SCIENTIA

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The University of New South Wales

Sciences

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

1980
Faculty Handbook

How to use this Handbook

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

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

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

Faculty Information.

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

Graduate Study is about higher degrees.

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

Information includes:
* Subject number, title and description
* Prerequisite, co-requisite and excluded subjects, where applicable
* Additional information about the subject such as unit values, credit hours, teaching hours per week, sessions when taught.

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

Staff list.

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

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The University of New South Wales Library has catalogued this work as follows:

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

Information in this Handbook has been brought up to date as at 10 September 1979, but may be amended without notice by the University Council.

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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. This **General Information** Section is intended to help you put the Faculty into perspective with the University as a whole, to introduce you to some of the services available to students and to note some of the most important rules and procedures.

For fuller details about the University and its activities you should consult the University Calendar.

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.

Some people who can help you

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

The Deputy Registrar (Student Services), Mr Peter O'Brien, and his **Administrative Assistant, Mrs Anne Beaumont,** are located on the first floor of the Chancellery. They will help 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 Assistant Registrar (Admissions and Higher Degrees), Mr Jack Hill, is located on the ground floor of the Chancellery. General enquiries should be directed to 3715.

The Assistant Registrar (Examinations and Student Records), Mr Peter Wildblood is located on the ground floor of the Chancellery. For particular enquiries 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, contact the Administrative Officer, Mr John Grigg, 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 in 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 Section in the huts at the foot of Basser Steps. For assistance in obtaining suitable lodgings phone 3260.

The Student Health Unit is located in Hut E at the foot of Basser Steps. 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. 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; Greek Orthodox—2683; Lutheran—2683; Uniting Church—2685.

The Students' Union is located on the second floor of Stage III of the University Union, where the SU 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), 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 session and there are short recesses of one week within each of the sessions.

Session 1 commences on the first Monday of March.

1980

Session 1	3 March to 11 May
(14 weeks)	*May Recess:* 12 May to 18 May
	19 May to 15 June
Tuesday	*Midyear Recess:* 16 June to 20 July
17 June	Examinations begin
Wednesday	
2 July	Examinations end
Session 2	21 July to 24 August
(14 weeks)	*August Recess:* 25 August to 31 August
	1 September to 2 November
Monday	
10 November	Examinations begin
Friday	
29 November	Examinations end

January

Tuesday 1	New Year's Day — Public Holiday
Friday 4	Last day for applications for review of results of *annual* examinations
Friday 11	Last day for acceptance of applications by Admissions Office for transfer to another undergraduate course within the University
Monday 28	Australia Day — Public Holiday

February

Monday 4 — Enrolment period begins for new undergraduate students and undergraduate students repeating first year

Monday 18 — Enrolment period begins for second and later year undergraduate students and graduate students enrolled in formal courses

Last day for undergraduate students who have completed requirements for pass degrees to advise the Registrar they are proceeding to an honours degree or do not wish to take out their degree for any other reason

March

Monday 3 — **Session 1 commences**

Tuesday 4 — List of graduands for April/May ceremonies and of 1979 prize-winners published in daily press

Friday 14 — Last day for acceptance of enrolment by new undergraduate students (late fee payable)

Friday 28 — Last day for acceptance of enrolment by undergraduate students re-enrolling in second and later years (late fee payable)

April

Thursday 3 — *Confirmation of Enrolment* forms despatched to all students

Friday 4 to
Monday 7 — Easter

Friday 18 — Last day for undergraduate students to discontinue without failure subjects which extend over Session 1 only

Friday 25 — Anzac Day — Public Holiday

May

Monday 5 — Last day for undergraduate students completing requirements for degrees or diplomas at the end of Session 1 to submit *Application for Admission to Degree* form

Monday 12 — **May Recess begins**

Thursday 15 — Publication of provisional timetable for June/July examinations

Sunday 18 — **May Recess ends**

Friday 23 — Last day for students to advise of examination timetable clashes

June

Tuesday 3 — Publication of timetable for June/July examinations

Sunday 15 — **Session 1 ends**

Monday 16 — Queen's Birthday — Public Holiday
Midyear Recess begins

Tuesday 17 — Examinations begin

July

Wednesday 2 — Examinations end

Tuesday 15 — Examination results mailed to students

Wednesday 16 — Examination results displayed on University noticeboards

Tuesday 15 to
Friday 18 — Students to amend enrolment programs following receipt of June examination results

Sunday 20 — **Midyear Recess ends**

Monday 21 — **Session 2 begins**

Last day for application for review of June examination results

Thursday 31 — Foundation Day (no classes held)

August

Friday 1 — Last day for students to discontinue without failure subjects which extend over the whole academic year

Monday 25 — **August Recess begins**

Sunday 31 — **August Recess ends**

September

Friday 5 — Last day for undergraduate students to discontinue without failure subjects which extend over Session 2 only

Monday 8 — Last day for applications from undergraduate students completing requirements for degrees and diplomas at the end of Session 2 to submit *Application for Admission to Degree* forms

Wednesday 10 — List of graduands for October graduation ceremonies published in daily press

Friday 12 — Last day for students to discontinue without failure subjects which extend over Session 2 only

Confirmation of Enrolment form forwarded to all students

Monday 15	Last day to notify intention of attending October graduation ceremonies
Monday 22	Last day for applications from undergraduate students completing requirements for degrees and diplomas at the end of Session 2 to submit *Application for Admission to Degree* form
Friday 26	Last day for acceptance of corrected *Confirmation of Enrolment* forms

October

Wednesday 1	Last day to apply to UCAC for transfer to another university in New South Wales
Thursday 2	Publication of provisional examination timetable
Monday 6	Eight Hour Day — Public Holiday
Thursday 9	Graduation ceremonies
Friday 10	Last day for students to advise of examination timetable clashes
Thursday 21	Publication of timetable for examinations

November

Sunday 2	**Session 2 ends**
Monday 3	**Study Recess begins**
Sunday 9	**Study Recess ends**
Monday 10	Examinations begin
Saturday 29	Examinations end

December

Tuesday 16	Examination results mailed to students
Wednesday 17	Examination results displayed on University notice boards
Thursday 25	Christmas Day — Public Holiday
Friday 26	Boxing Day — Public Holiday

Organization of the University

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

In 1979 the University had 18,466 students and over 3,700 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 discription is as follows:

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

The lion and the four stars of the Southern Cross on the Cross of St George have reference to the State of New South Wales which brought the University into being; the open book with SCIENTIA across its page reminds us of its original purpose. Beneath the shield is the motto 'Manu et Mente', which is the motto of the Sydney Technical College, from which the University has developed. The motto 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 44 members from the State Parliament, industry and commerce, agriculture, the trade unions, professional bodies, the staff, the students and the graduates of the University.

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

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

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 together with the Australian Graduate School of Management. In addition, the Board of Studies in General Education fulfils a function similar to that of the faculties. The Board of Studies in Science and Mathematics, which was established to facilitate the joint academic administration of the Science and Mathematics degree course by the Faculties of Biological Sciences and Science, considers and reports to the Professorial Board on all matters relating to studies, lectures and examinations in the science and mathematics degree course.

The Schools

Once courses of study have been approved they come under the control of the individual Schools (eg the School of Chemistry, the School of Mathematics). The Head of the School in which you are studying is the person in this academic structure with whom you will be most directly concerned.

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 Ray Golding and Professor Rex Vowels, together with the Deans and the three heads of the administrative divisions.

General Administration

The administration of general matters within the University comes mainly within the province of the Registrar, Mr 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.

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

Student Representation on Council and Faculties/Boards

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

Students proceeding to a degree or a graduate diploma may elect members for appointment by the Council to their Faculty/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 the faculties have their own rules for the conduct of open meetings.

Award of the University Medal

The University may award a bronze medal to undergraduate students who have achieved highly distinguished merit on completion of their final year.

Identification of Subjects by Numbers

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

Textbook Lists

Textbook lists are no longer published in the Faculty handbooks. Separate lists are issued early in the year 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 main library building (Menzies Library) houses 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 948 0261) which is closely associated with the Physical Sciences Library.

The library at the Broken Hill Division in the W.S. and L.B. Robinson University College building. Phone Broken Hill (080) 6022.

The library at the Royal Military College, Duntroon ACT, serving the Faculty of Military Studies. Phone (062) 73 0427.

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.

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. Fees are payable on a session basis. Conferences are catered for, particularly with Kosher requirements. Rates are available on application. Apply in writing to the Master, Shalom College, The University of New South Wales, PO Box 1, Kensington, NSW 2033.

Warrane College

Warrane College provides accommodation for 200 men and is open to students of all ages, backgrounds and beliefs. 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 Catholic lay association Opus Dei. Apply in writing to the Master, Warrane College, PO Box 123, Kensington, NSW 2033.

Creston Residence

Creston Residence offers accommodation for 25 full-time undergraduate and graduate women students without restriction of denomination or nationality. Non-resident membership provides students with the opportunity to participate in the activities of the Residence and to make use of its facilities. Creston is directed by the Women's Section of Opus Dei, a Catholic lay association. Enquiries should be addressed to 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 Section 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 the huts at the foot of Basser Steps. Phone 663 0351, extension 3260.

Student Employment and Scholarships

The Student Employment and Scholarships Section 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 and undergraduate and graduates scholarships is also available.

The service is located in 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 698 9499, or for The Prince of Wales Hospital clinics by telephoning 399 0111.

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 663 0351, 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 Section 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 Section 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 Section is located in the huts 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 Section provides a recreational program for students and staff at the Physical Education and Recreation Centre. The Centre consists of eight squash courts, a 50m heated indoor swimming pool, and a main building, the latter containing a large gymnasium and practice rooms for fencing, table tennis, judo, weight-lifting, karate and jazz ballet, and 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 $11 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 the huts at the foot of Basser Steps, and the control of the Sports Association is vested in the General Committee. The Sports Association may be contacted on extension 2673.

Student Travel Concessions

The Student Amenities and Recreation Section 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 the section (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 $55 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 one year at the University are eligible for election. The President directs the entire administration of the Students' Union and its activities.

Other officers include the **Education Vice-President** who works towards the implementation of Student 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 $17 per annum for full-time students and $13 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.
5. A nursery/kindergarten, *The House at Pooh Corner*.
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.
13. Provision of a bail fund.

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 noticeboards for details.

Australian Armed Forces Enquiries should be directed to:
Royal Australian Navy Royal Australian Navy Liaison Officer, Emeritus 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 spare-time work would also be needed.

Students in the following types of university courses are eligible for assistance:
• Undergraduate and graduate bachelor degree courses
• Graduate diploma courses
• 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 fom the Commonwealth Department of Education.

1979 Higher School Certificate candidates and tertiary students receiving an allowance are sent forms in January 1980. Other students may obtain forms from the Admissions Section or Student Employment and Scholarships Section, or from the Commonwealth Department of Education, 59 Goulburn Street, Sydney, NSW 2000 (phone 218 8800).

Continuing students should submit applications as soon as examination results are available. New students should do so as soon as they are enrolled. All students should apply by 31 March 1980, 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 appropriate School office.

Further information and advice regarding scholarships is available from the Student Employment and Scholarships Section in the Chancellery.

2. Graduate Awards An honors 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 Calendar.

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.

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

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

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

Financial Assistance to Aboriginal Students

Financial assistance is available to help Aboriginal students from the 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 the latter 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 (eg 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 Admissions Office, located in the Chancellery on the upper campus, provides information for students on admission requirements, undergraduate and graduate courses and enrolment procedures. The Admissions 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 Universities and Colleges Admissions Centre.

How do I qualify 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 the Calendar and in a pamphlet obtainable at the Admissions Office.

Enrolment

How do I enrol?

All students, except those enrolling as graduate research students (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 the course requires this.

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

For details of the locations and hours for enrolment see *Enrolment Procedures 1980*, a free booklet obtainable from the Admissions Office or from your School or Faculty Office.

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 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) unless the student has permission from the Deputy Registrar (Student Services). Payment may be made through the mail in which case it is important that the student registration number be given accurately. Cash should not be sent through the mail.

New Undergraduate Enrolments

Persons who are applying for entry in 1980 must lodge an application for selection with the Universities and Colleges Admissions Centre, PO Box 7049, GPO, Sydney 2001, by 1 October 1979.

Those who are selected will be required to complete enrolment at a specified time before the start of Session 1. Compulsory fees should be paid on the day. In special circumstances, however, and provided class places are still available, students may be allowed to complete enrolment after the prescribed time.

Application forms and details of the application procedures may be obtained from the 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 Universities and Colleges Admissions Centre, PO Box 7049, GPO, Sydney 2001, by 1 October 1979.

Restrictions Upon Re-enrolling

Students enrolled for the first time in any undergraduate course in the University who failed more than half their program in 1979; 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 Enrolments

Students may be permitted to enrol as miscellaneous students in subjects not counted as part of (ie 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 as miscellaneous students in subjects which may be counted towards courses from which they have been excluded.

Students seeking to enrol as miscellaneous students 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.

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 (14 March 1980) 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 (28 March 1980) 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 (1 August 1980) 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 Calendar.

Can I transfer from one course to another?

To transfer from one course to another you must apply on an application form obtainable from the Admissions Office by Friday 11 January 1980. If your application is successful you are required to comply with the enrolment procedures for the year/stage of the new course and, unless otherwise instructed, you should present the letter granting transfer to the enrolling officer. If you intend to transfer, you should also inform the enrolling officer of the School in which you were enrolled in 1979.

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 office controlling your course, from which application forms are available. The Registrar will inform you of the decision. Application to enrol in additional subjects must be submitted by 28 March 1980 for Session 1 only and Whole Year subjects and by 15 August 1980 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. In some cases students will be entitled to fee refunds.

For details see the Calendar.

Subjects

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

(1) for one session subjects, the end of the seventh week of that session (18 April or 5 September)

(2) for whole year subjects the end of the second week of Session 2 (1 August)

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 Universities and Colleges Admissions Centre before 1 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-enrol 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, of 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 Calendar.

(3) The Appeal Committee shall determine the appeal after consideration of the student's academic record, his/her application for special permission to re-enrol, and the stated grounds of appeal. In exceptional circumstances, the Appeal Committee may require the student to appear in person.

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 Rule **1.** or **2.** may not enrol as a miscellaneous student in subjects which may be counted towards any such course.

Re-admission after Exclusion

9. (1) An excluded student may apply for re-admission after the period of exclusion has expired.

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

(b) An application for re-admission to a subject should be made to the Registrar before 30 November in the year prior to which re-admission is sought. Such applications will be considered by the relevant Head of School.

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

(4) Applications for re-admission to a course or subject that are unsuccessful (see **9.** (2) (a), (b) respectively) will be reconsidered automatically by the Re-enrolment Committee of the Professorial Board. The decision of the Committee will be final.

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

Restrictions and Definitions

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

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

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** (see page 2) and on the *Notification of Examination Results*. The forms are available from the Enquiry Counter in the north wing of the Chancellery 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 1980 for students completing at the end of Session 1, and 1 March 1981 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 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 procedeures 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. Accomodation 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

University Union, annual subscription	$55
Sports Association, annual subscription	$11
Students' Union	
Students enrolling in full-time courses, annual subscription	$17
Students enrolling in part-time courses and miscellaneous subjects, annual subscription	$13
Miscellaneous annual fee	$25

This 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 recommeded 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 1980 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 1980,* 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. Students enrolled in courses at the W.S. and L.B. Robinson University College and in the faculty of Military Studies are exempt from the fees mentioned above but shall pay such other fees and charges as the Council may from time to time determine.

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

5. Students who while enrolled at and attending another university (or other tertiary institution as approved by the Vice-Chancellor) in a degree or diploma course are given approval to enrol at the University of New South Wales but only 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.

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

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

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

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

10. Graduate students who have completed all the work for a qualification at the commencement of Session 1, except for the submission of the relevant thesis or project report, may be exempted from the payment of Student Activities Fees by the Deputy Registrar (Student Services) on production of an appropriate statement signed by the relevant supervisor or Head of School.

Is exemption from membership possible?

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

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 secondhand bookshop. Information about special equipment costs, accommodation charges and cost of subsistence on excursions, field work, etc, and for hospital residence (medical students) are 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 (25 April 1980). 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 (29 August 1980).

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 Whole 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 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 Pass Conceded in a subject will normally allow progression to another subject for which the former subject is a prerequisite. In a particular subject, however, a subject authority may specify that a pass conceded is insufficient to meet a particular subject prerequiste.

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 Enquiry Desk, Chancellery, also by 30 November). Results are also posted on School noticeboards and in either the University library or 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 not later than fifteen working days after the issue of the *Notification of Results* form.

A review of a result is not a detailed assessment of a student's standard of knowledge and understanding of, and skills in, the subject.

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,* unless there are exceptional circumstances.

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,* unless there are exceptional circumstances.

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 Examination 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 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.

Compulsory Industrial Training

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 Enquiry Desk, in the north wing of the 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 Linguistic 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 15 minutes before the time for commencement.

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

4. Candidates shall not be admitted to an examination after 30 minutes from the time of commencement of the examination.

5. Candidates shall not be permitted to leave the examination room before the expiry of 30 minutes from the time the examination commences.

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

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

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

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

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

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 qouted 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 in the north wing of the Chancellery.

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 *Submissions 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 impracticble 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 24 April and 12 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, the Chancellery.

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 noticeboards and students are expected to be aquainted 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 noticeboards 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.

Vice-Chancellor's Official Welcome to New Students

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

Full-Time Students

In the Faculties of Architecture, Arts, Biological Sciences, Commerce, Law:
Thursday 28 February 1980
11 am in the Clancy Auditorium

In the Faculties of Applied Science, Engineering, Medicine, Professional Studies, Science, and the Board of Studies in Science and Mathematics:
Friday 29 February 1980
11 am in the Clancy Auditorium

Part-time Students
Thursday 28 February 1980
6.30 pm in the Clancy Auditorium

Meeting for Parents of New Students

Friday 29 February 1980
7.30 pm in the Clancy Auditorium

Introduction to the Sciences Handbook

This handbook has been designed to assist understanding of the academic activities of three inter-related groups within the university, namely the Board of Studies in Science and Mathematics, the Faculty of Biological Sciences and the Faculty of Science. The Board is responsible for the under-graduate studies of students majoring in disciplines associated with the two faculties and several schools from other faculties. The regulations governing the award of the degree of Bachelor of Science form a substantial part of the handbook.

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 gradu-ate 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 1980 or enrolling in graduate courses should obtain a copy of the free booklet *Enrolment Procedures 1980* 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

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

research needs of staff, graduate students and under-graduate 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 under-graduate 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 $14 per annum with a $3 rebate if paid before 1 March.

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

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

Applications and requests for further information should be sent to the Hon. Secretary, Dr Ann Eyland, Department of Economics and Financial Studies, Macquarie University, North Ryde 2113.

Board of Studies in
Science and Mathematics

Board of Studies in Science and Mathematics

Introduction

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

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

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

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

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

First Year Biology Unit	Dr M. L. Augee
‡ School of Anatomy	Dr Ewa Bystrzycka (2nd Year and 3rd Year)
	Professor F. W. D. Rost (4th Year)
‡ School of Applied Geology	Mr G. J. Baldwin
‡ School of Biochemistry	Professor W. J. O'Sullivan
‡ School of Biological Technology	Associate Professor Pamela A. D. Rickard
‡ School of Botany	Associate Professor J. H. Palmer
School of Chemistry	Mr W. J. Dunstan
‡ School of Community Medicine	Dr A. E. Stark
‡ School of Electrical Engineering (Computer Science)	Dr G. McMahon
‡ School of Geography	Mr N. Lonergan
‡ School of History and Philosophy of Science	Dr D. R. Oldroyd
School of Mathematics	Head of School
	Miss M. Potter
‡ Marine Science	Dr P. Dixon

School of Mechanical and Industrial
Engineering .... Mr K. Kjorrefjord
‡ School of Metallurgy .... Dr P. G. McDougall
‡ School of Microbiology .... Dr Y. M. Barnet
‡ School of Philosophy .... Professor C. L. Hamblyn
School of Physics .... Dr P. R. Elliston
‡ School of Physiology .... Dr P. H. Barry
‡ School of Psychology .... Dr P. J. Cleary
Mr T. J. Clulow
‡ School of Zoology .... Dr Patricia Dixon

Board of Studies in Science and Mathematics

The Board of Studies in Science and Mathematics includes all members of the Faculty of Biological Sciences* and the Faculty of Science* and some members of a number of specific Schools in other faculties contributing to the Science and Mathematics Course.

The Deans of the Faculty of Science (Professor V. T. Buchwald) and the Faculty of Biological Sciences (Professor B. J. Ralph) serve alternately as Dean responsible for the Board.

The Chairman is Professor D. J. Anderson.

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

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).

‡ See text of introduction. on previous page.

⁰ See Staff, listed later in this handbook.

Board of Studies in Science and Mathematics

3970
Science and Mathematics Course

The Science and Mathematics Course, which leads to the Bachelor of Science degree, is administered by the Board of Studies in Science and Mathematics and offers a wide choice of programs, each designed to meet specific aims and objectives. Most programs are identified with a particular school or discipline but some are multi-disciplinary.

Aims of the Science and Mathematics Course

The main aims of the Science and Mathematics Course, diverse and not necessarily exclusive, may be summarized as providing opportunities to students to prepare themselves for careers in:
- research
- technology
- science and mathematics education
- areas of management or public policy involving the use of science or mathematics

Objectives of the Science and Mathematics Course

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

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

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

3. To encourage curiosity and creative imagination and an appreciation of the role of speculation in the selection and solution of problems, the construction of hypotheses, and the design of experiments.

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

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

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

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

8. To promote understanding of the significance of science, technology, economics and social factors in modern society, and of the contributions they can make in improving 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 discipine.

The three year program

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

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

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

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

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

2. General Studies electives as specified in an individual program, usually one in Year 2 and two in Year 3.

● 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 1;

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

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

2. 1. an approved honours program offered by one or more schools;

or

    2. at least 10 units at Level IV as specified in an individual program;

3. General Studies electives as specified in an individual program, usually one in Year 2, two in Year 3 and one in Year 4.

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

Students are required:

● to have completed Years 1, 2 and 3 of the specific program and to have satisfied prerequisite requirements as specified in Table 3.

● to seek the guidance of the appropriate head of school at an early stage of study to ensure that the program being followed is best suited to lead to the Year 4 honours program.

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

● to have the approval of the appropriate head of school at the end of Year 3.

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

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

Rules governing admission to the Science and Mathematics Course with advanced standing 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 on partial completion of the requirement for any degree or other award of another institution shall not be such that it will permit the applicants to qualify for the award of the science and mathematics degree by satisfactory completion of the program of study deemed by the Board to be less than that required for students in full time attendance in the final year of the Science and Mathematics course (course 3970).

(4) The standing granted by the Board of Studies in Science and Mathematics in the case of applications based upon the partial completion of the requirements for any degree or award of the University may be such as to give full credit in the Science and Mathematics course (course 3970) for work done in the course from which the students transfer.

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, 4143, 4144, 4145, 4162, 4170, 4173

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* In Rule 1, the word 'undergraduates' includes graduands, ie a person may be admitted under these rules if he has met all requirements for a first degree which has not yet been conferred on him, and his admission under these rules shall be no bar to the subsequent award for the first degree.

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

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, 4305, 4306, 4307, 4308, 2743, 4143, 4344, 4345, 4513, 6243
Chemistry	see programs 0201, 0202, 0203, 0204, 0241, 0242, 0262, 7302
Chemical Physics	see programs 6851, 6852, 6853
Community Medicine	units available in some programs (the identifying number is 79)
Computer Science	see programs 0601, 0603, 0604, 0605, 0610, 0611
Genetics	see program 6840
Geography	see programs 2701, 2702, 2703, 2725, 2743
Geology	see programs 2501, 2502, 2725, 6225
History and Philosophy of Science	see programs 6200, 6201, 6225, 6243, 6245, 6270, 0162, 0262, 4162
Marine Science	see programs 6831, 6832, 6833, 6834
Mathematics	see programs 1001, 1002, 1003, 1004, 1005, 1006, 1007, 1008, 1009, 1010, 1011, 1012, 1013, 1014, 1015, 1016, 1017, 1018, 1019, 1020, 1021, 1022, 1023, 1068, 1069, 0610, 0611
Metallurgy	see programs 0401, 0402, 0403
Microbiology	see programs 4401, 4402, 4403, 4404, 4144, 4244, 4344
Philosophy	units available in some programs (the identifying number is 52)
Physics	see programs 0101, 0102, 0103, 0105, 0106, 0162, 6201
Physiology	see programs 7301, 7302, 7303, 7312, 7345, 7073, 4173
Psychology	see programs 1201, 1270, 7312
Zoology	see programs 4501, 4502, 4508, 4509, 4513, 4514, 4145, 4345, 4570, 6245, 7345

In addition to Course 3970 programs are also included for Courses 4770 (Science/Law), 3730 (Science/Civil Engineering), 3970/3640 (Science/Electrical Engineering), 4070 (Mathematics Education), 4080 (Science Education).

0101
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:
1.041
5.010
17.031, 17.021
25.110, 25.120

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, 1.053
2 General Studies electives
Choose at least 2 units from:
1.133, 1.143, 1.153, 1.163, 1.173, 1.3033, 1.313, 1.323, 1.3333
10.212A, 10.412D

Year 4
1.104
1 General Studies elective

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

0102
Physics
Single Major†

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

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

Year 3
1.013*, 1.023*, 1.033*, 1.043
2 General Studies electives
Choose at least 3 units from Table 1 and/or Table 2 for program 0102

* See footnote to program 0101.

† Under exceptional circumstances students taking this program may be eligible for transfer into Year 4 of program 0101 or 0103 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:
1.041
5.010
17.031, 17.021
25.110, 25.120

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, 1.3033, 1.3133, 1.3233, 1.3333, 1.3533, 1.053

Year 4
1.304
1 General Studies elective

° See footnote to program 0101.

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:
1.041
5.010
17.031, 17.021
25.110, 25.120

Year 2
1.012*, 1.022*, 1.032
10.111A,
10.1113 & 10.1114
or
10.1213 & 10.1214,
10.2111 & 10.2112
or
10.2211 & 10.2212
1 General Studies elective
Choose 2 units from:
6.620
10.211E, 10.331, 10.411A *or* 10.421A,
10.411B *or* 10.421B

Year 3
1.013* *or* 10.222F, 1.023*, 1.033*, 1.043
1.513 *or* 1.523
2 General Studies electives
Choose at least 2 units from:
1.513 *or* 1.523, 10.412D, 10.122B, 10.212A *or* 10.222A,
10.422A & 10.422B, 10.1128 & 10.1129, 10.1125 & 10.1126

Year 4
1.504
1 General Studies elective

° See footnote to program 0101.

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, 1.143, 1.153, 1.3433
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 *and/or* Table 2 for program 0162

Year 2
1.012*, 1.022*, 1.032
10.2111, 10.2112
*1 General Studies elective***
62.022, 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:
62.012, 62.032, 62.013, 62.033, 62.063, 62.083, 62.093
Choose 1 unit from:
15.001, 15.703, 15.753, 10.212A *or* 10.412D

Year 4
62.024
*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 footnote to program 0101.

** 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

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

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

* See footnote to program 0201.

0203
Chemistry
Double major

Students wishing to take 8 or more Level III Chemistry units are required to transfer to the Pure and Applied Chemistry Course (3910) before the commencement of Year 2. If Year 2 studied in the Science and Mathematics course is similar to Year 2 of Course 3910, the transfer may still be made before the commencement of Year 3.

The Pure and Applied Chemistry Course is described in detail later in this handbook (**Faculty of Science**) and enables specialization in Chemistry.

Year 1
1.001 or 1.011
2.121, 2.131
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, 2.003H
2 General Studies electives
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

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
3.023
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
3.037
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
17.031, 17.021

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
62.022, 62.052, 62.062
*1 General Studies elective**
Choose 1 unit from Table 1

Year 3
4 Chemistry Level III units from Table 1
*½ General Studies elective**
Choose 3 units from:
62.012, 62.013, 62.032, 62.033, 62.063, 62.083, 62.093
Choose 1 unit from:
15.001, 15.703, 15.753

Year 4
*1 General Studies elective**
2.004 *or*
62.024

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

7302
Chemistry/Physiology

See 7302 Physiology/Chemistry

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 Level III units from Table 1 or 3 Level III units from Table 1 and 1 Level III unit from Table 2 for program 0401

Year 4
4.004
1 General Studies elective

33

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.

0403
Metallurgy
Double major

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

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

Year 1
1.001 *or* 1.011
2.121, 2.131
10.001 *or* 10.011
Choose *either*:
25.110, 25.120
or
5.010 *and* 5.030
Year 2
2.002A
4.302, 4.402, 4.502, 4.602, 4.802
10.031
25.541
1 General Studies elective
Year 3
4.303, 4.403, 4.503, 4.613, 4.703
7.023
2 General Studies electives
Choose *either*:
4.813 *or*
6.851 *and* 6.852

Year 4
4.024, 4.054, 4.314, 4.324, 4.414, 4.424, 4.504
1 General Studies elective

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*

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*

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*

Year 4
6.606
1 General Studies elective

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

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

0603
Computer Systems Programming

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 including at least 1 unit of statistics from:
1. Table 1 & / or
2. The BA course* & / or
3. Table 2 for program 0601*

Year 3†
6.613, 6.632, 6.633, 6.642, 6.643
2 General Studies electives
Choose at least 2 units from:
1. Table 1 &/*or*
2. The BA course* &/*or*
3. Table 2 for program 0601*
Year 4
6.606
1 General Studies elective

*† See footnote to program 0601.

0604
Scientific Computing

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
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 at least 3 units (including 2 or more Level III Computer Science units) from:
1. Table 1 &/*or*
2. The BA course* &/*or*
3. Table 2 for program 0601*

Year 4
6.606
1 General Studies elective

*† See footnote to program 0601.

0605
Commercial Computing

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
10.2113 (*or* 10.2213), 10.2114 (*or* 10.2214)
Choose at least 1 unit of statistics
1 General Studies elective
Choose 3 units from:
1. Table 1 &/*or*
2. The BA course* &/*or*
3. Table 2 for program 0601*

Year 3†
6.632, 6.633, 6.642, 6.646, 6.647
2 General Studies electives
Choose at least 2 units from:
1. Table 1 *or*
2. The BA course* *or*
3. Table 2 for program 0601*
Year 4
6.606
1 General Studies elective

*† See footnotes to program 0601.

0610
Computer Science/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 0601*
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:
1. Table 1 &/*or*
2. The BA course* &/*or*
3. Table 2 for program 0601*
Year 3†
2 General Studies electives
Choose at least 7 units including 4 (or 3) Level III Computer science units and 3 (or 4) Level III Mathematics units
Year 4
6.606
1 General Studies elective

*† See footnotes to program 0601.

0611
Computer Science/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 0601*
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 at least 7 units including 4 (or 3) Level III Computer Science units and 3 (or 4) Level III Statistics units
Year 4
6.606
1 General Studies elective

*† See footnotes to program 0601.

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

* Up to 8 units of this program may be replaced by subjects offered in the BA degree course. (6 credit points at Level I or 4 credit points at Upper Level are equivalent to 1 unit.) The BA degree subjects are limited to those offered by the following schools: Drama, Economics, English, French, German, History, Political Science, Russian, Sociology, Spanish and Latin American Studies. Upper Level subjects from the School of Economics are restricted to all those in Economic History plus 15.062, 15.072, 15.263 and 15.273.

† Not more than 8 units that are not in Table 1 may be taken without the approval of the Head of the School of Mathematics.

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

1002
Pure Mathematics

Year 1
10.001 *or* 10.011
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), 10.114 (*or* 10.1214), 10.2111 (*or* 10.2211), 10.2112 (*or* 10.2212)
1 General Studies elective
Choose 5 units from:
1. Table 1 &/*or*
2. The BA course*† &/*or*
3. Table 2† for program 1001

Year 3
10.1111‡, 10.1112‡, 10.1121, 10.1128
Choose 2 units from:
10.1122, 10.1123, 10.1124, 10.1125, 10.1126, 10.1127, 10.1129, 10.112C, 10.1521
2 General Studies electives
If only 3 Level II Mathematics units taken in Year 2 choose 1 further Level II or Level III Mathematics unit
Choose 3 (*or* 2) units from:
1. Table 1 &/*or*
2. The BA course*† &/*or*
3. Table 2† for program 1001

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

*† See footnotes to program 1001.

‡ 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
at least 2 of which must be Level III units

Year 4
10.123
1 General Studies elective

*† See footnotes to program 1001.

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

1004
Applied Mathematics

Year 1
10.001 *or* 10.011
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 footnotes to program 1001.

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

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

10.222A, 10.222M

Choose 1 unit from:

10.222L, 10.222C, 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 footnotes to program 1001.

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 footnotes to program 1001.

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 footnotes to program 1001.

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

Year 3
10.412A (*or* 10.422A), 10.421B (*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 footnotes to program 1001.

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

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), 10.2213 (*or* 10.2113), 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 footnotes to program 1001.

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

*† See footnotes to program 1001.

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

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

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

† Geography, History and Philosophy of Science, and Philosophy shall be from the
BA degree course.

§ At least 6 units of this program must come from subjects offered in the BA degree
course (6 credit points at Level I or 4 credit points at Upper Level are equal to 1 unit).
The BA degree subjects are limited to those offered by the following schools: Drama,
Economics, English, French, Geography, German, History, History and Philosophy
of Science, Philosophy, Political Science, Russian, Sociology, Spanish and Latin
American Studies. Upper Level subjects from the School of Economics are restricted
to those in Economic History plus 15.062, 15.072, 15.263 and 15.273.

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

1012
Pure Mathematics and Liberal Studies§

Year 1

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

10.1111‡, 10.1112‡, 10.1121, 10.1128
Choose 2 units from:
10.1122, 10.1123, 10.1124, 10.1125, 10.1126, 10.1127,
10.1129, 10.112C, 10.1521
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 consists of at least 25 units of which not less than eight nor
more than ten units may be from Level I; there is no General Studies requirement.
2. 3rd year Higher Pure Mathematics Units may be substituted for equivalent pass
units with the approval of the Head of School of Mathematics.

°†§ See footnotes to program 1011.

‡ This unit may be taken in Year 2 or Year 3 of the program.

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

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

°‡§ See footnotes to program 1011.

1014
Applied Mathematics and Liberal Studies§

Year 1

10.001 or 10.011
Choose 6 units* from:
1. Table 1† &/or
2. The BA course§ &/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),
10.2113‡ (or 10.2213‡), 10.2114‡ (or 10.2214‡)
Choose 4 units from:
1. Table 1† &/or
2. The BA course§ &/or
3. Table 2 for program 1011

Year 3

10.212A (or 10.222A), 10.212L (or 10.222L), 10.212M (or
10.222M)
Choose 1 unit from:
the Theory of Statistics Level III units or from the Theoretical
Mechanics Level III units
Choose 5 units from:
1. Table 1† &/or
2. The BA course§ &/or
3. Table 2 for program 1011

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

°†§ See footnotes to program 1011.

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

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

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

*†§‡ See footnotes to program 1011.

1016
Statistics 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), 10.2112 (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:
10.321A (or 10.322A), 10.321B (or 10.322B), 10.321C (or 10.322C), 10.312D (or 10.322D), 10.312E (or 10.322E)
Choose 3 Level III Mathematics and/or Computer Science units from Table 1
Choose 2 units from:
1. Table 1† &/or
2. The BA course§ &/or
3. Table 2 for program 1011

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

*†§ See footnotes to program 1011.

1017
Statistics Honours and Liberal Studies§

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

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

*†§ See footnotes to program 1011.

1018
Theoretical Mechanics and Liberal Studies§

Year 1
10.001 or 10.011
1.001 or1.011
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

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

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

°†§ See footnotes to program 1011.

1019
Theoretical Mechanics Honours and Liberal Studies§

Year 1
10.011
1.001 or 1.011
Choose 4 units* from:
1. Table 1† &/or
2. The BA course§ &/or
3. Table 2 for program 1011

Year 2
10.121A (or 10.111A), 10.1213, 10.1214, 10.2211, 10.2212, 10.421A, 10.421B
Choose 3 units from:
1. Table 1† &/or
2. The BA course§ &/or
3. Table 2 for program 1011

Year 3
10.422A, 10.422B, 10.222C, 10.422D
Choose 2 units from:
10.412A, 10.212A (or 10.222A), 10.222M (or 10.212M), 10.2213 (or 10.2113), 10.2214 (or 10.2114), 10.122B, 10.122E (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

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

*†§ See footnotes to program 1011.

1020
Applied Mathematics (Economic Optimization)

Year 1
10.001 or 10.011
15.001, 15.011
Choose 4 units from:
1. Table 1 &/or
2. **The BA course &/or
3. Table 2 for program 1020

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)
15.002, 15.042
1 General Studies elective
Choose either 10.331 and 1 unit from:
1. Table 1 &/or
2. **The BA course &/or
3. Table 2 for program 1020
or
Choose both:
10.311A, 10.311B
or
Choose both:
10.321A, 10.321B

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

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

* The two half units 10.1125 and 10.1126 are recommended.

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

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, 10.2213, 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

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

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

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

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

1023
Mathematics of Management
Honours Program

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

Year 2
10.121A (or 10.111A), 10.1213, 10.1214, 10.2211, 10.2212, 10.2213, 10.2214, 10.331*
14.532, 14.552
Choose either
15.062 and 15.072
or
15.042 and 15.002
1 General Studies elective

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

Year 4
10.233
14.852
14.851 or one Accountancy Honours Option

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

* May be taken in third year.

