to the physiological researches of Henderson and Cannon in the mid-twentieth century. Topics covered include: the Vesalian tradition; the work of Harvey on the functioning of the heart and the circulation of the blood; Descartes and the mechanisation of biology; early microscopy and plant physiology; theories of animal heat and respiration; the contributions of Haller, Bichat and Magendie to the modern experimental method in physiology; German materialistic biology in the mid-nineteenth century; the work of Bernard, Henderson and Cannon on organic homeostasis; relations between theories of biological equilibrium and social stability in the twentieth century.

62.053 Theories of Generation and Heredity S2 L2T4
Prerequisite: As for 62.013.

The history of theories relating to generation and heredity, especially during the period from 1830 to the present, with special reference to the interplay of scientific, social and ideological factors. Topics covered include: the development of cell theory; nineteenth century embryology; the theory of spontaneous generation and its overthrow; Mendel and his predecessors; the rise of classical genetics and the background to the Synthetic Theory of Evolution; the rise of molecular biology; the phage group and central dogma of DNA; heredity in relation to IQ and to sex roles in modern society; the controversy over genetic manipulation and its wider implications.

62.063 History and Philosophy of Cosmology* S2 L2T4
Prerequisite: As for 62.013.

The main formative influences that have shaped the science of cosmology. The work of investigators such as Kant, Laplace and Herschel on the Milky Way, which followed from the work of Galileo and Newton on motion and gravitation. The implications of the investigations of Olbers, Einstein and Hubble for an expanding universe. The conceptual and observational framework of the present situation in cosmology; central physical-philosophical problems raised by various cosmological scenarios of the universe concerning space and time, matter and radiation; the paradigms of the evolutionary and steady-state theories of the universe and the proliferation of alternative models; the tensions between the theorists and the optical and radio-astronomical communities.

62.073 Predicate Logic and the Foundations of Mathematics* F L2T1
Prerequisite: 52.162 or prescribed reading preceding long vacation.

(Offered by the School of Philosophy.)

Predicate Logic
A system of natural deduction for the first order predicate calculus, including identity and definite descriptions. Emphasis is upon construction of formal derivations, methods of showing the invalidity of formal arguments, and the evaluation of informal arguments by symbolization.

Foundations of Mathematics
An introduction to a selection of problems concerning the foundations of Mathematics, including non-Euclidean geometry and consistency proofs, axiomatics, antinomies of naive set theory, logicism, intuitionism, formalism. Godel's incompleteness result.

62.083 Marxism and Science* F L0T3
Prerequisite: As for 62.013.

A course of weekly seminars and directed readings on Marxism and science. Includes: Marxist interpretations of scientific knowledge and its development, the claims of Marxism to be a science, the critique of non-Marxist philosophies of science and the nature and function of ideology in relation to scientific knowledge.

62.093 Science and the Strategy of War and Peace S1 L2T2
Prerequisite: As for 62.013.

Aims to give historical perspective to the impact of science and technology on the art of war from Leonardo da Vinci 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.

Graduate Study
For students enrolled in the MScSoc degree course.

62.701 Philosophy and Methodology of Science S1 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.

62.703G Technology and Society in the Twentieth Century S1 L2
A discussion on a historical ground plan, of the interrelations between technology and society. Review of the main lines of development of technology in the twentieth century; case studies referring to such
issues as: the opposed claims of technological determinism and social determinism; relations between technology and politics; the social mechanisms of the transfer of technology, the ‘spin off’ from military and space technology; the role of technology in the developing countries and the issue of appropriate technology; recent developments in pollution control technology and alternative energy sources.

62.709G The Scientific Community

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

1. Historical Perspectives: 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; the historical roots of contemporary issues in the philosophy of science.

2. Science and Ethics: Exposition and appraisal of some of the classical ethical theories; 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 are evaluated as to the most appropriate forms of action, in the light of the ethical framework previously established.

62.711G Marxism and the Critique of Science

1. Introduction to the basic concepts of historical and dialectical materialism. 2. The Marxist theory of the interdependence of scientific knowledge and social development; 3. The Marxist critique of the economic, political and ideological functions of science under capitalism; 4. The 'Stalinist' approach to science in the Soviet Union, 1930s to 1950s; 5. The ' Maoist' approach to science in China, 1966-1977; 6. The convergence of the capitalist 'Science Policy' approach with the Soviet and Chinese 'State Planning' approach in the 1970s; 7. The Western Marxist critique of bureaucratic technocracy.

62.712G Science, War and the State

An introduction to the developing interrelations and mutual dependencies of the scientific community and its institutions, scientific research and development and innovation, and the military and industrial communities in the twentieth century. Case studies used to examine national attempts to integrate civilian and defence resources, priorities and policies, the unification of research and development activities, and the power and influence of the ‘military-industrial’ complex.

62.713G Interdisciplinary Seminar and Project Chosen in consultation with the Program Co-ordinator. Topics aim to exploit students’ special interests.

62.714G Science and Government

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, leading to evaluation of the structure of modern government. The impacts of two world wars and the ‘cold war’. Differences between countries in scientific organization and science policy.

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.

Note: The half units 10.1113 (10.1213) and 10.1114 (10.1214) together replace the unit 10.111B (10.121B). The half units 10.2111 (10.2211) and 10.2112 (10.2212) together replace the unit 10.211A (10.221A). The half units 10.2113 (10.2213) and 10.2114 (10.2214) together replace the unit 10.211D (10.221D).

10.001 Mathematics I

Prerequisite: F L4T2

HSC Exam
Percentile Range
Required

2 unit Mathematics
71-100

or

3 unit Mathematics
11-100 # #

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.

** When a unit is listed as a prerequisite or co-requisite, the appropriate higher unit may be substituted.

# # Results in the percentile range 11-30 at a standard acceptable to the Professional Board.

# Results in the percentile range 1-10 at a standard acceptable to the Professional Board.
### Sciences

**10.011 Higher Mathematics I**  
**FL4T2**

**Prerequisite:**

- HSC Exam  
- Percentile Range Required

<table>
<thead>
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<th>3 unit Mathematics</th>
<th>71-100</th>
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<tbody>
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<td>or 4 unit Mathematics</td>
<td>1-100 #</td>
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</table>

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.); co-ordinate 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.

**10.021B General Mathematics IB**  
**S1 or S2 L4T2**

**Prerequisite:**

- HSC Exam  
- Percentile Range Required

<table>
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<th>31-100 # # #</th>
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<tr>
<td>or 3 unit Mathematics</td>
<td>11-100 #</td>
</tr>
<tr>
<td>or 4 unit Mathematics</td>
<td>1-100 #</td>
</tr>
<tr>
<td>or 10.021A</td>
<td></td>
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</tbody>
</table>

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)**  
**FL1T1**

**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)**  
**FL1T1**

**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.

**10.041 Introduction to Applied Mathematics**  
**S2 L4T2**

**Co-requisite:** 10.001.

Not offered in 1979.

Combinatorial mathematics, finite differences, games and networks, hydrostatics, mathematical models.

### Pure Mathematics

**10.111A Pure Mathematics II — Linear Algebra**  
**FL1½T½**

**Prerequisite:** 10.001. Excluded: 10.121A.


**10.1111 Pure Mathematics II — 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 II — Geometry**  
**S2 L1½T½**

**Prerequisite:** 10.001. **Co-requisite:** 10.1111. Excluded: 10.121C.

Elementary concepts of Euclidean, affine and projective geometries.

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† 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.

* These units are also available to Faculty of Science student 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.

# Results in the percentile range 1-10 at a standard acceptable to the Professional Board.

# # # Results in the percentile range 31-70 at a standard acceptable to the Professional Board.
10.1113 Pure Mathematics II — Multivariable Calculus  
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  
Prerequisite: 10.001. Excluded: 10.1214.

Analytic functions, Taylor and Laurent series, integrals. Cauchy’s Theorem, residues, evaluation of certain real integrals.

10.121A Higher Pure Mathematics II — Algebra  


10.121C Higher Pure Mathematics II — Number Theory and Geometry  

Galois fields, quadratic reciprocity, quadratic forms, continued fractions, number theoretic functions; axioms for a geometry, affine geometry, Desargues’ theorem, projective geometry.

10.1213 Higher Pure Mathematics II — Multivariable Calculus  
Prerequisite: 10.011. Excluded: 10.1113.

As for 10.1113 but in greater depth.

10.1214 Higher Pure Mathematics II — Complex Analysis  
Prerequisite: 10.1213. Excluded: 10.1114.

As for 10.1114 but in greater depth.

10.112C Pure Mathematics III — Differential Geometry  
Prerequisites: 10.111A, 10.1113. Co-requisites: ***. Excluded: 10.122C.


10.1121 Pure Mathematics III — Number Theory  
Prerequisites: ***. Excluded: 10.121C.

Euclidean algorithm, congruences, sums of squares, diophantine equations.

10.1122 Pure Mathematics III — Algebra  
Prerequisite: 10.111A. Co-requisite: 10.1111. Excluded: 10.122A.

Rings, polynomials, fields.

10.1123 Pure Mathematics III — Set Theory  
Prerequisites: ***.

Intuitive and axiomatic set theory. Cardinal and ordinal numbers. The axiom of choice.

10.1124 Pure Mathematics III — Combinatorial Topology  
Prerequisites: ***.

Elementary combinatorial topology of surfaces.

10.1125 Pure Mathematics III — Ordinary Differential Equations  
Prerequisites: ***. Excluded: 10.122E.

Systems of ordinary differential equations; variations of constants formula, stability, Poincaré space; Lyapunov’s direct method.

10.1126 Pure Mathematics III — Partial Differential Equations  
Prerequisites: 10.1113, 10.1114. Co-requisite: 10.1125.

Systems 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  
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  
Prerequisites: ***. Excluded: 10.122B.


10.1129 Pure Mathematics III — Real Analysis  
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.

*** 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 and are concurrently attempting the remaining unit.


10.122A Higher Pure Mathematics III — Algebra  F L2T½  
Prerequisite: 10.121A. Excluded: 10.1122.  
Field theory and theory of rings and modules.

10.122B Higher Pure Mathematics III —  
Integration and Functional Analysis  F L2T½  
Lebesgue Integration; Fourier series; normed vector spaces; Hilbert spaces; measure theory.

10.122C Higher Pure Mathematics III —  
Topology and Differential Geometry  F L2T½  
Prerequisite: 10.121A, 10.1213. Excluded: 10.1124, 10.112C.  
The axiom of choice, metric and topological spaces, compactness. Compact surfaces, triangulations, geodesies, Gauss-Bonnet theorem.

10.122E Higher Pure Mathematics III — Complex  
Analysis and Differential Equations  F L2T½  
Prerequisites: 10.1213, 10.1214. Excluded: 10.1125.  
Analytic continuation; entire and meromorphic functions; elliptic functions; normal families and further advanced topics in complex analysis. Existence and uniqueness theorems for ordinary differential equations; linear systems; qualitative theory of autonomous systems; equations on manifolds.

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 L1½T½  
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  S2 L1½T½  
Prerequisites: 10.001. Excluded: 10.2212.  
10.212A Applied Mathematics III — Numerical Analysis

Prerequisites: 10.2111, 10.2112, 10.111A. Excluded: 10.222A.


10.212L Applied Mathematics III — Optimization Methods

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

Prerequisites: 10.1113 & 10.1114, 10.111A or 10.2113. Excluded: 10.222M.

Optimal control of systems described by difference equations, continuous-time dynamic programming, calculus of variations, Pontryagin maximum principle, stochastic decision processes. Applications of control theory to resource allocation, control of production, investment, inventory, and advertising, and to models of the economy.

10.222A Higher Applied Mathematics III — Numerical Analysis

Prerequisites: 10.2211 or 10.2111 (Dist), 10.2212 or 10.2112 (Dist), 10.121A or 10.111A (Dist). Excluded: 10.212A.

As for 10.212A but in greater depth.

10.222C Higher Applied Mathematics III — Maxwell's Equations and Special Relativity

Prerequisites: 10.2211 or 10.2111 (Dist), 10.2212 or 10.2112 (Dist), 10.1213 or 10.1113 (Dist), 10.1214 or 10.1114 (Dist). 1.001. Excluded: 1.033.


10.222F Higher Applied Mathematics III — Quantum Mechanics

Prerequisites: 10.2211 or 10.2111 (Dist), 10.2212 or 10.2112 (Dist), 10.121A or 10.111A (Dist)., 10.1213 or 10.1113 (Dist), 10.1214 or 10.1114 (Dist). Excluded: 1.013.


10.222L Higher Applied Mathematics III — Optimization Methods

Prerequisites: 10.1213 or 10.1113 (Dist)**. Excluded: 10.212L.

As for 10.212L but in greater depth.

10.222M Higher Applied Mathematics III — Optimal Control Theory

Prerequisites: 10.1213 or 10.1113 (Dist), 10.1214 or 10.1114 (Dist), 10.121A or 10.111A (Dist), or 10.2213 or 10.2113 (Dist). Excluded: 10.212M.

As for 10.212M but in greater depth.

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.

Note: The half units 10.1113 (10.1213) and 10.1114 (10.1214) together replace the unit 10.111B (10.121B). The half units 10.2111 (10.2211) and 10.2112 (10.2212) together replace the unit 10.211A (10.221A).

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

Prerequisites: 10.001 or 10.021C (Cr). Excluded: 10.321A, 10.301, 10.331, 45.101.


* The evening course for 10.311A, subject to sufficient enrolment, runs at 3½ hours per week throughout the year.

** 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 (Dist), 10.1214 or 10.1114 (Dist), 10.2211 or 10.2111 (Dist), 10.2212 or 10.2112 (Dist), 10.2213 or 10.2113 (Dist), 10.2214 or 10.2114 (Dist).
10.311B Theory of Statistics II — Basic Inference
Prerequisite: 10.311A. Excluded: 10.321B, 10.301, 10.331, 45.101.
Point estimation (moments, maximum likelihood, minimum $\chi^2$, 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.

Probability and Random Variables
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
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
Prerequisites: 10.311A, 10.111A, 10.1113, 10.2112. 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.

10.322A Higher Theory of Statistics III —
Probability and Stochastic Processes
Prerequisites: 10.321A, 10.111A, 10.1113, 10.2112. Excluded: 10.312A.
As for 10.312A but in greater depth.

10.312B Theory of Statistics III — Experimental
Design (Applications) and Sampling
Prerequisite: 10.311B or 10.331 (normally Cr). Excluded: 10.322B.
Principles of good experimental design. Completely randomized
Analysis of factorial experiments. Multiple comparison methods. Random
models. Split plot design. Sampling theory.

10.312C Theory of Statistics III —
Experimental Design (Theory)
Prerequisites: 10.311B, 10.111A, 10.1113, 10.2112. Co-requisites:
10.312B, plus any two Level III Pure Mathematics or Applied Mathema-
tics or Theoretical Mechanics units. Excluded: 10.322C.
theorem. Hypothesis testing. Analysis of variance.

10.322B Higher Theory of Statistics III —
Experimental Design (Applications)
and Sampling
Prerequisites: 10.312B, 10.111A, 10.1113, 10.2112. Excluded: 10.312B.
As for 10.312B but in greater depth.

10.322C Higher Theory of Statistics III —
Experimental Design (Theory)
Prerequisites: 10.321B, 10.111A, 10.1113, 10.1114, 10.2112. Co-
requisites: 10.322B, plus any two Level III Pure Mathematics or Applied
Mathematics or Theoretical Mechanics units. Excluded 10.312C.
As for 10.312C but in greater depth.

10.312D Theory of Statistics III —
Probability Theory
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
treatment of Markov chains. Markov chains with continuous par-

10.322D Higher Theory of Statistics III —
Probability Theory
Prerequisites: 10.321B, 10.111A, 10.1113, 10.1114, 10.2112. Co-
requisites: Any two Level III Pure Mathematics or Applied Mathematics
or Theoretical Mechanics units. Excluded: 10.312E.
Bayesian inference and decision theory. Classical inference. Contin-

gency tables (large sample and exact tests). Order Statistics. Non-

darametric methods.

10.322E Higher Theory of Statistics III —
Statistical Inference
Prerequisites: 10.311B, 10.111A, 10.1113, 10.2112. Co-requisites:
Any two Level III Pure Mathematics or Applied Mathematics or
Theoretical Mechanics units. Excluded: 10.322E.
Bayesian inference and decision theory. Classical inference. Conting-
cy tables (large sample and exact tests). Order Statistics. Non-

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 sur-
faces. Stochastic processes. Theories of inference. Sequential analy-
10.301 Statistics SA  F  L 1 ½T½

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  L 1 ½T½

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 \( \chi^2 \) 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 L3T1
Prerequisite: 10.001. Co-requisites: 10.411B or 10.121, 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, method of images, harmonic functions, and axially symmetric flow. Introduction to compressible and viscous fluids.

10.411B Theoretical Mechanics II — Principles of Theoretical Mechanics  S1 L3T1
Prerequisites: 10.001, 10.011 or 10.041, 5.010. Co-requisites: 10.211, 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 L3T1
Prerequisites: 10.011 or 10.001 (Dist). 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 L3T1
Prerequisites: 10.011 or 10.001 (Dist), 10.001 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  L 1 ½T½
Prerequisites: 10.2111, 10.2112, 10.111, 10.1113, 10.1114. Co-requisites: 10.411A or 10.121 or 1.913. Excluded: 10.422B.


10.412D Theoretical Mechanics III — Mathematical Methods  F  L 1 ½T½
Prerequisites: 10.2112, 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 (Dist). 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 10.421B (Dist) or 10.121. Excluded: 10.412B.

As for 10.412B but in greater depth.

10.422D Higher Theoretical Mechanics III — Mathematical Methods  F  L 1 ½T½
Prerequisites: 10.2211 or 10.2111 (Dist), 10.2212 or 10.2112 (Dist), 10.1213 or 10.1113 (Dist), 10.1214 or 10.1114 (Dist). Excluded: 10.412D.

Revision of functions of a complex variable, contour integration. Asymptotic expansions with applications to special functions. Methods

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

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<td>10.342A</td>
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<td>35.670</td>
<td>Mathematics for Builders</td>
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<tr>
<td></td>
<td>(Calculus, Algebra &amp; Geometry)</td>
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</tbody>
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Graduate Study

10.062G Advanced Mathematics General
For research workers throughout the University requiring employment of advanced mathematics. Topics vary from year to year according to demand and interest.

10.073G Advanced Mathematical Analysis of Data
Development of aspects of transform, representation and distribution theory and applies them to the processing and evaluation of discrete sample values of one and two-dimensional functions.

1. Pulse and ramp functions (sinc, Gaussian, diffraction, error, sine integral, etc).
2. Schwartz distributions (Heaviside, delta, sign, etc; Fourier test function; Gibbs' phenomenon; generalised limits).
3. Spectral and other properties of functions and distributions (time and band limited functions).
5. Sampling of functions (sampling interval, truncation effects, coltabular functions, fold frequency, aliasing).

6. Filters and windows; noisy data; implications of smoothing; measure of roughness.
7. Representation of functions (Fourier, Chebychev, Lagrange, etc. Sampling Theorem and the alias).
8. Interpolation in one and two dimensions (truncation errors, plotting of profiles and contours).

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.

10.372G Statistics 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 analysis, 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 randomised design, the randomised block design, the \(2^7\) factorial fully randomised design, and the fully randomised 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

10.384G Time Series
Subject Descriptions

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 Non-Experimental Statistics
Simple, stratified and systematic random sampling. Estimation of proportions, ratios, and sample sizes. Multi-stage sampling.

10.388G Sequential Analysis
The sequential probability ratio test — OC and ASN functions. General theory of sequential tests. Sequential estimation.

10.389G Non-Parametric Methods

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, advanced order statistics, population statistics, non-linear programming, discrete distribution theory and other topics.

10.401G Seiches and Tides

Servicing Subjects

10.061G Advanced Mathematics for Electrical Engineers
10.361G Statistics
10.371G Statistics
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
10.481G Essay

Mechanical and Industrial Engineering

Undergraduate Study

5.010 Engineering A

Prerequisite: HSC Exam

Percentile Range

Required

SS L4T2

Either

2 unit Science (Physics) 31-100
or

4 unit Science (incl. Physics) 11-100

or

2 unit Industrial Arts 31-100

or

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.


Introduction to Engineering Design: Engineering method, problem identification, creative thinking, mathematical modeling, 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  
Prerequisite: 5.010.


5.030 Engineering C  
SS L/T6


And one of the following options (determined by the course of study):

1. (Mechanical, Industrial and Aeronautical Engineering and Naval Architecture students must take this option) Design for Manufacture I: Approximately 30 hours of workshop training, including casting, fitting, machining, welding. Principles of design for manufacture.

2. 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.

3. Introduction to systems and Computers: Introduction to computers to follow the computer work in Mathematics I. To develop: (1) familiarity with algorithms; (2) the use of procedure oriented languages; and (3) an introduction to computing equipment.

Systems. To give students an appreciation of some of the concepts used in engineering, to relate the concepts to phenomena within their experience, and to illustrate them by case histories and engineering examples. Quantities. Concepts. Components. Systems.