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. 25.110, 25.120 *or* 27.801 and 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), 10.411B *or* 10.421B *or* 1.012
68.302
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. 25.622
3. 2.002A, 2.002D
4. 3.024†
2 General Studies electives

Year 3
10.411A (*or* 10.421A), 10.412A, 10.412D (*or* 10.422D)
68.313
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. 3.038†§
1 General Studies elective

† Taken together 3.024 and 3.038 count as 3 units.

§ Omitting 'multicomponent systems'.

1069
Mathematics/Marine Science
Honours

Year 1
10.011
1.001 *or* 1.011
Choose 4 units from:
1. 17.031, 17.021
2. 25.110, 25.120 *or* 27.801 and 27.811
3. 2.121, 2.111 *or* 2.131
4. 5.010, 5.030

Year 2
10.121A (*or* 10.111A), 10.1213, 10.1214, 10.2211, 10.2212, 10.421B, 10.421A
68.302
Choose 2 units from the groups **1.**, **2.**, **3.** *or* **4.** chosen in year 1:
1. 17.012
43.111
45.201
2. 25.622
3. 2.002A, 2.002D
4. 3.024†
1 General Studies elective

Year 3
10.412A, 10.422A, 10.422D
(10.2213 & 10.2214) *or* 10.222C
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
3. 1.913, 2.043A
4. 3.038†§
2 General Studies electives

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.

† Taken together, 3.024 and 3.038 count as 3 units.

§ Omitting 'multicomponent systems'.

1201
Psychology

Year 1
10.001 *or* 10.011
or
10.021B and 10.021C
12.001
Choose 4 Level I units from Table 1

Year 2
12.152
Choose 2 units from:
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 1 unit from each of Groups B, C and D. Additionally, students intending to take the research alternative in Psychology IV are required to include 12.163 from Group A.

1270
Psychology/Anatomy**

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

Year 2
12.052, 12.062, 12.152
70.011A, 70.011C
73.121 or 73.111§
1 General Studies elective
Choose*** 70.011B or 70.304 or 70.012B or choose 1 unit
from Table 1

Year 3
70.021A, 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***

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

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

*** Students taking Honours in Anatomy must have completed at least 4 Anatomy units at Level III. This requires one elective unit chosen from 70.011B, 70.021B, or 70.304.

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

† Students taking Honours in Psychology must have completed 8 Level III units of Psychology including 12.153 from Group A and at least 1 unit from each of Groups B, C and D. Additionally, students intending to take the research alternative in Psychology IV are required to include 12.163 from Group A.

7312
Psychology/Physiology

See 7312 Physiology/Psychology

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
25.110, 25.120

Year 2
25.211, 25.221, 25.212, 25.223
1 General Studies elective
Choose 4 units from Table 1

Year 3 (offered 1981)*
25.311, 25.321, 25.312, 25.313, 25.314, 25.324, 25.325,
25.326
2 General Studies electives

Year 4 (offered 1982)
25.400
Plus
either
25.404
or
25.405
1 General Studies elective

* Students enrolling in Year 3 Geology subjects should refer to the 1979 Combined Sciences Handbook for subject descriptions.

2502
Geology
Single major

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
25.110, 25.120

Year 2
25.211, 25.221, 25.212, 25.223
1 General Studies elective
Choose 4 units from Table 1

Year 3 (offered 1981)*
25.311, 25.312, 25.314, 25.321
2 General Studies electives
Choose 4 units from Table 1

Year 4
25.406
1 General Studies elective

* Students enrolling in Year 3 Geology subjects should refer to the 1979 Combined Sciences Handbook for subject descriptions.

2725
Science Geography/Geology

See 2725 Geology/Science
Geography

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

2703
Science Geography with Geology

Year 1
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
25.110, 25.120
27.801, 27.802

Year 2
1.001
25.211, 25.221, 25.212
27.811, 27.812, 27.813
1 General Studies elective

Year 3 (offered 1981)*
25.311, 25.312
27.183, 27.133
2 General Studies electives
Choose 3 units from:
Either
25.312 (or 25.314), 27.153, 27.143, 27.862

Year 4
27.604
1 General Studies elective

* Students enrolling in Year 3 Geology subjects in 1980 should refer to the 1979 Combined Sciences Handbook for subject descriptions.

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
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
43.142
2 General Studies electives
Choose 4 units from:
27.183, 27.133, 27.862
43.112, 43.162

Year 4
27.604
1 General Studies elective

2725
Science Geography/Geology

Year 1
2.121, 2.131
10.001 or 10.011
or
10.021B & 10.021C
25.110, 25.120
27.801, 27.802

Year 2
1.001
25.211, 25.221, 25.212, 25.222
27.811, 27.813
1 General Studies elective

Year 3 (offered 1981)*
27.183, 27.133, 27.812
Choose four subjects from:
25.311, 25.312, 25.313, 25.314, 25.321, 25.324, 25.325, 25.326
2 General Studies electives
Choose 1 unit from:
27.153, 27.143, 27.862

Year 4
1 General Studies elective
27.604 or 25.406

* Students enrolling in Year 3 Geology subjects in 1980 should refer to the 1979 Combined Sciences Handbook for subject descriptions.

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
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
1 General Studies elective
Choose at least 3 units from Table 1

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

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

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

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

4145
Biochemistry/Zoology

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

Year 3
41.102A, 41.102B
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
2.121, 2.131
10.001 or 10.011
17.031, 17.021
Choose 2 Level I units from Table 1
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 both 41.102C & 41.102D
½ General Studies elective*
Choose 3 units from:
62.012, 62.032, 62.033, 62.053, 62.083, 62.093
Choose 1 unit from:
15.001, 15.703, 15.753
Year 4
1 General Studies elective*
41.103 or
62.024

* 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 73.111** or choose 1 or 2 units from:
2.002A, 2.002D, 2.042C, 70.011B
Year 3
41.102A, 41.102B
70.012B, 70.304
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.

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

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

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
42.103 *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

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

Year 2
43.101, 43.111
1 General Studies elective
Choose 2 Level II units of Biochemistry or Chemistry or Physics or Mathematics
Choose 4 units from:
17.012
25.212
43.112, 43.121, 43.131, 43.152, 43.162
44.101
or other units from Table 1

Year 3
2 General Studies electives
Choose at least 4 or 6 Level III Botany units from Table 1, including either or both of 43.112 *or* 43.162
Choose either 4 or 2 Level III units from Table 1

Year 4
43.103
1 General Studies elective

4305
Botany — Applied Plant Physiology
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
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

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

4307
Plant Physiology
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
43.111, 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

4308
Botany — Ecology
Year 1
2.121, 2.131
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

2743
Science Geography/Botany

See 2743 Botany/Geography

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
17.012
41.101
43.101, 43.111, 43.121
44.101, 44.121
1 General Studies elective

Year 3
43.131
43.132
43.172
44.102
and either 43.152, 44.112
or
43.182, 44.122, 44.132
2 General Studies electives

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

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

4144
Microbiology/Biochemistry

See 4144 Biochemistry/Microbiology

4244
Microbiology/Biotechnology

See 4244 Biotechnology/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 7 units from Table 1 including at least 4 units from:
45.112, 45.121, 45.122, 45.132, 45.142, 45.152, 45.202,
45.302, 45.422
Students wishing to enter the Honours program must complete
8 Level III units

Year 4
45.103
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
45.201 *or* 45.301
1 General Studies elective
Choose 3 Level II units from: Zoology, Botany, Microbiology or
Mathematics

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

Year 4
45.103
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
6.620
17.012
43.101
45.301, 45.402
45.101 or 10.331
1 General Studies elective
Choose 2 units from:
10.031
43.111
44.101
45.201

Year 3
45.121, 45.122, 45.152, 45.302
79.201
2 General Studies electives
Choose at least 2 units from:
6.646, 6.643
10.032
43.102, 43.172
45.112, 45.202
79.302
Students wishing to enter the Honours program must complete
8 Level III units

Year 4
45.103
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, 10.1113 & 10.1114, 10.2111 & 10.2112
45.201, 45.301
1 General Studies elective
Choose 3 units from Table 1 including at least 1 Level II Statistics unit

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

Year 4
45.103
1 General Studies elective

4543
Entomology and Plant Pathology

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

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

Year 4
45.103 or 43.103
1 General Studies elective

4514
Zoology (Fisheries and Wildlife Biology)

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

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

Year 4
45.103
1 General Studies elective

4145
Zoology/Biochemistry

See 4145 Biochemistry/Zoology

4570
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
70.021B
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
Physiology/Zoology

See 7345 Zoology/Physiology

6200**
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:
History and Philosophy of Science units
52.353 & 52.393
52.1531 and 52.323 (or 10.1127)

Year 4
62.014
½ General Studies elective*

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

6201
History and Philosophy of Science/ Physics

Year 1
1.001 or 1.011
10.001 or 10.011
2.121, 2.131
Choose 2 Level I units from:
5.010, 5.030
17.031, 17.021
25.110, 25.120

Year 2
1.012, 1.022, 1.032
10.2111 and 10.2112
1 General Studies elective*
62.012, 62.032, and either 62.033 or 62.063
Choose 1 unit from Table 1

Year 3
1.013, 1.023, 1.033, 1.043
2 General Studies electives*
Choose 3 units from:
62.022, 62.052, 62.062, 62.013, 62.033, 62.043, 62.053, 62.063, 62.083, 62.093, 62.103, 62.104, 10.212A

Year 4
Either
1.104** and 1 General Studies elective*
or
62.014** and ½ General Studies elective*

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

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

6225
History and Philosophy of Science/ Geology

Year 1
1.001 (or 1.011) or 17.031 and 17.021
2.121, 2.131
10.001 or 10.011
25.0110, 25.0120

Year 2
25.0211, 25.0221, 25.0212
62.012, 62.032, 62.103
1 General Studies elective*
Choose 2 units from Table 1

Year 3
25.0311, 25.0312, 25.0325
Choose 4 HPS units from Table 1
2 General Studies electives*

Year 4
62.014
½ General Studies elective*

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

6245
History and Philosophy of Science/ Zoology

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
45.101, 45.201 (or 45.402), 45.301, 43.101
62.012, 62.032
62.043 or 62.053 or 62.104
1 General Studies elective*

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

Year 4
Either
62.014 and ½ General Studies elective*
or
43.103 and 1 General Studies elective*

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

6243
History and Philosophy of Science/ Botany

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
43.101, 43.111
62.012, 62.032
62.043 or 62.053 or 62.104
1 General Studies elective*
Choose 2 units from Table 1

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

Year 4
Either
62.014 and ½ General Studies elective*
or
43.103 and 1 General Studies elective*

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

0162
Science Studies with Physics

See 0162 Physics with Science Studies

0262
Science Studies with Chemistry

See 0262 Chemistry with Science Studies

4162
Science Studies with Biochemistry

See 4162 Biochemistry with Science Studies

6270
History and Philosophy of Science/Anatomy

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
62.012, 62.032, *and either* 62.043** *or* 62.053 *or* 62.104
70.011A, 70.011B, 70.011C
1 General Studies elective†
Choose 1 unit from Table 1

Year 3
70.021B
2 General Studies electives†
Choose 4 History and Philosophy of Science units from Table 1
Choose 3 units from:
70.012A, 70.012C, 70.303, 70.304

Year 4
Either
62.014
½ General Studies elective†
or
70.013
1 General Studies elective†

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

** 62.043 must be taken in Year 3 unless completed in Year 2.

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

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. 25.110, 25.120
or 27.801 and 27.811
3. 2.121, 2.131

Year 2
68.302
10.2111 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. 25.622
3. 2.002A

Year 3
1.913
10.411A, 10.412A, 68.313
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. 43.172
45.112
2. None
3. 2.043A

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. 25.110, 25.120
or 27.801 and 27.811
3. 2.121, 2.131

Year 2
68.302
43.111
44.101
45.201 or 41.101
1 General Studies elective
Choose at least 1 unit from:
17.012, 41.101, 44.121, 45.101, 45.201, 45.301
Choose 2 units from subjects related to units of groups **1.**, **2.**
and **3.** chosen in Year 1:
1. 10.031
2. 25.612
3. 2.002A

Year 3
43.172
45.112
2 General Studies electives
Choose at least 5 units from Table 1 which may include sub-
jects related to units from 2 of the groups **1.**, **2.** and **3.** chosen
in Year 1:
1. 10.032, 10.412A, 68.313
2. 25.632
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
25.110, 25.120
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
25.621, 25.622
27.801, 27.811
1 General Studies elective
Choose at least 4 units from Table 1 including the units re-
quired 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
25.631, 25.632, 25.634, 25.635
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, 68.313
2. 43.172
45.112
3. 2.043A

Year 4
68.304
1 General Studies elective

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. 25.110, 25.120
or 27.801 and 27.811

Year 2
68.302
2.002A, 2.002D
1 General Studies elective
Choose at least 4 units from Table 1 including the units re-
quired 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. 25.622

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, 68.313
2. 43.172
45.112
3. None

Year 4
68.304
1 General Studies elective

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, 44.121
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
41.111
2. 6.620
9.801
17.012
79.402
3. 43.111 or 43.131
45.201 or 45.402
45.301
62.012 or 62.032
79.402

Year 3
2 General Studies electives
Choose 4 units from:
9.802
43.102
44.102
45.121
79.201, 79.302
Choose 4 of the following:
6.646
41.102A
43.112
44.122
62.053
70.3041
79.202, 79.403

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 1 units from Table 1

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

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

Year 4
68.504
1 General Studies elective

* 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,
2.013A, 2.002A
10.111A or 10.121A,
10.1113 and 10.1114,
or 10.1213 and 10.1214,
10.2111 and 10.2112,
or 10.2211 and 10.2212
1 General Studies elective

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

Year 4
68.504
1 General Studies elective

* The minimum of 7 Level III units may not include 1.013 or 2.003A.

6853
Chemical Physics (Physics/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, 1.032
2.002A, 2.013A
10.111A *or* 10.121A,
10.1113 *and* 10.1114,
or 10.1213 *and* 10.1214,
10.2111 *and* 10.2112,
or 10.2211 *and* 10.2212
1 General Studies elective

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

Year 4
68.504
1 General Studies elective

* 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 & 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 *or* 73.111†
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.

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

1270
Anatomy/Psychology

See 1270 Psychology/Anatomy

4170
Anatomy/Biochemistry

See 4170 Biochemistry/Anatomy

4570
Anatomy/Zoology

See 4570 Zoology/Anatomy

6270
Anatomy/History and Philosophy of Science

See 6270 History and Philosophy of Science/Anatomy

7073
Anatomy/Physiology

Year 1*
2.121, 2.131
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
41.111
70.011A, 70.011C
73.111
1 General Studies elective
Choose 70.011B, 70.012B, 70.304 or 1 unit from Table 1

Year 3
73.012
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 4 units from Table 1

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.

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.

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
73.111 *or* 73.121
1 General Studies elective
Choose 6 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
73.023
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.

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 12.014 Psychology must have completed 8 Level III units of Psychology including 12.153 and 12.163 from Group A and at least 1 unit from each of Groups B, C and D.

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

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 4 Level III Chemistry units from Table 1
Choose 2 other 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

Mathematics

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

Year 2
10.111A & 10.121A,
10.1113 & 10.1114
or
10.1213 & 10.1214,
10.2111 & 10.2112
or
10.2211 & 10.2212
90.141, 90.161
Choose 1 Level II unit from Table 1
Choose 2 Level I or Level II units from Table 1

Year 3
90.213, 90.214, 90.301
Choose 4 Level III Mathematics units from Table 1
Choose 2 other units of appropriate levels from Table 1

Psychology
Year 1
10.001 *or* 10.011
or
10.021B & 10.021C
12.001
90.112, 90.711
Choose 2 Level I units from Table 1

Year 2
12.052, 12.062, 12.152
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 Psychology units from Table 1
Choose 2 other units of appropriate levels from Table 1

Geology
Single Major*
Year 1
2.121, 2.131
10.001 *or* 10.011
or
10.021B & 10.021C
25.110, 25.120
90.112, 90.711

Year 2
1.001 *or* 1.011
25.211, 25.221, 25.212, 25.233
90.141, 90.161

Year 3 (offered in 1981)*
Choose four subjects from the following:
25.311, 25.312, 25.314, 25.321, 25.313, 25.324, 25.325, 25.326
90.213, 90.214, 90.301
Choose 2 Level II *or* Level III units from Table 1

* Students enrolling in Year 3 Geology subjects in 1980 should refer to the 1979 Combined Sciences Handbook for subject descriptions.

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

Year 2
27.811, 27.812, 27.813
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 units from:
27.103, 27.203, 27.413,
27.423 *or* 27.863,
27.872
Choose 2 units of appropriate levels from Table 1

Biochemistry
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
2.002B
41.101
90.141, 90.161
Choose 1 Level II unit from Table 1 (preferably 41.111)
Choose 2 Level I *or* Level II units from Table 1
Year 3
41.102A, 41.102B
or
41.102C & 41.102D
90.213, 90.214, 90.301
Choose 2 units of appropriate levels from Table 1

Botany
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
43.101, 43.111
90.141, 90.161
Choose 2 Level II units from Table 1
Choose 2 Level I *or* Level II units from Table 1
Year 3
90.213, 90.214, 90.301
Choose 4 Level III Botany units from Table 1
Choose 2 other units of appropriate levels 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 unit 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

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

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

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
25.110, 25.120
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
25.622
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, 10.412
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

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, 8.573, 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 2.981 Chemistry ICE (ie 2 or 4 unit Science including Physics or Chemistry at HSC Exam percentile range 31–100) are advised to apply to enrol in two acceptable alternative subjects, 2.111 Introductory Chemistry and 2.121 Chemistry IA.

*** 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, 27.862, 27.863

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.

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

Physics with Mathematics

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

Year 2
1.012
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, 1.053, 1.3233
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
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.

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

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
10.2113 (or 10.2213), 10.2114 (or 10.2214),
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†
Choose 4 units of Mathematics from Table 1 in the Combined Sciences Handbook (at least one must be Level III)

Year 4
8.273, 8.301, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
1 elective†
Choose 3 Level III (not Level II/III) Mathematics units from Table 1 in the Combined Sciences Handbook

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.

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
25.110, 25.120
3 electives†

Year 3
2.042C
8.173, 8.174, 8.182, 8.351, 8.571
25.211, 25.221, 25.212
29.441, 29.491
1 elective†

**Year 4 (offered in 1981)*
8.273, 8.301, 8.572, 8.573, 8.581, 8.582, 8.671, 8.672
Choose four subjects from the following:
25.311. 25.312, 25.314, 25.321, 25.313, 25.324, 25.325,
25.326††

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.

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

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.

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†

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
1 General Studies elective

Year 2
1.972, 1.982
6.021A, 6.021B, 6.021C, 6.021D (6.620), 6.021E (6.631)
10.111A, 10.1113, 10.1114, 10.2111, 10.2112
1 General Studies elective or 6.641†

Year 3§

Either

3641 Computer Science
2 General Studies electives†
or
1 General Studies elective and 1 Level II or Level III unit from
Table 1
6.613, 6.632, 6.633, 6.646
Choose at least 3 Mathematics units at Levels II or III
or
Choose 6.642, 6.643 and at least one Level II or III Mathematics unit

or

3642 Mathematics
2 General Studies electives†
or
1 General Studies elective and 1 Level II or Level III unit from
Table 1
Choose at least 5 Mathematics units, at least 4 of which are
Level III
Choose at least 2 Level II or Level III units from Table 1

or

3643 Physics
1 General Studies elective
1.013*, 1.023, 1.033
Choose 5 Level II or III units from Table 1, at least one of which
must be at Level III and one must be 1.012 (or 1.992 with the
permission of the Head of the School of Physics) if 1.992 was
omitted from Year 2

Year 4
From Electrical Engineering course, modified as required by
Head of School

Year 5
From Electrical Engineering Course

† Take 2 General Studies electives in Year 3 only if 6.641 replaced the General
Studies elective in Year 2.

§ Year 3 refers to Course 3970 units and Table 1 in this handbook.

* Students electing to take a major in Theoretical Physics may substitute 10.222F.

4070
Mathematics Education
Degree Course

4080
Science Education
Degree Course

4070
Mathematics Education Degree Course
Bachelor of Science Diploma in Education
BSc DipEd

The Mathematics Education Course, leading to the award of the combined qualification BSc DipEd, is designed primarily to prepare students for entry into the teaching profession as teachers of mathematics in secondary schools.

An important feature of the course is that students take education subjects along with mathematics subjects in second, third and fourth years. The Mathematics component is based on programs offered in the Science and Mathematics course. Students may proceed to honours level in either mathematics or in education.

Objectives of the Course

The objectives of the Mathematics components broadly aim: to develop a comprehensive knowledge and interest in mathematical techniques and problem solving, to develop an ability to reason mathematically and to present mathematical reasoning clearly and persuasively, and to ensure the student's understanding of the applications of mathematics.

Objectives related to the education component seek: to develop skills in teaching mathematics, to provide an understanding of the major disciplines which contribute to educational theory, to develop a knowledge of the latest innovations in educational practice and theory and to clarify the methodologies and curriculum materials relevant to secondary mathematics teaching.

Students enrolling in this course must seek advice from the Director of Science Teachers' Courses, Room 41, Building G2, Western Campus.

Honours and Pass Degree Requirements

The course is offered at both pass and honours levels.

1. The pass course requires successful completion of a four-year program.

2. The honours course requires successful completion of a five-year program in which the fifth year is devoted to an approved honours program in one of the following options:

Pure Mathematics, Applied Mathematics, Mathematical Statistics, Theoretical Mechanics, or Education

The grades in this program shall be Honours Class I, II/1, II/2 and III.

Components of the Course

The Mathematics Education Course consists of Mathematics, Education and General Studies components.

1. Mathematics Component

Two alternative programs are available. The programs consist of units ranked as Level I, Level II, Level II/III, Level III and Level IV. These units vary from 56 to 84 hours in duration. The terms Levels I, II and III do not necessarily refer to the years in which the unit must be studied. Units at the various levels may be taken in other years provided the prerequisites are met. Level II/III units have only Level I prerequisites.

Students must select one of the two following programs:

5811   The Mathematics and Science Program

The pass course requires at least 23 units in addition to Education and General Studies subjects

or

5812   The Mathematics and Liberal Studies Program

The pass course requires at least 24 units in addition to Education subjects.

For both programs the selection of units is subject to the requirements listed below:

(1) Not less than 8 units, nor more than 10 units selected from Level I. Except with the approval of the Head of the School of Mathematics and the Director of Science Teacher Courses, not more than 2 Level I units may be taken in any one discipline other than Mathematics.

(2) The following subjects or their higher equivalents shall be included:

10.001, 10.111A, 10.1113, 10.1114, 10.2111, 10.2112.

(3) Courses amounting to at least 2 full units chosen from:

10.1111, 10.1112, 10.1121, 10.1128, 10.1129, 10.1123, 10.1127, provided that a student may substitute for any of the above units such higher units as are deemed equivalent (for the purposes of satisfying this rule) by a professor of Pure Mathematics.

(4) Not less than 2 units from the following:

10.2113, 10.2114, 20.212L, 10.212M, 10.331, 10.311A, 10.311B, 10.312A, 10.312B, 10.312C, 10.312D, 10.312E, 10.411A, 10.411B, 10.412A, 10.1127, provided that a student may substitute for any of the above units such higher units as are deemed equivalent (for the purposes of satisfying this rule) by the Head of the School of Mathematics.

(5) Not less than 8 Level II or Level III Mathematics units from Table 1 (see below) and of these not less than four shall be Level III units of which only one may be Level II/III.

(6) For the award of honours the student must complete 10 units as specified in an individual program and must meet prerequisite requirements set out in Table 3 (see below).

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

2. Education Component

The Education component is one of the major sequences in the course. It consists of subjects grouped as follows:

Theory of Education	58.602,	58.603,	58.604
Mathematics Curriculum and Instruction	58.642,	58.643,	58.644
School Experience	58.612,	58.613,	58.614
Honours	58.505		

3. General Studies Component

(1) The Mathematics and Science Program for the pass course requires 63 hours of General Studies. In the honours course an additional General Studies elective is required. The 63 hours in the pass course is made up of three half electives or their equivalent. The three half electives are normally spread over the second, third and fourth years but this distribution may be varied to suit the program of individual students.

(2) In the Mathematics and Liberal Studies Program the Liberal Studies subjects provide the General Studies component.

Enrolment Requirements

1. A student in first year must be enrolled in a Mathematics program in either the Science and Mathematics Course (3970) or the Mathematics Education Course (4070). In the second, third and fourth years a student must be enrolled in one of the Mathematics programs for the Course 4070, the Education program and, in the case of Mathematics and Science program, General Studies.

2. A student may with the approval of the Director of Science Teachers' Courses, and in consultation with the Head on the School of Mathematics, change from one selected Mathematics program to another. A written application to make the change must be lodged, including details of optional units selected in the new program, at the Science Education Office, Room 41, Building G2, Western Campus.

3. A student must take care to satisfy the requirements of sequences of units such as prerequisites and co-requisites. A prerequisite subject is one which must be completed prior to enrolment in the subject for which it is prescribed. A co-requisite subject is one which must either be completed successfully before or be studied concurrently with the subject for which it is prescribed. In exceptional circumstances, on the recommendation of the Head of the School of Mathematics, the particular prerequisite or co-requisite may be waived by the Director of Science Teachers' Courses.

Programs

The course taken by each student has three component programs:

1. Education Program

This program is the same for each student though there are electives built in to some of the subjects. The program is as follows:

Year	Subject	Hours per week
2	58.602	1
	58.612	2
	58.642	1½
3	58.603	1½
	58.613	2
	58.643	3
4*	58.604	2.8
	58.614	4
	58.644	2
5	58.505†	

* In 1980 students in Year 4 take 58.584, 58.534 and 58.594 (see 1979 Professional Studies Handbook).

† 58.505 is the honours year in education. It is a possible alternative to an honours year in mathematics.

2. General Studies Program

(1) For students electing the Mathematics and Science Program:

Three half electives (or equivalent) taken during Years 2, 3 and/or 4 for the pass degree.

An additional elective in Year 5 is required in the honours program.

(2) For students electing the Mathematics and Liberal Studies Program:

No specific General Studies subjects are required.

3. Mathematics Program

5811
Mathematics and Science

Year 1
10.001 or 10.011
Choose 6 units from:
Tables 2 &/or
The BA course*† &/or
Table 2† for program 5811

Year 2
10.111A *or* 10.121A, 10.1113 *or* 10.1213, 10.1114 *or* 10.1214, 10.2111 *or* 10.2211, 10.2112 *or* 10.2212
Choose 4 or 5 units from:
Table 1 &/or
The BA course*† &/or
Table 2† for program 5811

Year 3
Choose 2 Level III Mathematics units from Table 1
Choose 2 or 3 units from:
Table 1 &/or
The BA course*† &/or
Table 2† for program 5811

Year 4
Choose 2 Level III Mathematics units from Table 1
Choose a further Level II or III Mathematics unit if needed to make up the required 8
Choose 1 or 2 units from:
Table 1 &/or
The BA course*† &/or
Table 2† for program 5811

Year 5
10.123 *or* 10.223 *or* 10.323 *or* 10.423.

° Up to 5 units of this program may be replaced by subjects offered in the BA degree course (6 credit points at Level I, or 4 credit points at Upper Level are equivalent to 1 unit). The BA degree subjects are limited to those offered by the following schools: Drama, Economics, English, French, German, History, Philosophy, Political Science, Russian, Sociology, Spanish and Latin American Studies. Upper Level subjects from the School of Economics are restricted to all those in Economic History plus 15.062, 15.072, 15.263 and 15.273.

† This program may not include more than 8 units from the BA degree course and the Schools of Mechanical and Industrial Engineering, Electrical Engineering (except Level II), Psychology, Geography, and Philosophy, without approval of the Director of Science Teachers' Courses.

5812
Mathematics and Liberal Studies

Year 1
10.011 or 10.001
Choose 4–6 units from:
Table 1† & / or
The BA course*

Year 2
10.111A or 10.121A, 10.1113 or 10.1213, 10.1114 or 10.1214, 10.2111 or 10.2211, 10.2112 or 10.2212
Choose 4 or 5 units from:
Table 1† & / or
The BA course*

Year 3
Choose 2 Level III Mathematics units from Table 1
Choose 2 or 3 units from:
Table 1† & / or
The BA course*

Year 4
Choose 2 Level III Mathematics units from Table 1
Choose 2 or 3 units from:
Table 1† & / or
The BA course*

Year 5
10.123
or
10.223
or
10.323
or
10.423

† Units in History and Philosophy of Science shall be those from the BA degree course.

* At least 6 units of this program must come from subjects offered in the BA degree course (6 credit points at Level I, or 4 credit points at Upper Level are equivalent to 1 unit). The BA degree subjects are limited to those offered by the following Schools: Drama, Economics, English, French, Geography, German, History, History and Philosophy of Science, Philosophy, Political Science, Russian, Sociology, Spanish and Latin American Studies. Each Upper Level unit so offered by these Schools shall count as 1½ units. Upper Level subjects from the School of Economics are restricted to all those in Economic History plus 15.062, 15.072, 15.263 and 15.273.

4080
Science Education Degree Course
Bachelor of Science Diploma in Education
BSc DipEd

The Science Education Course, leading to the award of the combined qualification, BSc DipEd is designed primarily to prepare students for entry into the teaching profession as teachers of science in secondary schools.

An important feature of the course is that students take education subjects along with science subjects in second, third and fourth years. The science component is based on programs offered in the Science and Mathematics Course. Students may proceed to honours in a science or in education. One of the science units is a history and philosophy of science subject. This is included to give students an understanding of the nature of science and of its relationship to society, which is especially important to prospective teachers of science.

Students enrolling in this course must seek advice from the Director of Science Teachers' Courses, Room 41, Building G2, Western Campus.

Objectives of the Course

The objectives of the course are those of the Science and Mathematics Course (3970) together with others which are essential for a course which is designed to prepare science teachers.

In summary, the objectives of the Science and Mathematics course broadly aim to develop a working knowledge of scientific methods of investigation and to promote an understanding of the significance of science, technology, economics and sociological factors in modern society. The objectives seek to develop in the student the ability and disposition to think logically, to communicate clearly by written and oral means and to read critically. Students are encouraged to develop the habit of seeking and recognizing relationships between phenomena, principles, theories, conceptual frameworks and problems.

The education component of the course seeks to provide a knowledge of theories of education and the latest innovations in educational practice and theory, and the development of skills in teaching science.

Honours and Pass Degree Requirements

There are both pass and honours programs available in the course leading to the double qualification Bachelor of Science Diploma in Education (BSc DipEd).

1. The pass course requires successful completion of a four-year program.

2. The honours course requires successful completion of a five-year program in which the fifth year is devoted to an approved honours program in one of the following disciplines:

Physics, Chemistry, Geology, Biochemistry, Biological Technology, Botany, Microbiology, Zoology, Education, Physiology.

The grades in this program shall be Honours Class I, II/1, II/2 and III.

Components of the Course

The Science Education Course consists of Science, Education and General Studies components.

1. Science Component

The Science component is based on the prescribed programs from the Science and Mathematics Course (3970) rearranged to spread over one additional year. These programs are composed of units ranked as Level I, Level II, Level II/III, Level III, and Level IV, such units varying from 56 to 84 hours. The terms Levels I, II and III do not necessarily refer to the years in which the unit must be studied. Units at the various levels may be taken in other years provided the prerequisites are met. Level II/III units have only Level I prerequisites. For the pass course the science component requires at least 23 units with the following requirements:

(1) There shall be ten units from Level I and these must come from the following subjects: 1.001 or 1.011, 2.121, 2.131, 10.001 or 10.011 or 10.021B and 10.021C, 17.011 or 17.031, 17.021, 25.011.

(2) Not less than four units from Level III.

(3) Not less than two units beyond Level I in science disciplines in any of the teaching areas physics, chemistry, biology and geology other than that of the student's major. In special circumstances this requirement may be waived with the permission of the Director of Science Teachers' Courses or as specified in individual programs.

(4) One unit shall be a History and Philosophy of Science subject. In special circumstances this requirement may be waived with the permission of the Director of Science Teachers' Courses or as specified in individual programs.

(5) For the honours program with honours in a science discipline there shall be at least six Level III units and students must meet prerequisite requirements set out in Table 3.

(6) For the award of honours in a science discipline the student must complete at least ten Level IV units as specified in an individual program.

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

2. Education Component

The Education Component is one of the major sequences in the course. It consists of subjects grouped as follows:

Theory of Education	58.602,	58.603,	58.604
Science Curriculum and Instruction	58.632,	58.633,	58.634
School Experience	58.612,	58.613,	58.614
Honours	58.505		

3. General Studies Component

The General Studies component involves 63 hours in the pass course. In the honours course an additional General Studies elective is required. The 63 hours in the pass course is made up of three half electives or their equivalent. The three half electives are normally spread over the second, third and fourth years but this distribution may be varied to suit the programs of individual students.

Enrolment Requirements

1. In all years of the course a student must be enrolled in one of the prescribed Science programs.

In years two, three and four a student must be also enrolled in the Education program and the General Studies program.

2. A student may, with approval of the Director of Science Teachers' Courses, change from one selected Science program to another. A written application to make the change must be lodged, including details of any optional units selected in the new program, at the Science Education Office, Room 41, Building G2, Western Campus.

3. The allowed specific programs, listed in Programs below, are made up of sequences of units. Where a choice is indicated care must be taken to satisfy the requirements such as prerequisites and co-requisites.

4. A prerequisite subject is one which must be completed prior to enrolment in the subject for which it is prescribed. A co-requisite subject is one which must either be completed successfully before or be studied concurrently with the subject for which it is prescribed. An excluded subject is one which cannot be counted together with the subject which excludes it towards the degree of qualification. In exceptional circumstances, on the recommendation of the head of the appropriate school, the particular prerequisite or co-requisite may be waived by the Director of Science Teachers' Courses.

5. Students lacking the HSC prerequisites for 1.001 Physics I and/or 2.121 Chemistry IA may satisfy prerequisites by completing the respective introductory subjects 1.021 Introductory Physics for Health and Life Scientists or 2.111 Introductory Chemistry. Students requiring 10.001 Mathematics I for Physics programs may satisfy prerequisites by completing 10.021B or 10.021A and 10.021B where appropriate. Under these circumstances these introductory subjects are not counted among the units required for the degree course.

Programs

The Course followed by a particular student has three component programs.

1. Education Program

This program is the same for each student though there are electives built in to some of the subjects. The program is as follows:

Year	Subject	Hours per week
2	58.602	1
	58.612	2
	58.632	1½
3	58.603	1½
	58.613	2
	58.633	5
4	58.604	2.8
	58.614	4
	58.634	3½
5	58.505†	

° In 1980 students in Year 4 take 58.584, 58.524 and 58.594 (see 1979 Professional Studies Handbook).

† 58.505 is the honours subject in education. It is a possible alternative to an honours year in one of the sciences.

2. General Studies Program

Three half electives (or equivalent) taken during second, third and/or fourth years for the pass degree.

An additional elective in year 5 is required in the honours course.

3. Science Program

Each Science program is based on a program in the Science and Mathematics Course. Each one has an identifying number. The Science Education programs have 58 as the first two digits of the identifying number.

5801
Physics†

Year 1
1.001 or 1.011
2.121, 2.131
10.001 or 10.011
17.031, 17.021
or
25.110, 25.120

Year 2
1.012, 1.022, 1.032
10.2111, 10.2112
10.1113, 10.1114
17.031, 17.021
or
25.110, 25.120

Year 3
62.042
Choose 2 units from:
1.013, 1.023, 1.033, 1.043, 1.053
Choose 1 unit from:
10.111A or Table 1†

Year 4
Choose 3 units from:
1.013, 1.023, 1.033, 1.043, 1.053
Choose 1 unit from:
10.412D or Table 1†

Year 5
1.104

† Units available for choice from Table 1 in this program are those from Schools other than: Mechanical and Industrial Engineering (except Level 2), Mathematics, Psychology, Geography, Philosophy.

5802
Physics
Single Major*†

Year 1
1.001 or 1.011
10.001 or 10.011
2.121, 2.131
17.031, 17.021
or
25.110, 25.120

Year 2
1.012, 1.022, 1.032
10.2111, 10.2112
17.031, 17.021
or
25.110, 25.120
Choose 1 unit from Table 1†

Year 3
62.042
Choose 2 units from:
1.013, 1.023, 1.033, 1.043
Choose 1 unit from Table 1†

Year 4
Choose 2 units from:
1.013, 1.023, 1.033, 1.043
Choose 2 units from Table 1†

° Under exceptional circumstances students taking this program may be eligible for transfer into Year 5 of programs 5801, 5803, 5805, the latter if the student reaches a satisfactory level in a number of Mathematics units at Levels II and III.

† See this footnote to program 5801.