4. (Chemical Engineering students must take this option) Introduction to Chemical Engineering: Routes to and end uses of industrial chemicals. Likely new industrial chemicals. A survey of several Australian chemical industries from the point of view of their historical and economic importance. Examination of the unit operations involved in the industry and the raw materials, equipment and services used. Environmental aspects of the chemical industry.

5. (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.

6. (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.

7. (Electrical Engineering students must take this option) Introduction to Computing: Introduction to computer program design with emphasis on the design of correct, reliable programs. The subject is organized on a tutorial basis and a number of simple fundamental programming tasks are illustrated. Programs are written in a high level language which provides facilities for the specification of algorithms and data structure.


9. (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.

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, aluminum and other metals. Elementary process analysis. Laboratory analysis and solution of problems.

4.402 Physical Metallurgy I  
S1 L3T3  S2 L2T4  


* This unit is taken in Session 1.
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


4.502 Mechanical Properties of Solids

Co-requisite: 4.402.


4.602 Metallurgical Engineering I

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


4.403 Physical Metallurgy II

Prerequisite: 4.402. Excluded: 1.313.


4.503 Mechanical Metallurgy


4.613 Metallurgical Engineering IIA

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 IIC, 3.122 Unit 4 (see Faculty of Applied Science Handbook).

4.703 Materials Science

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

Prerequisite: 4.303.


4.324 Chemical and Extraction Metallurgy IIIB

Prerequisite: 4.303.

A selection of advanced topics in chemical and extractive metallurgy.

4.404 Physical Metallurgy III

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

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*

An experimental investigation of some aspects of metallurgy.

* Project includes three weeks laboratory work during the Midyear Recess.
Sciences

4.054 Metallurgy Seminar  FL2T0
A course of lectures on the preparation and presentation of technical papers. Each student is required to prepare and present a paper on a nominated subject.

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Microbiology

Undergraduate Study

Level II Units

44.101 Introductory Microbiology  S1 L2T4
Prerequisites: 17.011 & 17.021 or 17.031 & 17.021.

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.

44.111 Microbiology  F L1T2
This unit is not acceptable as a prerequisite for Level III Microbiology units except on the recommendation of the Head of School.

A short introduction to microbiology which is designed to familiarize students, without previous biological training, with microorganisms and with the methods used in their isolation and identification. The contents of the course is similar to that of 44.101.

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.

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: 17.011 & 17.021 or 17.031 & 17.021, 41.101 or 41.101A and 41.101B.

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, 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 (Honours) Units

44.513 General Microbiology
Microbial taxonomy, structure and function, physiology, ecology and genetics.

44.523 Applied Microbiology
Selected aspects of industrial microbiology including fermentation processes, food production and food spoilage, soil microbiology; pathogenesis of microorganisms and host resistance; diagnostic medical microbiology; chemotherapy, disinfection and sterilization.

44.533 Immunology
Phylogeny and ontogeny of the immune response, non-specific and specific immune mechanisms; hypersensitivity reactions; immunology; diagnostic serology, immunoprophylaxis and therapy.

44.543 Virology
A detailed study of virus-host interactions based on examples of bacterial and animal viruses; virus genetics, epidemiology of virus diseases; diagnostic virology.

44.553 Electron Microscopy
The principles and practice of electron microscopic techniques.
44.563  Microbiology Project I
A supervised laboratory project of 150 hours duration designed to provide experience in a wide range of microbiological and immunological techniques and to introduce students to the general principles of research methodology, particularly at an applied level.

44.573  Microbiology Project II
A supervised laboratory project of 300 hours duration. While consider- able emphasis will be given to acquiring technical competence in many microbiological or immunological techniques, the projects in this unit will provide greater scope for training in research methodology.

44.583  Microbiology Project III
A supervised laboratory project of 500 hours minimum duration. These projects provide training in research in fundamental aspects of microbiology or immunology, with special emphasis on the development and use of specialized techniques relevant to the particular field of study.

Optometry

Undergraduate Study

31.811  Optometry I  F L4T4
Prerequisites: 1.011 or 1.001 or 1.021, 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.


31.812  Optometry II  F L8T7


31.813  Optometry III  F L6T0
Prerequisite: 31.812, 31.831.


31.821  Special Anatomy and Physiology  F L3T3
Prerequisites: 17.031, 17.021. Co-requisite: 73.011A.


31.831  Diseases of the Eye  F L2T1


31.704G Advanced Contact Lens Studies F L1T3
Contact lens materials: polymer chemistry, physical and chemical properties of soft and hard lens materials.

31.705G Advanced Contact Lens Practice F L1T3
The examination, evaluation and aftercare of contact lens patients.

31.706G Occupational Optometry F L2T2

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, macro-photography, micro-photography. 'Invisible light' photography (ultraviolet and infra-red), photofluorography, speedlight techniques, fundus photography. Dark-room techniques, portable dark-rooms. Quantitative photographic data analysis.

31.799G Project
Formerly Department of Behavioural Science; new name effective from 1 January 1979.

For subject descriptions, see page 136.
Philosophy

First Enrolment in Philosophy

New Students normally enrol in
52.103 Introductory Philosophy A (Session 1).
52.104 Introductory Philosophy B (Session 2).
Each of these has 1-unit value.

Students who do not take Philosophy in Session 1 may, however, still qualify for admission to Upper Level work by passing 52.104 Introductory Philosophy B in Session 2.

Students in their second or later year of study may proceed immediately to Upper Level work after passing 52.103 Introductory Philosophy A alone.

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 is 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 recommended 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 personally should consult the School.

Undergraduate Study

52.103 Introductory Philosophy A S1 L3T1

Topics include: some arguments concerning the immortality of the soul; the problem of personal identity; the nature of Freud's theory of dream interpretation, whether scientific or non-scientific; objectivity, subjectivity and ideology.

52.104 Introductory Philosophy B S2 L3T1

Topics include: the logician's approach to language, reasoning and belief; 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.

52.1531 Predicate Logic A S1 L2T0
Prerequisite: Any Level I unit. Not available to students who have already taken 52.153 or 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.

52.1532 Predicate Logic B S2 L2T0
Prerequisite: 52.1531. Not available to students who have already taken 52.153 or 52.162.

A continuation of Predicate Logic A, including the theories of identity and of definite descriptions.

52.163 Descartes S1 L2T0
Prerequisite: Level II status in Philosophy.**

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.

52.173 British Empiricism S2 L2T0
Prerequisite: Level II status in Philosophy.**

The empiricist tradition with special concentration on Locke and Berkeley.

52.183 Greek Philosophy: Thales to Plato S1 L0T2
Prerequisite: Level II status in Philosophy.**

The leading ideas of the Greek philosophers from Thales to Plato, with special reference to Pre-Socrates.

52.193 Scientific Method S1 L2T0
Prerequisite: Level II status in Philosophy.**

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.

52.203 Classical Political Philosophy S1 L2T0
Prerequisite: Level II status in Philosophy.** Excluded: 52.182.

The basis of political society, its various functions and its relation to the individuals in it, investigated through the works of a number of historically central philosophers. 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.

** 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.
52.213 Sartre S1 L2 T0
Prerequisite: 52.163.
Sartre's account of freedom, relations between persons and his social theory.

52.233 Argument S2 L2 T0
Prerequisite: Level II status in Philosophy.**
A theoretical study of practical argumentation in the courtroom, politics and everyday life as compared with argument in logic, mathematics and theoretical science. Confirmation and probability, authority, testimony, precedent; rules of debate; criteria of validity; problem of mechanization of practical arguments: logical rationalism and scepticism.

52.263 Philosophy of Psychology S2 L2 T0
Prerequisite: 52.193.
Some aspects of fundamental theory of psychology, with special emphasis on classical and contemporary behaviourism and behaviourist oriented psychology, and on the general conceptions of "behaviour" and "purpose".

52.273 Aesthetics S2 L2 T0
Prerequisite: Level II status in Philosophy.**
The central concepts, types of judgment and theories occurring in the fields of aesthetics, art criticism and literary criticism.

52.283 Philosophical Study of Woman S2 L2 T0
Prerequisite: Level II status in Philosophy.**
Crucial structures involved in woman's situation.

52.293 Plato's Later Dialogues S2 L2 T0
Prerequisite: 52.483 (or, by permission, a course covering similar material).
Centred round some of Plato's later dialogues, the Theaetetus and Sophist in particular.

52.303 Spinoza and Leibniz S2 L2 T0
Prerequisite: 52.163.
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.

52.333 Philosophy of Perception S2 L2 T0
Prerequisite: 52.163 or 52.173.
What it is that we are directly aware of when we perceive something. Emphasis on twentieth-century sense-data theories and their critics.

52.343 Privacy and Other Minds S1 L2 T0
Prerequisites: 52.163 and either 52.173 or 52.243.
The questions: (a) whether there is anything that a person can know which it is logically impossible for anybody else to know; (b) whether it is logically possible that anybody should speak a language that cannot be understood by anybody else; and (c) how we come to understand another person's mind.

52.353 History of Modern Logic S1 L2 T0
Prerequisite: 52.153 or 52.1532.
A historical treatment of selected topics in logic since Boole, with particular reference to Frege, Russell, Carnap and Quine.

52.373 Philosophical Foundations of Marx's Thought S1 L2 T0
Prerequisite: Level II status in Philosophy.**
A discussion of the basics of Marx's historical materialism and dialectical materialism.

52.393 History of Traditional Logic S2 L2 T0
Prerequisite: 52.153 or 52.1532.
A historical treatment of selected topics in logic before 1850, including the traditional theory of deduction; the rhetorical tradition; topics and fallacies; the medieval theory of terms; traditional treatment of modality; logic in India and China.

52.403 Model Theory S2 L2 T0
Prerequisite: 52.323 or 10.1123.
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.

**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.
52.413 Reading Option A S1 or S2
Admission by permission, to suitable students with good passes in at least two half-units at Level II.
A course of individually supervised reading and assignments on an approved topic not otherwise offered.

52.423 Seminar A S2 L0T2
Admission by permission, based on a student's performance in Level II units. Topics vary from year to year and are influenced by student requests. Topics may include:
- Contemporary Ethics
- Logical Atomism
- Wittgenstein
- Theories of the Emotions

52.433 Seminar B S1 L0T2
As for 52.423 Seminar A.

52.443 Seminar C S2 L0T2
As for 52.423 Seminar A.

52.453 Reading Option B S1 or S2
As for 52.413 Reading Option A.

52.463 Introduction to Transformational Grammar S1 L2T0
Prerequisite: Any Level I unit.
Transformational grammar from the beginning: its history, goals, theory, and practice, emphasizing understanding and constructing arguments for one transformational system over another.

52.473 Meaning and Truth S2 L2T0
Prerequisite: 52.1531 or 52.463 or 52.153.
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.

52.483 Plato's Theory of Forms S1 L2T0
Prerequisite: Level II status in Philosophy** (Not available to students who have taken a similar course at Level I).
Some dialogues of Plato, with special attention to Socratic definition and Plato's Theory of Forms.

52.513 Social and Political Philosophy S2 L2T0
Prerequisites: Level II Status in Philosophy** and 52.182 or 52.203.
Largely through contemporary writings, including a number of journal articles, examination of such notions as justice, liability, responsibility, coercion, rights and punishment and the issues surrounding these notions.

52.523 Classical Ethical Theories S1 L2T0
Prerequisite: Level II Status in Philosophy**
Some central and quite influential works in the history and development of moral philosophy. Comparison of certain aspects of these moral theories; comparison of the varying approaches taken by these philosophers, and the development of certain ideas through these philosophers. Stress on examining and understanding each theory in itself.

52.533 Contemporary Ethics S2 L2T0
Prerequisite: 52.523*.
A survey of some central themes in contemporary ethical theory (beginning with G. E. Moore), focusing primarily on questions concerning the use, meanings, and logic of moral terms and concepts.

52.543 The Philosophy of Love S1 L2T0
Prerequisite: Level II status in Philosophy**.
Four main topics:
1. The distinction between eros and agape. This, together with the cognitive distinctions between desire and love and between lust and love, is considered with an emphasis on Plato, St Paul, St Augustine, St Thomas Aquinas, and Luther. Ordo, Lucretius and Freud are given secondary consideration in this section (Freud on genital and narcissistic love).
2. The relation between love and reason. This, together with the relation between love and will, is studied mainly in Plato, St Augustine and St Thomas. Freud is given secondary consideration.
3. Union and separation. This is studied mainly in Plato, St Augustine, Plotinus. Secondary consideration is given to St Teresa, Hegel, McTaggart and Freud.
4. Courtly and romantic love. The main interest here lies in the attachment to the unattainable and it is treated in various texts from the troubadours to the modern novel and film.

52.553 Contemporary Moral Issues S2 L2T0
Prerequisite: Level II status in Philosophy**.
Investigation and discussion of a number of contemporary moral issues such as abortion, prejudice and discrimination, privacy, war and civil disobedience, punishment, and sexual morality.

52.563 Hume S1 L2T0
Prerequisite: Level II status in Philosophy**. Excluded 52.152.
A study of Hume's epistemology, his discussion of arguments for the existence of God, free will and the basis of morals.

52.573 Psychoanalysis—Freud and Lacan S2 L2T0
Prerequisite: Level II status in Philosophy**
A discussion of psychoanalytic theory, particularly for what it shows about the relation between the individual and the social.

** 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.
* May be waived with the consent of the lecturer.
52.583 Theories, Values and Education
S1 L2T0
Prerequisite: Level II status in Philosophy**.

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.

Physics

Undergraduate Study

Physics Level I Units

1.001 Physics I F L3T3

Physics and/or Chem.)

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 radioactivity, electronics, and

Either geometrical optics, optical instruments, wave optics, microscopes and their uses,

Or advanced electronics (Optometry students).

Physics Level II Units

1.012 Mechanics and Thermal Physics S1 L3T2
Prerequisites: 1.001 or 1.011, 10.001. Co-requisite: 10.2111.

Properties of solids and liquids, elasticity, hydrostatics, hydrodynamics, damped and forced vibrations, resonance, coupled systems, normal modes, Fourier analysis, waves, group velocity, reflection and transmission at a boundary.

Kinetic theory, Maxwell velocity distribution, transport coefficients, first and second laws of thermodynamics, thermodynamic functions, simple applications, microscopic approach to thermodynamics, Boltzmann probability.

Additional material is studied for the award of Distinction/High Distinction.

1.022 Electromagnetism and Modern Physics S2 L3T2
Prerequisites: 1.001 or 1.011, 10.001. Co-requisite: 10.2111. Excluded: 1.932.

Electrostatics in vacuum and in dielectrics, Gauss' law, current density, magnetostatics in vacuum and in magnetic materials, electromagnetic induction, displacement current, Maxwell's equations, simple solutions, applications.

# Results in the percentile range 1-10 at a standard acceptable to the Professorial Board.

** 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.
Special theory of relativity, Lorentz transformation, simultaneity relativistic mass, momentum and energy, formalism of wave mechanics, Schrödinger’s equation, simple solutions, hydrogen atom, spectra, electron spin, selection rules, exclusion principle, Zeeman effect, molecules.

Additional material is studied for the award of Distinction/High Distinction.

1.032 Laboratory F T3
Prerequisites: 1.001 or 1.011, 10.001. Excluded: 1.922.

Alternating current circuits, complex impedance, resonance, mutual inductance, introductory electronics, diode 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.

1.023 Statistical Mechanics and Solid State Physics S1 L3T1
Prerequisites: 1.012, 1.022, 10.2111 & 10.2112. Excluded: 10.222C.

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 model of metals, band theory, point defects, dislocations.

Additional material is studied for the award of Distinction/High Distinction.

1.013 Quantum Mechanics and Nuclear Physics F L1½T1½
Prerequisites: 1.012, 1.022, 10.2111 & 10.2112. Excluded: 2.023A, 10.222F.

Concepts and formulation, expectation values and measurement, steps, wells, and barriers, tunnelling, harmonic oscillator, perturbation theory, hydrogen atom, angular momentum operators, spin and spin orbit coupling, vector model, line structure, identical particles, helium atom, spectroscopy, electron states in molecules and solids.

Detecting instruments for nuclear particles, counting statistics, Rutherford scattering, radioactivity, radiative processes, reactions, optical model, parity, introduction to particle physics, mesons, baryons, quarks.

Additional material is studied for the award of Distinction/High Distinction.

1.033 Electromagnetism and Optical Physics S2 L3T1
Prerequisites: 1.012, 1.022, 10.2111 & 10.2112. Excluded: 10.222C.

Wave equation, reflection and transmission at dielectric, metallic and plasma interfaces, Fresnel equations, skin depth, waveguides and cavities, radiation fields, dipole and long antenna.

Fourier theory, diffraction from rectangular and circular apertures, interference and interferometry, coherence, image formation, resolution, holography, Fourier transform spectroscopy.

Additional material is studied for the award of Distinction/High Distinction.

1.043 Experimental Physics F T6
Prerequisites: 1.012, 1.022, 1.032.

A course of instruction in modern experimental techniques, methods of experimental design and analysis of results. Experiments, which will in the main consist of small open-ended projects, will be available in many areas of physics including electromagnetic waves, solid state physics, nuclear physics, atomic physics and spectroscopy, optical and laser physics, vacuum systems.

1.133 Electronics S1 L2T4
Prerequisite: 1.922 or 1.032.


1.143 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, Hodgkin and Huxley equations.


1.153 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.

1.163 Astrophysics S1 L1½T½
Prerequisite: 1.022.


1.173 Conceptual Framework of Physics S2 L2T1
Prerequisites: 1.012, 1.022. Co-requisites: 1.013, 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.

1.313 Physics of Materials S2 L2T4


1.323 Physics of Measurement S1 L2T4
Prerequisite: 1.032.


1.333 Applications of Radiation S2 L2T4
Co-requisite: 1.033.


1.513 Plasma and Laser Physics S2 L3T1
Prerequisites: 1.012, 1.022.

Experimental and theoretical problems in plasma physics. Plasma waves, magnetohydrodynamics, magnetic confinement of plasmas for nuclear fusion, laboratory, extraterrestrial and chemical plasmas. Theory of lasers; lasers of various types and properties. Interaction of high intensity lasers with plasmas; experiments and theory of plasma properties and nonlinear effects, absorption, self-focusing. Laser compressed nuclear reaction plasmas, relativistic effects, pair production.

1.523 Relativity and Electromagnetism S1 L3T1
Prerequisites: 1.012, 1.022, 10.2111 & 10.2112, 10.111A, 10.1113 & 10.1114.


1.913 Marine Acoustic and Seismic Methods (Oceanography Unit) F L2T1
Excluded: 25:634.

Component given by School of Physics (S1):


Component given by School of Applied Geology (S2):

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.

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.

1.115G Critical Literature Review
For MPhysics students.

1.125G Research Project
For MPhysics students.

1.135G Atomic Physics
For MPhysics students.

Ionization of gases, electron scattering, impact ionization, ion sources, atomic spectroscopy.

1.145G Biophysics
For MPhysics students.

NMR studies of ions in living systems, thermodynamics of irreversible processes applied to ion accumulation and membrane potentials, electrical properties of membranes, nerve excitation, feedback systems in man.

1.155G Crystallography
For MPhysics students.

Diffraction and lattice dynamics, improved methods of structure determination, X-ray and neutron diffraction.

1.165G Solid State Transport
For MPhysics students.

Thermogalvanomagnetic effects in semiconductors, lattice conductivity, high field transport in insulators, electrical breakdown, effects of defects and dislocations on diffusion.

1.175G Magnetic Materials
For MPhysics students.

Ferromagnetic properties of rare-earth and transition-metal alloys, high field magnetization, electron spin resonance, magnetic properties of transition-metal oxides, phase transitions, magnetic minerals.

1.185G Surface Physics
For MPhysics students.

Surface properties of semiconductors and metals, low-and-high energy electron diffraction from surfaces, EPR and Auger spectroscopy applied to surfaces, surface melting, surface barriers.

1.195G Materials Irradiation
For MPhysics students.

Interaction of energetic charged particles and photons with solids, channelling, blocking and sputtering phenomena, radiation damage, strength of solids, fracture propagation.

Servicing Subjects

1.931 Physics I (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)
1.991 Physics I (Architecture)
1.962 Physics of Measurement (Surveying)
1.972 Electromagnetism (Electrical Engineering)
1.982 Solid State (Electrical Engineering)
1.992 Thermal Physics and Classical Mechanics (Electrical Engineering)
Acoustic waves in solids. Effects of radiation-induced defects on ultrasonic propagation, internal friction, acoustic spectroscopy, propagation in heterogeneous media, transients.

1.917G Vibration and Wave Theory I
For MSc(Acoustics) students.
Simple oscillator, damped oscillator, ordinary differential equations, complex numbers, forced vibrations and resonance, coupled oscillators. Plane waves, interference and diffraction.

1.927G Acoustic Theory
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
For MSc(Acoustics) students.
Microphones, amplifiers, loudspeakers, filters, recorders, pick-ups, noise generators. Acoustic measuring instruments.

1.947G Advanced Physical Acoustics (Elective)
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, multiwalls, 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
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.

1.967G Vibration and Wave Theory II
For MSc(Acoustics) students.
Fourier analysis, guided waves, electrical analogs, analysis of networks. Statistical distributions, probability, noise, correlation, sampling and digital procedures.