5803
Applied Physics†

Year 1
1.001 *or* 1.011
2.121, 2.131
10.001 *or* 10.011
17.031, 17.021
or
25.110, 25.120

Year 2
1.012, 1.022, 1.032
10.2111, 10.2112
10.1113, 10.1114
17.031, 17.021
or
25.110, 25.120

Year 3
1.013, 1.023, 62.042
Choose 1 unit from:
1.133, 1.3033, 1.3133, 1.3233, 1.3333, 1.3533, 1.053

Year 4
1.033, 1.043
Choose 2 units from:
1.133, 1.3033, 1.3133, 1.3233, 1.3333, 1.3533, 1.053

Year 5
1.304

5805
Theoretical Physics†

Year 1
1.001 *or* 1.011
2.121, 2.131
10.001 *or* 10.011
17.031, 17.021
or
25.110, 25.120

Year 2
10.111A, 10.2111 & 10.2112, 10.1113, 10.1114
17.031, 17.021
or
25.110, 25.120
Choose 2 units from:
1.012, 1.022, 1.032

Year 3
62.042
Choose 1 unit from:
1.012, 1.022, 1.032
Choose 2 units from:
1.013, 1.023, 1.033, 1.043

Year 4
Choose 2 units from:
1.013, 1.023, 1.033, 1.043
Choose *either*
1.513 *or* 1.523
Choose 1 unit from:
1.513, 1.523, 10.412D, 10.1125 & 10.1126, 10.1128 & 10.1129

Year 5
1.504

† A student may substitute for any of the listed Mathematics units in these programs such higher units as are deemed equivalent by the Head of the School of Mathematics.

5821
Chemistry Major

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
or
25.110, 25.120

Year 2
2.002A, 2.002B, 2.042C, 2.002D
17.031, 17.021
or
25.110, 25.120
Choose 1 unit from:
Table 1†

Year 3
62.042
Choose 2 Level III Chemistry units
Choose 1 unit from:
Table 1†

Year 4
Choose 2 Level III Chemistry units
Choose 2 units from Table 1†

Year 5
2.014

† See this footnote to program 5801.

5831
Geology
Double Major

Year 1
1.001 *or* 1.011
2.121, 2.131
10.001 *or* 10.011
or
10.021B & 10.021C
25.110, 25.120

Year 2
17.031, 17.021
25.211, 25.221, 25.212, 25.223
62.042
Choose 1 unit from Table 1†

Year 3 (offered 1981)*
Choose four out of the following:
25.311, 25.321, 25.312, 25.313, 25.314, 25.324, 25.325, 25.326

Year 4 (offered 1982)
Take the remaining 4 units of Level III Geology III not taken in Year 3

Year 5
25.400
25.404 *or* 25.405

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

† Units available for choice from Table 1 in this program are those from Schools other than: Mechanical and Industrial Engineering, Electrical Engineering (except Level II), Mathematics, Psychology, Geography, Philosophy.

5832
Geology
Single Major

Year 1
1.001 *or* 1.011
2.121, 2.131
10.001 *or* 10.011
or
10.021B & 10.021C
25.110, 25.120

Year 2
17.031, 17.021
25.211, 25.221, 25.212, 25.223

Year 3 (offered in 1981)*
Choose two out of the following:
25.311, 25.312, 25.314, 25.321, 25.313, 25.324, 25.325, 25.326
62.042
Choose 1 unit from Table 1†

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

Year 5
25.406

° Students enrolling in Level III Geology subjects in 1980 should refer to the 1979 Combined Sciences Handbook for subject description.

† See this footnote to program 5831.

5841
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
25.110, 25.120
41.101, 41.111
Choose 1 unit from Table 1†

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

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

Year 5
41.103

† See this footnote to program 5831.

5842
Microbiology and 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
25.110, 25.120
41.101
44.101, 44.121

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

Year 4
44.102, 44.112

Year 5
41.103 *or*
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

° Students are advised to include, where possible, the subject 41.111 in addition to those listed.

5851
Systematic Botany

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
43.101, 43.111
25.110, 25.120
Choose 2 Level II units of Biochemistry or Chemistry or Physics
Choose 1 unit from Table 1†

Year 3
62.042
Choose either 43.112 or 43.162
Choose 1 unit from:
43.102, 43.132, 43.152, 43.172
or other Level III Botany units
Choose 1 unit from Table 1†

Year 4
Choose 2 Level III Botany units
Choose 2 units from Table 1†

Year 5
43.103

† See this footnote to program 5831.

5853
Botany and 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

Year 2
25.110, 25.120
41.101
43.131
45.101, 45.201

Year 3
43.132, choose 1 Level III Botany unit
Choose 2 units from:
45.202, 45.402, 45.412, 45.422

Year 4
Choose 2 Level III Botany units
Choose 2 units from:
45.202, 45.402, 45.412, 45.222

Year 5
43.103 or 45.103

5852
Mycology — Plant Pathology

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
25.110, 25.120
41.101
43.111, 43.131
44.101

Year 3
43.132, 43.172
62.042
Choose 1 unit from:
43.101, 43.121

Year 4
Choose 2 Level III Botany units
Choose 2 units from Table 1†

Year 5
43.103

† See this footnote to program 5831.

5861
Microbiology

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
25.110, 25.120
41.101
44.101, 44.121

Year 3
41.102A
44.102

Year 4
44.112, 44.132
62.042

Year 5
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

5862
Microbiology (General)

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
25.110, 25.120
41.101
44.101, 44.121
Choose 1 unit from Table 1†

Year 3
44.102, 44.112

Year 4
62.042
Choose 3 units from Table 1†

Year 5
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 this footnote to program 5831.

5867
Zoology with Botany

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
25.110, 25.120
43.101, 43.111
45.201, 45.301

Year 3
45.101
62.042
Choose 2 Level III Zoology units

Year 4
Choose 2 Level III Zoology units
Choose 2 Level III Botany units

Year 5
45.103

5866
Zoology (General)

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
25.110, 25.120
45.101, 45.201, 45.301
Choose 2 Level II units of Biochemistry or Chemistry or Mathematics

Year 3
43.101
62.042
Choose 2 Level III Zoology units from Table 1†

Year 4
Choose 2 Level III Zoology units from Table 1
Choose 2 units from Table 1†

Year 5
45.103

† See this footnote to program 5831.

5871
Physiology
Single Major

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
25.110, 25.120
41.101, 41.111
73.111

Year 3
73.012

Year 4
62.042
Choose 3 units from Table 1†

Year 5
73.013

† See this footnote to program 5831.

Units offered by the
Board of Studies in Science and Mathematics

Table 1

Information Key

The following is the key to the information supplied about each subject in the table below: F (Full year ie both sessions); S1 (Session 1); S2 (Session 2); SS (single session, ie *one* only); I, II, III (Levels, I, II, III); Hpw (Hours per week); C (Credit).

School of Physics

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
1.001	Physics I	1	2	F	6	2 unit Mathematics (at HSC Exam percentile range 71-100) *or* 3 unit Mathematics (at HSC Exam percentile range 21-100) *or* 4 unit Mathematics (at HSC Exam percentile range 1-100) *or* (for 1.001 only) 10.021B and 2 unit Science (incl. Physics *and/or* Chem.) (at HSC Exam percentile range 31-100) 4 unit Science (incl. Physics *and/or* Chem.) (at HSC Exam percentile range 31-100)	10.012C, *or* 10.021,*or* 10.001, *or* 10.011	
1.011	Higher Physics I	I	2	F	6		10.001 *or* 10.011	
1.021	Introductory Physics I* (For Health and Life Scientists)	I	2	F	6		10.021A *and* 10.021B, *or* 10.021B *and* 10.021C, *or* 10.021 *or* 10.001 *or* 10.011	

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

School of Physics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Physics Level II								
1.012	Mechanics and Thermal Physics	II	1	S1	5	1.001 or 1.011 10.001	10.2111	
1.022	Electromagnetism and Modern Physics	II	1	S2	5	1.001 or 1.011 10.001	10.2111	1.9322
1.032	Laboratory	II	1	F	3	1.001 or 1.011 10.001		1.9222
1.9222	Electronics	II	½	S1	3	1.001 or 1.011 or 1.021		1.032
1.9322	Introduction to Solids	II	½	S2	3	1.001 or 1.011 or 1.021		1.022 4.402 4.412
1.9422	Introduction to Physics of Measurement	II	½	S1	3	1.001 or 1.011		
Physics Level III								
1.013	Quantum Mechanics and Nuclear Physics	III	1	F	2	1.012, 1.022, 10.2111, 10.2112		2.023A 10.222F
1.023	Statistical Mechanics and Solid State Physics	III	1	S1	4	1.012, 1.022, 10.2111, 10.2112	1.013 or 2.023A	
1.033	Electromagnetism and Optical Physics	III	1	S2	4	1.012, 1.022, 10.2111, 10.2112		10.222C
1.043	Experimental Physics A	III	1	F	4	1.012, 1.022, 1.032		
1.053	Experimental Physics B	III	1	F	4		1.043	
1.133	Electronics	III	1	S1	6	1.032 or 1.9222		
1.1433	Biophysics	III	½	S1	3	1.012, 1.022		
1.1533	Biophysical Techniques	III	½	S2	3	1.012, 1.022, 1.032		
1.1633	Astrophysics	III	½	S1	2	1.022		
1.1733	Conceptual Framework of Physics	III	½	S2	3	1.012, 1.022	1.013, 1.023	
1.3033	Mechanical Properties of Materials	III	½	S1	2		1.023	4.043
1.3133	Electrical, Optical and Thermal Properties of Materials	III	½	S2	2		1.023	
1.3233	Measurement and Data Handling	III	½	S1	2	1.032	1.053	
1.3333	Applications of Radiation	III	½	S2	2		1.033, 1.053	1.343
1.343	Applications of Radiation (Practice and Theory)	III	1	S2	5		1.033	1.3333
1.3533	Marine Acoustics	III	½	S1	2			1.913 25.643
1.513	Plasma and Laser Physics	III	1	S2	4	1.012, 1.022		
1.523	Relativity and Electromagnetism	III	1	S1	4	1.012, 1.022, 10.2111, 10.2112, 10.111A, 10.1113, 10.1114		
Physics Level III Supplementary Units								
1.913	Marine Acoustics and Seismic Methods (Oceanography Unit)		1	F	3			25.643 1.3533

School of Chemistry

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
2.121	Chemistry IA	I	1	S1 or S2	6	2.111 or 2 unit Science (any strands) (at HSC Exam percentile range 31-100) or 4 unit Science (any strands) (at HSC Exam percentile range 31-100)		
2.131	Chemistry IB	I	1	S1 or S2	6	2.111 or 2.121		
2.002A	Physical Chemistry	II	1	S1 or S2	6	2.121, 10.001 or 10.011 or 10.021B & 10.021C		
2.002B	Organic Chemistry	II	1	*	6	2.131		
2.002D	Analytical Chemistry	II	1	*	6	2.121, 2.131, 10.001 or 10.011 or 10.021B & 10.021C		
2.042C	Inorganic Chemistry	II	1	*	6	2.121, 2.131		
2.003E	Nuclear and Radiation Chemistry	II/III	1	*	6	2.121, 2.131, 10.001 or 10.011 or 10.021B & 10.021C		
2.003H	Molecular Spectroscopy and Structure	II/III	1	S2	6	2.121, 2.131		
2.003J	Fundamentals of Biological Chemistry	II/III	1	*	6	2.121, 2.131		2.013L, 41.101
2.003K	Solid State Chemistry	II/III	1	*	6	2.121, 2.131 and 10.001 or 10.011		
2.013A	Introductory Quantum Chemistry	II/III	1	S1	6	1.001 or 1.011, 2.121, 2.131, 10.001 or 10.011 or 10.021B & 10.021C		
2.003A	Physical Chemistry	III	1	SS	6	2.002A		
2.003B	Organic Chemistry	III	1	*	6	2.002B		
2.003C	Inorganic Chemistry	III	1	*	6	2.042C		
2.003D	Instrumental Analysis	III	1	*	6	2.002D, 2.002A		
2.003L	Applied Organic Chemistry	III	1	*	6	2.002B		2.033L
2.003M	Organometallic Chemistry	III	1	*	6	2.002B		
2.013B	Synthetic Organic Chemistry	III	1	*	6	2.003B		
2.013C	Advanced Inorganic Chemistry	III	1	*	6	2.042C	2.003C	
2.013D	Advanced Analytical Chemistry	III	1	*	6	2.002D	2.003D	
2.013L	Chemistry and Enzymology of Foods	III	1	*	6	2.002B		2.003J, 2.023L, 2.043L, 2.053L
2.023A	Quantum Theory of Atoms and Molecules	III	1	F	3	2.002A, 10.2111 & 10.2112		
2.023B	Natural Product Chemistry	III	1	*	6	2.003B		
2.023L	Biological and Agri-cultural Chemistry	III	1	*	6	2.002B		2.013L, 2.043L, 2.053L
2.033A	Physical Chemistry of Macromolecules	III	1	S1	6	2.003J or 2.002B, 1.012 or 2.002A		

School of Chemistry (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
2.043A	Environmental Chemistry	III	1	F or S2	6	2.002A, 2.002D		
2.043L	Chemistry and Enzymology of Foods†	III	2	F	6	2.002B		2.013L, 2.023L, 2.053L
2.053A	Chemical Kinetics and Reaction Mechanisms	III	1	SS	6	2.002A		
2.053L	Biological and Agricultural Chemistry†	III	2	F	6	2.002B		2.013L, 2.023L, 2.043L
2.063A	Advanced Molecular Spectroscopy	III	1	S2	6	2.013A		

* These courses may be offered either Full year, one session, or both.

† Only one of these double units may be chosen.

School of Metallurgy

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

* This unit must be taken in Session 1.

School of Mechanical and Industrial Engineering

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

School of Electrical Engineering

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
6.600	Introduction to Computers	II	1	S2	5			6.620, 6.601A, 6.021D
6.620	Introduction to Computer Science	II	1	S1	5	10.001		6.600, 6.601A, 6.021D
6.631	Assembler Programming and Digital Logic	II	1	S2	5	6.620* or 6.021D		6.602A, 6.021E, 6.031D
6.641	Programming I	II	1	S2	5	6.620* or 6.021D		
6.613	Computer Organization and Design	III	1	S1	5	6.631 or 6.021E, 6.021D or 6.620		6.612
6.632	Operating Systems	III	1	S1	5	6.631, 6.021E, 6.641		6.602B
6.633	Data Bases and Networks	III	1	S2	5	6.632, 6.641		
6.642	Programming II	III	1	S1	5	6.641		
6.643	Compiling Techniques and Programming Languages	III	1	S2	5	6.641		6.602D
6.646	Computer Applications	III	1	S1	5	6.620* or 6.021D		6.602C, 6.622
6.647	Business Information Systems	III	1	S2	5	6.641		14.602, 14.603, 14.604, 14.605
6.649	Computing Practice‡	III	1	**	5	6.641	6.633 or 6.643 or 6.647	

* Students completing 6.600 at a grade of credit or better, may be enabled to undertake this course with permission.

** Not offered in 1980.

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

School of Mathematics

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
Mathematics								
10.001	Mathematics I	I	2	F	6	2 unit Mathematics (at HSC Exam percentile range 71-100) *or* 3 unit Mathematics (at HSC Exam percentile range 21-100) *or* 4 unit Mathematics (at HSC Exam percentile range 1-100) *or* 10.021B		10.011 10.021A 10.021B 10.021C
10.011	Higher Mathematics I	I	2	F	6	3 unit Mathematics (at HSC Exam percentile range 71-100) *or* 4 unit Mathematics (at HSC Exam percentile range 11-100)		10.001 10.021A 10.021B 10.021C
10.021B	General Mathematics IB	I	1	S1 *or* S2	6	2 unit Mathematics (at HSC Exam percentile range 51-100) *or* 3 unit Mathematics (at HSC Exam percentile range 11-100) *or* 4 unit Mathematics (at HSC Exam percentile range 1-100) *or* 10.021A**		10.001 10.011
10.021C	General Mathematics IC	I	1	S2	6	10.021B		10.001 10.011 10.021A
10.041	Introduction to Applied Mathematics	I	1	Not offered 1980	6		10.001	
10.031‡	Mathematics	II	1	F	2	10.001 *or* 10.021C (C)		‡
10.032§	Mathematics	III	1	F	2	10.031		§

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

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

‡ Mathematics 10.031 is included for students desiring to attempt only one Level II Mathematics unit. If other Level II Units in Pure Mathematics, Applied Mathematics are taken, 10.031 Mathematics will not be counted.

§ Mathematics 10.032 is included for students desiring to attempt only one Level III Mathematics unit. If other Level III units in Pure Mathematics, Applied Mathematics or Theoretical Mechanics are taken, 10.032 Mathematics will not be counted except that 10.412A may be taken with 10.032.

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

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
Pure Mathematics								
Pure Mathematics Level II								
10.111A	Linear Algebra	II	1	F	2½	10.001		10.121A

School of Mathematics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.1111	Group Theory	II/III	½	S1	2	10.001	10.111A, 10.1113, 10.1114, 10.2111, 10.2112	10.121A
10.1112	Geometry	II/III	½	S2	2	10.001	10.1111 (or 10.121A)	10.121C
10.1113	Multivariable Calculus	II	½	S1 or S2	2½	10.001		10.1213
10.1114	Complex Analysis	II	½	S1 or S2	2½	10.001		10.1214

Higher Pure Mathematics Level II†

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.121A	Algebra	II	1	F	2½	10.011		10.111A 10.1111
10.121C	Number Theory and Geometry	II/III	1	F	2½	10.011	10.121A, 10.1213, 10.1214, 10.2211 or 10.2111, 10.2212 or 10.2112	10.1112 10.1121
10.1213	Multivariable Calculus	II	½	S1	2½	10.011		10.1113
10.1214	Complex Analysis	II	½	S2	2½	10.1213		10.1114

Pure Mathematics Level III***

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.112C	Differential Geometry	III	1	F	2	10.111A, 10.1113	***	10.122C
10.1121	Number Theory	III	½	SS	2	***		10.121C
10.1122	Algebra	III	½	S2	2	10.111A	10.1111	10.122A
10.1123	Logic and Computability	III	½	SS	2	***		
10.1124	Combinatorial Topology	III	½	S1 or S2	2	***		10.122C
10.1125	Ordinary Differential Equations	III	½	S1	2	***		10.122E
10.1126	Partial Differential Equations	III	½	S2	2	10.1113, 10.1114	10.1125	
10.1127	History of Mathematics	III	½	S2	2	10.111A, 10.1113, 10.1114, 10.2111, 10.2112		
10.1128	Foundations of Calculus	III	½	S1	2	***		10.122B
10.1129	Real Analysis	III	½	S2	2	10.2112*, 10.1128		10.122B
10.1521	Combinatorics and its Applications	III	½	SS	2	***		

Higher Pure Mathematics Level III**

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.122A	Algebra	III	1	F	2½	10.121A		10.1122
10.122B	Integration and Functional Analysis	III	1	F	2½	10.1213		10.1128 10.1129
10.122C	Topology and Differential Geometry	III	1	F	2½	10.121A, 10.1213		10.1124 10.112C
10.122E	Complex Analysis and Differential Equations	III	1	F	2½	10.1213, 10.1214		10.1125

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

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

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

2. Students majoring in Physics who wish to take Higher Pure Mathematics II should attempt 10.121A, 10.1213, 10.1214, either 10.2211 or 10.2111 and either 10.2212 or 10.2112.

3. Students aiming at Honours in Pure Mathematics must take 10.121A, 10.121C, 10.1213, 10.1214, either 10.2211 or 10.2111 and either 10.2212 or 10.2112.

** Students wishing to attempt 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.

School of Mathematics (continued)

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

Applied Mathematics

Applied Mathematics Level II

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.2111	Vector Calculus	II	½	S1	2½	10.001		10.2211 4.813
10.2112	Mathematical Methods for Differential Equations	II	½	S2	2½	10.001		10.2212 4.813
10.2113	Introduction to Linear Programming	II	½	S1	2	10.001		10.2213
10.2114	Linear and Non-Linear Optimization Techniques	II	½	S2	2	10.2113		10.2214
10.211E	Numerical Methods	II	1	F	2	10.001		

Higher Applied Mathematics Level II

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.2211	Vector Analysis	II	½	S1	2½	10.011 or 10.001 Dist**		10.2111
10.2212	Mathematical Methods for Differential Equations	II	½	S2	2½	10.2211		10.2112
10.2213	Introduction to Linear Programming	II	½	S1	2	10.011 or 10.001 Dist**		10.2113
10.2214	Linear and Non-Linear Optimization Techniques	II	½	S2	2	10.2213		10.2114

Applied Mathematics Level III

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.212A	Numerical Analysis	III	1	F	2	10.2111, 10.2112, 10.111A		10.222A
10.212L	Optimization Methods	III	1	F	2	10.1113***		10.222L
10.212M	Optimal Control Theory	III	1	F	2	10.1113 and 10.1114 10.111A or 10.2113		10.222M

Higher Applied Mathematics Level III

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
10.222A	Numerical Analysis	III	1	F	2	10.2211 or 10.211 Dist,** 10.2212 or 10.2112 Dist,** 10.121A or 10.111A Dist,**		10.212A
10.222C	Maxwell's Equations and Special Relativity	III	1	F	2	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		1.033
10.222F	Quantum Mechanics	III	1	F	2	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,**		1.013
10.222L	Optimization Methods	III	1	F	2	10.1213 or 10.1113 Dist,** ****		10.212L

For footnotes, see overleaf

School of Mathematics (continued)

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

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

Statistics
Theory of Statistics Level II

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded°
10.311A‡	Probability and Random Variables	II	1½	S1‡	7	10.001 or 10.021C (C)		10.321A 10.331 10.301 45.101
10.311B	Basic Inference	II/III	1½	S2	7	10.311A		10.321B 10.331 10.301 45.101
10.331	Statistics SS	II	1	F	2	10.001 or 10.021C (C)		10.311A 10.311B 10.321A 10.321B 10.301 45.101

Higher Theory of Statistics Level II

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

Theory of Statistics Level III**

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded°
10.312A	Probability and Stochastic Processes	III	1	S1	4	10.311A, 10.111A, 10.1113, 10.2112		10.322A
10.312B	Experimental Design (Applications) and Sampling	III	1	S2	4	10.311B or 10.331 (N or C)		10.322B
10.312C	Experimental Design (Theory)	III	1	S1	4	10.311B, 10.111A, 10.1113, 10.2112	10.312B†	10.322C
10.312D	Probability Theory	III	1	S2	4	10.311A, 10.111A, 10.1113, 10.2112		10.322D
10.312E	Statistical Inference	III	1	S2	4	10.311B, 10.111A, 10.1113, 10.2112	†	10.322E

School of Mathematics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded°
Higher Theory of Statistics Level III								
10.322A	Probability and Stochastic Processes	III	1	S1	4½	10.321A, 10.111A, 10.1113, 10.1114, 10.2112		10.312A
10.322B	Experimental Design (Applications) and Sampling	III	1	S2	4½	10.321B, 10.111A, 10.1113, 10.1114, 10.2112		10.312B
10.322C	Experimental Design (Theory)	III	1	S1	4½	10.321B, 10.111A, 10.1113, 10.1114, 10.2112	10.322B†	10.312C
10.322D	Probability Theory	III	1	S2	4½	10.321A, 10.111A, 10.1113, 10.1114, 10.2112		10.312D
10.322E	Statistical Inference	III	1	S2	4½	10.321B, 10.111A 10.1113, 10.1114, 10.2112	†	10.312E

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

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

† Plus any two Level III Pure Mathematics, Applied Mathematics, Theoretical Mechanics or Computer Science units. It is sufficient to take 10.312B (10.322B) in the same year.

°° For a student taking four of the units 10.312A, 10.312B, 10.312C, 10.312D, 10.312E (or the corresponding higher units) a project is required as part of either 10.312C (10.322C) or 10.312E (10.322E).

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

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded°
Theoretical and Applied Mechanics								
Theoretical Mechanics Level II								
10.411A	Hydrodynamics	II/III	1	S2	4	10.001	10.411B or 10.012, 10.1114	10.421A
10.411B	Principles of Theoretical Mechanics	II	1	S1	4	10.001, 1.001 or 10.041 or 5.010	10.2111, 10.2112, 10.1113	10.421B
Higher Theoretical Mechanics Level II								
10.421A	Hydrodynamics	II/III	1	S2	4	10.011 or 10.001 Dist.°°	10.421B, 10.1114	10.411A
10.421B	Principles of Theoretical Mechanics	II	1	S1	4	10.011 or 10.001 Dist.°°, 1.001 or 10.041 or 5.010	10.2211, 10.2212 10.1113	10.411B
Theoretical Mechanics Level III								
10.412A	Dynamical and Physical Oceanography	III	1	F	2	1.001, 10.2111 and 10.2112 or 10.031	‡	
10.412B	Continuum Mechanics	III	1	F	2	10.2111, 10.2112, 10.1113, 10.1114, 10.111A	10.411A or 1.012 or 1.913	10.422B
10.412D	Mathematical Methods	III	1	F	2	10.2112, 10.1113, 10.1114, 10.111A		10.422D

For footnotes, see overleaf

School of Mathematics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites††	Co-requisites††	Excluded*
Higher Theoretical Mechanics Level III								
10.422A	Fluid Dynamics	III	1	S2	4	10.421A or 10.411A Dist.**	10.422B	
10.422B	Mechanics of Solids	III	1	S1	4	10.2111, 10.2112, 10.1113, 10.1114, 10.111A, 10.421B or 10.411B Dist.** or 1.012		10.412B
10.422D	Mathematical Methods	III	1	F	2	10.2211 or 10.2111 Dist.**, 10.2212 or 10.2112 Dist.**, 10.1213 or 10.1113 Dist.**, 10.1214 or 10.1114 Dist.**		10.412D

** With the permission of the Head of the Department a sufficiently good grading may be substituted.

‡ It is recommended that one of the following be taken concurrently: 10.411A or 1.012 or 1.913.

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

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

School of Psychology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Psychology Level I								
12.001	Psychology I	I	2	F	5			
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 IIIA	III	1	S1	4	12.152		
12.163	Research Methods IIIB	III	1	S2	4	12.152, 12.153		
Psychology Level III: Group B								
12.253*	Learning IIIA	III	1	S1	4	12.052, 12.152		
12.263	Learning IIIB	III	4	S2	4	12.052, 12.152, 12.253		
12.323	Motivation IIIA	III	4	Not Offered 1980	4	12.052, 12.152		
12.413	Physiological Psychology IIIA	III	4	S2	4	12.052, 12.152		
12.423	Physiological Psychology IIIB	III	4	S2	4	12.052, 12.152	12.413	
12.453	Human Information Processing IIIA	III	4	S1	4	12.062, 12.152		

School of Psychology (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
12.463	Human Information Processing IIIB	III	4	Not Offered 1980	4	12.062, 12.152, 12.453		
12.473	Perception IIIA	III	4	S1	4	12.152		
12.483	Perception IIIB	III	4	S2	4	12.152, 12.473		
12.493	Psychophysics III	III	4	S2	4	12.153		

Psychology Level III: Group C

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
12.173	Psychological Issues III	III	4	Not Offered 1980	4	12.052, 12.062		
12.303	Personality IIIA	III	4	S1	4	2 Psychology Level II subjects		
12.313	Personality IIIB	III	4	Not Offered 1980	4	2 Psychology level II subjects, 12.303		
12.373	Psychological Assessment IIIA (Testing)	III	4	S1	4	12.152 and 1 other Psychology Level II subject		12.042 (Psych BSc)
12.383	Psychological Assessment (Psychometric Theory) IIIB	III	4	Not Offered 1980	4	12.152 and 1 other Psychology Level II subject, 12.373		
12.503	Social Psychology IIIA	III	4	S1	4	12.062, 12.152		
12.513	Social Psychology IIIB	III	4	S2	4	12.062, 12.152		12.523
12.523	Environmental Psychology III	III	4	S2	4	2 Psychology Level II subjects		12.513
12.553	Developmental Psychology IIIA	III	4	S2	4	12.062, 12.152		
12.563	Developmental Psychology IIIB	III	4	Not Offered 1980	4	12.062, 12.152, 12.553		
12.603	Abnormal Psychology IIIA	III	4	S1 or S2	4	12.052, 12.152		
12.613	Abnormal Psychology IIIB	III	4	Not Offered 1980	4	12.052, 12.152, 12.603		

Psychology Level III: Group D

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
12.623	Guidance and Counselling III	III	4	S2	4	2 Psychology Level II subjects		
12.653	Industrial Psychology III	III	4	S2	4	2 Psychology Level II subjects		
12.663	Ergonomics III	III	4	S1	4	12.152		
12.703	Psychological Techniques III	III	4	Not Offered 1980	4	2 Psychology Level II subjects		
12.713	Control and Modification of Behaviour III	III	4	S2	4	12.052, 12.152, 12.603		

* 12.253 is a prerequisite for the Psychology Honours Level IV electives of Behavioural Change: Issues and Problems, Experimental Psychopathology, Learning and Animal Behaviour, and Experimental–Clinical Psychology.

Notes:

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

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

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

4. A major in Psychology is minimally satisfied by the completion of 12.001, two Psychology Level II units, including 12.152, and four Psychology Level III units.

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

Biological Sciences

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
17.031	Cell Biology	I	1	S1	6	Science 2 *or* 4 units at HSC Exam percentile range 31-100		
17.021*	Biology of Higher Organisms	I	1	S2	6	17.031†		
17.012	General Ecology	II	1	S2	6	17.011 *and* 17.021 *or* 17.031 *and* 17.021		

* 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, 45.201 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.

† Terminating pass acceptable.

School of Applied Geology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
25.110	Earth Materials and Processes*	I	1	S1	6	2 unit Science (any strand) (at HSC Exam percentile range 31-100) *or* 4 unit Science (multistrand) (at HSC Exam percentile range 31-100)		
25.120	Earth Environments and Dynamics**	I	1	S2	6	25.110		
25.211	Earth Materials I	II	1	S1	6	25.120		
25.221	Earth Materials II***	II	1	S2	6	25.211		
25.212	Earth Environments I****	II	1	S1	6	25.120		
25.223	Earth Physics	II	1	S2	6	—		
25.621	Marine Geology I§	II	1	F	3	25.601 *or* 25.110 *and* 25.120		††
25.622	Hydrological and Coastal Surveying§	II/III	1	F	3			††
25.311	Earth Materials III†	III	1	S1	6	25.221	25.326	
25.321	Earth Materials IVϕ†	III	1	S2	6	25.311		
25.312	Earth Environments II†	III	1	S1	6	25.212		
25.313	Exploration and Data Processingϕϕ†	III	1	S1	6	25.223		
25.314	Mineral and Energy Resources Iϕϕϕ†	III	1	S1	6	25.221	25.311	
25.324	Mineral and Energy Resources II†	III	1	S2	6	25.312		
25.325	Engineering and Environmental Geology†	III	1	S2	6			
25.326	Geological Techniquesϕ†	III	1	S2	6	25.212, 25.311		

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

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

*** Field work of up to 10 days is a compulsory part of the subject.

**** Field work of up to 3 days is a compulsory part of the subject.

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

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

ϕϕϕ Field work of up to 6 days is a compulsory part of the subject.

§ Compulsory field work to be arranged.

† Offered in 1981. Students enrolling in Year III Geology subjects in 1980 should refer to the 1979 Combined Sciences Handbook for subject descriptions.

†† *Not* available for programs 2501, 2502, 2703, 2725, *nor* in Geology program of Course 4770, *nor* in Geology with some Mathematics program of Course 3730.

School of Geography

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
27.801	Introduction to Physical Geography*	I	1	S1	4½			
27.802	Introduction to Human Geography*	I	1	S2	4½			
27.813	Geographic Methods**	II	1	F	3	27.801‡, 27.802		
27.811	Physical Geography*	II	1	S2	4½	27.801, 27.813†		
27.812	Human Geography*	II	1	S1	4½	27.802, 27.813†		
27.153	Climatology	II/III	1	S2	5	1.001, 27.811 or 25.011 or 17.031 and 17.021		
27.143	Biogeography**	II/III	1	S1	5	27.811 or 17.031 and 17.021		
27.183	Geomorphology**	II/III	1	S2	5	25.011 or 27.811		
27.133	Pedology**	II/III	1	S1	5	Any two (2) of: 2.111, 2.121, 2.131 and 27.811 or 25.012 or 25.022		27.863
27.860	Landform Studies**	II/III	1	S2	4½	27.811		
27.862	Australian Environment and Natural Resources**	II/III	1	S2	4½	27.811 or 27.812 or 25.110 and 25.120		
27.863	Ecosystems and Man**	II/III	1	S2	4½	27.811 or 27.812		27.423
27.824	Spatial Population Analysis**	II/III	1	S2	4	27.812		
27.825	Urban Activity Systems**	II/III	1	S1	4	27.812		
27.826	Urban and Regional Development**	II/III	1	S1	4	27.812		
27.834	Spatial Population Analysis (Advanced)**	III	1	S2	4	27.812 (Cr), 27.813 (Cr)		
27.835	Urban Activity Systems (Advanced)**	III	1	S1	4	27.812 (Cr), 27.813 (Cr)		
27.836	Urban and Regional Development (Advanced)**	III	1	S1	4	27.812 (Cr), 27.813 (Cr)		
27.870	Landform Studies (Advanced)**	III	1	S1	6	27.811 (Cr), 27.813 (Cr)		
27.872	Australian Environment and Natural Resources (Advanced)**	III	1	S2	6	27.811 (Cr) or 27.812 (Cr)		
27.880	Advanced Geographic Methods	III	1	F	3	27.813 (Cr) and 27.811 (Cr) or 27.812 (Cr)		
27.412	Coastal Geographyφ**	II	½	S2	5	27.811 or 25.110 and 25.120		

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

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

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

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

φ Only for students in the Marine Science program. Not offered in 1980.

School of Biochemistry‡

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites*	Co-requisites	Excluded
41.101	Biochemistry	II	2	S1	12	17.021†, 2.121†, 2.131†		2.003J
41.111	Biochemical Control	II	1	S2	6	41.101		
41.102A	Biochemistry of Macromolecules	III	2	S1	12	41.101** or 41.111**, 2.002B		
41.102B	Physiological Biochemistry	III	2	S2	12	41.101** or 41.111**, 2.002B		
41.102C	Plant Biochemistry	III	1	S2	6	41.101** or 41.111**, 2.002B		
41.102D	Biosynthesis of Plant Metabolites	III	1	S2	6	41.101** or 41.111**, 2.002B	41.102C	

‡ Level III Units available only during the daytime.
* In exceptional circumstances a student may apply to the Head of School for variation of the prerequisite.
† Terminating pass not acceptable.
** Pass conceded not acceptable as prerequisite.

School of Biological Technology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites*	Co-requisites	Excluded
42.101	Introduction to Biotechnology	II	1	S2	6	2.121, 2.131, 17.021, 10.001 or 10.011 or 10.021B and 10.021C		
42.102A	Biotechnology A	III	1	S1	6	41.101 42.101 or 44.101		
42.102B	Biotechnology B	III	1	S2	6	42.101		

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

School of Botany†

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
17.012	General Ecology					See under Biological Sciences		
43.101	Introductory Genetics	II	1	S2	6	17.001 or 17.011 and 17.021 or 17.031 and 17.021*		
43.111	Flowering Plants	II	1	S1	6	17.001 or 17.011 and 17.021 or 17.031 and 17.021		
43.121	Plant Physiology	II	1	S2	6	17.001 or 17.011 and 17.021 or 17.031 and 17.021, 2.001 or any 2 units of: 2.111, 2.121, 2.131***		
43.131	Fungi and Man	II	1	S1	6	17.001 or 17.011 and 17.021 or 17.031 and 17.021		

School of Botany† (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
43.102	Microbial Genetics	III	1	S1	6	43.101		
43.112	Plant Taxonomy	III	1	S2§	6	43.111	43.101	
43.122	Biochemical Approaches to Plant Physiology	III	1	S1	6	41.101 or 41.101A and 41.101B		
43.132	Mycology-Plant Pathology	III	1	S2	6	43.131***		
43.142	Ecology and Environmental Botany	III	1	S1	6	17.001 or 17.011 and 17.021 or 17.031 and 17.021		
43.152	Plant Community Ecology	III	1	S2	6	43.111 and 17.012		
43.162	The Plant Kingdom	III	1	S2§	6	43.111		
43.172	Phycology and Marine Botany	III	1	S1	6	43.111		
43.182	Cellular and Developmental Botany	III	1	S2	6	43.111 or 43.121**		

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, 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. 43.112 Plant Taxonomy is offered in 1980. If both units 43.112 and 43.162 are to be included in a three-year pass degree program, one should be completed in Year 2.

School of Microbiology†

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites°	Co-requisites	Excluded
44.101	Introductory Microbiology	II	1	S1	6	17.011 and 17.021 or 17.031 and 17.021		
44.111	Microbiology**	II	1	F	3			
44.121	Microbial Growth	II	1	S2	6	44.101 41.101 or 2.003J		
44.102	General Microbiology	III	2	S1	12	44.101, 44.121, 44.101 or 41.101A and 41.101B		
44.112	Applied Microbiology	III	2	S2	12	44.102		
44.122	Immunology	III	1	S2	6	17.011 and 17.021; or 17.031 and 17.021; 41.101 or 41.101A and 41.101B		
44.132	Virology	III	1	S2	6	44.102		

† All units available only during the daytime.

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

°° 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†

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
45.101	Biometry	II	1	S1	6	17.011, 17.021 or 17.031 and 17.021		10.311A, 10.321A, 10.331
45.201	Invertebrate Zoology	II	1	S2	6	17.011, 17.021 or 17.031 and 17.021		
45.301	Vertebrate Zoology	II	1	S1, S2	6	17.011, 17.021 or 17.031 and 17.021		
45.112	Marine Ecology§	III	1	S1	6	17.011 and 17.021 or 17.021 and 17.031, 45.201 or 25.621 or 2.002D		
45.121	Evolutionary Theory	III	1	S1	6	17.011, 17.021 or 17.031 and 17.021		
45.122	Animal Behaviour	III	1	S2	6	45.101‡ and (45.201 or 45.301)		
45.132	Ecological Physiology	III	1	S1	6	45.201 or 45.301		
45.142	General and Reproductive Physiology	III	1	S1	6	45.201, 45.301		
45.152	Population and Community Ecology	II/III	1	S1	6	17.021 and 10.001 or 10.011		
45.202	Topics in Invertebrate Biology	III	1	S2	6	45.201		
45.302	Vertebrate Zoogeography	III	1	S2	6	45.301		
45.402	Insects§	II/III	1	S1, S2	6	17.011, 17.021 or 17.031 and 17.021		
45.412	Insect Physiology	III	1	S1	6	45.101‡	45.402	
45.422	Economic Zoology	III	1	S2	6	45.201 or 45.402		
45.432	Project	III	1	S2	6	45.412		

Note: A student will not be admitted to Level III Zoology units without special permission of the Head of School, unless Chemistry 2.001 or 2.121 and 2.131 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 except as detailed in an approved program.

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

§ Students intending to enrol in this unit should register with the School of Zoology for the February field trip by 14 January.

‡ One of: 10.311A; 10.321A; 10.331 may be substituted for 45.101 with special permission of the Head of School.

School of Philosophy

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
52.103	Introductory Philosophy A	I	1	S1	4			
52.104	Introductory Philosophy B	I	1	S2	4			
52.1531	Predicate Logic A	II	½	S1	2	Any Level I unit		52.153, 52.162
52.1532	Predicate Logic B	II	½	S2	2	52.1531		52.153, 52.162

School of Philosophy (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
52.163	Descartes	II	½	S1	2	Level II status in Philosophy**		
52.173	British Empiricism	II	½	S2	2	Level II status in Philosophy**		
52.183	Greek Philosophy: Tales to Plato	II	½	S1	2	Level II status in Philosophy**		
52.193	Scientific Method	II	½	S1	2	Level II status in Philosophy**		
52.203	Classical Political Philosophy	II	½	S1	2	Level II status in Philosophy**		52.182
52.213	Sartre	II	½	S1	2	52.163		
52.233	Argument	II	½	S2	2	Level II status in Philosophy**		
52.263	Philosophy of Psychology	II	½	S2	2	52.193		
52.273	Aesthetics	II	½	S2	2	Level II status in Philosophy**		
52.283	Philosophical Study of Woman	II	½	S2	2	Level II status in Philosophy**		
52.293	Plato's Later Dialogues	II	½	S2	2	52.483*		
52.303	Spinoza and Leibniz	II	½	S2	2	52.163		
52.323	Set Theory	II	½	S1	2	52.153 or 52.1532 or 26.812 or 10.001 or 10.011 or 10.021B and 10.021C		
52.333	Philosophy of Perception	II	½	S2	2	52.163 or 52.173		
52.343	Privacy and Other Minds	II	½	S1	2	52.163 and either 52.173 or 52.243		
52.353	History of Modern Logic	II	½	S1	2			52.153 52.1532
52.373	Philosophical Foundations of Marx's Thought	II	½	S1	2	Level II status in Philosophy**		
52.393	History of Traditional Logic	II	½	S2	2			52.153 52.1532
52.403	Model Theory	II	½	S2	2	52.323 or 10.1123		
52.413	Reading Option A	II	½	S1 or S2		Satisfactory performance in Level II units		
52.423	Seminar A	II	½	S2	2	Level II units (Cr)		
52.433	Seminar B	II	½	S1	2	Level II units (Cr)		
52.443	Seminar C	II	½	S2	2	Level II units (Cr)		
52.453	Reading Option B	II	½	S1 or S2		Satisfactory performance in Level II units		
52.463	Introduction to Transformational Grammar	II	½	S1	2	Any Level I unit		
52.473	Meaning and Truth	II	½	S2	2	52.463 or 52.153 or 52.1531		
52.483	Plato's Theory of Forms	II	½	S2	2	Level II status in Philosophy**		
52.513	Social and Political Philosophy	II	½	S2	2	Level II status in Philosophy** and 52.182 or 52.203		
52.5231	Classical Greek Ethics	II	½	S1	2	Level II status in Philosophy**		

For footnotes, see overleaf

School of Philosophy (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
52.5232	Theories in Moral Philosophy	II	½	S2	2	Level II status in Philosophy**		
52.543	The Philosophy of Love	II	½	S1	2	Level II status in Philosophy**		
52.553	Contemporary Moral Issues	II	½	S2	2	Level II status in Philosophy**		
52.563	Hume	II	½	S1	2	Level II status in Philosophy**		52.152
52.573	Psychoanalysis — Freud and Lacan	II	½	S2	2	Level II status in Philosophy**		
52.583	Theories, Value and Education	II	½	S1	2	Level II status in Philosophy**		

* In exceptional circumstances a student may apply to the School for variation of the prerequisite or co-requisite.

** Level II status in Philosophy consists in **1.** being in second or later year of university study, and **2.** having taken and passed at least one Level I Philosophy unit. If the unit is composed of two half-units, these must have been passed in the same session. The prerequisite may be waived in certain cases by the School.

School of History and Philosophy of Science

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
62.012	The Origins of Modern Science	II/III	1	S1	3			
62.022	The Social History of Technology in the Eighteenth and Nineteenth Centuries	II/III	1	S2	3			
62.032	The Scientific Theory	II/III	1	S2	3			
62.052	Scientific Knowledge and Political Power	II/III	1	S1	3	A pass in *two* of 1.001 *or* 1.011		
62.062	The Social System of Science	II/III	1	S2	3	2.121 *and* 2.131		
62.033	The Development of Theories of Matter*	II/III	1	S1	3	10.001 *or* 10.011 *or* 10.021B *and* 10.021C		
62.043	The Historical Foundations of Experimental Biology	II/III	1	S1	3	12.001 17.031 *and* 17.021		
62.053	Theories of Generation and Heredity*	II/III	1	S2	3	25.110 *and* 25.120 27.801 *and* 27.802		
62.063	History and Philosophy of Cosmology	II/III	1	S2	3			
62.093	Science and the Strategy of War and Peace	II/III	1	S1	3			
62.103	The Discovery of Time	II/III	1	S1	3			
62.104	The Darwinian Revolution	II/III	1	S2	2			
62.013	History of the Philosophy and Methodology of Science	III	1	F	2	62.012 *or* 62.022 *or* 62.032 *or* 62.052 *or* 62.062		
62.083	Marxism and Science*	III	1	S1	3			
62.042	Science Education and the Dynamics of Scientific Development	II	1	S2	4	58.632		
62.105	Research Methods in History and Philosophy of Science	III	1	F	2½	Completion of 3 HPS units with an average of Credit or better, or by permission of Head of School		

* Not offered in 1980.

School of Physiology and Pharmacology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
73.111	Physiology IA	II	2	F	6	2.121, 2.131, 10.001 or 10.011 or 10.021B and 10.021C, 17.021	41.101	73.121
73.121	Physiology IB	II	2	F	6	2.121, 10.001 or 10.011 or 10.021B and 10.021C, 17.021	2.131	73.111
73.012	Physiology II	III	4	F	12	73.111, 41.101, 41.111		
73.012A	Membrane Biology	III	1	S1	6	Normally as for 73.012, but may be studied only with permission of Head of School		
73.012B	Neurophysiology	III	1	S1	6			
73.012CD	Organ Physiology	III	2	S2	12			
73.022	Pharmacology	III	2	F	6	73.111 or 73.121	73.012 or 41.102A and 41.102B or 2.003J and 2.033A	

Note: The above represent the normal prerequisites for the courses in Physiology, but the Head of School may recommend that students with a good academic record be granted exemption from them.

School of Community Medicine

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
79.201	Population Genetics Theory	III	1	S1	5	45.101 or 10.331 or 10.311A and 10.311B or 10.321A and 10.321B		
79.202	Quantitative Methods in Human Genetics	III	1	S2	5	9.801 or 43.101; 9.811 or 10.311A and 10.311B; or 10.321A and 10.321B; or 10.331 or 12.152 or 45.101		
79.302	Biochemical Genetics of Man	III	1	S2	6	43.101, 41.101		
79.402	Genetics of Behaviour I	II	1	S1	5	17.011 or 17.031		
79.403	Genetics of Behaviour II	III	1	S2	5	79.402		

Course 3970
Units available in specific programs

Table 2

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Specific Programs
1.041	Laboratory Computers in Physical Science	I	1	S1	6	As for 1.001	10.001	0101, 0102, 0103, 0105, 0162
2.111	Introductory Chemistry*	I	1	S1	6			0101, 0103, 0105, 1068 1069, 2702, 2743
2.013E	Advanced Nuclear and Radiation Chemistry	III	1	S2	6	2.003E		Any appropriate program *except* 0201, 0202, 0203, 0204, 0241, 0242 *and* Course 3910
3.023	Chemical Engineering Science I	II	2	F	5S1 4S2	1.001, 10.001		0204
3.024	Chemical Engineering Principles 1	II	1	F	2S1 3S2	1.001, 10.001		1001, 1068, 1069, 5811
3.037	Chemical Engineering Science II	III	2	F	6S1 8S2	2.002A, 3.023		0204
3.038	Chemical Engineering Principles 2	III	1	F	3			1001, 1068 1069, 5811
4.802	Metallurgical Physics	II	½	S2	2	1.001 *or* 1.011		0401, 0402 0403
4.813	Mathematical Methods	III	1	F	3	10.001 *or* 10.011		0401, 0402 0403
6.010	Electrical Engineering I	I	1	SS	6	Electrical & magnetism section of 1.001 *or* 1.011		0101, 0102, 0103, 0105, 0106, 0162, 0601
6.021A	Basic Circuit Theory	II	½	S1	4	6.010		0102, 0601
6.021C	Electronics	II	½	S1	4	6.021A		0102, 0601

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Specific Programs
6.851	Electronics and Instrumentation	II	½	S1	3	1.001 or 1.011		0401, 0402, 0403
6.852	Electrical Machinery and Supply	II	½	S2	3	1.001 or 1.011		0401, 0402, 0403
7.023	Mineral Process Engineering	III	½	S1	2			0402, 0403
9.801	Genetics I	II	1	F	2S1 3S2			6840
9.811	Biostatistics I	III	1	S1	4	45.101		6840
9.802	Genetics II	III	1	F	4	9.801		6840
10.021A	General Mathematics IA	I	1	S1	6			
10.022	Engineering Mathematics II	II	1	F	4	10.001		Course 3730
10.301	Statistics SA	II	1	F	2	10.001 or 10.021 (C)		4308, 6832
14.501	Accounting and Financial Management IA	I	1	S1	4½			0601, 1001, 1020, 1021, 1022, 1023, 5811
14.511	Accounting and Financial Management 1B	I	1	S2	4½	14.501		0601, 1001, 1020, 1021 1022, 1023, 5811
14.522	Accounting and Financial Management IIA	II	1	S1	4½	14.511		0601, 1001, 1022, 5811
14.532	Accounting and Financial Management IIA (Honours)	II	1	S1	4½	14.511		1023
14.542	Accounting and Financial Management IIB	II	1	S2	4½	14.511		0601, 1001, 1022, 5811
14.552	Accounting and Financial Management IIB (Honours)	II	1	S2	4½	14.511		1023
14.563	Accounting and Financial Management IIIA	III	1	S1	4½	14.542		1022
14.573	Accounting and Financial Management IIIA (Honours)	III	1	S1	6	14.542		1023
14.583	Accounting and Financial Management IIIB	III	1	S2	4½	14.522		1022
14.593	Accounting and Financial Management IIIB (Honours)	III	1	S2	6	14.522		1023
14.601	Law and Society I	I	1	S2	3			1020, 1021, 1022, 1023
14.602	Information Systems IIA	II	1	S1	3			0601, 1001, 1020, 1021, 1022, 1023, 5811
14.603	Information Systems IIB	II	1	S2	3	14.602 or 6.620		0601, 1001, 1020, 1021, 1022, 1023, 5811
14.604	Information Systems IIIA	III	1	S1	3	14.603		0601, 1022, 1023
14.605	Information Systems IIIB	III	1	S2	3	14.604		0601
14.608	Advanced File Design and Commercial Programming	III	1	S2	3	14.604		0601, 1022, 1023

For footnotes, see overleaf

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Specific Programs
14.613	Business Finance II	II	1	S2	3			0601, 1001, 1022, 1023, 5811
14.614	Business Finance IIIA	III	1	S1	3	14.613		0601, 1022, 1023
14.615	Business Finance IIIB	III	1	S2	3	14.614		0601, 1022, 1023
14.851	Current Developments in Accounting Thought — Financial	IV	1	S1	3			1023
14.852	Current Developments in Accounting Thought — Managerial	IV	1	S1	3			1023
15.001	Microeconomics I	I	1	S1	4			0601, 1020, 1021, 1022, 1023
15.002	Microeconomics II	II	1	S1	4	15.011		0601, 1001, 1020, 1023, 5811
15.003	Macroeconomics III	III	1	S1	3	15.042		0601, 1020
15.011	Macroeconomics I	I	1	S2	4	15.001		0601, 1020, 1021, 1022, 1023
15.012	Microeconomics II (Honours)§	II	1	S1	4			1021
15.013	Macroeconomics III (Honours)§	III	1	S1	4			1021
15.024	Economics IVC	IV	1	S1	2½			1021
15.034	Economics IVD	IV	1	S2	2½			1021
15.042	Macroeconomics II	II	1	S2	4	15.011		1001, 1020, 1022, 1023, 5811
15.052	Macroeconomics II (Honours)§	II	1	S2	4			1021
15.062	Economics IID	II	1	S1	4	15.011		1023
15.063	Monetary Theory and Policy	III	1	S2	4	15.002		1020, 1021
15.072	Economics IIE	II	1	S2	4	15.011		1023
15.073	Natural and Environmental Resources Economics	III	1	S1	4	15.002 or 15.072		1020, 1021
15.103	International Economics	II	1	S2	3	15.002 or 15.012		1020
15.113	International Economics (Honours)§	II	1	S2	3			1020
15.143	Microeconomics III	III	1	S1 or S2	4	15.002 or 15.012		0601, 1001, 1020
15.153	Microeconomics III (Honours)§	III	1	S1 or S2	4			1021
15.183	Economic Planning	III	1	S2	4	15.002 or 15.042		1020, 1021
15.413	Econometrics A	III	1	S1	4	15.462 or 10.331 or (10.311A and 10.311B)		1020, 1021
15.423	Econometrics B	III	1	S2	4	15.413 or 10.312C		1020, 1021
15.433	Decision Theory	III	1	S2	3	15.462 or 10.331 or (10.311A and 10.311B)		1020, 1021
15.434	Mathematical Economics A	III	1	S1	3	15.432		1020, 1021
15.444	Mathematical Economics B	III	1	S2	3	15.442		1020, 1021

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Specific Programs
15.453	Time Series Analysis	III	1	S2	3	15.462 or 10.331 or (10.311A and 10.311B)		1020, 1021
15.601	Economic History IA	I	1	S1	3			1020, 1021, 1022, 1023
15.611	Economic History IB	I	1	S2	3	15.601		1020, 1021, 1022. 1023
25.332	Geology for Geomorphologists and Pedologists‡	III	2	S2	6	25.211, 25.221, 25.212	25.1311, 27.413, 27.423	2703
25.541	Mineralogy†	II	½	F	2			0401, 0402, 0403
25.631	Marine Geology II††	III	1	F	3	25.621		6833
25.634	Marine Mineral Deposits and Exploration††	III	1	S1	6	25.621	25.631	6833
25.635	Marine Resources††	III	1	F	3	25.621	25.631	6833
25.632	Estuarine Geology†††‡	III	1	S2	6			6832, 6833
68.302	Introductory Marine Science	II	1	S1	4			1068, 1069, 6831, 6832, 6833, 6834
68.503	Science of Interfaces	III	1		5	1.012, 1.022, 2.002A		6851, 6852, 6853
70.011A	Histology I	II	1	S1	6	17.021		
70.011B	Mammalian Embryology	III	1	S2	6	70.011A		1270, 4170 4402**
70.011C	Introductory Anatomy	II	1	S1	6	17.021		4570, 6270
70.012A	Musculoskeletal Anatomy	III	1	S1	6	70.011A, 70.011C		7001, 7002
70.012B	Visceral Anatomy	III	1	S2	6	70.011A, 70.011C		7003, 7073
70.012C	Neuroanatomy	III	1	S1	6	70.011A, 70.011C		Course 4770
70.303	Kinesiology	III/IV	1	S2	6	70.012A, 70.012C		(Anatomy)
70.304	Histology II	III	1	S2	6	70.011A		
70.3041	Histological and Histochemical Techniques	III	½	S2	3	17.031, 17.021, and any 1 of 41.101, 45.301 or 70.011A		6840

* 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.

†† Offered in 1981. Students enrolling in Level III Oceanography units in 1980 should refer to the 1979 Combined Sciences Handbook for subject descriptions.

‡ Compulsory field work to be arranged.

§ Consult with Head of Department.

** 70.011A and 70.304 only.

Course 3970
Level IV units offered by
the Board of Studies in
Science and Mathematics

Table 3

A student planning to complete a program involving any unit / units from this table must seek the approval of the Head of the School in which the unit is taught.

No.	Name	Level	Unit Value	When Offered	Prerequisites in Years 1, 2, 3 or 4	Number of Level III Units Required
1.104†	Physics IV (Honours)	IV	10	F	Program 0101, 0103 or 0105‡	7
					Program 5801, 5803 or 5805	6
1.304	Applied Physics IV (Honours)	IV	10	F	Program 0101, 0103 or 0105‡	7
					Program 5801, 5803 or 5805	6
1.504	Theoretical Physics IV (Honours)	IV	10	F	Program 0101§ or 0105	7
					Program 5801 or 5805	6
1.604	Biophysics IV (Honours)	IV	10	F	Program 0106	6
2.004	Chemistry IV	IV	10	F	4 Level III Chemistry units	8
					Program 5821	7
4.004	Metallurgy IV	IV	10	F	Program 0401 or 0402	7-8
6.606	Computer Science IV	IV	10	F	6.613, 6.632, 6.642, 6.643	8
10.123	Pure Mathematics Honours	IV		F	Program 1003 or 1013	*
					*Program 5811 or 5812	7
10.223	Applied Mathematics Honours	IV		F	Program 1005 or 1015	*
					*Program 5811 or 5812	7
10.233	Applied Mathematics Honours (Short Course)	IV	6	F	Program 1021 or 1023	*
10.323	Theory of Statistics Honours	IV		F	Program 1007 or 1017	*
					*Program 5811 or 5812	7
10.423	Theoretical Mechanics Honours	IV		F	Program 1009, 1019 or 1069	*
					*Program 5811 or 5812	7
12.014	Psychology IV (Research)	IV	10	F	Program 1201, 1270 or 7312: must contain 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 1 unit from each of Groups B, C and D, at an average level of Credit or better	8

Table 3: Level IV units offered by the Board of Studies in Science and Mathematics

No.	Name	Level	Unit Value	When Offered	Prerequisites in Years 1, 2, 3 or 4	Number of Level III Units Required
12.044	Psychology IV (Course Work)	IV	10	F	Program 1201 or 1270: must contain 12.001, 12.052, 12.062; 12.152 and 8 Psychology Level III units, including 12.153 from Group A and at least 1 unit from each of Groups B, C and D, at an average level of Credit or better	8
14.851	Current Developments in Accounting Thought — Financial	IV	2	F	See program 1023	
14.852	Current Developments in Accounting Thought — Managerial	IV	2	F	See program 1023	
15.024	Economics IVC	IV	2	F	See program 1021	
15.034	Economics IVD	IV	2	F	See program 1021	
25.404	Geology IV**	IV	10	F	Program 2501, 2502, 2725 or 5831 Program 5832	8 7
27.604	Geography IV	IV	10	F	Program 2701, 2702, 2703, 2725 or 2743	8
41.103	Biochemistry IV	IV	10	F	4 Level III Biochemistry units Program 5841 or 5842	8 7
42.103	Biotechnology IV	IV	10	F	4 Level III units in a discipline, or disciplines, related to Biotechnology	8
43.103	Botany	IV	10	F	4 Level III Botany units or a closely related discipline Program 5851, 5852 or 5853	8 7
44.513	General Microbiology	IV	2	S1		
44.523	Applied Microbiology	IV	2	S1		
44.533	Immunology	IV	2	S1		
44.543	Virology	IV	2	S1	44.102, 44.112	8
44.553	Electron Microscopy	IV	2	F	Program 5861, 5862 or 5842	7
44.563	Microbiology Project I	IV	2	F		
44.573	Microbiology Project II	IV	4	F		
44.583	Microbiology Project III	IV	6	F		
45.103	Zoology IV	IV	10	F	4 Level III Zoology units Program 5866 or 5867	8 7
62.014	History and Philosophy of Science Honours	IV	10	F	Program 6200, 6201, 6225, 6245, 6270, 6433	8
62.024	Science Studies Honours	IV	10	F	Program 0162, 0262 or 4162	8
68.304	Marine Science IV	IV	10	F	Program 6832, 6833 or 6834	8
68.404	Genetics IV	IV	10	F	Program 6840	7½
68.504	Chemical Physics	IV	10	F	Program 6851, 6852 or 6853	8
70.031	Anatomy IV	IV	10	F	4 Level III Anatomy units	8
73.013	Physiology IV	IV	10	F	4 Level III Physiology units Program 5871	8 7
73.023	Pharmacology	IV	10	F	Program 7303	8
79.013	Community Medicine	IV	10	F	At least 3 of the following: 41.102A, 43.102, 44.122, 45.121, 79.201, 79.202, 79.302, 79.403	8

° Higher level units of Mathematics must be included at Levels I, II and III in order to comply with the prerequisites for admission to Level IV Mathematics. Since entry to Level IV is only with approval of the Head of School, students should discuss their Year 3 program with a Professor of the Department concerned. In special circumstances additional prerequisites may be required, or some of those listed may be waived.

† Students 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.

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

°° For 1980 and 1981 only. From 1982 onwards new subjects will be offered.

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.

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, eg 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 10.001 Mathematics I or 10.021B General Mathematics IB and 10.021C 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 one subject from each of Groups B, C and D (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*

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

10.021A General Mathematics IA* *and* 10.021B General Mathematics IB

or

17.031 Cell Biology *and*

17.021 Biology of Higher Organisms.

(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*

54.1001 Political Science I *or*

52.103 Introductory Philosophy A *and* 52.104 Introductory Philosophy B

or with the approval of the Head of the School of Psychology, one other Arts I subject.

(iii) that they shall include at least one subject (two Science and Mathematics Level II units or twelve Arts Upper Level credit points are equivalent to one Level II subject and three Science and Mathematics Level III units are equivalent to one Level III subject) which together with the subject meeting the requirements of (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 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)
    79.402 Genetics of Behaviour II

- 53.001 Introduction to Sociology followed by twelve credit points value of Sociology Upper Level subjects
    15.001 Economics IA and 15.011 Economics IB followed by twelve credit points value of Economics Upper Level subjects
    15.904 Political Science I followed by twelve credit points value of Political Science Upper Level subjects
    52.103 Introductory Philosophy A and 52.104 Introductory Philosophy B followed by twelve credit points value of Philosophy Upper Level subjects

(2) The proposed course must be approved by the Head of the School of Psychology or his representative prior to or during enrolment. The courses must be chosen in such a way as will fit in with the timetable.

(3) Progression in the Course shall be by subjects, and the subjects in the Course may be completed in any order consistent with the requirements concerning prerequisites and co-requisites for the subjects chosen.

3. *Prerequisites and Co-requisites*

Before enrolling in any course (or equivalent units of a subject) the student shall have attended the classes and shall have satisfied the examiners in all relevant prerequisite subjects.

The student should refer to the appropriate Faculty Handbook 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 Pscyhology 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;

* 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.

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

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.

In *Year 1*, such students usually take four subjects which include 12.001, either Biology I or a first-year Mathematics, one of Economics I, Sociology I, Philosophy I or Political Science I or one other Arts I subject, and a fourth subject. (It should be noted that the University has arranged these subjects so that there is no clash of timetables. If other subjects are taken, care must be taken to check that there is no timetable clash in the program that is chosen.)

In *Year 2* students usually take 12.042, 12.052, 12.062, 12.152, a second-year follow on subject from one of the non-Psychology subjects completed in Year 1, and one other Level I, II or III non-Psychology subject. Eight Level III units of Psychology are usually taken in *Year 3*, while *Year 4* consists of 12.004 only.

Some examples of patterns, based on supporting subject variants, are suggested below:

Compulsory Psychology Subjects for all Courses

Year 1
12.001

Year 2
12.042, 12.052, 12.062 *and* 12.152

Year 3
8 Psychology Level III units including 12.153 from Group A and at least one subject from each of Groups B, C and D. Additionally, if intending to take the research alternative in Psychology IV 12.163 must also be taken from Group A.

Year 4
12.004

Main Supporting Subject
Pure Mathematics
2 Years

Year 1
10.001
Social Science Subject I*
Any approved Level I Subject*

Year 2
2 Mathematics Level II unit value chosen from 10.111A, 10.1113, 10.1114, 10.2111 *and* 10.2112
An approved Level I or II Subject*

3 Years

Year 1
10.001
A Social Science Subject I*
Any approved Level I Subject*

Year 2
10.111A, 10.1113, 10.1114, 10.2111 *and* 10.2112

Year 3
3 Pure Mathematics Level III unit value

Statistics
2 Years

Year 1
10.001
A Social Science Subject I*
Any approved Level I Subject*

Year 2
10.311A, 10.311B
An approved Level I or II Subject*

Biochemistry
2 Years

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

Year 2
41.101
A Social Science Subject I*

Zoology
2 Years

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

Year 2
45.301
43.101 *or* 45.101
A Social Science Subject I*

Genetics
2 Years

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

Year 2
43.101
79.402
A Social Science Subject I*

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

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 .... *Not offered in 1980*
Graduate Diploma in Food and Drug Analysis .... Dr G. Crank

or

in the case of Masters and Doctors degrees from:

School of Chemistry .... Professor J. S. Shannon
School of Mathematics .... Associate Professor I. H. Sloan
School of Physics .... Associate Professor J. F. McConnell

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

Level	No.	Title	Prerequisites	Co-requisites	Excluded
II/III	2.003E	Nuclear and Radiation Chemistry	2.121 *and* 2.131 10.001 *or* 10.011 *or* 10.021B *and* 10.021C		

Level	No.	Title	Prerequisites	Co-requisites	Excluded
II/III	2.003H	Molecular Spectroscopy and Structure	2.121 and 2.131		
II/III	2.003J	Fundamentals of Biological Chemistry	2.121 and 2.131		2.013L, 41.101
II/III	2.003K	Solid State Chemistry	2.121 and 2.131 and 10.001 or 10.011		
II/III	2.013A	Introductory Quantum Chemistry	1.001 or 1.011 and 2.121 and 2.131 and 10.001 or 10.011 or 10.021B and 10.021C		
III	2.003A	Physical Chemistry	2.002A		
III	2.003B	Organic Chemistry	2.002B		
III	2.003C	Inorganic Chemistry	2.042C		
III	2.003D	Instrumental Analysis	2.002D and 2.002A		
III	2.003L	Applied Organic Chemistry	2.002B		2.033L
III	2.003M	Organometallic Chemistry	2.002B		
III	2.013B	Synthetic Organic Chemistry	2.003B		
III	2.013C	Advanced Inorganic Chemistry	2.042C	2.003C	
III	2.013D	Advanced Analytical Chemistry	2.002D	2.003D	
III	2.013E	Advanced Nuclear and Radiation Chemistry	2.003E		Not available in Course 3910
III	2.013L	Chemistry and Enzymology of Foods	2.002B		2.003J, 2.043L, 2.023L, 2.053L
III	2.023A	Quantum Theory of Atoms and Molecules	2.002A and 10.2111 and 10.2112		
III	2.023B	Natural Product Chemistry	2.003B		
III	2.023L	Biological and Agricultural Chemistry	2.002B		2.053L, 2.013L, 2.043L
III	2.033A	Physical Chemistry of Macromolecules	2.003J or 2.002B and 1.012 or 2.002A		
III	2.043A	Environmental Chemistry	2.002A, 2.002D		
III	2.043L	Chemistry and Enzymology of Foods† (double unit)	2.002B		2.013L, 2.023L, 2.053L
III	2.053A	Chemical Kinetics and Reaction Mechanisms	2.002A		
III	2.053L	Biological and Agricultural Chemistry† (double unit)	2.002B		2.013L, 2.023L, 2.043L
III	2.063A	Advanced Molecular Spectroscopy	2.013A		

† Only *one* of these double units may be chosen.

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

Year 1		Hours per week
1.011	Higher Physics I *or*	6
1.001	Physics I	
2.121	Chemistry IA *and*	6
2.131	Chemistry IB	
10.011	Higher Mathematics I *or*	6
10.001	Mathematics I *or*	
10.021B	General Mathematics IB &	
10.021C	General Mathematics IC	

Plus one of

5.010	Engineering A *and*	6
5.020	Engineering B *or*	
5.030	Engineering C	
	or	
17.021	Biology of Higher Organisms *and*	6
17.031	Cell Biology	
	or	
25.110*	Earth Materials and Processes *and*	
25.120**	Earth Environment and Dynamics	
27.801	Introduction to Physical Geography *and*	6
27.802	Introduction to Human Geography	

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

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

Year 2

		Hpw
2.002A	Physical Chemistry	3
2.002B	Organic Chemistry	3
2.002D	Analytical Chemistry	3
2.003H	Molecular Spectroscopy and Structure	3
2.042C	Inorganic Chemistry	3
	Science Electives* (2 units)	6
	Two General Studies Electives	3
		24

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

Chemistry

Any non-compulsory units for which prerequisites are held.

Mathematics

10.031	Mathematics	2
10.331	Statistics SS	2
10.111A		
10.1113 *and*		
10.1114	Mathematics II	6
10.2111 *and*		
10.2112		

Physics

Choose 2 of
1.9222	Electronics	3
1.9322	Introduction to Solids	
1.9422	Introduction to Physics of Measurement	

Biological Sciences

17.021	Biology of Higher Organisms *and*	6
17.031	Cell Biology	
41.101	Biochemistry	12
44.101	Introductory Microbiology	6

Geology

25.110	Earth Materials and Processes *and*	6
25.120	Earth Environment and Dynamics	
25.211	Earth Materials I	3
25.221	Earth Materials II	3
25.212	Earth Environment I	3
25.223	Earth Physics	3

Year 3

2.003B	Organic Chemistry	3
2.003C	Inorganic Chemistry	3
2.003D	Instrumental Analysis	3
2.013A	Introductory Quantum Chemistry	3
	Advanced Electives* (4 units)	12
	One General Studies Elective	1½
		25½

* Chosen from Level II/III or Level III units offered by the School of Chemistry in the Science and Mathematics course and in accordance with Science and Mathematics course regulations.

Year 4 Honours

2.004	Chemistry Honours	24
	One General Studies Elective	1½
		25½

Part-time Course

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

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

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

Stages 1 and 2

Two of the following subjects are taken in the first year and the other two in the second year (as directed).

		Hours per week
1.011	Higher Physics I *or*	6
1.001	Physics I	
2.121	Chemistry IA *and*	6
2.131	Chemistry IB	
10.001	Mathematics I *or*	
10.021B	General Mathematics IB *and*	6
10.021C	General Mathematics IC	

Plus one of
5.010	Engineering A *and*	
5.020	Engineering B *or*	6
5.030	Engineering C	
	or	
17.021	Biology of Higher Organisms *and*	6
17.031	Cell Biology	
	or	
25.110*	Earth Materials & Processes *and*	6
25.120**	Earth Environment & Dynamics	
	or	
27.801	Introduction to Physical Geography*** *and*	6
27.802	Introduction to Human Geography***	

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

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

°°° Field work (to be arranged by the School of Geography) is a compulsory component of each unit.

Stage 3

		Hpw
2.002A	Physical Chemistry	3
2.042C	Inorganic Chemistry	3
	Science Electives* (two units)	6
		12

* See footnote * under Year 2 full-time course.

Stage 4

2.002B	Organic Chemistry	3
2.002D	Analytical Chemistry	3
2.003H	Molecular Spectroscopy and Structure	3
	General Studies Electives	3
		12

Stage 5

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

Stage 6

	Advanced Electives* (4 units)	12

* See footnote under Year 3 full-time course.

Honours

The requirements for admission to the honours course and the program of study are the same as for Year IV of the full-time course. A student wishing to do honours on a part-time basis may complete the honours year over two part-time years. Students are, however, advised to make every effort to do the honours year full time.

3950
Optometry Course

The School of Optometry provides a four year full-time course in Optometry leading to the award of the degree of Bachelor of Optometry, at either the pass or honours level. The first year of the course involves a study in the fundamental sciences of physics, chemistry, mathematics and biology. Students who have completed the first year of a science course including physics, chemistry, mathematics and general and human biology or zoology at any Australian university are eligible for selection for admission to the second year of the course. Second, third and fourth years are devoted to professional training in optometry including clinical optometry in the final year.

3950
Optometry — Full-time Course
Bachelor of Optometry
BOptom

Year 1

		Hours per week
1.031	Physics I (Optometry)	6
2.121	Chemistry IA ⎫	
2.131	Chemistry IB ⎬	6
10.001	Mathematics I *or*	
10.011	Higher Mathematics I *or* ⎫	
10.021B	General Mathematics IB *and* ⎬	6
10.021C	General Mathematics IC ⎭	
17.031	Cell Biology *and* ⎫	
17.021	Biology of Higher Organisms ⎬	6
		24

In special cases, students who do not meet the prerequisites for admission to 2.121 Chemistry IA may be enrolled in 2.111 Introductory Chemistry in Session 1, 2.121 Chemistry IA in Session 2 and be permitted to carry 2.131 Chemistry IB into Session 1 of Year 2.

Students who do not meet the prerequisites for admission to 10.021B Mathematics will be enrolled in 10.021A Mathematics but cannot proceed to Year 2 of the Optometry Course until all the requirements of 10.021B and 10.021C Mathematics have been satisfied.

Year 2

		Hpw
31.811	Optometry I	8
31.821	Special Anatomy and Physiology	6
73.011A	Principles of Physiology	6
	General Studies Elective	1½
		21½

Year 3

		Hpw
12.001	Psychology I	5
31.812	Optometry II	15
31.831	Diseases of the Eye	3
	Two General Studies Electives	3
		26

Year 4

		Hpw S1	S2
Full Year			
12.741	Psychology (Optometry)	2	2
31.813	Optometry III	6	6
31.841	Clinical Optometry	15	15
	General Studies Elective	1½	1½
Session 2			
74.001	Indication for Medical Referral	0	1
		24½	25½

Conditions for the 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 under-graduates' 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 appro-priate general studies subjects and no less than four units of either Level II or Level III and four other Level III units, in accordance with the Science and Mathematics Course regulations.

The units submitted for the award of the Bachelor's degree under these regulations must include at least four Level III units chosen from related disciplines in accordance with the Science Course regulations.

3. In order to qualify for the award of the degree of BOptom, students so admitted shall complete the requirements of the Optometry degree course.

* In Rule 1, the word 'undergraduates' includes graduands, ie a person may be admitted under these rules if he has met all requirements for a first degree which has not yet been conferred on him, and his admission under these rules shall be no bar to the subsequent award of the first degree.

**Faculty of Biological Sciences and
Faculty of Science**

Graduate Study

Faculty of Biological Sciences and Faculty of Science Enrolment Procedures

All students re-enrolling in 1980 or enrolling in graduate courses should obtain a copy of the free booklet *Enrolment Procedures 1980* 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 degree course.

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 IV
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

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43.999G   Botany
44.999G   Microbiology
12.999G   Psychology
45.999G   Zoology

The results in alternative qualifying subjects are graded Pass or Fail only.

Fees
Candidates enrolled in the Alternative Qualifying Program are exempt from student service fees.

Biological Technology

Head of School
Professor B. J. Ralph

5320
Biochemical Engineering Graduate Diploma Course
GradDip

The School of Biological Technology, conjointly with the School of Chemical Engineering, offers a course in biochemical engineering which leads to the award of a graduate diploma (GradDip). The course is open to graduates in the biological sciences, chemistry, chemical engineering or agriculture, and can be completed in one year of full-time or over a longer period by part-time study. It contains a component of graduate level 'bridging' subjects, designed to facilitate the introduction of graduates with a variety of backgrounds to the current practice of biochemical engineering.