1.977G Electro-Acoustics
For MSc(Acoustics) students.
Sound reinforcement systems; ambiphony, assisted resonance. Special requirements for translation, language laboratories.

1.118G Methods of Theoretical Physics
For PhD, MSc and MPhysics students.
Part 1. Response functions and Green’s functions.
Part 2. Symmetry and group theory.
Part 3. Many particle systems.
Part 4. Tensor calculus and variational techniques.

1.128G Methods of Experimental Physics
For PhD, MSc and MPhysics students.
Part 1. General Methods: Signal processing, characterization of specimens, vacuum, high temperatures, low temperatures.
Not all these topics are covered in any one year.

1.119G Basic Solid State Physics
For GradDip in Current Science students.

1.129G Solid State Device Physics
For GradDip in Current Science students.
1.139G Biophysics S2 L2T1
For GradDip in Current Science students.


1.149G Physical and Applied Acoustics S1 L2T1
For GradDip in Current Science students.

Physical acoustics: ultrasonic measurement techniques, resonance methods, pulse-echo methods, optical diffraction and Brillouin scattering methods. Ultrasonic waves in solids, determination of elastic constants, internal friction due to viscoelastic and thermoelastic effects, dislocation damping, effects of deformation and radiation, acoustic emission, ultrasonic holography. Surface waves on crystals, propagation conditions, generation and detection, acoustic amplification in piezoelectric semiconductors. Sound waves and their properties, subjective acoustics, auditory response, audiology and deafness, articulation and intelligibility, loudness, speech and interference, critical band marking, damage risk criteria, impulsive noise conservation and compensation. Noise reduction: measurement and analysis, noise sources and their characteristics, material and systems—absorption and transmission loss, room acoustics, barriers and enclosures, noise control.

1.319G Measurement and Data-handling SS L1T2
For GradDip in Current Science students.

Electrical measurement techniques, ranging from DC to UHF. Transducers for conversion of measures of various physical quantities to electrical form. Noise in circuits. Digital instruments. Errors of observation and their treatment by statistical methods, using computers and desk calculators. Problems of measurement under adverse conditions.

1.329G Physics of Strong Materials SS L1T2
For GradDip in Current Science students.

Revision of bonding and structures in crystalline and non-crystalline solids; elastic and plastic properties. Ideal and real strength of solids; cracks in brittle and ductile materials. Strengthening of metallic and polymeric materials. Natural and synthetic fibrous composites and aggregates.

1.519G Laser Physics and Applications SS L2T0
For GradDip in Current Science students.

After reviewing some results of laser properties, technology and applications, the physical principles for lasers and basic concepts of quantum theory and optics are presented. Description of lasers: solid-state, liquid, gas, dye, chemical, semiconductor (junction lasers and electron beam excited lasers) from far infrared to X-rays and γ-rays, and present status of achieved results.

Physiology and Pharmacology

Undergraduate Study

73.111 Physiology IA F L2T4
Prerequisites: 17.021; 2.121, 2.131; 10.001 or 10.011 or 10.021 B & C. Excluded: 73.121, 73.011A.

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

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 oriented 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.

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.
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 capacities. 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 cardio-respiratory activity.

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.

The basic phenomena of behaviour and experience in a biological context.

Information processing and cognitive functioning, and social bases of behaviour and personality.

The personality development of the individual from birth through to death, focussing on the influences on such development from family of origin, school, peer group, work, marriage and other social groups. The theoretical contributions to an understanding of development from Freud, Piaget and Erikson.

Measurement and significance of individual differences in intellectual, motivational and personality functioning. Statistics, to cover the fundamentals of hypothesis testing.
12.152 Research Methods II  F L2T1
Prerequisite: 12.001. Excluded: 12.082.

General introduction to the design and analysis of experiments; hypothesis testing, estimation, power analysis; general treatment of simple univariate procedures; correlation and regression.

Psychology Level III Units: Group A

12.153 Research Methods II A  S1 L2T2
Prerequisite: 12.152.

Analysis of variance for single factor and multifactor designs. Fixed, random and mixed models. Test procedures for planned and post-hoc contrasts defined on parameters of fixed and mixed models. General principles of experimental design.

12.163 Research Methods II B  S2 L2T2
Prerequisites: 12.152, 12.153.

For students who intend to undertake a research thesis in Psychology IV, and is concerned with data analysis using the SPSS and PSY systems of computer programs, and with the statistical bases of these programs.

Psychology Level III Units: Group B

12.253 Learning II A  S1 L2T2
Prerequisites: 12.052, 12.152.

The establishment and elimination of extended sequences of behaviour in complex environments. Implications of the theories and research for applied work.

12.373 Psychological Assessment (Testing) II A  S1 L2T2
Prerequisites: 12.152 and 1 other Psychology Level II unit. Excluded: 12.042.

Principles and techniques of psychological assessment. Types of tests and their application in selection and allocation procedures.

12.413 Physiological Psychology II A  S1 L2T2
Prerequisites: 12.052, 12.152.


12.453 Human Information Processing II A  S2 L2T2
Prerequisites: 12.062, 12.152.

The stages involved in the reception of stimulus information from the environment, its analysis, storage, and translation into responses. Particular emphasis will be given to the processes which have the effect of reducing the amount of information to be subsequently stored or further processed. Special attention will be given to the comprehension, storage and utilization of semantic information.

Psychology Level III Units: Group C

12.173 Psychological Issues III  S1 L2T2
Prerequisites: 12.052, 12.062.

The historical and philosophical background to contemporary research problems in psychology.

12.263 Learning II B  S2 L2T2
Prerequisites: 12.052, 12.152, 12.253.

Enduring issues in conditioning and learning set in their contemporary and historical contexts. Issues include conditions of reinforcement, anticipatory responding, distribution of practice, and 'attentional-perceptual' phenomena.

12.303 Personality II A  S1 L2T2
Prerequisites: 2 Psychology Level II units.

Personality dynamics and structure. The practical work involves an exploration of student-chosen topics within designated areas of personality.
A restricted unit for potential Psychology IV students approved by the Head of School.

The psychology of interpersonal relationships and transactions, and the development of personality with special reference to experimental and social determinants. The practical work requires students to participate in groups.

Prerequisites: 2 Psychology Level II units, 12.303.

Ethology, psychology, and neurophysiology of motivational states and processes, and includes thirst, hunger, attachment, and addictions.

Prerequisites: 12.052, 12.152, 12.413.


Prerequisites: 12.062, 12.152, 12.553.

The effects of population, technology and urbanization on social change with special reference to individual functioning and the quality of life. The measurement of social change is treated in practical exercises.

Prerequisites: 2 Psychology Level II units. Excluded: 12.513.

The role of the psychologist in industry. Problems of power, authority and control. Theories of human nature and motivation, and their use by industrial psychologists.

Prerequisites: 2 Psychology Level II units.

A review of classical and contemporary psychophysical theories, namely theories which attempt to explain the relationship between physical and judged values of stimuli; an introduction to the methodology of psychophysical measurement; an examination of the relevance of psychophysical theories and methods to areas outside of sensory psychology where they have been traditionally developed.

Prerequisites: 12.062, 12.152. Excluded: 12.523.

Psychology Level IV Units

12.004 Psychology IV  
Prerequisites: All other Course requirements.

Psychology IV in the BSc in Psychology course. A program of selected study from the School’s Advanced Electives, chosen in consultation with the Head of School or his representative, plus a research thesis or project. Combinations of electives are available for students intending to specialize in areas of professional practice (eg clinical, community, psychological measurement) or in research.

12.014 Psychology IV (Research)  
Prerequisites: 12.001, 12.052, 12.062, 12.152 and 8 Psychology Level III units, including 12.153 and 12.163 from Group A and at least 3 units from Group B, at an average level of credit or better.

Psychology IV in the Science and Mathematics Course. Research and thesis, course work and readings to be determined in consultation with the Head of School.

12.044 Psychology IV (Course Work)  
Prerequisites: 12.001, 12.052, 12.062, 12.152 and 8 Psychology Level III units, including 12.153 from Group A and at least 3 units from Group B, at an average level of credit or better.

Psychology IV in the Science and Mathematics Course. Course work, practicum, project and readings to be determined in consultation with the Head of School.

Psychology Servicing Units

12.651 Psychology (Industrial Relations)

12.741 Psychology (Optometry)  
Prerequisite: 12.001.

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 habituation on perception. Throughout the course emphasis will be placed on an examination of relevant experimental data. Abnormal Psychology — The concept of normality-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

12.220G The Theoretical Bases of Clinical and Community Psychology

A comparative study of the major theoretical systems underlying present day clinical practice. Medical, experiential, cognitive, behavioural and social models of psychological disturbance. Theoretical issues which have given rise to the new field of community psychology.

12.221G Experimental Analysis and Modification of Problem Behaviour

The application of the principles of experimental psychology to the understanding and modification of a range of clinical problems (eg anxiety reactions, depression, sexual disorders, excessive alcohol consumption and other addictive behaviours, enuresis, speech problems, and the behaviour problems of children) using a range of techniques (eg systematic desensitization, aversive control, modelling, operant and contingency management, social skills training). Indirect methods of behavioural modification through verbal and non-verbal interpersonal influences. Problems of self-regulation of behaviour. Institutional regimes; techniques for producing social and institutional change.

12.228G Research Project

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.

12.231G Professional Practice

Supervised work with clients in the School’s clinic, and in approved institutions.

12.233G Psychodlagnosis and Clinical Assessment

The application of psychological theories and techniques to the diagnosis and assessment of abnormal and deviant behaviour in children and adults.

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. Topics: behavioural genetics; organic brain syndromes; schizophrenia; depression; psychophysiology of stress; metabolic and endocrinological aspects of behavioural disturbance; nutrition and behavioural disturbance; psychopharmacology and pharmacotherapy; somatic treatments.

12.239G Research and Evaluation Methods in Clinical and Community Psychology

Problems of experimental design in the clinical field; measurement and scaling; analysis of change, including sequential analysis, and the application of the experimental methods to the individual cases. Design and evaluation of community programs.

12.240G Graduate and Clinical Seminars

A series of seminars on topics of particular relevance to the practice of clinical psychology, eg the organization and regulation of psychology as a profession; ethical standards in relation to clients, members of other professions, and the public; legal aspects of psychological
practice. Additional topics dealing with contemporary issues in clinical psychology are chosen in consultation with students undertaking the seminars.

12.241G Graduate Colloquium
Participation in the staff-graduate student colloquium.

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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.

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Zoology†

Undergraduate Study

45.101 Biometry S1 L2T4

Statistical methods and their application to biological data, including: introduction to probability; the binomial, poisson, negative binomial, normal distributions; student's t, $\chi^2$ 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 $\chi^2$, the Kruskal-Wallis test, Fisher's exact probability test and rank correlation methods.