The normal entrance requirement is an appropriate degree or equivalent qualification in biological sciences, chemistry, chemical engineering or agriculture. Intending students are referred to the conditions for the award of Graduate Diplomas set out later in this handbook.

| | | **Hours per week** | |
		S1	S2
Session 1			
3.481G	Mass Heat and Momentum Transfer	4	0
3.482G	Thermodynamics	4	0
42.211G	Principles of Biology	3	0
42.212G	Principles of Biochemistry	3	0
44.111G	Microbiology	3	3
Session 2			
3.483G	Process Dynamics and Biochemical Engineering Design	0	8
42.213G	Biochemical Methods	0	3
42.214G	Biotechnology	0	3
		17	17

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.

| | | **Hours per week** | |
		S1	S2
Obligatory Subjects			
Full Year			
42.215G	Practical Biotechnology	7	7
Session 1			
42.102A	Biotechnology A	6	
Session 2			
42.101	Introduction to Biotechnology		6
Elective Subjects			
Full Year			
42.104G	Graduate Seminars	2	2
42.111G	Reading List in Biological Technology (Microbiology)	3	3
42.112G	Reading List in Biological Technology (Biochemistry)	3	3
42.305G	Case Studies	1	1
44.111	Microbiology	3	3
Session 1			
44.101	Introductory Microbiology	6	
42.212G	Principles of Biochemistry	3	
Session 2			
42.102B	Biotechnology B		6
44.121	Microbial Growth		6
		34	37

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)

		Hours per week	
		S1	S2
Full Year			
42.306G	Project	7	7
Session 1			
42.303G	Biochemical Process Control	5	0
42.304G	Biodeterioration and Biodegradation	5	0
Session 2			
42.301G	Microorganism Productivity	0	5
42.302G	Enzyme Technology	0	5
42.305G	Case Studies	0	2
		17	19

Psychology

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

The School of Psychology offers 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 four sessions for full-time students and six sessions for part-time students.

To qualify for the degree, students must satisfy the examiners in respect of their academic attainments, and their skill and competence in relevant aspects of practical professional work.

The course consists of lectures, seminars, demonstrations and practical work, supervised clinical and community work, and a research thesis.

The major aims of the course are: **1.** to acquaint students with the issues, findings and problems of contemporary clinical and community psychology; and **2.** to equip them with basic clinical skills and techniques. A total of 250 hours of supervised clinical practice must be completed in the first year, and a further 430 hours in the second year.

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

It should be noted that the course requirements involve a full two year program rather than four academic sessions with vacation breaks.

8250
Master of Psychology
MPsychol
Full-time

Year 1

		Hours per week	
		S1	S2
Full Year			
12.220G	The Theoretical Bases of Clinical and Community Psychology	2	2

		Hpw	
12.221G	Experimental Analysis and Modification of Problem Behaviour	5	5
12.228G	Research Thesis	1	1
12.231G	Professional Practice: 250 hours		
12.233G	Psychodiagnosis and Clinical Assessment	1	1
12.235G	Community Psychology	5	5
12.237G	Biological Aspects of Behavioural Disturbance	2	2
12.239G	Research and Evaluation Methods in Clinical and Community Psychology	2	2
12.240G	Graduate and Clinical Seminars	2	2
12.241G	Graduate Colloquium	1	1

Year 2
Full Year

12.221G	Experimental Analysis and Modification of Problem Behaviour	3	
12.228G	Research Thesis	2	5
12.230G	Psychological Problems of Children	3	
12.231G	Professional Practice: 180 hours in Session 1 250 hours in Session 2		
12.235G	Community Psychology	3	
12.241G	Graduate Colloquium	1	1

Note: Part-time students normally are expected to take half the full-time program in any one session.

Faculty of Science

Facilities are available in each of the Schools for research leading to the 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 course leading to the award of the 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:

		Unit value
1.119G	Basic Solid-State Physics	1
1.129G	Solid-State Device Physics	1
1.139G	Biophysics	1
1.149G	Physical and Applied Acoustics	1
1.319G	Measurement and Data-Handling	1
1.329G	The Physics of Strong Materials	1
1.519G	Laser Physics and Applications	1
2.150G	Chemistry of Natural and Synthetic High Polymers	2
2.251G	Toxicology, Occupational and Public Health	2
2.153G	Recent Advances in Chemistry	2
2.154G	⎧ Advanced Analytical Chemistry	2
2.155G	⎨ and Chemical Instrumentation,	2
2.156G	⎩ Units A, B & C	2
4.261G	Modern Microscopy of Materials	1
10.073G	Advanced Mathematical Analysis of Data	1
10.372G	Statistics and Experimental Design	1
10.401G	Seiches and Tides	1
42.211G	Principles of Biology	1
42.212G	Principles of Biochemistry	1
42.401G	Chemical Transformations in the Environment	1
44.111	Microbiology	1
97.004G	Psychology of Communication	1
97.010G	Basic FORTRAN IV Programming I & II	1

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 practice as public analysts. The prime aim is to present discussions of the principles and design of analytical methods which are therefore presented on a comparative basis.

It is considered that the techniques involved in the handling of foods and drugs together with those discussed in the ancillary subjects of the course provide a firm basis of approach to many other fields.

Intending students are referred to the conditions for the award of graduate diplomas set out later in this handbook.

Year 1

Part-time		Hours per week
2.231G	Foods and Drugs I	4*
2.371G	Treatment of Analytical Data	1†
2.281G	Instrumental Techniques in Food and Drug Analysis	4
		9

Year 2

2.242G	Food and Drugs II Pharmacognosy and Microscopy of Crude Drugs	4
2.251G	Toxicology, Occupational and Public Health	3
44.111	Microbiology	3
		10

* 5 hours per week for 8 weeks in latter part of year.

† For 20 weeks.

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:

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

* 2 units.

Candidates may select 4 further units from the following list:

62.710G	Science, Philosophy and Social Values
62.711G	Marxism and the Critique of Science
62.712G	Science, War and the State
62.714G	Knowledge, Power and Public Policy
62.715G	Cause, Belief and Progress in the History of Science
15.715G	Science, Society and Institutions
15.716G	Science, Technology and Economic Development
26.568G	Technology and Alternative Development
30.960G	Technology and Organisations
53.309G	Social and Technological Forecasting (2 units)

Selected candidates may undertake a third-year MScSoc honours degree program of advanced study which includes a dissertation based on supervised research into particular aspects of the relationships between science and technology and science and its institutions.

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 10.194G, the duration of each being two hours per week for one session. With the approval of the Head of the School of Mathematics a student may substitute for one or more of these lecture courses a reading course supervised by a member of staff. Again with this approval a student may substitute for at most two of these courses graduate courses offered either within or outside the School of Mathematics. Students are also required to participate in relevant departmental seminars. In addition, students are required to undertake a project supervised by a staff member, consisting of either a critical review of the literature in a specific field of mathematics, or a short research project. It is anticipated that students will spend three hours per week for two sessions on their project. Each candidate's proposed program of study requires the approval of the Head of the School of Mathematics.

The conditions for the award of the degree are set out later in this handbook.

8750
Master of Statistics
MStats

The Master of Statistics Course covers a wide range of statistical theory and practice and provides advanced training for practising statisticians. The course may be completed in two years of full-time or four years of part-time study, and it is available to graduates with a pass degree in statistics or an honours degree in a related field (commonly mathematics) with supporting study in statistics. Honours graduates in statistics may be exempted from a maximum of half the course. The conditions for the award of the degree are set out later in this handbook.

The academic requirement for the degree is 24 credits.

Each candidate's program of study must be approved by the Head of the School.

Compulsory Subjects

		Credits
10.381G	Experimental Design I	2
10.383G	Stochastic Processes	2
10.385G	Multivariate Analysis I	2
10.390G	Statistical Inference	2
10.392G	Project	2

Elective Subjects

10.382G	Experimental Design II	2
10.384G	Time Series	2
10.386G	Multivariate Analysis II	2
10.387G	Sample Survey Design	2
10.388G	Sequential Analysis	2
10.389G	Non-Parametric Methods	2
10.391G	Special Topic*A	2
10.393G	Special Topic* B	2

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: eg biological statistics, further work on order statistics, population statistics, non-linear programming, discrete distribution theory.

Optometry

Head of School
Professor J. Lederer

The School of Optometry offers a formal graduate course leading to the award of the degree of Master of Optometry (MOptom). This course comprises the study of three elective graduate subjects and of advanced Clinical Optometry, together with the preparation of a thesis on an assigned project. It may be completed in one year of full-time study, or (to meet the needs of practising optometrists) in two or three years of part-time study. The course provides advanced training in clinical and theoretical aspects of Optometry, with opportunities for specialization in fields such as contact lenses, occupational optometry, and orthoptics.

Conditions for admission and for the award of the degree of Master of Optometry are set out later in this handbook.

8760
Master of Optometry
MOptom

		Hours per week
31.701G	Advanced Clinical Optometry	4
	Three elective graduate subjects chosen from the list below (each 4 hours)	12
31.799G	Project	8
		24

Elective Graduate Subjects

31.702G	Advanced Physiological Optics	4
31.703G	Pleorthoptics and Binocular Vision	4
31.704G	Advanced Contact Lens Studies	4
31.705G	Advanced Contact Lens Practice	4
31.706G	Occupational Optometry	4
31.707G	Clinical Photography	4

The six elective graduate subjects offered are quite independent, and any three of them are suitable for a student seeking

advanced professional training of a general nature. If clinical specialization is aimed at, the student would be advised to elect the graduate subjects shown below:

Specialization	Graduate Subjects
Contact Lenses	1. Advanced Contact Lens Studies 2. Advanced Contact Lens Practice 3. Clinical Photography
Occupational Optometry	1. Occupational Optometry 2. Pleorthoptics and Binocular Vision 3. Advanced Physiological Optics
Orthoptics	1. Pleorthoptics and Binocular Vision 2. Clinical Photography

The subject matter of the course provides an advanced training in a branch of physics, the topic of which is determined during the year preceding that in which it is offered.

Students undertaking the masters course by formal study must enrol in *one* of the following subjects:

1.801G   Energy Alternatives
1.802G   Astrophysics
1.803G   Acoustics
1.804G   Biophysics

Enrolment in any one of the above subjects normally involves at least five units of lecture material, a literature survey, and small research project.

Physics

Head of School
Professor K. N. R. Taylor

Executive Assistant to Head of School
Dr P. R. Elliston

Administrative Officer
Mr P. Clark

8730
Master of Physics
MPhysics

The School of Physics offers a graduate course leading to the award of the Master of Physics degree (MPhysics).

The Master of Physics degree course is intended for honours graduates in physics. Others may be admitted if they have submitted evidence of such academic and professional attainments as may be approved by the Faculty of Science on the recommendation of its Higher Degree Committee. Applicants with other qualifications may be admitted after completing a qualifying examination approved by the Faculty of Science.

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.

First Degrees

Higher Degrees

Title	Abbreviation	Calendar/Handbook
Doctor of Science	DSc	Calendar
Doctor of Letters	DLitt	Calendar
Doctor of Laws	LLD	Calendar
Doctor of Medicine in the Faculty of Medicine	MD	Calendar Medicine
Doctor of Philosophy	PhD	Calendar and all faculties
Master of Applied Science	MAppSc	Applied Science
Master of Architecture	MArch	Architecture
Master of Arts	MA(Hons)	Arts Military Studies
	MA	Arts
Master of Biomedical Engineering	MBiomedE	Engineering
Master of Building	MBuild	Architecture
Master of the Built Environment (Building Conservation)	MBEnv	Architecture
Master of Business Administration	MBA	AGSM
Master of Chemistry	MChem	Sciences*

Higher Degrees

125

Title	Abbreviation	Calendar/Handbook
Master of Commerce (Honours)	MCom(Hons)	Commerce
Master of Commerce	MCom	Commerce
Master of Education	MEd	Professional Studies
Master of Educational Administration	MEdAdmin	Professional Studies
Master of Engineering Master of Engineering without Supervision	ME	Applied Science Engineering Military Studies
Master of Engineering Science	MEngSc	Engineering Military Studies
Master of General Studies	MGenStud	General Studies
Master of Health Administration	MHA	Professional Studies
Master of Health Personnel Education	MHPEd	Calendar†
Master of Health Planning	MHP	Professional Studies
Master of Landscape Architecture	MLArch	Architecture
Master of Laws by Research	LLM	Law
Master of Librarianship	MLib	Professional Studies
Master of Mathematics	**MMath**	**Sciences***
Master of Optometry	**MOptom**	**Sciences***
Master of Physics	**MPhysics**	**Sciences***
Master of Psychology	**MPsychol**	**Sciences‡**
Master of Public Administration	MPA	AGSM
Master of Science **Master of Science without Supervision**	**MSc**	Applied Science** Architecture Engineering Medicine Military Studies **Sciences*‡**
Master of Science (Acoustics)	MSc(Acoustics)	Architecture
Master of Science and Society	**MScSoc**	**Sciences***
Master of Science (Biotechnology)	**MSc(Biotech)**	**Sciences‡**
Master of Science (Building)	MSc(Building)	Architecture
Master of Social Work	MSW	Professional Studies
Master of Statistics	**MStats**	**Sciences***
Master of Surgery	MS	Medicine
Master of Surveying Master of Surveying without Supervision	MSurv	Engineering
Master of Surveying Science	MSurvSc	Engineering
Master of Town Planning	MTP	Architecture

	Title	Abbreviation	Calendar/Handbook
Graduate Diplomas	Graduate Diploma	GradDip	Applied Science Architecture Engineering **Sciences*‡**
		DipFDA	**Sciences***
	Graduate Diploma in the Faculty of Professional Studies	DipArchivAdmin DipEd DipLib	Professional Studies

* Faculty of Science.
† Professorial Board.
‡ 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:

Doctor of Philosophy (PhD)

2. A candidate for registration for the degree of Doctor of Philosophy shall:

Qualifications

(1) hold an honours degree from the University of New South Wales; or

(2) hold an honours degree of equivalent standing from another approved university; or

(3) if the candidate holds a degree without honours from the University of New South Wales or other approved university, have achieved by subsequent work and study a standard recognised by the higher degree committee of the appropriate faculty or board of studies (hereinafter referred to as the committee) as equivalent to honours; or

(4) in exceptional cases, submit such other evidence of general and professional qualifications as may be approved by the Professorial Board on the recommendation of the committee.

3. When the committee is not satisfied with the qualifications submitted by a candidate, the committee may require the candidate, before being permitted to register, to undergo such examination or carry out such work as the committee may prescribe.

4. A candidate for registration for a course of study leading to the degree of Doctor of Philosophy shall apply to the Registrar on the prescribed form at least one calendar month before the commencement of the session in which registration is to begin.

Registration

5. Subsequent to registration the candidate shall pursue a program of advanced study and research for at least six academic sessions, save that:

(1) a candidate fully engaged in advanced study and research for the degree, who before registration was engaged upon research to the satisfaction of the committee, may be exempted from not more than two academic sessions;

(2) in special circumstances the committee may grant permission for the candidate to spend not more than one calendar year of the program in advanced study and research at another institution provided that the work can be supervised in a manner satisfactory to the committee;

(3) in exceptional cases, the Professorial Board on the recommendation of the committee may grant permission for a candidate to be exempted from not more than two academic sessions.

6. A candidate who is fully engaged in research for the degree shall present for examination not later than ten academic sessions from the date of registration. A candidate not fully engaged in research shall present for examination not later than twelve academic sessions from the date of registration. In special cases an extension of these times may be granted by the committee.

7. The candidate shall be fully engaged in advanced study and research, save that:

(1) the committee may permit a candidate to undertake a limited amount of University teaching or outside work which in its judgment will not interfere with the continuous pursuit of the proposed course of advanced study and research;

(2) a member of the full-time staff of the University may be accepted as a part-time candidate for the degree, in which case the committee shall prescribe a minimum period for the duration of the program;

(3) in special circumstances, the committee may, with the concurrence of the Professorial Board, accept as a part-time candidate for the degree a person who is not a member of the full-time staff of the University and is engaged in an occupation which, in its opinion, leaves the candidate substantially free to pursue a program in a school* of the University. In such a case the committee

* Or department where department is not within a school.

shall prescribe for the duration of the program a minimum period which, in its opinion, having regard to the proportion of the time which the candidate is able to devote to the program in the appropriate University school* is equivalent to the six sessions ordinarily required.

8. Every candidate shall pursue a program under the direction of a supervisor appointed by the committee from the full-time members of the University staff. The work, other than field work, shall be carried out in a school* of the University save that in special cases the committee may permit a candidate to conduct the work at other places where special facilities not possessed by the University may be available. Such permission will be granted only if the direction of the work remains wholly under the control of the supervisor.

9. Not later than two academic sessions after registration the candidate shall submit the topic of research for approval by the committee. After the topic has been approved it may not be changed except with the permission of the committee.

10. A candidate may be required by the committee to attend a formal course of appropriate study.

Thesis **11.** On completing the 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 the research. In special cases work done conjointly with other persons may be accepted, provided the committee is satisfied on the candidate's part in the joint research.

13. Every candidate shall be required to submit with the thesis a short abstract of the thesis comprising not more than 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 the thesis any work or material which has previously been submitted for a university degree or other similar award.

Entry for Examination **15.** The candidate shall give in writing two months' notice of intention to submit the thesis.

16. Four copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of higher degree theses. The candidate may also submit any work previously published whether or not such work is related to the thesis.

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* Or department where department is not within a school.

17. It shall be understood that the University retains the four copies of the thesis submitted for examination, and is free to allow the thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act, 1968 the University may issue the thesis in whole or in part, in photostat or microfilm or other copying medium.

18. There shall normally be three examiners of the thesis appointed by the Professorial Board on the recommendation of the committee, at least two of whom shall be external to the University.

19. 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 resubmit his thesis in a 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 examination on the subject of the thesis and/or subjects relevant thereto, save that on the recommendation of the examiners the committee 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 re-present the same thesis and submit to a further oral, practical or written examination within a period specified by them but not exceeding eighteen months.

22. At the conclusion of the examination, the examiners will submit to the committee a concise report on the merits of the thesis and on the examination results, and the committee shall recommend whether or not the candidate may be admitted to the degree.

1. The degree of Master of Chemistry by formal course work may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Science (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.

Master of Chemistry (MChem)

2. (1) An applicant for registration shall hold an approved degree of Bachelor with Class I or Class II honours in Chemistry.

Qualifications

(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.

3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two months before the commencement of the session in which the candidate desires to register.

Registration

(2) An approved applicant shall register as a student in full-time or part-time attendance at the University.

(3) A candidate for the degree shall be required to undertake the appropriate course of study and pass the prescribed examinations. Under the supervision of a member of the academic staff, a candidate shall be required to 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.

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.

5. An approved candidate shall pay such fees as may be determined from time to time by the Council.

1. The degree of Master of Optometry by formal course work may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Science (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.

Master of Optometry (MOptom)

2. (1) An applicant for registration for the degree shall have been admitted to the degree of Bachelor in the discipline of Optometry in the University of New South Wales or other approved University.

Qualifications

(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 course.

Registration

(2) An approved applicant shall register as a student in either full-time or part-time attendance at the University.

(3) A candidate for the degree shall be required to undertake the appropriate course of study and pass the prescribed annual examinations. Under the supervision of a member of the academic staff a candidate shall be required to undertake a specified project, the satisfactory completion of which shall be regarded as part of the annual examinations.

4. Having considered the results of the candidate's work in the prescribed course of study the Committee shall recommend whether or not the candidate should be admitted to the degree.

Recommendation for Admission to Degree

5. An approved candidate shall pay such fees as may be determined from time to time by the Council.

Fees

1. The degree of Master of Physics by formal course work may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Science (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.

Master of Physics (MPhysics)

2. (1) An applicant for registration shall hold an approved degree of Bachelor with Class I or Class II Honours in Physics.

Qualifications

(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.

3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two months before the commencement of the session in which the candidate desires to register.

Registration

(2) An approved applicant shall register as a student in full-time or part-time attendance at the University.

(3) A candidate for the degree shall be required to undertake the appropriate course of study and pass the prescribed examinations. Under the supervision of a member of the academic staff, a candidate shall be required to submit a report consisting of a critical review of the literature in an approved branch of Physics and a report on a short research project. In either case the report will be assessed by two examiners, and the candidate may be required to attend an oral examination. The report is to be presented in a form approved by the Head of the School of Physics.

(4) A candidate shall not be considered for the award of the degree until the lapse of one academic year from the date of registration in the case of a full-time candidate or two academic years from the date of registration in the case of a part-time candidate.

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 (MPsychol)

1. The degree of Master of Psychology by formal course work may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Biological Sciences (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.

The degree shall be awarded in two grades, namely Pass and Honours. There shall be two classes of Honours, namely Class I and Class II.

Qualifications

2. (1) An applicant for registration shall hold an approved degree of Bachelor with Honours Class I or Class II in Psychology.

(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:
(a) undertake the specified courses of advanced study;
(b) except in exceptional circumstances pass the prescribed examinations at the first attempt;
(c) submit a research thesis on a topic approved by the Committee and prepared under the guidance of a supervisor appointed by the Committee.

(4) The minimum period of registration before the award of the degree shall be of four sessions for full-time students, and six sessions for part-time students.

4. (1) Every candidate shall submit three copies of the research thesis. All copies shall be presented in a form which complies with the requirements of the University for the preparation and submission of higher degree theses or reports. A candidate may submit also for examination any work he has published whether or not such work is related to the research thesis.

(2) For each candidate's research thesis there shall be two examiners appointed by the Professorial Board on the recommendation of the Committee, one of whom shall ordinarily be an external examiner.

(3) It shall be understood that the University retains the copies of the research thesis submitted for examination and is free to allow the research thesis to be consulted or borrowed. Subject to the provisions of the Copyright Act, 1968 the University may issue the research thesis in whole or in part, in photostat or microfilm or other copying medium.

Research Thesis

5. Having considered the results of the candidate's work in the prescribed course of study and the skill and competence attained in relevant aspects of practical professional work the Committee shall recommend whether or not the candidate should be admitted to the degree.

Recommendation for Admission to Degree

6. An approved candidate shall pay such fees as may be determined from time to time by the Council.

Fees

1. The degree of Master of 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.

Master of Science (MSc)

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.

Qualifications

(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.

Registration

(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 **5.** Having considered the examiners' reports the Committee shall recommend whether or not the
Admission to Degree 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.

Recommendation for Admission to Degree

6. An approved applicant shall pay such fees as may be determined from time to time by the Council.

Fees

1. The degree of Master of Science (Biotechnology) may be awarded by the Council on the recommendation of the Higher Degree Committee of the Faculty of Biological Sciences (hereinafter referred to as the Committee) to a candidate who has satisfactorily completed an approved program of advanced study.

Master of Science (Biotechnology) (Msc(Biotech))

2. (1) An applicant for registration shall hold an approved degree of Bachelor with Honours Class I or Class II in Biological Technology or other relevant discipline.

Qualifications

(2) An applicant for registration with an approved degree at a standard below Honours Class II may be accepted following satisfactory completion of a qualifying course of not less than one year and examination approved by the Committee.

(3) In special cases, a person may be permitted to register as a candidate for the degree 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 such examinations as the Committee may determine.

3. (1) An application to register for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two months before the commencement of the academic year.

Registration

(2) An approved applicant shall register as a student in full-time or part-time attendance at the University.

(3) A candidate for the degree shall be required to undertake the specified course of advanced study and pass the prescribed examinations. Under the supervision of a member of the academic staff, a candidate shall be required to undertake a specified project, the satisfactory completion of which shall be regarded as part of the examinations.

(4) The minimum period of registration before the award of the degree shall be two sessions for full-time students and four sessions for part-time students.

4. Having considered the results of the candidate's work in the prescribed course of study the Committee shall recommend whether or not the candidate should be admitted to the degree.

Recommendation for Admission to Degree

Fees

5. An approved candidate shall pay such fees as may be determined from time to time by the Council.

Master of 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

(5) The progress of a candidate shall be reviewed annually by the Committee and as a result of such review the Committee may terminate the candidature or take such other action as it considers appropriate.

4. Having considered the candidate's results in the prescribed course of study the Committee shall recommend whether the candidate may be admitted to the degree.

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.

Registration

(2) A candidate for the degree shall be required to undertake the appropriate course of study and pass the prescribed annual examinations. Under the supervision of a member of the academic staff a candidate shall be required to undertake a specified project, the satisfactory completion of which shall be regarded as part of the annual examinations.

(3) No candidate shall be considered for the award of the degree until a lapse of four complete sessions from the date of registration, save that in the case of a candidate who obtained the degree of Bachelor with Honours in Statistics this period may, with the approval of the Committee be reduced by up to two sessions by exemption from appropriate specified courses of study.

4. Having considered the results of the candidate's work in the prescribed course of study the Committee shall recommend whether or not the candidate should be admitted to the degree.

Recommendation for Admission to Degree

5. An approved applicant shall pay such fees as may be determined from time to time by the Council.

Fees

Graduate Diplomas

Graduate Diploma (GradDip)

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); F (Session 1 *plus* Session 2, ie full year); S1 or S2 (Session 1 *or* Session 2, ie choice of either session); SS (single session, ie which session taught not known at time of publication); L (Lecture, followed by hours per week); T (Laboratory/Tutorial, followed by hours per week); C (Credit).

HSC Exam Prerequisites
Subjects which require prerequisites for enrolment in terms of the HSC Examination percentile range refer to the **1978 and subsequent HSC Examinations.**

Candidates for enrolment who obtained the HSC in previous years or hold other high school matriculation should check with the appropriate School on what matriculation status is required for admission to a subject.

Physics

Undergraduate Study

Physics Level I Units

1.001   Physics I   F L3T3

Prerequisite:

	HSC Exam Percentile Range Required
2 unit Mathematics	*71-100*
or	
3 unit Mathematics	*21-100*
or	
4 unit Mathematics	*1-100 or* *(for 1.001 only) 10.021B*
and	
2 unit Science (incl. Physics and/or Chem.)	*31-100*
or	
4 unit Science (incl. Physics and/or Chem.)	*31-100*

Co-requisite: 10.021C or 10.021 or 10.001 or 10.011.

Aims and nature of physics and the study of motion of particles under the influence of mechanical, electrical, magnetic and gravitational forces. Concepts of force, inertial mass, energy, momentum, charge, potential, fields. Application of the conservation principles to solution of problems involving charge, energy and momentum. Electrical circuit theory, application of Kirchoff's Laws to AC and DC circuits. Uniform circular motion, Kepler's Laws and rotational mechanics.

A molecular approach to energy transfer, kinetic theory, gas laws and calorimetry. The wave theories of physics, transfer of energy by waves, properties of waves. Application of wave theories to optical and acoustical phenomena such as interference, diffraction and polarization. Interaction of radiation with matter, photoelectric effect. Compton effect, spectroscopy. Resolution of the wave — particle paradox by means of wave mechanics and the uncertainty principle.

1.011   Higher Physics I   F L3T3

Prerequisite: As for 1.001. Co-requisite: 10.001 or 10.011.

For students of all Faculties except Medicine and Architecture who have a good secondary school record and who wish to do a more challenging course. Entry to this course requires permission from the Head of the School of Physics.

As for 1.001 with additional topics: space physics, mechanical properties of real materials, rotational dynamics, physics of biological systems, AC and charged particle dynamics, physics of energy resources and conversion.

1.021   Introductory Physics I
(For Health and Life Scientists)   F L3T3

Prerequisites: None. Co-requisites: 10.021A & 10.021B, or 10.021B & 10.021C, or 10.021 or 10.001 or 10.011.

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

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

1.031   Physics I (Optometry)   F L3T3

Prerequisites: None. Co-requisites: As for 1.021.

The description of motion, dynamics, statics, conservation of momentum and energy, rotation, elasticity and vibration, wave motion, fluids, temperature and expansion, heat and heat transfer, the theory of heat, electric charge, electric field, electric energy, electric circuits, electromagnetism, applied electricity, alternating current, analog electronics, digital electronics, modern physics.

1.041   Laboratory Computers in
Physical Sciences   S1 L2T4

Prerequisites: As for 1.001. Co-requisite: 10.001.

Principles and practice of digital logic, basic operations of computers, fundamentals of operating systems. Higher level and assembler languages. Programming techniques, iterative and convergence methods. Applications to mechanics, atomic physics, optics, electrical circuits. Data reduction and error analysis in physical measurements. Experiments in 'on-line' measurements and control. Problems of speed and precision.

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.

1.022   Electromagnetism and
Modern Physics   S2 L3T2

Prerequisites: 1.001 or 1.011, 10.001. Co-requisite: 10.2111. Excluded: 1.9322.

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.

Special theory of relativity, Lorentz transformation, simultaneity relativistic mass, momentum and energy, formalism of wave mechanics, Schrodinger's equation, simple solutions, hydrogen atom, spectra, electron spin, selection rules, exclusion principle, Zeeman effect, molecules.

1.032   Laboratory   F T3

Prerequisites: 1.001 or 1.011, 10.001. Excluded: 1.9222.

Alternating current circuits, complex impedance, resonance, mutual inductance, introductory electronics, diode 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.

Terminating Physics Level II Units

1.9222   Electronics   S1 L1T2

Prerequisites: 1.001 or 1.011 or 1.021, 10.001 or 10.011 or 10.021B & 10.021C. Excluded: 1.032.

The application of electronics to other disciplines. Includes: principles of circuit theory and analogue computing; amplifiers, their specification and application; transducers; electronic instrumentation; industrial data acquisition.

1.9322   Introduction to Solids   S2 L2T1

Prerequisites: 1.001 or 1.011 or 1.021. Excluded: 1.022, 4.402, 4.412.

Introductory quantum mechanics and atomic physics; crystal structure; point and line defects; introductory band theory; conductors, semiconductor and insulators; energy level diagrams.

1.9422   Introduction to Physics of
Measurement   S1 L1½T1½

Prerequisites: 1.001 or 1.011.

Resolution; accuracy and sensitivity of instruments; errors of observation; experimental design; transducers; thermometry; electrical noise; servo systems; mechanical design of apparatus; optical instruments; optical fibres; photometry; colorimetry; analogue to digital conversion and digital instruments; measurement of very large and very small quantities.

Physics Level III Units

1.013   Quantum Mechanics and
Nuclear Physics   F L1½T½

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, fine 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.

1.023   Statistical Mechanics and
Solid State Physics   S1 L3T1

Prerequisites: 1.012, 1.022, 10.2111 & 10.2112. Co-requisite: 1.013 or 2.023A.

Canonical distribution, paramagnetism, Einstein solid, ideal gas, equipartition, grand canonical ensemble, chemical potential, phase equilibria, Fermi and Bose statistics, Bose condensation, blackbody radiation. Chrystal structure, bonding, lattice dynamics, phonons, free-electron models of metals, band theory, point defects, dislocations.

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 A   F T4

Prerequisites: 1.012, 1.022, 1.032.

Basic experimental techniques and analysis of results in the following areas: electricity, magnetism, diffraction optics (including X-ray and electron diffraction, solid state physics, nuclear physics, atomic physics and spectroscopy, vacuum systems).

1.053   Experimental Physics B   F T4

Co-requisite: 1.043.

Advanced experimental techniques and open ended projects in the areas covered in 1.043 Experimental Physics A together with projects involving electron and nuclear magnetic resonances, low temperature physics and super-conductivity.

Sciences

1.1333   Electronics   S1 L2T4

Prerequisite: 1.9222 or 1.032.

Extension of AC circuit theory. Revision of transistors, parameters. Multistage discrete amplifiers, bias, coupling, stability. Positive feedback, oscillators. Integrated amplifiers, properties. Negative feedback. Regulated power supplies. Narrow band amplifiers, power and pulse amplifiers. Modulation, AM FM chopper amplifiers. Pulse circuits, gates, flip-flops, scalers, Schmitt trigger, integrated circuits. Thyristors.

1.1433   Biophysics   S1 L2T1

Prerequisites: 1.012, 1.022.

Thermodynamics in Biology, Electrochemical potentials, Donnan equilibrium, irreversible processes, diffusion and applications to biological systems.

Membrane potentials, Nernst potential, Goldman and Nernst-Planck equation, generalized approach.

Active transport. Membrane structure. The nerve impulse, activation and inactivation, Hogkin and Huxley equations.

Muscle, contractive process, thermodynamics. Ecological ensemble theory, global thermodynamics interaction of species, ecological associations.

1.1533   Biophysical Techniques   S2 L2T1

Prerequisites: 1.012, 1.022, 1.032.

The theory and application of physical techniques of relevance to the study of biological systems.

Techniques considered may include optical and electron microscopy X-ray and neutron diffraction, magnetic resonance, lasers, light scattering, calorimetry, fluorescence, electrochemical techniques and electrophysiological methods and dielectric measurements.

1.1633   Astrophysics   S1 L1½T½

Prerequisite: 1.022.

Stellar radiation, spectra classification. Hertzsprung-Russell diagrams, determination of stellar masses and radii. Equations of stellar structure, energy sources in stars, nuclear reaction cycles, energy transport, equations of state, degeneracy, opacity. Properties of main sequence stars, stellar evolution, structure of red giants and white dwarfs. The solar atmosphere.

1.1733   Conceptual Framework of Physics   S2 L2T1

Prerequisites: 1.012, 1.022. Co-requisites: 1.013, 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.

1.3033   Mechanical Properties of Materials   S1 L1½T½

Co-requisite: 1.023. Excluded: 4.043.

Properties of materials in relation to their structure: atomic and molecular structure of solids; elasticity, inelasticity, long-range (rubber) elasticity, viscoelasticity; plasticity; brittle fracture; viscosity and surface tension of liquids; adhesion; friction and lubrication.

1.3133   Electrical, Optical and Thermal Properties of Materials   S2 L1½T½

Co-requisite: 1.023.

Review of electronic structure and lattice vibrations in crystalline materials. Electrons and holes in semiconductors. Solid state devices. Photoconductivity. Optical absorption. Luminescence. Dielectric and magnetic phenomena. Thermal expansion and thermal conductivity.

1.3233   Measurement and Data Handling   S1 L2T0

Prerequisite: 1.032. Co-requisite: 1.053.

Basic considerations of instrumentation, errors of observation and their treatment, statistical design and treatment of experimental data. Metrology and standards. Transducers and measurement parameters. Dynamics of measurement systems. Data storage and manipulation. Computer usage with high level language programming. Microprocessors, machine language programming instrument control. Peripherals. Assemblers, compilers, minicomputers.

1.3333   Applications of Radiation   S2 L2T0

Co-requisites: 1.033, 1.053. Excluded: 1.343.

The present and potential uses of electro-magnetic radiation over the whole spectrum. Microscopy, interferometry and optical spectroscopy. Applications of thermal radiation, microwaves, radio waves, polarized light. Principles and applications of lasers. Holography, X-ray spectroscopy, diffractometry and radiography. Special radiation sources and detectors.

1.343   Applications of Radiation (Practice and Theory)   S2 L2T3

Co-requisite: 1.033. Excluded: 1.3333.

The present and potential uses of electro-magnetic radiation over the whole spectrum.

Microscopy, interferometry and optical spectroscopy. Applications of thermal radiation, microwaves, radio waves, polarized light. Principles and applications of lasers. Holography, X-ray spectroscopy, diffractometry and radiography. Special radiation sources and detectors. Laboratory work.

1.3533   Marine Acoustics   S1 L1½T½

Excluded: 1.913, 25.643.

Wave theory: general wave equation for fluids, viscoelastic media and solids. Travelling and standing wave solutions. Wave Guides: fluid and solid wave guides, ray and mode theories. Sound Transmission in the ocean and application of reflection and refraction theory, scattering and diffraction effects.

1.513   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.

Scalars and vectors in non-Cartesian frames. Principle of relativity and signal propagation. Space-time. Four vectors. Mass-energy. Four-momentum. Electromagnetic field equations. Gauges. Wave equation. Solutions. Introduction to tensors. Field tensor. Stress tensor. Four-momentum of free field. Moving charges. Electromagnetic mass.

1.913   Marine Acoustic and Seismic Methods
(Oceanography Unit)   F L2T1

Excluded: 25.643.

Component given by School of Physics (S1):

Wave Theory: General wave equation for fluids, viscoelastic media and solids. Travelling and standing wave solutions. *Wave Guides:* Fluid and solid waveguides, ray and mode theories. *Sound Transmission in the Ocean:* Applications of reflection and refraction theory, scattering and diffraction effects. *Experiments relating to the above:* Including fluid waveguide, solid waveguide, measurement of absorption and reflection coefficients.

Component given by School of Applied Geology (S2):

Ray Theory Interpretation and Applications: Seismic refraction methods, seismic reflection methods, computational methods. *Instrumentation and Processing:* Seismic and acoustic sources, recording systems, signal processing. *Geological and Physical Interpretation. Practical work relating to the above:* Instrumentation, recording and interpretation of field data.

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.

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)**

Graduate Study

Not all graduate subjects are necessarily offered in any one year.

1.801G   Energy Alternatives

For MPhysics students.

A study of energy alternatives: solar thermal and solar electric energy; energy from fossil fuels; conversions, hydrogen, nuclear fusion and fission, wind, ocean and geothermal sources of energy; political and sociological aspects of energy alternatives.

1.917G   Vibration and Wave Theory I   S1 L2T1

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   S2 L1½T½

For MSc(Acoustics) students.

Sources of acoustic radiation; simple, dipole, quadrupole, plane, impulsive source, random source, aerodynamic sources. Free field propagation in fluids, interference and diffraction, absorption, shock waves. Boundary effects; reflection and transmission at fluid/fluid and fluid/solid interfaces, fluid waveguides, solid waveguides. Reception and analysis; transducers, Fourier analysis, statistical methods, impulse measurement.

1.937G   Acoustic Measuring Systems   S1 L1T0

For MSc(Acoustics) students.

Microphones, amplifiers, loudspeakers, filters, recorders, pick-ups, noise generators. Acoustic measuring instruments.

1.947G   Advanced Physical Acoustics
(Elective)   S1 L3T1

For MSc(Acoustics) students.

Vibrating systems; coupled oscillators, beams, membranes, plates, resonators, acoustic filters; analogs, analogue computer simulation of vibrating systems; transfer of energy from one system to another. Reflection and transmission at walls, rigid walls, flexible walls, multiple walls, impulsive excitation. Sound absorbers; porous absorbers, perforated panel absorbers, sonic and ultrasonic measurement techniques, relation to properties of materials.

1.957G   Acoustic Laboratory and Analysis   S1 L1T2

For MSc(Acoustics) students.

Practical experiments related to the subject matter of 1.927G Acoustic Theory.

Theory and practice of digital methods of analysis in the time and frequency domains.

1.967G   Vibration and Wave Theory II   S2 L2½T½

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   S2 L1T0

For MSc(Acoustics) students.

Sound reinforcement systems; ambiophony; 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.

Part 2. Non-specific Techniques: Thermal diffusion and electrodiffusion, electrical transport in solids, thermal conductivity, ultrasonic properties, specific heat, static magnetic measurements.

Part 3. Advanced Techniques: Spectroscopic methods, diffraction and scattering methods.

Not all these topics are covered in any one year.

1.119G   Basic Solid State Physics   S1 L2T0

For GradDip in Current Science students.

Crystals. Crystal structures and their determination. Binding. Elasticity. Phonons and thermal properties of solids. Defects and dislocations. Electron theory of metals. Free electron theories. Energy bands. Semiconductors. Bulk and junction properties. Optical properties. Magnetism and dielectric phenomena. Diamagnetism, paramagnetism and ferromagnetism. Magnetic resonance. Dielectrics and ferroelectrics. Superconductivity. Phenomenological and microscopic theories. Type I and type II superconductivity.

1.129G   Solid State Device Physics   S2 L2T0

For GradDip in Current Science students.

Semiconductor diodes and transistors. Power diodes. High frequency diodes. Tunnel diodes. Backward diodes. Varactors. High frequency transistors. Thyristors. Microelectronics. Semiconductor transport devices. Thermistors. Hall and magnetoresistance devices. Thermoelectric and thermomagnetic energy convertors. Acoustoelectric effect. Gunn effect. Photo-devices. Photoconductors for visible and infrared radiation. Photovoltaic cells. Electroluminescence. Semiconductor lasers. Magnetic and dielectric devices. Microwave ferrites. Magnetic memories. Applications of ferroelectricity. Piezoelectric devices. Superconducting devices. Superconducting electronic devices. High-field superconductors. Tunnelling devices.

1.139G   Biophysics   S2 L2T1

For GradDip in Current Science students.

Thermodynamic equilibrium. Relationships between thermodynamic variables, chemical potential. Diffusion in the steady state. Diffusion through membranes. Desalination techniques. Diffusion of electrolytes

through membranes, Nernst, Planck and modern developments in bioelectric potentials. Excitability and the nerve impulse. Fixed charge systems in living cells. The Donnan equilibrium.

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.

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   Introductory Chemistry†   S1 L2T4

Prerequisite: None.

Classification of matter and the language of chemistry. The gas laws and the Ideal Gas Equation, gas mixtures and partial pressure. The structure of atoms, cations and anions, chemical bonding, properties of ionic and covalent compounds. The Periodic classification of elements, oxides, hydrides, halides and selected elements. Acids, bases, salts, neutralisation. Stoichiometry, the mole concept. Electron transfer reactions. Qualitative treatment of reversibility and chemical equilibrium, the pH scale. Introduction to the diversity of carbon compounds.

2.121   Chemistry IA†   S1 or S2 L2T4

Prerequisites:

	HSC Exam Percentile Range Required
2 unit Science (any strands) or	31-100
4 unit Science (multistrand)	31-100

or 2.111.

Stoichiometry and solution stoichiometry. Structure of matter, solids, liquids, gases. Thermochemistry. Equilibrium and equilibrium constants, entropy changes, free energy changes, the relationship between equilibrium and standard free energy changes. Ideal solutions, colligative properties. Equilibrium in electrolyte solutions, acid-base equilibria, solubility equilibria and redox equilibria. The rate of a chemical change and chemical kinetics.

2.131   Chemistry IB   S1 or S2 L2T4

Prerequisite: 2.111 or 2.121.

Relative stability of oxidation states. Electronic structure of atoms in terms of the quantum mechanical model. Structure of the Periodic Table and its relationship to electronic configuration. Chemical bonding, hybridization. Properties of compounds of selected elements, acid-base character of oxides and hydroxy compounds. Chemistry of carbon compounds, stereoisomerism, reactions of aliphatic and aromatic hydrocarbons, alcohols, phenols, ethers, alkyl halides, aldehydes, ketones, carboxylic acids and their derivatives, esters, acyl halides, anhydrides, amides, amines.

† 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.

Sciences

2.002A Physical Chemistry   S1 or S2 L3T3

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   L3T3

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 sulphonic acids.

2.002D Analytical Chemistry   L2T4

Prerequisites: 2.121, 2.131, 10.001, 10.011 or 10.021B & 10.021C.

Chemical equilibria in analytical chemistry. Acid-base, complex formation, redox systems, solid/solution, and liquid/liquid equilibria with applications to volumetric, gravimetric and complexometric analysis, and to liquid/liquid extractions. Spectrophotometry, basic principles. Chromophores. Fundamentals of precision. Electrochemistry, theory and applications to electrodeposition and potentiometry; ion selective electrodes. Radioactive tracer techniques. Data evaluation in analytical chemistry. Qualitative analysis.

2.042C Inorganic Chemistry   L2T4

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   L2T4

Prerequisites: 2.121, 2.131 and 10.001, 10.011 or 10.021B & 10.021C.

Fundamental particles, nuclear structure and properties. Nuclear transformations. Properties of nuclear radiations. Interaction of radiation with matter. Detection and measurement of nuclear radiations. Nuclear pulse spectrometry. Nuclear instrumentation. Radiation chemistry: primary and secondary processes in the absorption of ionizing radiation in gases, liquids and solids. Free radical detection and reactions. Technological applications and techniques. Preparation of radionuclides in high energy machines and nuclear reactors. Radiochemical techniques. Handling precautions. Chemistry of nuclear transformations. Chemistry of reactor fuel cycles. Applications of radionuclides in chemistry, biology and industry.

2.003H Molecular Spectroscopy and Structure   S2 L3T3

Prerequisite: 2.121, 2.131.

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, pK values, zwitterion, isoelectric points. Simple peptide synthesis.

Treatment of carbohydrates, establishment of structures, reactivity. Chemistry of monosaccharides, disaccharides and polysaccharides. Methods of analysis, chemical and physiochemical.

Fats, correlation of properties with saturated and unsaturated fatty acid composition. Structural chemistry of fatty acids. Reaction of unsaturated fatty acids, urea complexes. Detergents.

Trace elements in biological systems. Chemistry of common heterocyclic systems with emphasis on molecules of biological importance.

2.003K Solid State Chemistry   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 Introduction to Quantum Chemistry   S1 L2T4

Prerequisites: 1.001 or 1.011, 2.121, 2.131 and 10.001, 10.011 or 10.021B & 10.021C.

Quantum mechanical concepts. Particle in a box. Rotational and vibrational motions — spectra. The hydrogen atom. Angular momentum. Many electron atoms; effects of electron spin; atomic spectra. Molecular spectroscopy and valence: electronic structure and spectra of molecules. The Frank-Condon principle. Delocalization; Huckel M. O. theory. Ligand field theory. Photoelectron spectroscopy. Magnetic resonance: basic principles and experimental techniques; spin density effects in ESR spectra; theory of nuclear shielding and spin-spin coupling; relaxation processes.

2.003A   Physical Chemistry   SS L3T3

Prerequisite: 2.002A.

Thermodynamics, including non-ideal systems; advanced electrochemistry; statistical thermodynamics; applications to gases, liquids and chemical equilibria; states of matter.

2.003B   Organic Chemistry   L2T4

Prerequisite: 2.002B.

Alicyclic Chemistry. Stereochemistry of acyclic systems; classical and non-classical strain in cyclic systems; stereochemistry and conformation of monocyclic and polycyclic compounds; synthesis, reactions and rearrangement of monocyclic compounds including stereochemical selectivity; transannular reactions in medium rings. Synthesis and reactions of fused and bridged polycyclic systems.

Heterocyclic Chemistry. Synthesis and reactions of the following heteroaromatic systems; pyridine, quinoline, isoquinoline. Flavones and isoflavones; pyrimidine; pyrrole, furan, thiophen. Indole, imidazole.

2.003C   Inorganic Chemistry   L2T4

Prerequisite: 2.042C.

Coordination chemistry: valence bond and crystal field theory and their application to magnetic and spectral properties of complexes. Factors affecting the stability of complexes; unusual oxidation states of transition metals. Chemistry of the groups IIIA (the lanthanides and actinides), IVA, VA, VIA and VIIA. More advanced chemistry of groups IIIB, IVB, VB, VIB and VIIB and the noble gases.

2.003D   Instrumental Analysis   L2T4

Prerequisites: 2.002A and 2.002D.

Selected spectrophotometric methods of analysis: infrared, emission, flame, precision spectroscopy, spectrofluorimetry, X-ray fluorescence, mass spectroscopy. Instrumental chromatography, thermal analysis. Electrochemical and kinetic methods. Introduction to automation and data processing.

2.003L   Applied Organic Chemistry   L1T2

Prerequisite: 2.002B. Excluded: 2.033L.

Discussion at advanced level of the chemistry of selected commercially important groups of organic materials. Mechanisms of reaction and physical properties, together with methods of examination, in overall unit approach, correlating structure with behaviour. Emphasis on breakdown to model systems.

Theory of physical techniques, refractometry, polarimetry etc. from basis of additivity. Fatty acids with emphasis on unsaturation, thermal and oxidative polymerizations, alkyl resins, analysis of mixtures. Waxes and sterols; selected natural and synthetic macromolecules; polymerization processes, including treatment of initiators, chain transfer agents, retarders. Vulcanization and sulphur-olefin reactions. Photochemical processes; electro-organic chemistry. Fine chemicals, soaps and detergents. Aspects of metal catalysis in industry.

2.003M   Organometallic Chemistry   L2T4

Prerequisite: 2.002B.

Synthesis, structure and reactions of metal alkyls and aryls; metal carbonyls, isonitriles and acetylides; compounds of metals with unsaturated hydrocarbons; organic chemistry of boron, silicon, phosphorus and arsenic; application of organometallic compounds in organic synthesis and homogeneous catalysis.

2.004   Chemistry Honours

An honours program consisting of selected series of lectures on advanced topics in Chemistry and a research project.

Students intending to seek admission to this course should consult the School re selection of units in the earlier years and apply to the Head of the School for consideration for admission at the end of Year III (or completion of requirements for the pass degree).

2.013B   Synthetic Organic Chemistry   L2T4

Prerequisite: 2.003B.

Introduction, aims, stereochemical and positional problems, recognition of sub-units. Modern functional group transformations with particular reference to positional and stereochemical control. Spectroscopic markers. Electrocyclic reactions, formation, contraction and expansion of rings, Diels-Alder and related cycloadditions, photochemistry, Woodward-Hoffman rules, protecting groups. Representative syntheses of compounds of theoretical and biological interest, eg cubane, Dewar benzene, caryophyllene, reserpine, corrins.

2.013C   Advanced Inorganic Chemistry   L2T4

Prerequisite: 2.042C. Co-requisite: 2.003C.

Reaction mechanisms involving metal complexes. Spectroscopic methods for investigating metal complexes, including infrared, electronic, and Mössbauer spectroscopy. Inorganic crystal chemistry: structures and properties of simple compounds. Cluster compounds, metal-metal bonding, extended electronic interactions. π-Complexes, carbonyls, nitrosyls, ethylene complexes, and sandwich-type compounds; methods of preparation, reactions, evidence for structures and type of bonding involved.

2.013D   Advanced Analytical Chemistry   L2T4

Prerequisite: 2.002D. Co-requisite: 2.003D.

Sampling of biological, environmental and industrial materials. Preparation for analysis. Approaches to analysis of gases, waters, soils and geological materials, plants and biological materials, ceramics, ferrous and non-ferrous metals and alloys. Chemical microscopy.

2.013E   Advanced Nuclear and
Radiation Chemistry*   L2T4

Prerequisite: 2.003E.

Advanced nuclear instrumentation and special counting methods; isotope effects and isotope separation methods; nuclear reactors, accelerators and isotope production; isotope labelling techniques; radiation

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* Only available to non-Chemistry majors. It may not be included in course programs 0201, 0202, 0203, 0204, 0241, 0242 and Course 3910.

sources and their uses; hot atom and recoil reactions; actinide chemistry and nuclear reactor fuel processing; environmental radioactivity; biochemical applications including radioimmunoassay techniques and the preparation of short lived radiopharmaceuticals; isotopic methods applied to chemical measurements; industrial tracer applications.

Laboratory classes involve experiments associated with the above topics.

2.013L   Chemistry and Enzymology of Foods   L1T2

Prerequisite: 2.002B. Excluded: 2.003J, 2.043L, 2.023L, 2.053L.

The chemistry of food constituents at an advanced level and the relationship between the chemistry and enzymology associated with the origin and handling of foodstuffs. Treatment of the stability of constituents, changes in colour and texture occurring during processing and storage. Methods of assessment, chemical and physical.

General classification of constituents, role of free and combined water. Fixed oils and fats, rancidity of enzymic and autoxidative origin, antioxidants — natural and synthetic — theories on mechanisms of action, carbohydrates, reactivity, role in brewing processes, carbohydrate polymers, starch structure, enzymic susceptibility and mode of action, estimations, enzymic degradation and enzymic browning, reactions and stability of natural pigments, vitamins, preservatives.

2.023A   Quantum Theory of Atoms
and Molecules   F L2T1

Prerequisites: 2.002A, 10.2111 & 10.2112.

Wave mechanics — linear operators; Schrödinger wave equation, applications, method of solution; variation principle, linear combinations, perturbation theory. Many-electron problems — central field method; electron spin; Fermi-Dirac statistics; angular momentum operators; Coulomb repulsion two-electron operator; spin-orbit coupling; Russell-Saunders and jj coupling; Zeeman effect; vector coupling and Wigner coefficients; allowed transitions. Group theory — symmetry operations; matrix representation; irreducible representation; characters of a group; non-rigid molecules; antisymmetry operators.

2.023B   Natural Product Chemistry   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.

Water supplies, bore water, methods of examination and assessment. Origin of plant constituents of importance to food industries. Oxygen and nitrogen heterocyclic chemistry as required for natural pigments, phenolics, tannins, methods of estimation. Photochemical processes. Toxic and nontoxic constituents, alkaloids, enzyme inhibitions, preparation, assessment and active site concepts.

Animal feeds, fodders, silage formation. Soil and plant nutrients. Fractionations of carbohydrates, proteins. Structure and glyceride fractionation of fats.

Agricultural chemicals, feed additives. Insecticides, pesticides, natural and synthetic. Fungicides, herbicides and plant growth hormones. Synthesis formulation, stability and degradation processes. Extensions in vitamin chemistry. Trace metals in plant and animal metabolites.

2.033A   Physical Chemistry of
Macromolecules   S1 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, viscosity, osmometry and light scattering. Spectroscopic properties: circular dichroism and optical rotary dispersion; conformation of macromolecules in solution; helix-random coil transitions. Macromolecules in the solid state; X-ray diffraction; basic structural features.

2.043A   Environmental Chemistry   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.

Basic kinetic concepts, mechanisms of elementary processes and fundamental theories of kinetics. Gas-phase systems, unimolecular and free-radical reactions. Reactions involving excited species, pyrolysis, photolysis, mass spectrometry; comparison of flash photolysis and pulse radiolysis. Reactions in solution. Surface kinetics and catalysis. Fast reactions. Applications of the above concepts to inorganic and organic reaction mechanisms.

2.053L   Biological and Agricultural Chemistry‡   F L2T4

Prerequisite: 2.002B. Excluded: 2.023L, 2.013L, 2.043L.

As for 2.023L but in more detail and depth.

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[*] Students are given the choice of these two topics.
‡ Only one of these double units may be chosen.

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 photo-electron spectra. Kinetic spectroscopy. Lasers.

Servicing Subjects

2.011	**Chemistry for Medical Students**
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 numbers 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†
2.156G   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; carbohydrates, sugars, by physical and chemical methods, jams and preserves, pectin, agar, alginates, oils and fats; protein foods, meat, gelatin, fish products; dairy products, milk, cream, cheese, etc.; fermented liquids, beer, wine, spirits, minor constituents. Principles of food processing, dehydration, quick freezing, canning; cereal products; beverages and flavouring essences; nutritional aspects, vitamins in detail; preservatives and food additives; radiation chemistry of food products. *Drugs:* Elements of pharmacology chemotherapy and modes of action, galenicals, identification tests for alkaloids, etc. Analytical chemistry of analgesics, sedatives, hypnotics, steroid hormones, antihistamines, etc. Antibiotics, penicillin, streptomycin, aureomycin, sulphonamides. Activity of enzyme preparations; antiseptics and disinfectants; soaps and detergents.

Pharmacognosy and Microscopy of Crude Drugs
A graded course of 20 hours, progressive from relatively simple structures to the examination of adulterated mixtures.

Examples from the series: hairs and textile fibres of natural origin, woods, stems, leaves, and barks. Seeds, fruits, rhizomes and roots. Flowers, dried juices and gums. Reactions of cell wall and cell contents. Steps in characterization of unknown powders, adulterants of food and drug powders.

**2.251G   Toxicology, Occupational and
                  Public Health   F L1T2**

Important classes of toxic materials found in the environment; treatment of pesticide residues, industrial chemicals of various types, toxic gases, mould metabolites and bacterial toxins occurring in food, carcinogenic substances, toxic metals etc. Effects of these substances on living organisms, particularly man. Practical work: pesticide residue analysis, blood and urine analysis, gas sampling and analysis, trace metal determination and experiments on the animal metabolism of toxic substances.

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† Units available to students enrolled in the Graduate Diploma in Current Science degree course.

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

Lectures: **1.** Analytical flame spectroscopy. **2.** Advanced electrochemical analysis. **3.** Chromatography. **4.** Analytical chemistry of pollutants. **5.** Emission, IR, mass and XRF spectroscopy. **6.** Calculations and statistics in analytical chemistry. **7.** Chemical analysis of organic and biological materials. **8.** Operations and applications of minicomputers in chemistry. **9.** Chemical microscopy. *Laboratory:* Practice, instruction and visits. *Research Project* or *Critical Literature Survey.*

Chemical Engineering

Undergraduate Study

3.023 Chemical Engineering Science I S1 L3T2 S2 L2T2

Prerequisites: 1.001, 10.001.

Flow of Fluids
Introduction and units. Definitions and properties. Statics pressure dis-

tribution and measurements. Dynamics. Euler and Bernouilli equations. Momentum equations. Laminar and turbulent flow. Steady flow in pipes and equipment. Pressure losses. Flow metering. Elementary boundary layer theory. Boundary layers in pipes and on flat plates.

Dimensions and Dimensional Analysis
Units and measures. Conversions of units and equations. Dimensions and Dimensional Analysis. Basic principles of modelling.

Heat Transfer 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 formating, dimensioned variables and sub-routines. Application to the solution of selected problems involving heat and mass balances, fluid flow and pumping.

3.024 Chemical Engineering Principles I S1 L1T1 S2 L1½T1½

Prerequisite: 1.001, 10.001.

The following topics, from 3.023 Chemical Engineering Science I: Flow of Fluids, Heat Transfer I, Pumps and Pumping.

3.037 Chemical Engineering Science II S1 L3T3 S2 L5T2

Prerequisites: 2.002A, 3.023.

Mass Transfer (Theory)
Molecular diffusion in gases, liquids and solids and the measurement and calculation of diffusion coefficients. Diffusion at an interface — one component unidirectional diffusion and equimole counterdiffusion under steady state conditions. Mass transfer coefficients. Estimation and application of chemical and phase equilibria. Stage calculations applied to liquid/liquid, vapour/liquid and other mass transfer operations. The two film theory and the transfer unit concept in gas/liquid, vapour/liquid, and other operations.

Heat Transfer II (Theory)
An extension of the work covered in Heat Transfer I, with an emphasis on the fundamentals of convection and condensation; unsteady state conduction; introduction to heat exchanger design.

Multicomponent Systems
The separation of multicomponent systems by stagewise operations. Brief review of conventional graphical calculation methods leading to a graphical treatment of ternary distillation. Multicomponent separations

using modern computer techniques. Phase equilibrium relationships for liquid-vapour and liquid-liquid systems. Azeotropes and azeotropic distillation.

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

Digital Computation: Introduction to Cyber control language, use of files, efficient FORTRAN programming methods. Numerical methods for solving algebraic equations, and other computer techniques. Application to the analysis and solution of selected chemical engineering problems.

Analogue computation: An introduction to the theory and programming of analogue computers, with application to the solution of differential equations and the simulation of dynamic systems.

3.038   Chemical Engineering
Principles II   S1 L2T1 S2 L2T1

Prerequisite: 3.024.

The following topics, from 3.037 Chemical Engineering Science II: Mass Transfer (Theory), Heat Transfer II (Theory), Fluid-particle Systems, Multicomponent Systems.

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 sys-

tems, illustrated by the extraction of iron, copper, aluminium and other metals. Elementary process analysis. Laboratory analysis and solution of problems.

4.402   Physical Metallurgy I   S1 L3T3 S2 L2T4

Co-requisites: 2.002A*, 4.502. Excluded: 1.932, 4.412, 4.422.

The crystal structure of metallic phases. Crystal defects. Physical properties of solids. X-ray diffraction. Phase equilibrium in alloy systems. The genesis of microstructure. Mechanism of phase transformations, departures from equilibrium, metastable transition phases. Heat treatment of alloys. Structure of carbon steels and cast irons. Optical metallography.

4.412   Metallurgical Phases — Structure and
Equilibrium Part I   S1 L3T3

Co-requisites: 2.002A, 4.302. Excluded: 1.932, 4.402.

The crystal structure of metallic phases. Crystal defects. Physical properties of solids. Phase equilibrium in alloy systems. The genesis of microstructure. Metallography.

4.422   Metallurgical Phases — Structure and
Equilibrium Part 2   S2 L2T4

Prerequisite: 4.412. Co-requisite: 4.303. Excluded: 4.402.

X-rays and X-ray diffraction. Mechanism of phase transformations, departures from equilibrium, metastable transition phases. Principles of heat treatment. Optical and X-ray examination of metallurgical materials.

4.502   Mechanical Properties of Solids   S1 L2T2

Co-requisite: 4.402.

The nature and significance of mechanical properties. Analysis of stress and strain. Stress/strain/time relationships. Influence of stress state, temperature, strain rate and environment on mechanical behaviour. Modes of failure under load. Mechanical testing.

4.602   Metallurgical Engineering I   S2 L3T2

Co-requisite: 4.302.

Mass and energy accounting in metallurgical processes. An introduction to the principles and applications of transport processes in systems with specific reference to industrial processes in primary and secondary metallurgy.

4.303   Chemical and Extraction
Metallurgy II   F L3T2

Prerequisites: 4.302, 4.602 and 4.402 or 4.412. Co-requisite: 4.222.

Metallurgical thermodynamics, application to equilibria involving liquid metals, slags, gases and the solid state. Electrochemistry, corrosion, hydrometallurgy. Kinetics applied to metallurgical processes. Process assessment and selection.

* This unit is taken is Session 1.

4.403   Physical Metallurgy II   F L4T5

Prerequisite: 4.402. Excluded: 1.313.

Diffusion in metals. Nucleation of phase transformations. Mechanisms of precipitation in the solid state. Metallography and properties of commercial alloys. Geometry of deformation in metals. Introduction to dislocation theory and its application to mechanical behaviour of alloys. Zone theory of solids — application to electrical, thermal and magnetic properties and to theory of alloys. Preferred orientations in metals. Optical, X-ray and electron metallography.

4.503   Mechanical Metallurgy   S2 L1T2

Prerequisite: 4.502.

Flow and fracture in metals. Plasticity theory. Principles of metal shaping processes. Relationship between formability and conventional mechanical test results. Fracture mechanics. Fractography. Defects and their significance. Experimental methods related to stress analysis, flow and fracture.

4.613   Metallurgical Engineering IIA   S1 L2T1

Prerequisite: 4.602.

An extension of the principles and applications of transport processes to metallurgical systems. The principles of metallurgical heating and cooling including fuels, refractories and furnace design and operation. Solidification in moulds, continuous casting. *Economics:* As for Chemical Engineering IIC, 3.122 Unit 4 (see Faculty of Applied Science Handbook).

4.703   Materials Science   S2 L2T1

Co-requisite: 4.403.

The application of the principles of physical metallurgy to the development of modern materials, stressing the structure property relationships that determine the design of materials. Topics include: materials used for structural purposes, high temperature applications, corrosive environments, nuclear engineering, fuel cells, magnetic applications.

4.314   Chemical and Extraction
Metallurgy IIIA   S1 L3T1½

Prerequisite: 4.303.

Kinetics of interphase transfer in metallurgical systems. Advances in pyrometallurgy, related to fuel utilization, agglomeration, emission, recycling. Advances in hydrometallurgy. Corrosion and oxidation, selection of materials.

4.324   Chemical and Extraction
Metallurgy IIIB   S2 L3½T1

Prerequisite: 4.303.

A selection of advanced topics in chemical and extractive metallurgy.

4.404   Physical Metallurgy III   S1 L3T4½ S2 L3T1½

Prerequisite: 4.403.

Applications of dislocation theory to work hardening and annealing

processes. Phase transformations in alloys. Mathematical crystallography, reciprocal lattice, diffraction. Electron and X-ray metallography. Selection of advanced topics in physical metallurgy including radiation damage, martensitic transformations, neutron diffraction, internal friction, sintering, creep, superplasticity, fracture.

4.504   Mechanical and Industrial
Metallurgy   S1 L3T0 S2 L3T6

Prerequisites: 4.403, 4.503.

The application of metallurgical principles to industrial processing with particular reference to casting, welding, shaping, properties and selection of materials. Metal finishing. Metallurgical aspects in engineering design. Fracture mechanics, design against fatigue, brittle and ductile fracture.

4.024   Metallurgy Project*   S1 6 S2 3

An experimental investigation of some aspects of metallurgy.

4.054   Metallurgy Seminar   F L2T0

A course of lectures on the preparation and presentation of technical papers. Each student is required to prepare and present a paper on a nominated subject.

Mechanical and Industrial Engineering

Undergraduate Study

5.010   Engineering A   SS L4T2

Prerequisite:

	HSC Exam Percentile Range Required
Either	
2 unit Science (Physics)	*31-100*
or	
4 unit Science (incl. Physics)	*11-100*
or	
2 unit Industrial Arts	*31-100*
or	
3 unit Industrial Arts	*11-100*

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

Statics: Composition and resolution of forces, laws of equilibrium. Friction. Statics of rigid bars, pin jointed frames and beams. Simple states of stress. Statics of fluids.

' Project includes three weeks laboratory work during the Midyear Recess.

Introduction to Engineering Design: Engineering method, problem identification, creative thinking, mathematical modelling, computer aided design, materials and processes, communication of ideas, the place of engineering in society.

Introduction to Materials Science: The structure and properties of the main types of engineering materials, with emphasis on the way in which properties may be controlled by controlling structure.

5.020   Engineering B   S2 L4T2

Prerequisite: 5.010.

Engineering Dynamics: Kinetics of the plane motion of a particle; equations of motion, dynamic equilibrium, work and energy. Kinetics of systems of particles; impulse and momentum. Rotation of rigid bodies about a fixed axis. Belt, rope and chain drives, gear trains.

Mechanics of Solids I: Concepts of stress, strain. Stress and deformation due to axial force. Linear and non-linear problems, compound bars. Concepts of stiffness and flexibility. Bending moment and shear force in simple beams. First and second moments of areas. Stress and deformation due to bending; linear and non-linear problems; use of step functions.

5.030   Engineering C   SS L/T6

Engineering Drawing: Graphic communication, first and third angle orthographic projection and isometric projection. Descriptive geometry fundamentals and their application to engineering problems with special emphasis on visualization of problems and developments of methods for their solution. Australian standard engineering drawing practice. Applications involving detail and assembly drawings, functional dimensioning and tolerancing.

And one of 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. (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.

4. (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.

5. (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.

6. (Available only to Electrical and Surveying students, who 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.

7. (Industrial Chemistry students must take this option) *Introduction to Chemical Technology:* Introduction to computation in chemical technology: process flow diagrams, information flow diagrams, flow charts in computer programming, developing of algorithms. Principle of operation of processors. Batch and real-time processing. Concepts of steady-state and unsteady-state simulation. Programming in Fortran IV and Real-Time Basic and of programmable calculators. Concepts of on-line data acquisition and reduction. Data processing laboratory and plant data.

8. (Ceramic Engineering students must take this option) *Introduction to Ceramic Engineering:* The nature of ceramics. Classification of materials. The materials science approach. History of ceramics. The ceramic engineer and society. The origin, classification, physical properties and uses of clay minerals and other non-clay raw materials. Principal unit operations used in the ceramic industry. Drying and firing of ceramics, melt forming, pot forming and other forming procedures.

Electrical Engineering

Computer Science

Undergraduate Study

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).

6.606   Computer Science Honours

6.613   Computer Organization and Design   S1 L2T3

Prerequisites: 6.631 or 6.021E, 6.021D or 6.620. Excluded: 6.612.

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 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) or 6.021D. 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; register transfer description of a tutorial computer, switching algebra, minimization, combinational logic design, integrated circuits, registers, counters, and other medium scale integration (m.s.i.) devices, clocked sequential circuits, computer arithmetic.

6.632   Operating Systems   S1 L3T2

Prerequisites: 6.631 or 6.021E, 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: 6.632, 6.641.

Data management: compression techniques; redundancy coding; indexing; hashing; encryption and decryption. Data base management systems: data description languages; data manipulation languages; integrity and recovery. The relational view of data. Computer networks: digital data transmission; communication protocols; circuit switching; packet switching; packet routing; network performance. Current international standards and practice. Distributed data bases.

6.641   Programming I   S2 L3T2

Prerequisites: 6.620 or 6.600 (C) or 6.021D.

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. Files: sequential access, random access, merging, sorting, updating. String manipulation, pattern matching and associative algorithms.

6.642   Programming II   S1 L3T2

Prerequisites: 6.641.

Development and analysis of algorithms and data structures.

Models of computation: uniform and logarithmic cost, decision trees. Design of efficient algorithms: divide and conquer, recurrence equations, balancing, dynamic programming. Analysis of algorithms: worst and expected case order statistics. Set manipulation problems. Key transformations (hashing). Trees: optimal, balanced, multiway. Graphs. Finite state recognition: regular expressions, pattern matching algorithms. Computability. NP-complete problems.

6.643   Compiling Techniques and Programming Languages   S2 L3T2

Prerequisites: 6.641. Excluded: 6.602D.

1. Language description: phase 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.

4. Semantic analysis: program translation and code generation.

5. Compiler generators: automatic generation of compilers for LALR(1) grammars.

6. Code optimization by systematic program transformation.

7. Run-time organization: activation record stacks, heap management.

6.646   Computer Applications   S1 L3T2

Prerequisites: 6.620 or 6.600 (C) or 6.021D. Excluded: 6.602C, 6.622.

The use of computers for solving problems with a substantial mathematical and operational research content; includes use of some standard software packages. Topics selected from: discrete event simulation, the SIMULA programming language; pseudo random number generation; simple queueing theory; applications of mathematical programming; statistical calculations; critical path methods; computer graphics, artificial intelligence.

6.647   Business Information Systems   S2 L3T2

Prerequisites: 6.641. Excluded: 14.602, 14.603, 14.604, 14.605.

Introduction to accounting concepts and terminology. Auditing, internal

controls. Systems Analysis. Flowcharting. Decision tables. Models of business information systems. System design. Feasibility studies, presentation of designs, implementation, testing. The COBOL programming language. Data files: sequential, random, index sequential, inverted. File updating. Data bases. Integrated information systems.

6.649   Computing Practice*   S2 L3T2

Prerequisite: 6.641. Co-requisites: 6.633 or 6.643 or 6.647.

Not offered in 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.

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.

10.001   Mathematics I   F L4T2

Prerequisite:

	HSC Exam Percentile Range Required
2 unit Mathematics or	71-100
3 unit Mathematics or	21-100
4 unit Mathematics or	1-100
10.021B	

Excluded: 10.011, 10.021A, 10.021B, 10.021C.

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

10.011   Higher Mathematics I   F L4T2

Prerequisite:

	HSC Exam Percentile Range Required
3 unit Mathematics or	71-100
4 unit Mathematics	11-100

Excluded: 10.001, 10.021A, 10.021B, 10.021C.

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

10.021A   General Mathematics IA‡   S1 L4T2

Number systems (including absolute value, inequalities, surds, etc.); 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
2 unit Mathematics or	51-100
3 unit Mathematics or	11-100
4 unit Mathematics or	1-100
10.021A	

Excluded: 10.011, 10.001.

Functions (and their inverses), limits, asymptotes, continuity; differentiation and applications; integration, the definite integral and applications; inverse trigonometric functions; the logarithmic and exponential functions and applications; sequences and series; mathematical induction; the Binomial Theorem and applications; introduction to probability theory; introduction to 3-dimensional geometry; introduction to linear algebra.

10.021C   General Mathematics IC   S2 L4T2

Prerequisite: 10.021B. Excluded: 10.001, 10.011, 10.021A.

Techniques for integration, improper integrals; Taylor's Theorem; first order differential equations and applications; introduction to multivariable calculus; conics; finite sets; probability; vectors, matrices and linear equations.

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

** When a unit is listed as a prerequisite or co-requisite, the appropriate higher unit may be substituted.

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

10.031 Mathematics (one Level II unit)*   F L1T1

Prerequisite: 10.001 or 10.021C (Cr).

Differential equations, use of Laplace transforms, solutions by series; partial differential equations and their solution for selected physical problems, use of Fourier series; multiple integrals, matrices and their application to theory of linear equations, eigenvalues; introduction to numerical methods.

10.032 Mathematics (one Level III unit)*   F L1T1

Prerequisite: 10.031.

Vector Calculus: special functions; convolution theorem and applications; complex variable theory; Fourier integrals; Laplace transforms with application to ordinary and partial differential equations.

10.041 Introduction to Applied
Mathematics   S2 L4T2

Co-requisite: 10.001.

Not offered in 1980.

Combinatorial mathematics, finite differences, games and networks, hydrostatics, mathematical models.

Pure Mathematics

10.111A Pure Mathematics II — Linear Algebra   F L1½T1

Prerequisite: 10.001. Excluded: 10.121A.

Vector spaces, linear transformations and matrices, change of basis. Eigenvalues and eigenvectors, generalised eigenvectors. Functions of matrices. Linear systems of differential equations including the use of Laplace transform. Inner products, orthogonalisation, projections. Unitary and self-adjoint transformations. Quadratic and Hermitian forms.

10.1111 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.

10.1113 Pure Mathematics II —
Multivariable Calculus   S1 or S2 L1½T1

Prerequisite: 10.001. Excluded: 10.1213.

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

10.1114 Pure Mathematics II —
Complex Analysis   S1 or S2 L1½T1

Prerequisite: 10.001. Excluded: 10.1214.

Analytic functions, Taylor and Laurent series, integrals. Cauchy's Theorem, residues, evaluation of certain real integrals.

10.121A Higher Pure Mathematics II — Algebra   F L2T½

Prerequisite: 10.011. Excluded: 10.111A, 10.1111.

Linear Algebra: vector spaces, commutative rings, polynomials, modules, linear transformations, eigenvectors, invariant subspaces, canonical forms, linear functions, bilinear and multi-linear algebra. Group Theory: subgroups, quotient groups, isomorphisms, Lagrange's theorem, Sylow's theorem.

10.121C Higher Pure Mathematics II —
Number Theory and Geometry   F L2T½

Prerequisite: 10.011. Co-requisites: 10.121A, 10.1213, 10.1214, 10.2211 or 10.2111, 10.2212 or 10.2112. Excluded: 10.1112, 10.1121.

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   S1 L2T½

Prerequisite: 10.011. Excluded: 10.1113.

As for 10.1113 but in greater depth.

10.1214 Higher Pure Mathematics II —
Complex Analysis   S2 L2T½

Prerequisite: 10.1213. Excluded: 10.1114.

As for 10.1114 but in greater depth.

10.112C Pure Mathematics III —
Differential Geometry   F L1½T½

*Prerequisites: 10.111A, 10.1113. Co-requisites: **. Excluded: 10.122C.*

Curves and surfaces in space. Differential forms. Frame fields. Gaussian curvature, Gauss-Bonnet theorem.

* These units are also available to Faculty of Science students as a sequence of two units constituting a terminating service course in mathematics. As such they are mutually exclusive to any other Level II or level III units in Pure and/or Applied Mathematics and/or Theoretical Mechanics.
** 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.

**10.1121 Pure Mathematics III —
Number Theory**   **SS L1½T½**

Prerequisites: *. Excluded: 10.121C.