45.201 Invertebrate Zoology S2 L2T4
Prerequisites: 17.011 and 17.021 or 17.031 and 17.021.

A comparative study of the major invertebrate phyla with emphasis on morphology, systematics and phylogeny. Practical work to illustrate the lecture course. Obligatory field camp.

45.301 Vertebrate Zoology S1,S2 L2T4
Prerequisites: 17.011 & 17.021 or 17.031 & 17.021.

A comparative study of the Chordata, 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.

45.112 Marine Ecology S1 L2T4
Prerequisites: 17.011 & 17.021 or 17.031 & 17.021, 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 8 January.

45.121 Evolutionary Theory S1 L3T3
Prerequisites: 17.011 & 17.021 or 17.031 & 17.021.

Current evolutionary theory, emphasizing the population level. Ecological genetics, evolutionary aspects of ecological niche theory, speciation, coevolution, and general evolutionary genetics. Some background in genetics is desirable.

45.122 Animal Behaviour S2 L1T4
Prerequisites: 45.101, 45.201, 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 Comparative and Environmental Physiology S1 L2T4
Prerequisites: 41.101, 45.201, 45.301.

A study of the physiology of various groups of animals with particular emphasis on the adaptation of the animal to its environment. Includes: osmotic and ionic regulation, respiration and circulation, temperature regulation, nerve and muscle function, digestion and metabolism.

† 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 has been completed.
45.142 Developmental and Reproductive Biology S2 L2T4
Prerequisites: 45.201, 45.301.
Reproductive mechanisms, reproductive histology, reproductive endocrinology, and embryology, with particular reference to the comparative aspects in vertebrate species. Marsupial and monotreme reproduction.

45.152 Population and Community Ecology S2 L2T4
Prerequisites: 17.021 & 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.
Previous experience of ecologically oriented courses would be advantageous.

45.202 Advanced Invertebrate Zoology S2 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. Experimental work is included.

45.302 Vertebrate Zoogeography S2 L2T4
Prerequisite: 45.301. Co-requisites: 45.122 or 45.132 or 45.142.
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.

45.402 Insects S1, S2 L2T4
Prerequisites: 17.011, 17.021 or 17.031 & 17.021.
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.

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 Insects and Man S2 L2T4
Prerequisite: 45.412.
Fundamentals of insect control. Pest species and types of damage caused. Control by insecticides, physical and biological means. Insect toxicology. Insecticide resistance. Practical work to illustrate the above and also various aspects of bioassay in Entomology. Field excursions as arranged.
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 Faculty Information 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 the Student Employment and Scholarships Unit, 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.

<table>
<thead>
<tr>
<th>Donor</th>
<th>Value</th>
<th>Year/s of Tenure</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bursary Endowment Board*</td>
<td>$150 pa</td>
<td>Minimum period of approved degree/combined degree course</td>
<td>Merit in HSC and total family income not exceeding $4000</td>
</tr>
</tbody>
</table>

* Apply to The Secretary, Bursary Endowment Board, Box 7077, GPO, Sydney 2001 immediately after sitting for HSC.
### Undergraduate Scholarships (continued)

<table>
<thead>
<tr>
<th>Donor</th>
<th>Value</th>
<th>Year/s of Tenure</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sam Cracknell Memorial</td>
<td>Up to $3000 pa payable in fortnightly instalments</td>
<td>1 year</td>
<td>Prior completion of a 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.</td>
</tr>
<tr>
<td>Girls Realm Guild Scholarship</td>
<td>Up to $1500 pa</td>
<td>1 year renewable for the duration of the course subject to satisfactory progress and continued demonstration of need</td>
<td>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.</td>
</tr>
</tbody>
</table>

### Biological Sciences

#### Biological Technology

<table>
<thead>
<tr>
<th>Donor</th>
<th>Value</th>
<th>Year/s of Tenure</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mauri Brothers &amp; Thomson Ltd</td>
<td>Up to $1000 pa</td>
<td>1 year</td>
<td>Eligibility for admission to the honours year of the full-time degree course in Biological Technology</td>
</tr>
</tbody>
</table>

### Science

#### Mathematics

<table>
<thead>
<tr>
<th>Donor</th>
<th>Value</th>
<th>Year/s of Tenure</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olivetti Australia Pty Ltd</td>
<td>Up to $600 pa</td>
<td>2 years subject to satisfactory progress</td>
<td>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</td>
</tr>
<tr>
<td>George Szekeres Award</td>
<td>$200 pa</td>
<td>1 year</td>
<td>Open to students entering the final year of the honours course in Pure Mathematics</td>
</tr>
</tbody>
</table>

#### Optometry

<table>
<thead>
<tr>
<th>Donor</th>
<th>Value</th>
<th>Year/s of Tenure</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gibb &amp; Beeman (Spectacle Makers) Pty Ltd</td>
<td>Up to $500 pa</td>
<td>1 year renewable for the duration of the course subject to satisfactory progress</td>
<td>Residents of NSW under the age of 21 who are eligible for admission to the full-time degree course in Optometry</td>
</tr>
<tr>
<td>Optometric Associates Co-operative Limited</td>
<td>Up to $250 pa</td>
<td>1 year</td>
<td>Permanent residents of NSW intending to practise optometry in NSW who are eligible for admission to the fourth year of the full-time degree course in Optometry</td>
</tr>
</tbody>
</table>
Application forms and further information are available from the Student Employment and Scholarships Unit, which is located on the ground floor of the Chancellery. This Unit produces the booklet *Graduate Awards*, and also provides information on additional scholarships which may become available from time to time, mainly from funds provided by organizations sponsoring research projects.

Where possible, the scholarships are listed in order of schools within the Faculty of Biological Sciences and the Faculty of Science.

<table>
<thead>
<tr>
<th>Donor</th>
<th>Value</th>
<th>Year/s of Tenure</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of New South Wales Research Awards</td>
<td></td>
<td>1-2 years for a Masters and 3-4 years for a PhD degree</td>
<td>Applicants must be honours graduates (or equivalent). Applications to Registrar by 31 October (30 November in special circumstances).</td>
</tr>
<tr>
<td>Commonwealth Postgraduate Research Awards</td>
<td>Living allowance of $4000 Other allowances may also be paid</td>
<td>As above</td>
<td>Applicants must be honours graduates (or equivalent) who will graduate with honours in current academic year, and who are permanent residents of Australia.</td>
</tr>
<tr>
<td>Commonwealth Postgraduate Course Awards</td>
<td></td>
<td>1-2 years; minimum duration of course</td>
<td>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).</td>
</tr>
<tr>
<td>Australian American Educational Foundation</td>
<td></td>
<td>Up to 1 year</td>
<td>Applicants must be graduates, senior scholars or post-doctoral Fellows. Applications close 30 September.</td>
</tr>
<tr>
<td>AEF Travel Grant*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australian Federation of University Women</td>
<td>A total of $500/$3200</td>
<td></td>
<td>Applicants must be female graduates from any accredited Australian or overseas university.</td>
</tr>
</tbody>
</table>

* Application forms are available from: The Secretary, Department of Education, AAEF Travel Grants, PO Box 826, Woden, ACT 2606.
### Graduate Scholarships (continued)

<table>
<thead>
<tr>
<th>Donor, Year/s of Tenure</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The British Council Commonwealth University Interchange Scheme</strong></td>
<td>Cost of travel to UK or other Commonwealth country university. Applicants must be: 1. University staff on study leave. Applications close with Registrar by 30 November, for visits to commence during ensuing financial year 1 April to 31 March. 2. Graduate research workers holding research grants. Applications close with Registrar by 31 January for visits to commence during ensuing 1 April to 31 March.</td>
</tr>
<tr>
<td><strong>The Caltex Woman Graduate of the Year Scholarship</strong></td>
<td>$5,000 pa for further studies in USA, UK, Northern Europe or in special cases Australia. There are no special allowances for travel or accommodation for married graduates. 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.</td>
</tr>
<tr>
<td><strong>Canadian Pacific Airlines Award for Travel to Canada for University Graduates</strong></td>
<td>One free economy class return flight a year to Canada. Graduates of an Australian University who are Australian citizens or permanent residents. Candidates must have been accepted by a Canadian University, be able to support themselves on a full-time basis, and intend to return to Australia. Applications close with Registrar by 31 May.</td>
</tr>
<tr>
<td><strong>Commonwealth Scholarship and Fellowship Plan</strong></td>
<td>Varies for each country. Generally covers travel, living, tuition fees, books and equipment, approved medical expenses. Marriage allowance may be payable. Graduates who are Commonwealth citizens or British Protected Persons, and who are not older than 35 years of age. Applications close with Registrar by 1 October.</td>
</tr>
<tr>
<td><strong>Gowrie Graduate Research Travelling Scholarship</strong></td>
<td>Maximum $2000 pa 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.</td>
</tr>
</tbody>
</table>

**Harkness Fellowships of the Commonwealth Fund of New York* | Living and travel allowances, tuition and research expenses, book and equipment and other allowances. Candidates must be either: 1. Members of the Commonwealth 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 and be between 21-30 years of age. Applications close 23 July. **

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* Application forms must be obtained from the Australian representative of the Fund, Mr L. T. Hinde, Reserve Bank of Australia, Box 3947, GPO, Sydney, N.S.W. 2001. These must be submitted to the Registrar by 24 July.

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### Graduate Scholarships (continued)

<table>
<thead>
<tr>
<th>Donor</th>
<th>Value</th>
<th>Year/s of Tenure</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General (continued)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frank Knox Memorial Fellowships at Harvard University</td>
<td>Stipend of $3600 plus tuition fees pa</td>
<td>2 years</td>
<td>Applicants must be British subjects and Australian citizens, who are graduates or near graduates of an Australian University.</td>
</tr>
<tr>
<td>Nuffield Foundation Commonwealth Travelling Fellowships†</td>
<td>Living and travel allowances</td>
<td>1 year</td>
<td>Australian citizens usually between 25 and 35 who are graduates preferably with higher degrees and who have at least a year's teaching or research experience at a university. Applications close by February.</td>
</tr>
<tr>
<td>The Rhodes Scholarship**</td>
<td>£3000 stg pa</td>
<td>2 years, may be extended for a third year</td>
<td>Unmarried male and female British subjects, 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 July each year.</td>
</tr>
<tr>
<td>Rothmans Fellowships Award‡</td>
<td>$12,000 pa</td>
<td>Up to 3 years</td>
<td>The field of study is unrestricted. Applications close early September each year.</td>
</tr>
</tbody>
</table>

### Biological Sciences

<table>
<thead>
<tr>
<th>Donor</th>
<th>Value</th>
<th>Year/s of Tenure</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queen Elizabeth II Postdoctoral Fellowships in the Physical and Biological Sciences§</td>
<td>Stipend of $16126 pa increased to $17333 pa at age 28 years. $500 pa for dependent wife, $200 pa for each dependent child, plus other allowances.</td>
<td>2 years</td>
<td>Applicants must be Australian citizens or citizens of the UK and colonies ordinarily resident in the UK, who have gained a PhD or equivalent qualification in one of the physical or biological sciences. Usually applicants should be under 30 years of age. Applications close at the end of the first weeks in March and September.</td>
</tr>
</tbody>
</table>

† Applications to the Secretary, The Nuffield Foundation Australian Advisory Committee, PO Box 783, Canberra City 2061.

** 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.

§ Applications obtainable from the Secretary, Queen Elizabeth Fellowships Committee, Department of Education, PO Box 826, Canberra, ACT 2600 or the Official Secretary, Australia House, Strand, London, W.C.2.
Graduate Scholarships (continued)

<table>
<thead>
<tr>
<th>Donor</th>
<th>Value</th>
<th>Year/s of Tenure</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Science</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Optical Corporation Scholarship</td>
<td></td>
<td></td>
<td>To enable a graduate in optometry to undertake study for the award of the degree of Master of Optometry. Application to Registrar by 15 January.</td>
</tr>
<tr>
<td>Contavue Laboratories Contact Lens Graduate Research Scholarship</td>
<td>$1000 pa</td>
<td>1 year renewable</td>
<td>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. Applications to Registrar by 30 November.</td>
</tr>
<tr>
<td>Hydron Laboratories Contact Lens Research Scholarship</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact Lens Society of Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science Research Scholarship of the Royal Commission for the Exhibition of 1851</td>
<td>£2000 stg pa</td>
<td>2 years. Renewal for further year possible.</td>
<td>To enable graduates under 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 or South Africa, who have done at least 3 years of a university Science Course.</td>
</tr>
<tr>
<td>The Rutherford Scholarship</td>
<td>Travel, fees, etc. A stipend which, if held in the UK, is worth £1800 stg pa</td>
<td>3 years</td>
<td>To enable graduates under 26 years of age, or if holding a PhD under 28 years, 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.</td>
</tr>
<tr>
<td>Shell Scholarship in Science and Engineering</td>
<td>£3250 stg pa plus travelling expenses</td>
<td>2 years</td>
<td>Applicants must be unmarried, male, British subjects, under 25 years of age, with at least 5 years’ domicile in Australia and who are graduates with at least 1 year’s research experience. The successful candidate will undertake 2 years’ graduate research leading to the MSc or PhD degree, at a British university.</td>
</tr>
</tbody>
</table>

For Prizes, see next page.
The following table summarizes the undergraduate prizes awarded by the University. Prizes which are not specific to any School are listed under 'General'. All other prizes are listed under the Faculty or Schools in which they are awarded.

<table>
<thead>
<tr>
<th>Donor/Name of Prize</th>
<th>Value $</th>
<th>Awarded for</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sydney Technical College Union Award</td>
<td>50.00</td>
<td>Leadership in the development of student affairs, and academic proficiency throughout the course</td>
</tr>
<tr>
<td>University of New South Wales Alumni Association</td>
<td>Statuette</td>
<td>Achievement for community benefit — students in their final or graduating year</td>
</tr>
<tr>
<td><strong>School of Accountancy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australian Society of Accountants</td>
<td>75.00</td>
<td>14.501 Accounting and Financial Management IA</td>
</tr>
<tr>
<td></td>
<td>75.00</td>
<td>14.522 Accounting and Financial Management IIA or 14.532 Accounting and Financial Management IIA (Honours)</td>
</tr>
<tr>
<td>Chamber of Manufactures of New South Wales Hungerfords</td>
<td>15.00</td>
<td>14.703 Advanced Auditing</td>
</tr>
<tr>
<td></td>
<td>25.00</td>
<td>14.511 Accounting and Financial Management IB</td>
</tr>
<tr>
<td></td>
<td>25.00</td>
<td>14.593 Accounting and Financial Management IIIB (Honours)</td>
</tr>
<tr>
<td>Law Book Co Ltd</td>
<td>20.00 Books</td>
<td>14.511 Accounting and Financial Management IB</td>
</tr>
<tr>
<td>Wilson Bros (Printers) Pty Ltd</td>
<td>30.00</td>
<td>14.583 Accounting and Financial Management IIIB</td>
</tr>
<tr>
<td>Arthur Young &amp; Co</td>
<td>50.00</td>
<td>14.613 Business Finance II</td>
</tr>
<tr>
<td><strong>School of Anatomy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Winifred Dickes Rost Prize</td>
<td>30.00</td>
<td>Outstanding merit in Anatomy in final year of the Science and Mathematics Course</td>
</tr>
<tr>
<td><strong>School of Biological Technology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mauri Brothers &amp; Thomson (Aust) Pty Ltd</td>
<td>150.00</td>
<td>Best result in 42.101 Introduction to Biology</td>
</tr>
<tr>
<td></td>
<td>150.00</td>
<td>Best result in one of the Level III Biotechnology subjects</td>
</tr>
<tr>
<td></td>
<td>150.00</td>
<td>Best result in 42.103 Biotechnology IV</td>
</tr>
</tbody>
</table>
### Undergraduate University Prizes (continued)

<table>
<thead>
<tr>
<th>Donor/Name of Prize</th>
<th>Value $</th>
<th>Awarded for</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School of Chemical Technology</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australian Paper Manufacturers Ltd</td>
<td>21.00</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td>Stauffer Chemical Co (Aust) Pty Ltd</td>
<td>50.00</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td><strong>School of Chemistry</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Analytical Chemistry</td>
<td>100.00</td>
<td>2.013D Advanced Analytical Chemistry</td>
</tr>
<tr>
<td>Australian Consolidated Industries Ltd</td>
<td>30.00</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td>Borden Chemical Co (Aust) Pty Ltd</td>
<td>50.00</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td>Chamber of Manufactures of New South Wales</td>
<td>15.00</td>
<td></td>
</tr>
<tr>
<td>CSR Chemicals Ltd</td>
<td>100.00</td>
<td>Chemistry Honours</td>
</tr>
<tr>
<td>Inglis Hudson Bequest</td>
<td>Advised annually</td>
<td>2.002B Organic Chemistry I</td>
</tr>
<tr>
<td>Merck, Sharp &amp; Dohme (Aust) Pty Ltd</td>
<td>52.50</td>
<td>Chemistry — Level 2 subjects in the Science and Mathematics Course</td>
</tr>
<tr>
<td></td>
<td>52.50</td>
<td>Chemistry — Level 3 subjects in the Science and Mathematics Course</td>
</tr>
<tr>
<td>The Nestlé Co (Aust) Ltd</td>
<td>50.00</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td>Tooth &amp; Co Ltd</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td>Unilever Aust Pty Ltd</td>
<td>21.00</td>
<td>2.013A Introductory Quantum Chemistry</td>
</tr>
<tr>
<td>UNSW Chemical Society George Wright</td>
<td>20.00</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td>UNSW Chemical Society Parke-Pope</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td><strong>School of Economics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australian Finance Conference</td>
<td>50.00</td>
<td>15.083 Public Finance</td>
</tr>
<tr>
<td>Brinds Ltd</td>
<td>100.00</td>
<td>15.013 Economics IIIA (Honours) and 15.033 Economics IIIB (Honours)</td>
</tr>
<tr>
<td>Unilever Aust Pty Ltd</td>
<td>21.00</td>
<td>15.011 Economics IB</td>
</tr>
<tr>
<td></td>
<td>21.00</td>
<td>15.022 Economics IIIB and 15.042 Economics IIC</td>
</tr>
<tr>
<td></td>
<td>21.00</td>
<td>15.023 Economics IIIB</td>
</tr>
</tbody>
</table>
### Undergraduate University Prizes (continued)

<table>
<thead>
<tr>
<th>Donor/Name of Prize</th>
<th>Value $</th>
<th>Awarded for</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School of Electrical Engineering</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chamber of Manufactures of New South Wales</td>
<td>15.00</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td>J. Douglas Maclurcan</td>
<td>30.00</td>
<td>Control Systems</td>
</tr>
<tr>
<td><strong>School of Mathematics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICI Australia Ltd</td>
<td>50.00</td>
<td>Theory of Statistics IV</td>
</tr>
<tr>
<td></td>
<td>30.00</td>
<td>Excellence in 10.011 Higher Mathematics I</td>
</tr>
<tr>
<td>School of Mathematics</td>
<td>30.00</td>
<td>Excellence in 5 or more Level II Mathematics subjects</td>
</tr>
<tr>
<td>Head of School’s</td>
<td>50.00</td>
<td>Excellence in 5 or more Level II Mathematics subjects</td>
</tr>
<tr>
<td>The Pure Mathematics</td>
<td>40.00</td>
<td>Excellence in Level III Pure Mathematics subjects</td>
</tr>
<tr>
<td>The Applied Mathematics</td>
<td>40.00</td>
<td>Excellence in Level III Applied Mathematics subjects</td>
</tr>
<tr>
<td>The Theoretical Mechanics</td>
<td>40.00</td>
<td>Excellence in Level III Theoretical Mechanics subjects</td>
</tr>
<tr>
<td>Statistical Society of Australia (New South Wales Branch)</td>
<td>50.00</td>
<td>General proficiency — Theory of Statistics subjects</td>
</tr>
<tr>
<td>The Broken Hill Proprietary Co Ltd</td>
<td>50.00</td>
<td>Higher Theory of Statistics II</td>
</tr>
<tr>
<td>W. D. &amp; H. O. Wills (Aust) Ltd</td>
<td>50.00</td>
<td>Higher Theory of Statistics III</td>
</tr>
<tr>
<td><strong>School of Metallurgy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcan Australia Ltd</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Austral Crane Ltd</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Australian Institute of Metals</td>
<td>30.00</td>
<td></td>
</tr>
<tr>
<td>Australian Welding Institute</td>
<td>60.00 (book order)</td>
<td></td>
</tr>
<tr>
<td>Chamber of Manufactures of New South Wales</td>
<td>15.00</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td>The Broken Hill Proprietary Co Ltd</td>
<td>50.00</td>
<td></td>
</tr>
<tr>
<td>The Eagle &amp; Globe Steel Co Ltd</td>
<td>50.00</td>
<td></td>
</tr>
<tr>
<td>The Electrolytic Refining and Smelting Co of Australia Ltd</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td>Zinc Corp Ltd</td>
<td>30.00</td>
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</table>
### Undergraduate University Prizes (continued)