Euclidean algorithm, congruences, sums of squares, diophantine equations.

10.1122 Pure Mathematics III — Algebra   **S2 L1½T½**

Prerequisite: 10.111A. Co-requisite: 10.1111. Excluded: 10.122A.

Rings, polynomials, fields.

**10.1123 Pure Mathematics III —
Logic and Computability**   **SS L1½T½**

Prerequisites: *.

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

**10.1124 Pure Mathematics III —
Combinatorial Topology**   **SS L1½T½**

Prerequisites: *

Elementary combinatorial topology of surfaces.

**10.1125 Pure Mathematics III —
Ordinary Differential Equations**   **S1 L1½T½**

Prerequisites: *. 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**   **S2 L1½T½**

Prerequisites: 10.1113, 10.1114. Co-requisite: 10.1125.

System of partial differential equations; characteristic surfaces; classifications; Cauchy problem; Dirichlet and Neumann problems; the maximum principle; Poisson's formula; conformal mapping.

**10.1127 Pure Mathematics III —
History of Mathematics**   **S2 L1T1**

Prerequisites: 10.111A, 10.1113, 10.1114, 10.2111, 10.2112.

Topics from the History of Mathematics, with emphasis on the development of those ideas and techniques used in undergraduate courses. Students are expected to read widely and to present written material based on their readings.

**10.1128 Pure Mathematics III —
Foundations of Calculus**   **S1 L1½T½**

Prerequisites: *. Excluded: 10.122B.

Properties of the real numbers. Convergence of sequences and series. Properties of continuous and differentiable functions of a real variable.

**10.1129 Pure Mathematics III —
Real Analysis**   **S2 L1½T½**

Prerequisites: 10.2112, 10.1128. Excluded: 10.122B.

Taylor's Theorem. Sequences and series of functions and applications. Metric spaces and the contraction mapping principle. Fourier Series.

**10.1521 Pure Mathematics III —
Combinatories and its Applications**   **SS L1½T½**

Prerequisites: *.

Generating functions, their properties and applications to partitions and recurrence relations. Branching processes, trees and the analysis of their paths, the analysis of algorithms and the Galton-Watson process. Coding theory and other design problems, Latin squares, block designs and error-correcting codes.

10.122A 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**

Prerequisite: 10.1213. Excluded: 10.1128, 10.1129.

Lebesque 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, geodesics, 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.

* 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.

Applied Mathematics

10.2111   Applied Mathematics II —
Vector Calculus   **S1 L1½T1**

Prerequisite: 10.001. Excluded: 10.2211.

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

10.2112   Applied Mathematics II —
Mathematical Methods for
Differential Equations   **S2 L1½T1**

Prerequisites: 10.001. Excluded: 10.2212.

Series solution of ordinary differential equations; numerical methods. Partial differential equations: separation of variables. Fourier series, Bessel functions.

10.2113   Applied Mathematics II —
Introduction to Linear
Programming   **S1 L1½T½**

Prerequisite: 10.001. Excluded: 10.2213.

Mathematical expression of practical optimization problems. Calculus methods for simple problems. Feasible regions and graphical methods.

Linear programming: the standard problem, basic solutions, fundamental theorem, simplex tableau, initial solution, unbounded and multiple solutions, degeneracy, duality. (Time permitting: the dual simplex method, post optimal analysis.)

10.2114   Applied Mathematics II —
Linear and Non-Linear
Optimization Techniques   **S2 L1½T½**

Prerequisite: 10.2113. Excluded: 10.2214.

Linear programming: the dual simplex method, post optimal analysis, integer linear programming. Applications of linear programming, including diet, allocation and transport problems.

Brief introduction to non-linear programming. Simple, numerical methods.

10.211E   Applied Mathematics II —
Numerical Methods   **F L1T1**

Prerequisite: 10.001.

Errors, their generation, propagation, estimation and avoidance. Solution of non-linear equations in one and two variables. Roots of polynomials. Lagrange interpolation. Differences and the elements of difference equations. Quadrature methods, classical and Romberg. Solution of ordinary differential equations: Taylor expansion, Runge-Kutta and predictor-corrector methods. Boundary value problems involving linear ordinary differential equations. Extensive practical work carried out either on a modern pocket calculator or on the University computer.

10.2211   Higher Applied Mathematics II —
Vector Analysis   **S1 L1½T1**

Prerequisite: 10.011 or 10.001 (Dist). Excluded: 10.2111.

As for 10.2111 but in greater depth.

10.2212   Higher Applied Mathematics II —
Mathematical Methods for
Differential Equations   **S2 L1½T1**

Prerequisite: 10.2211. Excluded: 10.2112.

As for 10.2112 but in greater depth.

10.2213   Higher Applied Mathematics II —
Introduction to Linear Programming   **S1 L1½T½**

Prerequisite: 10.011 or 10.001 (Dist). Excluded: 10.2113.

Mathematical expression of practical optimization problems. Calculus methods for simple problems. Feasible regions.

Linear programming: the standard problem, basic solutions, fundamental theorem, simplex tableau, initial solution, unbounded and multiple solutions, degeneracy, revised simplex method, duality, dual simplex method, post optimal analysis.

10.2214   Higher Applied Mathematics II —
Linear and Non-Linear Optimization
Techniques   **S2 L1½T½**

Prerequisite: 10.2213. Excluded: 10.2114.

Linear programming: reduction of linear inequalities, integer linear programming. Applications of linear programming including diet, allocation and transport problems.

Linear programming in economic analysis, including the theory of the firm and general equilibrium theory.

Brief introduction to non-linear programming. Simple numerical methods.

10.212A   Applied Mathematics III —
Numerical Analysis   **F L1½T½**

Prerequisites: 10.2111, 10.2112, 10.111A. Excluded: 10.222A.

Theory of interpolation and approximation, using polynomials, splines, rational functions and Fourier methods. Numerical quadrature including Gaussian and Clenshaw-Curtis rules, adaptive methods and methods for singular and oscillatory integrands. Sets of linear equations and their numerical solution, matrix eigenvalue problems. Numerical solution of ordinary and partial differential equations, boundary value problems, introduction to finite element methods.

10.212L   Applied Mathematics III —
Optimization Methods   **F L1½T½**

Prerequisites: 10.1113**. Excluded: 10.222L.

Unconstrained multivariable search procedures; including steepest descent, D-F-P method, Hooke and Jeeves method. Constrained optimization; including convexity, Lagrange multipliers, Kuhn-Tucker conditions, duality, simple constrained search methods, penalty functions. Special methods; including geometric programming, separable programming, branch and bound. Applications of these methods to resource allocation, production problems, capital investment and economic models.

10.212M   Applied Mathematics III —
Optimal Control Theory   **F L1½T½**

Prerequisites: 10.1113 & 10.1114, 10.111A 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   **F L1½T½**

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   **F L1½T½**

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.

Electrostatic and quasi-static magnetic fields: mathematical formulation of basic laws, field equations, methods of solution, general theorems, polarization, energy and mechanical forces. Electromagnetic fields: Maxwell's equations, Poynting theorem, Maxwell stress tensor, electromagnetic momentum and radiation pressure, electromagnetic potentials, radiation, vector wave equation, solutions, cavity resonators, waveguides. Relativity: relativistic kinematics, dynamics and electrodynamics, radiation from moving charges, radiation damping.

10.222F   Higher Applied Mathematics III —
Quantum Mechanics   **F L1½T½**

Prerequisites: 10.2211 or 10.2111 (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.

Review of physical basis for quantum mechanics, simple harmonic oscillator, hydrogen atom. General formalism, angular momentum, perturbation theory and other approximation methods. Scattering problems.

10.222L   Higher Applied Mathematics III —
Optimization Methods   **F L1½T½**

Prerequisites: 10.1213 or 10.1113 (Dist)***. Excluded: 10.212L.

As for 10.212L but in greater depth.

10.222M   Higher Applied Mathematics III —
Optimal Control Theory   **F L1½T½**

Prerequisites: 10.1213 or 10.1113 (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.

10.233   Applied Mathematics IV (Short Course)

6 units consisting of the preparation of an undergraduate thesis together with advanced lecture courses. Lecture topics include selections from: advanced optimization and control theory, functional analysis and applications, mathematics of economic models and of economic prediction, stability theory of differential and differential-difference equations, stochastic processes. With permission of the Head of Department, the subject may also include advanced lecture courses given by other Departments or Schools.

Statistics

10.311A* Theory of Statistics II —
Probability and Random Variables   **S1 L4T3**

Prerequisite: 10.001 or 10.021C (Cr). Excluded: 10.321A, 10.301, 10.331, 45.101.

An introduction to axiomatic treatment of probability. Variates (univariates, multivariates, expectations, moment generating and characteristic functions). Standard distributions. Sampling distributions.

ᵘ ʳ At least 1 further unit chosen from the following: 10.111A, 10.1114, 10.2111, 10.2112, 10.2113.

ⁿ ⁿ ⁿ 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 evening course for 10.3111A, subject to sufficient enrolment, runs at 3½ hours per week throughout the year.

10.311B Theory of Statistics II — Basic Inference   S2 L4T3

Prerequisite: 10.311A. Excluded: 10.321B, 10.301, 10.331, 45.101.

Point estimation (moments, maximum likelihood, minimum χ^2, etc.) Confidence interval estimation, exact and approximate. Elementary Neyman-Pearson theory of tests of significance, standard significance tests. Regression (including curvilinear) on a single fixed variable.

10.321A Higher Theory of Statistics II — Probability and Random Variables   S1 L5T3

Prerequisite: 10.001. Excluded: 10.311A, 10.301, 10.331, 45.101.

10.311A at greater depth and covering a slightly wider field.

10.321B Higher Theory of Statistics II — Basic Inference   S2 L5T3

Prerequisite: 10.321A. Excluded: 10.311B, 10.301, 10.331, 45.101.

10.311B at greater depth and covering a slightly wider field.

10.312A Theory of Statistics III — Probability and Stochastic Processes   S1 L2T2

Prerequisites: 10.311A, 10.111A, 10.1113, 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.

10.312B Theory of Statistics III — Experimental Design (Applications) and Sampling   S2 L2T2

Prerequisite: 10.311B or 10.331 (normally Cr). Excluded: 10.322B.

Principles of good experimental design. Completely randomized experiment, randomized block experiment in detail. Latin squares. Contrasts. Analysis of factorial experiments. Multiple comparison methods. Random models. Split plot design. Sampling theory.

10.312C Theory of Statistics III — Experimental Design (Theory)   S1 L2T2

Prerequisites: 10.311B, 10.111A, 10.1113, 10.2112. Co-requisites: 10.312B, plus any two Level III Pure Mathematics or Applied Mathematics or Theoretical Mechanics units. Excluded: 10.322C.

Matrix theory. Cochran-James theorem. Multivariate normal. Quadratic forms. Independence. The General Linear Hypothesis. Gauss-Markov theorem. Hypothesis testing. Analysis of variance.

10.312D Theory of Statistics III — Probability Theory   S2 L2T2

Prerequisites: 10.311A, 10.111A, 10.1113, 10.2112. Excluded: 10.322D.

Rigorous treatment of probability and moment generating functions and characteristic functions. Convergence in probability. Weak law of large numbers. Almost sure convergence. Strong law of large numbers. Compound distributions. Branching process. Advanced treatment of Markov chains. Markov chains with continuous parameter.

10.312E Theory of Statistics III — Statistical Inference   S2 L2T2

Prerequisites: 10.311B, 10.111A, 10.1113, 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. Contingency tables (large sample and exact tests). Order Statistics. Non-parametric methods.

10.322A Higher Theory of Statistics III — Probability and Stochastic Processes   S1 L2½T2

Prerequisites: 10.321A, 10.111A, 10.1113, 10.1114, 10.2112. Excluded: 10.312A.

As for 10.312A but in greater depth.

10.322B Higher Theory of Statistics III — Experimental Design (Applications) and Sampling   S2 L2½T2

Prerequisites: 10.321B, 10.111A, 10.1113, 10.1114, 10.2112. Excluded: 10.312B.

As for 10.312B but in greater depth.

10.322C Higher Theory of Statistics III — Experimental Design (Theory)   S1 L2½T2

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.

10.322D Higher Theory of Statistics III — Probability Theory   S2 L2½T2

Prerequisites: 10.321A, 10.111A, 10.1113, 10.1114, 10.2112. Excluded: 10.312D.

As for 10.312D but in greater depth.

10.322E Higher Theory of Statistics III — Statistical Inference   S2 L2½T2

Prerequisites: 10.321B, 10.111A, 10.1113, 10.1114, 10.2112. Co-requisites: Any two Level III Pure Mathematics or Applied Mathematics, Theoretical Mechanics units or Computer Science. Excluded: 10.312E.

As for 10.312E but in greater depth.

10.323 Theory of Statistics IV

Specialised study, from the topics set out, for students attempting honours in the Science and Mathematics or Arts courses with a major in Statistics. Mathematical basis. Experimental design: response surfaces. Stochastic processes. Theories of inference. Sequential analysis. Non-parametric methods. Multivariate analysis. Mathematical programming. Information theory. Discrete distributions. Project.

10.301 Statistics SA   F L1½T½

Prerequisite: 10.001 or 10.021C. Excluded: 10.331, 10.311A, 10.311B, 10.321A, 10.321B, 45.101.

Probability, random variables, independence, binomial, Poisson and normal distributions, transformations to normality, estimation of mean and variance, confidence intervals, tests of hypotheses, contingency tables, two sample tests of location, simple and multiple linear regression, analysis of variance for simple models.

10.331 Statistics SS   F L1½T½

Prerequisite: 10.001 or 10.021C (Cr). Excluded: 10.311A, 10.311B, 10.321A, 10.321B, 10.301, 45.101.

An introduction to the theory of probability, with finite, discrete and continuous sample spaces. The standard elementary univariate distributions: binomial, Poisson and normal; an introduction to multivariate distributions. Standard sampling distributions, including those of χ^2, t and F. Estimation by moments and maximum likelihood (including sampling variance formulae, and regression); confidence interval estimation. The standard tests of significance based on the above distributions, with a discussion of power where appropriate. An introduction to experimental design; fixed, random and mixed models, involving multiple comparisons and estimation of variance components.

Theoretical and Applied Mechanics

10.411A Theoretical Mechanics II — Hydrodynamics   S2 L3T1

Prerequisite: 10.001. Co-requisites: 10.411B or 1.012, 10.1114. Excluded: 10.421A.

Conservation laws and Bernoulli's equation for one-dimensional flow. Equations of continuity and Euler's equation. Kelvin's Theorem. Incompressible, irrotational flow in two and three dimensions, including applications of complex variables, methods of images, harmonic functions, and axially symmetric flow. Introduction to compressible and viscous fluids.

10.411B Theoretical Mechanics II — Principles of Theoretical Mechanics   S1 L3T1

Prerequisites: 10.001, 1.001 or 10.041 or 5.010. Co-requisites: 10.2111, 10.2112, 10.1113. Excluded: 10.421B.

Revision of vectors, kinematics of particles and rigid bodies. Dynamics of particles including simple harmonic and projectile motion. Systems of particles: conservation principles, collisions, rocket motion, the catenary. Work and energy. Rotating frames; moments of inertia.

Elementary problems derived from continuum mechanics including conservation laws, one-dimensional fluid flow, extension and bending of beams.

10.421A Higher Theoretical Mechanics II — Hydrodynamics   S2 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), 1.001 or 5.010 or 10.041. Co-requisites: 10.2211, 10.2212, 10.1113. Excluded: 10.411B.

As for 10.411B but in greater depth.

10.412A Theoretical Mechanics III — Dynamical and Physical Oceanography   F L1½T½

Prerequisites: 10.2111 & 10.2112 or 10.031, 1.001. It is recommended that one of the following be taken concurrently: 10.411A or 1.012 or 1.913.

1. The physical properties of the oceans and their measurement, including: salinity, temperature, density, dynamic heights. Currents, waves and tides. 2. Theoretical models of current and waves.

Up to seven days field/laboratory work per year.

10.412B Theoretical Mechanics III — Continuum Mechanics   F L1½T½

Prerequisites: 10.2111, 10.2112, 10.111A, 10.1113, 10.1114. Co-requisites: 10.411A or 1.012 or 1.913. Excluded: 10.422B.

Cartesian tensors, stress and strain in continuous media. Equations of equilibrium and motion. Equations of elasticity. Bending and torsion of beams. Plane elasticity (if time available). Viscous flow of liquids (if time available).

10.412D Theoretical Mechanics III — Mathematical Methods   F L1½T½

Prerequisites: 10.2112, 10.111A, 10.1113, 10.1114. Excluded: 10.422D.

Sturm-Liouville equation, eigenvalues, expansion in orthonormal functions. Fourier, Fourier-Bessel and Legendre series as special cases. Fourier and Laplace transforms, with application to ordinary and partial differential equations. Diffusion equation and transmission-line equation. Wave equation.

10.422A Higher Theoretical Mechanics III — Fluid Dynamics   S2 L3T1

Prerequisite: 10.421A or 10.411A (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 10.411B (Dist) or 1.012. Excluded: 10.412B.

As for 10.412B but in greater depth.

10.422D Higher Theoretical Mechanics III — Mathematical Methods F L1½T½

Prerequisites: 10.2211 or 10.2111 (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 of steepest descent and stationary phase. Fourier transform and Laplace transform, with applications to differential and integral equations. Generalized functions and asymptotic estimation of Fourier integrals. Applications to solutions of partial differential equations of the first and second order.

10.423 Theoretical Mechanics IV

An honours program consisting of the preparation of an undergraduate thesis together with advanced lecture courses on topics chosen from fluid mechanics, solid mechanics, planetary science and special mathematical and numerical techniques applied to partial differential equations. With the permission of the Head of Department, the subject may also include advanced lecture courses given by other Departments or Schools on topics such as optimal control theory, optimization theory, thermodynamics, numerical analysis or statistics.

Servicing Subjects

10.021A General Mathematics IA
10.022 Engineering Mathematics II
10.033 Electrical Engineering Mathematics III
10.341 Statistics SU
10.341A Statistics SU (Part A Sandwich Course)
10.341B Statistics SU (Part B Sandwich Course)
10.351 Statistics SM
10.361 Statistics SE
35.670 Mathematics for Builders (Calculus, Algebra & Geometry)

Graduate Study

10.194G Advanced Mathematics Lecture Courses

Each year a selection of courses is offered in the following areas:

Algebraic geometry; algebraic topology; categorical and homological algebra; commutative algebra; group theory; Lie groups and algebras; representation theory; group theory and its physical applications; advanced quantum mechanics; differential geometry; differential equations; optimal control theory; functional analysis; applied functional analysis; operator theory; harmonic analysis; advanced numerical analysis; theory of functions; finite mathematics; number theory; logic; theoretical astrophysics; history of mathematics; recent advances in mathematics; mathematical economics; optimization and control.

10.372G Statistical and Experimental Design

The concepts of random variables, means, variances, the common tests and confidence intervals based on the normal distribution, some simple analyses of variance.

Comparative Experiments: Requirements of a good experiment, assumptions underlying the conventional models of standard designs and their analyses, purpose of randomisation; how the physical circumstances of an experiment are related to its formal model on which its analysis is based; the internal estimate of error obtained from the variation left after accounting for all sources of systematic variation, these points illustrated by considering in some detail the fully randomized design, the randomized block design, the 2^2 factorial fully randomized design, and the fully randomized design with one concomitant variable.

Survey Sampling: the distinction between a survey sample and an experiment planned to compare a set of treatments, and how it affects the inferences that may be made; simple random sampling, stratified random sampling.

10.381G Experimental Design I

Modified designs for fixed effects models. Incomplete and balanced incomplete block designs. Confounding and fractional replication. Randomization theory. Multiple comparisons.

10.382G Experimental Design II

Extensive treatment of random and mixed models. Combinatorial structure of designs, cross-over and lattice designs, response surfaces.

10.383G Stochastic Processes

Discrete parameter, continuous time Markov processes. Brief survey of birth-and-death, immigration, epidemic and predator-prey processes. Introduction to dam and storage problems. Queueing processes. Diffusion approximations.

10.384G Time Series

Spectral estimates, discrete and continuous spectra. Periodogram analysis. Probability theory, special processes. Ergodicity, harmonic analysis and linear filters. Estimation and hypothesis testing.

10.385G Multivariate Analysis I

Likelihood ratio tests for means, variances and structure. Discriminant, principal component, canonical and factor analysis.

10.386G Multivariate Analysis II

The general linear hypothesis and analysis of dispersion. Tests based on roots. distribution theory.

10.387G Sample Survey Design

Simple, stratified and systematic random sampling. Estimation of proportions, ratios, and sample sizes. Multi-stage sampling.

10.388G Sequential Analysis

The sequential probability ratio test — OC and ASN functions. General theory of sequential tests. Sequential estimation.

10.389G Non-Parametric Methods

Sign test, run tests, goodness-of-fit tests. Order statistics and range. Rank-order statistics. Wilcox and signed-rank tests, one- and two-way rank analyses of variance. Rank correlation. Randomization theory and permutation tests. Paired comparisons. Censoring and truncation.

10.390G Statistical Inference

Decision theory. General theory of estimation and hypothesis testing.

10.391G Special Topic A

To be arranged, eg biological statistics, further work on order statistics, population statistics, non-linear programming, discrete distribution theory.

10.392G Project

10.393G Special Topic B

To be arranged, eg biological statistics, further work on order statistics, population statistics, non-linear programming, discrete distribution theory and other topics.

10.401G Seiches and Tides

The equations of motion of a shallow liquid. Shallow water waves, oscillations of rectangular and circular lakes. The tides, their observation and measurement. Newton's equilibrium theory. Harmonic analysis and prediction. Local tides. Oscillations and resonance of harbours and bays.

Servicing Subjects

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 Combinatories
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

Psychology

Undergraduate Study

Psychology Level I Unit

12.001 Psychology I   F L3T2

An introduction to the content and methods of psychology as a behavioural science, with emphasis on the biological and social bases of behaviour, relationships to the environment, and individual differences. Includes training in methods of psychological enquiry, and the use of elementary statistical procedures.

Psychology Level II Units

12.042 Psychology IIA   F L2T2

Prerequisite: 12.001. Co-requisites: 12.052, 12.062, 12.152.

Session 1:
As for 12.373 Psychological Assessment (Testing) IIIA.

Session 2:
Supervised visits to institutions and other places in which psychologists work. Linked lectures look systematically at issues raised by these visits.

12.052 Basic Psychological Processes II   S1 L2T2

Prerequisite: 12.001.

The basic phenomena of behaviour and experience in a biological context.

12.062 Complex Psychological Processes II   S2 L2T2

Prerequisite: 12.001.

Information processing and cognitive functioning, and social bases of behaviour and personality.

12.072 Human Relations II   S1 L2T2

Prerequisite: 12.001.

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.

12.082 Individual Differences II   S2 L2T2

Prerequisite: 12.001.

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.

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 IIIA   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 IIIB   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 IIIA   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.

12.263 Learning IIIB   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.

12.323 Motivation IIIA

Prerequisites: 12.052, 12.152.

Not offered in 1980.

12.413 Physiological Psychology IIIA   S2 L2T2

Prerequisites: 12.052, 12.152.

Elementary neuropharmacology and neuroanatomy. Brain control of eating, drinking, aggression, copulation, pain perception, memory, language and functional disorders.

12.423 Physiological Psychology IIIB   S2 L2T2

Prerequisites: 12.052, 12.152. Co-requisite: 12.413.

Physiological bases of human performance. Hormones and behaviour. Psychophysiology of selected psychological states such as stress, sleep and relaxation. Psychosomatics. Psychopharmacology.

12.453 Human Information Processing IIIA   S1 L2T2

Prerequisites: 12.062, 12.152.

The stages involved in the reception of stimulus information from the environment, its analysis, storage, and transmission into responses. Particular emphasis will be given to the processes which have the effect of reducing the amount of information to be subsequently stored.

12.463 Human Information Processing IIIB

Prerequisites: 12.062, 12.152, 12.453.

Not offered in 1980.

12.473 Perception IIIA   S1 L2T2

Prerequisite: 12.152.

The characteristics and processes of visual perception. Topics include the basic requirement for visual perception and the relative contributions of the observer and the stimulus in a range of visual situations.

12.483 Perception IIIB   S2 L2T2

Prerequisites: 12.152, 12.473.

Man in a spatial environment. A study of the organization and stability of the visual world with particular reference to object movement, eye movement and locomotion.

12.493 Psychophysics III   S2 L2T2

Prerequisite: 12.153.

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.

Psychology Level III Units: Group C

12.173   Psychological Issues III

Prerequisites: 12.052, 12.062.

Not offered in 1980.

12.303   Personality IIIA   S1 L2T2

Prerequisites: 2 Psychology Level II subjects.

Personality dynamics and structure. The practical work involves an exploration of student-chosen topics within designated areas of personality.

12.313   Personality IIIB

Prerequisites: 2 Psychology Level II subjects, 12.303.

Not offered in 1980.

12.373   Psychological Assessment (Testing) IIIA
                                                     S1 L2T2

Prerequisites: 12.152 and 1 other Psychology Level II subject. Excluded: 12.042.

Principles and techniques of psychological assessment. Types of tests and their application in selection and allocation procedures.

12.383   Psychological Assessment
              (Psychometric Theory) IIIB

Prerequisites: 12.152 and 1 other Psychology Level II subject, 12.373.

Not offered in 1980.

12.503   Social Psychology IIIA   S1 L2T2

Prerequisites: 12.062, 12.152.

Interpersonal perception, verbal and non-verbal communication and human social interaction processes.

12.513   Social Psychology IIIB   S2 L2T2

Prerequisites: 12.062, 12.152. Excluded: 12.523.

Research and theory in three fields of applied social psychology: organizational psychology; the social psychology of cultures in contact, including majority group-minority group relations and conflict resolution; and, the social psychology of living in cities.

12.523   Environmental Psychology III   S2 L2T2

Prerequisites: 2 Psychology Level II subjects. Excluded: 12.513.

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.

12.553   Developmental Psychology IIIA   S2 L2T2

Prerequisites: 12.062, 12.152.

An introduction to the study of cognitive development set loosely within the framework of Piagetian theory. Topics include: the development of perception with special reference to the nativism/empiricism issue; the development of operational thought with emphasis on its origins in sensori-motor intelligence; the development of language and its relationship to the development of thought; and the development of reading.

12.563   Developmental Psychology IIIB

Prerequisites: 12.062, 12.152, 12.553.

Not offered in 1980.

12.603   Abnormal Psychology IIIA   S1 or S2 L2T2

Prerequisites: 12.052, 12.152.

Conflict, anxiety and avoidance behaviour. Anti-social behaviour, psychosomatic disorders, brain pathology, mental deficiency, schizophrenia, depression, sexual anomalies, methods of diagnosis and treatment.

12.613   Abnormal Psychology IIIB

Prerequisites: 12.052, 12.152, 12.603.

Not offered in 1980.

Psychology Level III Units: Group D

12.623   Guidance and Counselling III   S2 L2T2

Prerequisites: 2 Psychology Level II subjects.

A review of significant therapeutic approaches from Freud to the present day, and their implied views of man. The sources of the theories of, for example, Freud, Miller and Dollard, Ellis, Rogers, Perls and Janov, concluding with problems in evaluating the effects of psychotherapy. Practical work involves interviewing, group process and structure, and interpersonal relations.

12.653   Industrial Psychology III   S2 L2T2

Prerequisites: 2 Psychology Level II subjects.

A critical investigation of the role of psychologists in industry, especially since World War II. Relationships between theories of human motivation and motivations of human theorists.

12.663   Ergonomics III   S1 L2T2

Prerequisite: 12.152.

Aspects of human performance relevant to work design. The principles involved in designing the environment in general, and work in particular, to suit man's capabilities.

12.703   Psychological Techniques III

Prerequisites: 2 Psychology Level II subjects.

Not offered in 1980.

12.713   Control and Modification
of Behaviour III   S2 L2T2

Prerequisite: 12.052.

Behaviourally based health maintenance programs. Use of the methods of behavioural change in individual, group and institutional settings. Non-psychological methods of behavioural influence. A comparison of attitude and behavioural change. Definitions of problem behaviour. Ethical issues.

Psychology Level IV Units

12.004   Psychology IV   F

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)   F

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 1 unit from each of Groups B, C and D, 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)   F

Prerequisites: 12.001, 12.052, 12.062, 12.152 and 8 Psychology Level III units, including 12.153 from Group A and at least 1 unit from each of Groups B, C and D, 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)   F L2T0

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 motivation 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 methods 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 Thesis

A research thesis involving an investigation into some aspect of clinical or community psychology.

12.230G   Psychological Problems of Children

An essentially practical course focussing on childhood disorders, such as mental retardation, infantile autism, physical and sensory handicaps, specific learning difficulties, and hyperactivity. Methods of assessment to be studied include standardized tests of child development, behavioural check lists and interviews, and observation of present behaviour.

Behavioural change procedures that may be effective in the treatment and management of the behavioural problems in question.

12.231G   Professional Practice

Supervised work with clients in the School's clinic, and in approved institutions.

12.233G   Psychodiagnosis 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.

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

1. Historical case studies at the industry or sectoral level.

2. Critical survey of the approach to science and economy via the economist's 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.

Biological Sciences

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 strand)	31-100

Basic cell structure; membranes, organelles, prokaryotic and eukaryotic cells; cellular locomotion; basic biological molecules; enzymes: structure and metabolic roles, cellular compartmentalization and enzyme function; diffusion, osmosis and active transport; theory of inheritance, linkage, gene interaction, sex determination, mutation, selection and evolution; information transfer and protein synthesis.

Requirements for Practical Work

Equipment required for practical work is set out in the *Course Guide*, available during Orientation Week from Laboratory A, Ground Floor, Biological Sciences Building. Students must purchase this *prior to* the first practical class.

17.021   Biology of Higher Organisms*   S2 L2T4

Prerequisite: 17.031.

The diversity of living things and the way 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.

* 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.

| 17.012 | **General Ecology** | **S2 L2T4** |

Prerequisites: 17.011 & 17.021, or 17.031 & 17.021.

Evolution and environmental selection in the Australian continent; geological, palaeoclimatological, biogeographical and historical background. Functional organization of ecosystems: energy budgets, hydrological and biogeochemical cycles. Integrated structure and function of ecosystems, including cropping and management of natural resources. Aspects of microbial ecology. Students are required to attend a field camp as an integral part of the course.

Applied Geology

Undergraduate Study

25.110   Earth Materials and Processes   S1 L2T4

Prerequisites:

	HSC Exam Percentile Range Required
2 unit Science (any strand) or	31-100
4 unit Science (any strands)	31-100

Constitution of the Earth: The Earth and the Solar System. The interior of the Earth: the crust and its chemical composition, gravity and isostasy. Minerals and rocks, economic mineral deposits.

Earth Processes: The origin of igneous rocks; plutonism and volcanism. The geological cycle. Weathering processes, soil formation and landforms. The origin of sedimentary rocks; transportation, deposition, lithification. Arid, glacial and periglacial processes. Geological time. Metamorphism and metamorphic rocks. Structural geology; classification and origin of faults and folds. Quaternary stratigraphic sequences, neatectonics.

Field Work of up to one and a half days is a compulsory part of the subject.

25.120   Earth Environments and Dynamics   S2 L2T4

Prerequisite: 25.110.

Earth Environments: Introductory palaeontology, including the evolution of life, invertebrates and vertebrates. Principles of stratigraphy. The stratigraphy of New South Wales: Broken Hill, Lachlan Orogen, New England Fold Belt and Sydney Basin. Introductory stratigraphy of Australia from the Precambrian to the Recent. The mineralogical study of rocks; techniques and significance of mineralogy. Structural geology; stereographic and statistical treatment of structural data.

Earth Dynamics: The evolution of ocean basins; sea-floor spreading and sea-level changes. Climates of the past. Geophysical methods of exploration; seismology and earthquake prediction. Plate tectonics and continental drift.

Field Work of three and a half days is a compulsory part of the subject.

25.211   Earth Materials I   S1 L2T4

Prerequisite: 25.120.

Mineralogy: Principles of optical crystallography and the use of the polarizing microscope. Chemical and physical properties of rock-forming minerals. Mineral identification.

Igneous Petrology: Occurrence, classification and origin of igneous rocks. Fractional crystallization and differentiation. Partial melting. Simple binary melting diagrams. Igneous petrology relating to plate tectonics.

Practical: Macroscopic and microscopic examination of rock forming and ore minerals and igneous rocks in the field and the laboratory.

25.221   Earth Materials II   S2 L3T3

Prerequisite: 25.211.

Sedimentary Petrology: The influence of transportation, deposition and diagenesis on the composition, texture and structure of detrital sedimentary rocks. The chemically formed sedimentary rocks including the phosphates, zeolites, evaporites, ferruginous and siliceous deposits.

Metamorphic Petrology: Origin and classification of metamorphic rocks as an aid in understanding common mineral assemblages. Petrographic studies of common metamorphic rocks. Field studies.

Structural Geology: Origin, classification and description of structures in rocks. Techniques of stereographic projection of structural elements and analysis of simple fracture systems. Tectonics and tectonic analysis.

Field Work of up to ten days, equivalent to twenty-eight tutorial hours is an essential part of the subject.

25.212   Earth Environments I   S1 L3T3

Prerequisite: 25.120.

Sedimentology: Flow regimes and bedding forms, sedimentary structures. Flume experiments. Modern and ancient sedimentary environments of deposition: alluvial, deltaic, coastal, shelf and deep sea. The facies concept.

Stratigraphy: Stratigraphic classification including the Code of Stratigraphic Nomenclature. Time in stratigraphy. An introduction to radiogenic methods of age determination: ^{14}C, K/Ar, Rb/Sr and fission track methods. The evolution of continental margins and geosynclines. Geological evolution of the New England Orogen.

Palaeontology: Morphology and stratigraphic distribution of invertebrates, including Foraminifera, Brachiopods, Mollusca, Arthropoda, Protochordata and Echinodermata. Introductory palaeobotany. Palaeoecology. Biogeography. Trace fossils. Reef building organisms and the evolution of reefs.

Field Work of up to three days, equivalent to seven tutorial hours is an essential part of the subject.

25.223   Earth Physics   S2 L2T4

Global Geophysics: Principles of gravity, geomagnetism, palaeomag-

netism, geothermy and seismology and their relation to shape, internal constitution, dynamic processes and major tectonic features of the earth.

Exploration Geophysics: Physical properties of rocks and soils. An introduction to electrical, electromagnetic, seismic, gravity, magnetic and radiometric methods of geophysical exploration. Application of these methods in the search for mineral deposits, petroleum, coal and groundwater and in civil and mining engineering projects.

Photogeology: The use of air photos for geological mapping and geomorphological evaluation of land. Techniques and principles of photo-interpretation and multi-band photography. Photo-interpretation of folds, faults, joints, bedding, limestone, intrusive igneous rocks, volcanic rocks, alluvial fans, terraces, slopes, landslides, coastal and tropical landforms, relationships between geology, drainage, soil and vegetation, orebody expression gossans, colouration halos. An introduction to remote sensing.

25.311   Earth Materials III   S1 L2T4

Prerequisite: 25.221.

Offered in 1981.

Mineralogy: Principles of X-ray powder diffractometry and the use of X-ray powder cameras and diffractometers. Elementary stereology. Laboratory methods of mineral separation. Mineral characterization.

Economic Mineralogy: Nature of reflected light. Orthoscopic and conoscopic rotation, dispersion phenomena. Microhardness and reflectivity, etch tests, XRD and microprobe techniques. Ore textures and their interpretation. Phase relations and paragenesis of ore minerals. Practical work in optical properties of ore materials, hardness and reflectivity measurements; study of selected ores and ore minerals under the microscope including textural studies.

Geochemistry: Some modern methods of rock and mineral analysis. Accuracy, precision and quality of geochemical data. The distribution of elements in terrestrial rocks. Norms.

25.321   Earth Materials IV   S2 L3T3

Prerequisite: 25.311. Co-requisite: 25.326.

Offered in 1981.

Clay Mineralogy: The structure and properties of the clay mineral groups including the kandites, illites, smectites, chlorites, mixed layered and fibrous clay minerals. Techniques for the identification of the clay minerals. Clay-water systems and ion exchange. Chemical weathering and the origin of the clay minerals.

Advanced Igneous Petrology: Origin of silicate liquids. High pressure and low pressure fractionation. Liquids and fluids. Nature of the Upper Mantle. The use of trace elements and isotopes as petrogenetic indicators. Practical petrography and literature studies of igneous suites. Field study.

Advanced Metamorphic Petrology: Facies series. Metamorphic reactions. Isograds. Mineral assemblages as geobarometers and geothermometers. Fluids in metamorphism. Fabric. Relationships of deformation and recrystallization. Metamorphic petrology of Australia. Practical macroscopic and microscopic study of metamorphic rocks.

Field Work of up to seven days, equivalent to six tutorial hours, is an essential part of the subject.

25.312   Earth Environments II   S1 L3T3

Prerequisite: 25.212.

Offered in 1981.

Stratigraphy: Biological and physical methods of correlation. Definition of international stratigraphic boundaries, stratotypes and reference points. The development of the Precambrian craton of Australia. The geological evolution of eastern Australia, particularly the Late Palaeozoic and Mesozoic history of the Tasman Mobile Belt. Intracratonic basins of western and southern Australia and the effects of the dispersal of Gondwanaland. Geological evolution of the northern margin of the Australian plate, particularly the Mesozoic to Recent of Papua-New Guinea. Stratigraphic and structural evolution of aulacogens.