<table>
<thead>
<tr>
<th>School of Optometry</th>
<th>Value $</th>
<th>Awarded for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Optometrical Association</td>
<td>50.00</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td>Chamber of Manufactures of New South Wales</td>
<td>15.00</td>
<td>31.841 Clinical Optometry</td>
</tr>
<tr>
<td>Cocks &amp; Halls</td>
<td>25.00</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td>Bausch &amp; Lomb Soflens</td>
<td>Diagnostic set of contact lenses</td>
<td>31.812 Optometry II</td>
</tr>
<tr>
<td>Contavue Laboratories Pty Ltd</td>
<td>Trial fitting set of contact lenses</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td>Filmer Sceats</td>
<td>30.00</td>
<td>31.821 Special Anatomy and Physiology</td>
</tr>
<tr>
<td>Hoya Australia Pty Ltd</td>
<td>250.00</td>
<td>Highest aggregate academic record in the Optometry degree course</td>
</tr>
<tr>
<td>International Optical Corporation Ltd</td>
<td>21.00</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td>L. G. Darcey Memorial</td>
<td>30.00</td>
<td>31.811 Optometry I</td>
</tr>
<tr>
<td>Theo Kannis</td>
<td>250.00</td>
<td>31.841 Clinical Optometry</td>
</tr>
<tr>
<td>Martin Wells Pty Ltd</td>
<td>150.00</td>
<td>31.821 Special Anatomy and Physiology</td>
</tr>
<tr>
<td></td>
<td>150.00</td>
<td>31.831 Diseases of the Eye</td>
</tr>
<tr>
<td></td>
<td>150.00</td>
<td>Final Year Essay</td>
</tr>
<tr>
<td>G. Nissel &amp; Co Aust Pty Ltd</td>
<td>Trial fitting set of contact lenses</td>
<td>31.813 Optometry III and 31.841 Clinical Optometry — Contact Lenses sections</td>
</tr>
<tr>
<td>Optical Products Pty Ltd</td>
<td>50.00</td>
<td>Subject selected by Head of School</td>
</tr>
<tr>
<td>Opticians and Optometrists' Association of NSW</td>
<td>30.00</td>
<td>Research project</td>
</tr>
</tbody>
</table>

### School of Physics

<table>
<thead>
<tr>
<th>School of Physics</th>
<th>Value $</th>
<th>Awarded for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute of Physics</td>
<td>50.00</td>
<td>Highest aggregate marks in three of the Units 1.013, 1.023, 1.033 and 1.043</td>
</tr>
<tr>
<td>Applied Physics Staff</td>
<td>30.00</td>
<td>Highest aggregate marks in three of the Units 1.133, 1.313, 1.323 and 1.333</td>
</tr>
<tr>
<td>Head of School's in Physics</td>
<td>30.00</td>
<td>Most creditable Year IV honours thesis</td>
</tr>
<tr>
<td>Physics Staff for Theoretical Physics</td>
<td>80.00</td>
<td>Highest aggregate marks in 1.513 and 1.523</td>
</tr>
<tr>
<td>Physics Staff for Physics IV Honours</td>
<td>50.00</td>
<td>Highest mark in 1.104, 1.304 or 1.504</td>
</tr>
<tr>
<td>Physics Staff for Physics II</td>
<td>50.00</td>
<td>Highest aggregate mark in 1.012, 1.022 and 1.032</td>
</tr>
</tbody>
</table>
Undergraduate University Prizes (continued)

<table>
<thead>
<tr>
<th>Donor/Name of Prize</th>
<th>Value $</th>
<th>Awarded for</th>
</tr>
</thead>
<tbody>
<tr>
<td>School of Physics (continued)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School Prize for Physics I</td>
<td>50.00</td>
<td>Highest mark in 1.011 Higher Physics I</td>
</tr>
<tr>
<td>Theoretical Physics Staff</td>
<td>30.00</td>
<td>Highest aggregate mark in 1.513 and 1.523</td>
</tr>
<tr>
<td>School of Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychology Staff Prize</td>
<td>10.00</td>
<td>Best Psychology Year II</td>
</tr>
</tbody>
</table>

Graduate University Prizes

The following table summarizes the graduate prizes awarded by the University.

<table>
<thead>
<tr>
<th>Donor/Name of Prize</th>
<th>Value $</th>
<th>Awarded for</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Thistlethwayte Memorial Prize</td>
<td>100.00</td>
<td>Best essay in the field of water — waste water treatment or water quality management, by MEngSc, MAppSc, ME, MSc student</td>
</tr>
<tr>
<td>School of Chemistry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smith, Kline and French</td>
<td>50.00</td>
<td>Best performance in the Graduate Diploma in Food and Drug Analysis course</td>
</tr>
<tr>
<td>School of Optometry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydron Manufacturing Pty Ltd</td>
<td>A trial fitting set of contact lens</td>
<td>31.705G Advanced Contact Lens Theory and Practice</td>
</tr>
<tr>
<td>Theo Kannis</td>
<td>250.00</td>
<td>31.701G Advanced Clinical Optometry</td>
</tr>
</tbody>
</table>
Faculty of Biological Sciences

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Iain Raeburn, BSc Edin., PhD Utah
Jeffrey William Sanders, BSc Monash, PhD A.N.U.
David Graham Tacon, BSc N'cle.(N.S.W.), PhD A.N.U.

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Clyde Arnold McGilchrist, BSc BEd Qld., MSc PhD N.S.W.

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Lecturers
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John Anthony Eccleston, BSc Syd., MSc Manc., PhD C'nell.
Kenneth Graham Russell, BA Macq., MStats PhD N.S.W.

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LOSc VCO(Melb), FAAO
Maxwell McNeil Lang, BSc PhD N.S.W., ASTC, FIO, FAAO, MAIP

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Stephen John Dain, BSc PhD City, FBOA
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Professor of Experimental Physics and Head of Department of Applied Physics
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Professor of Theoretical Physics and Head of Department of Theoretical Physics
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Professor of Applied Physics
Vacant

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Martin Desmond Knight, BSc N.S.W.

Tutors
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Jan Frommelt, MSc Flin.
Stephen Ronald Jones, BSc Syd.
Walter Kalceff, BSc DipEd Syd.
Colin Michael Reekie, BSc Brist., LittB N.E.
Betty Louise Webster, BSc Adel., PhD A.N.U.

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David John King, BSc James Cook, MSc Tas.
David Mills, BSc McM.
Derek Rowand Laver, BSc N.S.W.

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Robert Louis Dalgleish, BSc PhD N.S.W.
Barry Perczuk, BSc PhD Monash
Fredericus Gerardus Majella Steenbeeke, DiplMechEng Arnhem T.H.
Peter Claydon Young, BE N.S.W.I.T. GradIEAust

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Broken Hill Division

Staff

Director
Professor J. E. Andersen

Department of Mining and Mineral Sciences

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Lecturers
Llewellyn Ramsay Jones, BSc N.Z., DipAm MEng Sheff.,
PhD Wales, MIEAust, MIMechE
Ian Lachlan Maclaine-cross, BE Melb., PhD Monash, MIEAust,
MAIRAH, MSES
Chakravarti Varadachar Madhusudana, BE Mys., ME I.I.Sc.,
PhD Monash, MIEAust

Mining Engineering

Senior Lecturer
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MMGI, AIME, AMAusIMM

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Senior Lecturer
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Sciences

Geology

Senior Lecturer
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Kevin David Tuckwell, BSc PhD N.S.W., AMAusIMM

Tutor
Alaster Carlile Edwards, BSc Melb.

Department of Science

Chemistry

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Lecturer
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Senior Tutor
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Mathematics

Senior Lecturer
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Dennis William Trenerry, BSc PhD Adel.

Physics

Senior Lecturer
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Lecturer
Kenneth Reid Vost, BSc Glas., MSc N.S.W., AMAusIMM

Fowlers Gap Research Station

Officer-in-Charge
John Alfred Reynolds, BSc PhD N.S.W.
The University of New South Wales

Kensington Campus 1979

Theatres

Biomedical Lecture Theatres E27
Central Lecture Block E19
Classroom Block (Western Grounds) H3
Electrical Engineering Theatre F17
Keith Burrows Lecture Theatre J14
Mathews Theatres D23
Old Main Theatre K15
Parade Theatre E3
Science Theatre F13
Sir John Clancy Auditorium C24

Buildings

Affiliated Residential Colleges

New (Anglican) L6
Shalom (Jewish) M7
Warrane (Roman Catholic) E27

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 D16
Dalton F12
Robert Heffron E12
Civil Engineering H20
Commerce (John Goodsell) F20
Dalton (Chemistry) F12
Electrical Engineering G17
Geography and Surveying K17
Goldstein College C16
Golf House A27
Gymnasium B5
House at Pooh Corner N8
International House C6
John Goodsell (Commerce) F20
Kensington Colleges C17
Basser C18
Goldstein D16

General

Accountancy C20
Admissions Office C22
Anatomy C27
Applied Geology F10
Applied Science (Faculty Office) F10
Appointments Office C22
Architecture (including Faculty Office) H14
Arts (Faculty Office) C20
Australian Graduate School of Management F23
Biochemistry D26
Biological Sciences (Faculty Office) D26
Biological Technology D26
Biomedical Library F23
Bookshop G17
Botany D26
Building H14
Cashier's Office C22
Centre for Medical Education Research and Development C27
Chaplains E15a
Chemical Engineering F10
Chemical Technology F10
Chemistry E12
Child Care Centre N8
Civil Engineering H20
Closed Circuit Television Centre F20
Commerce (Faculty Office) F20
Community Medicine D26
Computing Services Unit E21
Drama D9
Economics F20
Education G2
Electrical Engineering G17
Engineering (Faculty Office) K17
English C20
Examinations and Student Records C22
Fees Office C22
Food Technology F10
French C20
General Studies C20
Geography K17
German C20
Health Administration C22
History C20
History and Philosophy of Science C20
Industrial Arts C1
Industrial Engineering J17
Institute of Languages G14
Institute of Social Technology B8
Kindergarten (House at Pooh Corner/ Child Care Centre) N8
Landscape Architecture H14
Law (Faculty Office) E21
Law Library E21
Librarianship B10
Library E21
Lost Property F20
Marketing F20
Mathematics F23
Mechanical Engineering J17
Medicine (Faculty Office) B27
Metallurgy E8
Microbiology D26
Mining Engineering K15
Music B11
National Institute of Dramatic Art C15
Nuclear Engineering G17
Optometry J12
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 Committee in Medical Education B27
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 E1
Sociology C20
Spanish and Latin American Studies C20
Student Amenities and Recreation E15c
Student Counselling and Research E15c
Student Employment C22
Student Health E15
Students' Union E4
Surveying K17
Teachers' College Liaison Office F16
Tertiary Education Research Centre E15d
Textile Technology G14
Town Planning K15
University Union (Blockhouse) G6
Wool and Pastoral Sciences B8
Zoology D26