Palaeontology: Theories of biological classification. The origin and early history of life. Processes and theories of evolution. Functional morphology. Practical applications of palaeontology.

Sedimentary Basin Analysis: Techniques of sedimentary basin analysis and data presentation: outcrop, borehole sections and logs, seismic sections. Structure, isopach and lithofacies maps. Seismic stratigraphy. Analysis of sedimentary facies and sequences in fluvial, deltaic, nearshore and deepwater environments. Interaction of sedimentation and structure in tensional, compressive and strike-slip tectonic regimes. Basin evolution.

25.313   Exploration and Data Processing   S1 L4T2

Prerequisite: 25.223.

Offered in 1981.

Exploration Geophysics: The practice and theory of geophysics as a basic tool of geological exploration with applications in areas of energy, mineral and ground-water resources and engineering projects.

Mathematical Geology: An introductory course to develop proficiency in the acquisition, display and analysis of geological data utilizing digital computer processing. Elementary descriptive and inferential statistics and sampling. Fortran programming language (including hands-on computing experience). Analytical methods of mathematical geology including time series analysis, Markov Chain analysis, map analysis and multivariate identification and classification techniques. A practical approach is adopted throughout whereby the student makes extensive use of a library of programs implemented on the University's CDC multimainframe Cyber 72/171 installation for processing and interpretation of real data.

Field Work of up to five days is an essential part of the subject.

25.314   Mineral and Energy Resources I   S1 L3T3

Prerequisite: 25.221. Co-requisite: 25.311.

Offered in 1981.

Metallic Resources: Classification and origin of ore deposits, geochemical processes, research methods. Orthomagmatic, hydrothermal, porphyry, volcanic-sedimentary, Mississippi Valley type, chromium, iron, manganese ores, residual and mechanical ores. Introduction to mineral exploration. Laboratory study of hand specimens, thin sections and polished sections of various ore types; study of selected mining areas representing various genetic types of ore.

Field Work of up to six days, equivalent to eighteen tutorial hours, is an essential part of the subject.

25.324   Mineral and Energy Resources II   S2 L3T3

Prerequisite: 25.312.

Offered in 1981.

Non-metallic Resources: Factors critical to the occurrence of oil, natural gas, oil shale and coal. Geochemistry of hydrocarbons and formation fluids. Typical Australian and overseas occurrences of petroleum. Techniques of petroleum exploration, assessment and development of reserves. Introduction to coal petrology. Geological controls on the formation and distribution of coal. Occurrence and economic use of non-metallic products including phosphates, bauxites, beach sands and industrial minerals.

Advanced Structural Geology: Analysis of structural elements at the microscopic, mesoscopic and macroscopic scales. Modern methods of petrofabric analysis. Detailed studies of the analysis of metamorphic terrains, eg Otago Schist, Cooma Complex.

25.325   Engineering and Environmental
Geology   S2 L4T2

Offered in 1981.

Environmental Geology: Hydrodynamics of pollutants and water quality principles. Domestic, industrial and radioactive waste disposal, deep well injections. Geological hazards and urban planning. Environmental impacts of dams, mineral exploration, mining and impact statement techniques. Water resources law and pollution, land use conflicts.

Hydrogeology: The hydrological cycle; confined and unconfined groundwater. Hydrological characteristics of rocks and their measurement. Pump tests. Aquifer boundaries. Exploration for groundwater, development and monitoring of groundwater resources. Groundwater flow nets. Case studies on the Great Artesian Basin and on the Murrumbidgee area.

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

Coastal Geology: The shoreline processes. Littoral and longshore drifts and net sand movement. Coastal engineering works. The estuarine environment: sedimentation, chemical and biological processes. Investigation techniques.

25.326   Geological Techniques   S2 L3T3

Prerequisite: 25.212, 25.311.

Offered in 1981.

Geochemistry: Modern destructive methods of rock and mineral analysis. Nondestructive methods; X-ray fluorescence spectroscopy and electron probe microanalysers.

Geological Surveying: Levels, tacheometers and theodolites. Field techniques. Precision and angular measurements. Stadia surveying. Levelling. Field computations. Closed and open traverses. Coordinates and their computation.

Sedimentology: Properties of sedimentary populations. Sampling practices. Measurement of grain size, grain shape and packing; analyses of measured data. Geological significance of sediment parameters.

Field Mapping: Geological mapping in a complicated geological terrain for up to seven days (equivalent to fourteen tutorial hours). Geological report writing and cartography.

25.332   Geology for Geomorphologists
and Pedologists   S2 L2T3

Prerequisites: 25.211, 25.221, 25.212.

Clay Mineralogy: The structure and properties of the clay 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.

Sedimentology: Properties of sedimentary populations. Sampling practices. Measurement of grain size, grain shape and packing; analyses of measured data. Geological significance of sediment parameters.

Coastal Geology: The shoreline processes. Littoral and longshore drifts and net sand movement. Coastal engineering works. The estuarine environment: sedimentation, chemical and biological processes. Investigation techniques.

25.621   Marine Geology I   F L1T2

Prerequisites: 25.601 or both 25.110 & 25.120.

The form and nature of ocean basins; the origin, transport, distribution and deposition of suspended matter in ocean water. Principal groups of oceanic index fossils. Igneous and sedimentary rock types of the ocean floor and their significance. Tectonics of ocean basins.

Compulsory field work.

25.622   Hydrological and Coastal Surveying   F L1T2

Prerequisites: None.

General principles of surveying, with particular reference to coastlines and off-shore techniques. Optical and electronic methods of distance measuring and position fixing. Methodology for short-term and long-term measurement of tides and flow currents. Bathymetric surveys in shallow and deep water conditions. Coastline morphologies and their relationship to the behaviour of water masses. Analysis of sedimentary systems in deltaic, estuarine and near-shore environments. Data collecting, processing and storage. Shallow-water investigations for bedrock morphologies.

Compulsory field work.

25.631   Marine Geology II   F L1T2

Prerequisite: 25.621.

Sedimentary and tectonic processes of the ocean basins and continental margins; ocean basin stratigraphy and the environmental and chronological utility of the principal groups of index fossils. Stratigraphical history and correlation of sedimentary rocks in the deep ocean basins and on continental shelves. Changes of sea level. The Quaternary history of the oceans. Reefs and carbonate sedimentation. Deep sea consolidated sediments. Magnetism and palaeomagnetism.

25.632   Estuarine Geology   S2 L2T4

Prerequisite: None.

Offered in 1981.

The physical nature of the estuarine environment; its characteristic topography, chemistry and layering of water masses; tidal behaviour. Characteristic sediments, stratigraphy of sediment bodies and distribution patterns of sediments and microfossils in estuaries. Inorganic and microbial diagenesis of estuarine sediments. Procedures for mapping, sampling and sample analysis. Mineral morphology. Statistical treatment of results.

Compulsory field work.

25.634   Marine Mineral Deposits and
Exploration   S1 L3T3

Prerequisite: 25.621. Co-requisite: 25.631.

Offered in 1981.

Oceanic minerals and mineral deposits — detrital, authigenic and epigenetic. Methods of exploration, assessment and exploitation. International law relating to the sea floor. Methods of subsurface analysis.

Geophysics of ocean basins and off-shore areas and the techniques of their study. Seismic refraction, reflection and computational methods. Instrumentation of seismic and acoustic sources, recording systems and signal processing. Geological and physical interpretation of results. Practical work on instrumentation, recording and interpretation of field data.

25.635   Marine Resources   F L1T2

Prerequisite: 25.621. Co-requisite: 25.631.

Offered in 1981.

Resources important to human civilization of a biological, fluid and mineral nature. Mining of ocean resources. Geological aspects of waste disposal and engineering works in the ocean. Tidal energy. Off-shore drilling.

25.411   Resource Geology   S1

Offered in 1982.

Geophysics: The planning of geophysical surveys within the context of overall exploration and engineering development programs. Geological interpretation of geophysical data and discussion of selected case studies.

Resource Economics: An introduction to the role of earth resources in industrial society; availability of resources and consideration of grade, price, economic, technical and political factors. Distribution, production, consumption and trade in minerals. Supply adequacy and resource assessment. Review of Australian and New South Wales mineral industry. Economics of engineering geological works.

Mineral Exploration: Use of geology in mineral exploration and area selection; principles of exploration geochemistry; radiometric and remote sensing methods, exploration drilling; ore reserve estimation; exploration ground tenure in New South Wales.

Engineering Geology: Rock slope stability analysis and stabilization techniques for mine developments. Groundwater control and hydrogeological principles applied to mineral and energy resource development: mine dewatering.

World Evolution: Seminars on the world's geology from varied aspects.

25.412   Mineral and Energy Resources   F

Co-requisite: 25.400.

Offered in 1982.

Students taking this option are expected to show preference for *either* mineral *or* energy resources. Projects, lectures, tutorials and seminars are designed accordingly.

Mineral Resources: A major part is a student field-laboratory research project in some aspect of mineral resources, as a general geological project, or a specialized mineral exploration project, eg, geochemical, geophysical, mineralogical. In Session 1 additional lectures/seminars follow on from 25.400 Resource Geology, giving more detailed appreciation of various aspects of mineral resources and include exploration management, mine evaluation, exploration geochemistry, exploration geophysics and mathematical geology. The content and extent of tuition in these subjects varies from year to year according to student requirements.

Energy Resources: A major part is a field mapping project in a sedimentary terrain. Depending on students' requisites, specialized field/laboratory studies are arranged in sedimentology, macro- and micropalaeontology, palynology, mathematical geology, geophysics and well-lig analysis. Where possible, projects are directly related to problems of coal and petroleum occurrence. In Session 1 attendance is expected at lectures/seminars described in *Mineral Resources* above and of common interest to understanding evaluation and exploitation of energy resources.

25.413   Engineering and Environmental
Resources   F

Co-requisite: 25.400.

Offered in 1982.

A major part is a field/laboratory research project in some aspect of engineering or environmental geology. In Session 1 additional lectures are on: foundation geology, construction materials, rock weathering and fabric analysis applications to engineering problems, site investigations, practical construction geology, soil slope stability analyses and stabilization, geomechanical principles, engineering geophysical techniques, engineering geological case histories and advanced geological surveying applied to engineering works.

25.414   Geology IV Honours

Single major.

Further details of the honours course may be obtained from the Head of the School of Geology.

General Studies

Graduate Study

For students enrolled in the MScSoc degree course

26.568G Technology for Alternative Development   S2L2

The need for alternative theories and models of development. Trends in economic development theory and development in practice. Current choice of science and technology in developing countries. The results of contemporary strategies of development and their relation to the policies of industrialized nations. The professed goals of development plans. Preferred models of development and the technology appropriate to them. The social, political and economic implications of choosing alternative goals and technologies in developing countries.

Geography

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 and tracing paper, and will be asked to contribute towards the cost of the field tutorials.

27.802   Introduction to Human Geography   S2 L2T2½

The relationships between man and the environment, their spatial consequences and the resulting regional structures that have emerged on the earth's surface. Basic concepts and methods for studying the spatial organization of human activities, particularly as they relate to patterns of location and distribution, to the flows, movements and linkages between places and activities, and to the processes operating that give rise to variations from place to place, particularly between urban and rural areas. Australian and South-East Asian examples are used where relevant.

Laboratory classes: presentation and description of geographical data, analysis of spatial patterns, together with appropriate statistical exercises. Includes a compulsory field excursion equivalent to eight tutorial hours.

27.811   Physical Geography   S2 L2T2½

Prerequisites: 27.801, 27.813†.

Emphasising inter-dependence of climate, hydrology, landforms, soils and vegetation in major zones. Classification of climates and world climatic patterns. Soil zonality and world soil patterns. World vegetation types and distribution, and their controls. Studies of selected zones with particular reference to the Australasian region.

Laboratory classes: climatic analysis and mapping, and analysis of natural landscapes, including airphoto interpretation, together with appropriate statistical exercises.

27.812   Human Geography   S2 L2T2½

Prerequisites: 27.802, 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.

Physical bases for understanding microclimate. Processes of energy exchange at the earth's surface, and the physical and biological controls of the heat and mass budgets. Atmospheric diffusion. Determinants of the local and site-specific climatic environment, particularly topographic, surface cover and substrate conditions. Urban climate and the microclimates of distinctive habitats. Climate in relation to human comfort and health. Building and constructional design aspects of climate and applications of climatology in urban and regional planning. Climatic aspects of the development and utilization of solar and wind energy sources.

† In special circumstances a student may apply to the Head of School for permission to take 27.813 as a co-requisite.

27.143   Biogeography   S1 L2T3

Prerequisites: 27.811 or 17.031 & 17.021.

Distribution of taxa. Floras of the Southern Hemisphere with particular reference to Australia. Endemic, discontinuous and relict taxa. Dispersal and migration of species. Origin, evolution and geological history of Angiosperms. The development of the Australian biogeographic element. Study of the recent past to understand present distributions of taxa. The role of man and climatic change on Australian vegetation. Detection of pattern and association and their causes. Classification, ordination and mapping of vegetation. Ecology of selected Australian vegetation types. Composition, structure, productivity and environmental controls of heathland, woodland, grassland and rainforest communities. Management of vegetation in different climatic regimes.

Field work forms an integral part of the course.

27.183   Geomorphology   S2 L2T3

Prerequisite: 25.001 or 27.811.

Beaches and their response to waves, currents and sediment movement. Barrier systems, lagoons and estuaries. Rock platforms. Quaternary sea level changes. Hydraulic geometry of stream channels, including effects of sediment transport and man's activities. Hillslope form, process and associated slope materials. Methods of slope measurement, analysis and survey. Hillslope models. Systems approach, equilibrium concepts and modelling in landform studies. Field projects in coastal and fluvial geomorphology, and laboratory time is devoted to statistical exercises using data collected from maps, airphotographs and in the field.

27.133   Pedology   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.

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   S2 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
(Advanced)   **S2 L2T2**

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
(Advanced)   **S1 L2T2**

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
(Advanced)   **S1 L2T2**

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.

27.604   Geography IV (Honours)   **F**

Prerequisite: 27.880.

Honours students in their final year are required to prepare a thesis of not more than 20,000 words and to attend a series of seminars on their thesis and supporting topics. The thesis topic must be approved by the Head of the School during the second half of the year *preceding* entry into the final year, while the thesis must be submitted before the examination period in November of the final year. It is expected that research work for the thesis is undertaken during the summer vacation preceding the final year. In addition, students are required to undertake advanced studies in a branch of geography appropriate to the area of research chosen for the thesis.

Organizational Behaviour

Graduate Study

For students enrolled in the MScSoc degree course

30.960G   Technology and Organizations   **S2 L3**

The impact of technological change on organizations. The origins, nature, rate, industrial distribution and prevailing ideologies of technological innovation, adaptation and diffusion and their impact on major organizational variables, interests of key groups and factors affecting the quality of working life.

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.

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.

‡ Only students enrolled in the Marine Science program. Not offered in 1980.

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Lens systems and thick lenses, Interference, Diffraction, Polarisation, Photometry.

Mechanical Optics and Optical Dispensing — The manufacture and properties of spectacle lens materials. The optical properties of spherical, cylindrical, sphero-cylindrical, and prismatic spectacle lenses. Bifocal and multifocal lenses. Protective lenses. Frame measurements. Optical dispensing. Magnifying spectacles, and magnifying glasses. Lens aberrations and spectacle lens design. Lens measuring and lens testing instruments.

Physiological Optics — Optical systems of the eye; the retinal image, visual acuity. Refraction of the eye; hyperopia, myopia, astigmatism, aphakia. Presbyopia. Anisometropia. The schematic eye. Theory of subjective refraction. Aberrations of the eye. Entopic phenomena. Accommodation and convergence. Binocular vision, stereoscopy.

31.812   Optometry II   F L8T7

Prerequisites: 31.811, 31.821. Co-requisite: 31.831.

External and Internal Examination of the Eye: Case history and symptoms. Signs of local and/or general disease. Examination methods and instruments. Optometrical photography. Facial measurements and frame fitting. *Examination of Visual Functions:* Theory and practice of perimetry. Criteria of norms. Interpretation of field defects. Evaluation of light and colour sense. *Refraction:* Theory and practice of keratometry, objective and subjective refraction, prescribing special visual aids. Theory of design and construction of apparatus. *Orthoptics and Pleoptics:* Assessment of binocular sensory and motor functions. Diagnosis and treatment of anomalies. Instrumentation. *Theory of Spectacle Lenses and Optical Instruments:* Advanced geometrical optics and spectacle lens design. Aberrations and their control. The elements of macroscopic and microscopic systems.

31.813   Optometry III   F L6T0

Prerequisite: 31.812, 31.831.

Industrial Optometry: Job analysis and standardization of visual requirements. Occupational visual aids. Vision screening. Industrial hazards and industrial eye protection. *Contact Lenses:* Theory and practice of prescribing haptic and corneal lenses. Instruments. *Reading Deficiency:* The reading process and its anomalies. Remedial training. Instrumentation. *Lighting:* Elements of illumination engineering. Assessment of visibility. Sight conservation. *Advanced Visual Physiology and Physiological Optics:* Recent advances in anatomy and physiology. An introduction to electrophysiology. Aetiology of refractive errors. Theories of colour perception and its anomalies. Evaluation of diagnostic tests. Theories of space perception. Distortion of stereoscopic space. Stereoptics. *Comparative Ophthalmology and Ocular Evolution:* The anatomy and physiology of invertebrate and vertebrate visual organs. Evolution of binocular vision. *History of Optics:* Discussion of the development of optics, ophthalmology and optometry against the background of a short history of science. Optometrical and interprofessional ethics.

31.821   Special Anatomy and Physiology   F L3T3

Prerequisites: 17.031, 17.021. Co-requisite: 73.011A.

Histology, Anatomy, and Embryology of the Eye and Associated Structures: Anatomy and histology of the eyeball, ocular adnexae, bony orbit, visual nervous pathways and visual cortex. The blood vessels, muscles, and nerves of the orbit and associated structures. The motor and sensory pathways associated with the visual apparatus. Elementary embryology and the detailed development of the eye and adnexae. Developmental defects of the eye and adnexae. *Physiology of the Eye*

and Vision: Physiology of the eyelids and lacrimal apparatus, cornea, aqueous humour and intra-ocular pressure, iris and pupil, lens and accommodation, retina and photo-chemistry of vision. Sensory responses to ocular stimulation, luminosity curve, flicker, afterimages, and contrast phenomena. Visual acuity. Light- and dark-adaptation, photopic and scotopic vision. Colour vision and colour blindness. Eye movements, binocular vision, and stereopsis. Theories of vision, visual perception.

31.831   Diseases of the Eye   F L2T1

Prerequisites: 31.811, 31.821, 73.011A. Co-requisite: 31.812.

Introductory Bacteriology and Pathology: Pathogenic organisms, infection, immunity, allergic manifestations. Antiseptics and germicides, antibiotics. Pathological tissue changes; cysts, neoplasms. Diseases of the blood, arteries, veins, heart, lungs, and kidneys. Venereal diseases. Diseases of the nervous system. *The Aetiology, Pathology, Diagnosis and Prognosis of Diseases of the Eye and Adnexae:* Diseases of the eyelids, lacrimal apparatus, orbit, conjunctiva, cornea, sclera, uveal tract, lens vitreous, retina, and optic nerve. Glaucoma. Ocular injuries. Sympathetic ophthalmia. Disease resulting from blood-borne infection. Disturbances of vision of central origin. Disturbances of ocular motility. Developmental abnormalities. *The Ocular Manifestation of Systemic Diseases:* Ocular manifestations of: tuberculosis, syphilis, disorders of metabolism, dental sepsis, diseases of the kidneys, cardiovascular system, blood, endocrine system, central nervous system, phakomatoses and hereditary syndromes.

31.841   Clinical Optometry   S1 L1T14
                                                          S2 T14

Prerequisites: 31.812, 31.831.

Each student examines and prescribes for about fifteen patients per week. Special emphasis is placed on perimetry, aniseikonia studies, orthoptic diagnosis and treatment, reading deficiency diagnosis and treatment, and other advanced optometrical techniques. Each student keeps a detailed case book of all patients examined and treated, and conducts a number of visual surveys and visual job analyses; experience is also gained in the fitting of contact and corneal lenses on selected patients.

Graduate Study

31.701G Advanced Clinical Optometry   F T4

Clinical work on selected patients, with special emphasis on advanced techniques and new developments. All areas of optometric examination procedures are covered, including: external and internal examination of the eyes; visual functions; tonometry; objective optometry; evaluation of binocular functions; aniseikonia; sub-normal vision; geriatric and pediatric optometry; the clinical application of electrophysiological techniques. The assessment of new instruments, methods and treatment.

31.702G Advanced Physiological Optics   F L2T2

Advanced studies in a number of areas of physiological optics. *Refractive State of the Eye:* Physiological basis of ocular refraction, advanced study of the schematic eye, modern concepts of ocular image formation, resolution of the ocular image. Scatter, absorption and reflection of light within the eye, illumination of the retina, receptor density and the retina image, image-forming properties of the rods and cones. Ultrasonic, X-ray and optical techniques for defining the parameters of the

refractive state. Aetiology of the refractive state. *Perceptual Organization of the Retinal Image:* Neural networks in the retina and their mathematical analogs, visual transfer functions. Mach bands, retinal inhibition, spatial and temporal resolution of the retina, static and dynamic visual acuity. Stabilization of the retinal image. Periodic stimulation processes. *Electrophysiology of Vision:* Electrical fields of the eye, monitoring the ocular potential. Electro-oculography, electroretinogram, electromyogram, electro-encephalogram. Electropathology of vision. *Autonomic Servo-mechanisms of the Eyes:* Pupillometry. Accommodation. *Colour Vision:* Basic mechanics of colour vision; visual pigments, fundus reflectometry, Stiles' increment threshold technique. Derivation of fundamental response curves. Differential and incremental colour thresholds. Temporal and spatial effects. Defective colour vision. Para-foveal colorimetry. Colour scales and colour spaces.

31.703G Pleorthoptics and Binocular Vision   F L2T2

An integrated subject, in which binocular vision and pleorthoptics are studied from theoretical and clinical viewpoints. Clinical experience is provided by selected patients. Includes: The nature and control of eye movements, and their role in maintaining the perception of a stable visual world. Binocular and monocular subjective visual directions. The neurophysiological substrate of binocular vision and its phenomena. Stereopsis and its measurement. Accommodation, convergence, and oculo-motor imbalance. Laboratory and clinical methods of measuring eye position and visual directions. The aetiologies, measurement, and treatment of strabismus, anomalous correspondence, eccentric fixation and amblyopia.

31.704G Advanced Contact Lens Studies   F L1T3

Contact lens materials: polymer chemistry, physical and chemical properties of soft and hard lens materials.

Contact lens design: the relationship of theoretical contact lens design and corneal topography. Clinical evaluation of current and new soft and hard lens designs.

Contact lens care and maintenance: Theory and performance of various soft and hard lens care and maintenance systems. Soft and hard lens parametric variations.

Contact lens patient: Systems and techniques for evaluating contact lens patients; new techniques for patient instruction and management. Evaluation of patient responses to lenses.

31.705G Advanced Contact Lens Practice   F L1T3

The examination, evaluation and aftercare of contact lens patients.

31.706G Occupational Optometry   F L2T2

Visual job analysis, human aspects of man-machine systems. Information theory, channel capacity. Visual aspects of man-machine relationships. Visual presentation of information, visual detection, identification and estimations, visual coding. Layout of workplaces, illumination, effects of environment on human performance. Relevant aspects of anthropometry. Visual screening techniques. Industrial eye protection and elements of Safety Engineering. Research techniques in Human Engineering. Visual factors in driving and road safety. Visual factors in aviation.

31.707G Clinical Photography   F L2T2

Introduction to clinical photography, cameras and lens systems, colour films, black-and-white films and filters, apparatus and accessories. Patient preparation and positioning, backgrounds and foregrounds,

lighting, the 'safe-set' method. Copying, slide making, macrophotography, microphotography. 'Invisible light' photography (ultra-violet and infra-red), photofluorography, speedlight techniques, fundus photography. Dark-room techniques, portable dark-rooms. Quantitative photographic data analysis.

31.799G Project

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Biochemistry

Undergraduate Study

41.101   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.

Electron transport and oxidative phosphorylation. Mitochondrial transport and function. Interrelationships in mammalian intermediary metabolism. Biochemical control mechanisms including hormones and allosteric interactions. Biochemistry of genetic diseases. Selected aspects of differentiation and development in higher organisms. Practical work to illustrate the lecture course and to provide experience in modern biochemical techniques.

41.102C   Plant Biochemistry   S2 L2T4

Prerequisites: 41.101, 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, carotenes and essential oils. Flower pigments and phytoalexins.

A combined practical with unit 41.102C illustrates and amplifies the course and includes a wide range of the latest techniques.

41.103   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.

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.

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.

Sciences

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 cytology, metabolism, bioenergetics; structure, function and characteristics of single and multicellular systems; growth; cell division; reproduction; heredity and evolution.

42.212G Principles of Biochemistry   **SS L3**

A condensed treatment of biochemistry comprising the following aspects; the elemental and molecular composition of living organisms; the chemistry and roles of the biological elements and molecules; the thermodynamics and enzymatic catalysis of metabolism; catabolic, anabolic, amphibolic and anaplerotic processes, with emphasis on hydrolysis and synthesis of polymers, glycolysis and gluconeogenesis of glucose, β-oxidation and synthesis of fatty acids, deamination and decarboxylation of amino acids, the tricarboxylic acid cycle, electron transport and oxidative phosphorylation; metabolic regulation and integration.

42.213G Biochemical Methods   **SS T3**

A laboratory program in practical biochemistry. The basic instrumentation and methodology of the biochemist will be introduced by practical exercises and demonstrations. A comprehensive treatment of the relevance and applicability of biochemical techniques is covered in tutorials.

42.214G Biotechnology   **SS L2T1**

The selection, maintenance and genetics of industrial organisms; metabolic control of microbial synthesis; fermentation kinetics and models of growth; batch and continuous culture; problems of scale-up and fermentor design; control of the microbial environment, computer/fermentor interactions. Industrial examples will be selected from: antibiotic and enzyme production, alcoholic beverages, single cell protein (SCP), microbial waste disposal and bacterial leaching.

Tutorial/practical sessions include: problem solving, instrumentation, continuous culture techniques, and mathematical modelling and simulation of industrial processes.

42.215G Practical Biotechnology   **F T7**

Illustration, demonstration and operation of laboratory-scale and pilot-scale equipment. Visits to appropriate industries. Experimental project or critical review.

42.301G Microorganism Productivity   **SS L2T3**

Mechanisms of metabolic control — induction, repression and forms of activation and inhibition; microbial genetics — mutation, selection, genetic transfer and manipulation; environmental parameters — oxygen tension, pH, temperature, energy source etc. as are relevant to productivity in industrially important microorganisms.

Detailed studies — choice of substrate, screening and isolation of microorganisms, systematic application of techniques of genetic and physiological manipulation required to optimize product formation (products include for example, amino acids, nucleotides, enzymes and other macromolecules, antibiotics and other physiologically active compounds), potential strain improvement of microorganisms involved in other industrial processes (for example, mineral leaching, single cell protein production, detoxification and waste disposal).

Laboratory component will include current techniques of microorganism isolation and maintenance, genetic manipulation and physiological manipulation.

42.302G Enzyme Technology   **SS L2T3**

Enzymes in vivo; properties; roles; sources; optimization of enzyme concentration, for example by nutritional control, environmental control and by genetic manipulation. Isolation of enzymes: methods of extraction and purification; stabilizing safeguards; assay procedures; kinetics of isolated enzymes. Immobilization of enzymes: entrapment in insoluble matrices; adsorption on high molecular weight inert carriers; ionic binding to ion-exchange materials; covalent enzyme-enzyme linkage via a low molecular weight bifunctional reagent; covalent linkage to a high molecular weight support; changes in kinetic parameters and stability after immobilization; advantages and disadvantages of immobilization. Enzyme Reactor Engineering: design of batch and continuous systems, including open and closed plug flow and stirred reactors; comparison of kinetics in various designs; scale-up. Enzyme application: analysis; fabric, food and biochemical industries; medical treatment; medical diagnosis. Occupational hazards: allergic responses to enzymes; infection from pathological samples.

Methods of isolation, immobilization and application of enzymes for analytical, industrial and medical purposes will be illustrated by laboratory exercises and short projects. Practical comparison of various reactor designs will also be made.

42.303G Biochemical Process Control   **SS L2T3**

Biochemical reactors: range of basic designs; range of biocatalysts, from microbial conglomerates to free enzymes; heat and mass transfer; design; scale-up; sterility; kinetics; economic considerations. Techniques for efficient operation and control of batch, single-stage continuous and multi-stage continuous processes.

Use of computers: aids to understanding the effects of operating variables for process optimization and control. Detailed examples: microbial processes such as production of antibiotics, organic acids, amino acids and enzymes; enzymic processes.

Practical illustration of: sample processes such as yeast and antibiotic production; mathematical simulation by analog computation; computer control of biochemical processes.

**42.304G Biodeterioration and
Biodegradation**   **SS L2T3**

Basic mechanisms of biodeterioration and biodegradation; direct and indirect attack mechanisms; co-metabolism and mixed population phenomena; factors controlling rates of degradation and recalcitrance of materials to biological attack; biological accelerators.

Detailed treatment of: biological corrosion of metals and alloys; biodeterioration of fuels, petrochemical products, synthetic materials, timber and cellulosic products, building materials etc.; degradation of rocks and minerals; biological leaching of ores and mineral processing residues.

The laboratory component includes assessment of biodegradability of common industrial materials (detergents, surface coatings, fuels, biocides etc.); evaluation of protective methods; determination of biological leachability of minerals and mineral processing residues.

42.305G Case Studies   SS L0T2

Critical evaluation of industrial processes and research and development procedures. Includes: study of isolated and selected areas of biotechnology, detailed study and evaluation of all aspects of an industrial process from the isolation of the appropriate organism or other biological starting material to the production and use of the final products, critical evaluation of techniques arising from current research and development programs.

42.306G Project   F L0T7

An experimental or technical investigation or design project in the general field of biotechnology with supporting seminars.

42.401G 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 inorganic 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.

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, organismal 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.

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 the 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.

* 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, 45.201 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.

43.112   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 time-table. 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. Field work will be an integral part of this course.

43.162   The Plant Kingdom§‡   S2 L2T4

Prerequisite: 43.111.

The major taxa of the Plant Kingdom with emphasis on the green plants. The evolution of basic vegetative structures, reproductive structures and genetic systems are studied. Field work will be part of the course.

43.172   Phycology and Marine Botany‡   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

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.

† 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.

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 content 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.

Level III Units

44.102   General Microbiology   **S1 L4T8**

Prerequisites: 44.101, 44.121, 41.101 or 41.101A and 41.101B.

Systems for the isolation, identification and taxonomic description of microorganisms; fine structure, cyto-chemistry, genetics of bacteria and viruses; metabolic requirements of microorganisms; microorganisms and their environment; growth, inhibition and death; energy-yielding and biosynthesizing systems; genotypic and phenotypic control systems.

44.112   Applied Microbiology   **S2 L4T8**

Prerequisite: 44.102.

Endeavours to relate the basic facts about microorganisms to a variety of practical conditions. The occurrence, importance, activity and control of microorganisms in soil, air, water and in their relationship with higher organisms (other than man); their industrial applications including manufacture, preservation and spoilage of food and dairy products. The nature of bacterial and fungal diseases of man, their cultural and serological diagnosis, epidemiology, treatment and prevention will be discussed in some detail.

44.122   Immunology   **S2 L2T4**

Prerequisites: 17.011 & 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; immunochemistry; immunogenetics, clinical immunology; transplantation.

44.132   Virology   **S2 L2T4**

Prerequisite: 44.102.

The structure, replication and behaviour of animal, plant and bacterial viruses; applications of virological techniques; virus diseases of animals and plants, their epidemiology and control.

Level IV (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; immunochemistry; 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 microscope 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 considerable 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.

Sciences

Servicing Subjects

44.143   Microbiology AS

80.311   Paraclinical Science

In conjunction with School of Pathology and School of Physiology and Pharmacology.

Zoology†

Undergraduate Study

45.101   Biometry   S1 L2T4

Prerequisites: 17.011 & 17.021 or 17.031 & 17.021. Excluded: 10.311A, 10.321A, 10.331.

Statistical methods and their application to biological data, including: introduction to probability; the binomial, poisson, negative binomial, normal distributions; student's t, x^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 x^2, the Kruskal-Wallis test, Fisher's exact probability test and rank correlation methods. Introduction to programming in BASIC.

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, with particular reference to the vertebrates, including morphology, systematics, evolution and natural history, with reference to selected aspects of physiology and reproduction. Practical work to supplement the lecture course. Field excursions as arranged.

45.112   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 14 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 and (45.201 or 45.301).

An introduction to Ethology, the biological study of behaviour. Physiological, ecological, developmental and evolutionary aspects of behaviour are examined as important elements in the analysis of behaviour, particularly social behaviour. Both field and laboratory work are included.

45.132   Ecological Physiology   S1 L2T4

Prerequisites: 45.201 or 45.301.

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

45.142   General and Reproductive Physiology   S2 L2T4

Prerequisite: 45.301.

Basic physiology of nerves, muscles, sensory perception, blood circulation, respiration, gastrointestinal tract, kidneys and hormones. Physiology of reproduction. The control of organ systems and body functions.

45.152   Population and Community Ecology   S1 L2T4

Prerequisites: 17.021 & 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   Topics in Invertebrate Biology   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.

† 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.

45.302   Vertebrate Zoogeography   S2 L2T4

Prerequisite: 45.301.

A geographic approach to the current distribution, abundance and types of vertebrate species in the Australian region. Particular emphasis is placed on the basic principles of speciation, the history of the Australian continent, vertebrate adaptations and changes in the distribution and abundance of the Australian.vertebrate fauna under the influence of man.

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.

Students intending to enrol in this unit should register with the School of Zoology, for the February field trip, by 14 January.

45.412   Insect Physiology   S1 L2T4

Prerequisite: 45.101. Co-requisite: 45.402.

The functions of the various organ systems and of the whole insect. Various aspects of reproduction, growth and metabolism. Experimental work to illustrate the lecture course.

45.422   Economic Zoology   S2 L2T4

Prerequisite: 45.201 or 45.402.

A study of the biology, ecology and control of vertebrate and invertebrate animals which harm man and his possessions. Human and domestic animal parasitology; pests or plants; diseases caused or spread by animals; chemical, biological and physical control, and side effects.

45.432   Project   S2 L2T4

Prerequisite: 45.412.

Selected aspects of insect physiology; ecology and toxicology. Treatment of topics in depth rather than breadth. Practical work illustrates the lectures and places emphasis on design and planning of experiments.

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.

51.173 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.

52.213 Sartre   S1 L2T0

Prerequisite: 52.163.

Sartre's account of freedom, relations between persons and his social theory.

52.233 Argument   S2 L2T0

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 L2T0

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 L2T0

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 L2T0

Prerequisite: Level II status in Philosophy.**

Crucial structures involved in woman's situation.

52.293 Plato's Later Dialogues   S2 L2T0

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 L2T0

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.

52.323 Set Theory   S1 L2T0

Prerequisite: 52.153 or 52.1532 or 26.812 or 10.001 or 10.011 or 10.021B & 10.021C.

An axiomatic development of Zermelo-Fraenkel set theory, including a construction of the natural numbers, equinumerosity, ordinal and cardinal numbers, the axiom of choice and some of its consequences.

52.333 Philosophy of Perception   S2 L2T0

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.

** 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.

52.343 Privacy and Other Minds   **S1 L2T0**

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 L2T0**

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 L2T0**

*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 L2T0**

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 L2T0**

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.

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   **S2 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.

52.5231 Classical Greek Ethics   **S1 L2T0**

*Prerequisite: Level II Status in Philosophy.***

A systematic investigation of the moral theories of Plato and Aristotle. The immoral and subsequent amoral position of Thrasymachus and his question in Book 1 of *The Republic*, 'Why should I be just?'; investigation of the ways in which Plato and Aristotle each sets out the problems of the nature of morality and why a person should be moral, their approaches to the solution to these problems, and their positive moral theories.

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52.5232   Theories in Moral Philosophy   S2 L2T0

Prerequisite: Level II Status in Philosophy. * *

An examination of three moral theories central in the history and development of moral philosophy. Hume, Kant, and Mill offer differing kinds of moral theories, differing approaches to arriving at a moral theory, and specific theories which are markedly different from each other. Examination of each moral theory in itself and in comparison with the other two theories.

52.543   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 cognate 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. Orid, 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.

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.

Sociology

Graduate Study

For students enrolled in the MScSoc degree course

53.309G   Social and
Technological Forecasting   F L2

The nature of various contemporary approaches to the forecasting of social and technological change, and the use of forecasting in particular sectors of economic, social and technological activity. Examines a number of commonly held views about the future and their connection with theories about relations between science, technology and society.

Education

Undergraduate Study

58.602   Theory of Education I   F L1

Educational Psychology: Includes learning, cognition, individual differences and cognitive development. Detailed classroom applications. Where possible, phenomena described is demonstrated experimentally. *Sociology of Education:* Stress on the problem of inequality of educational opportunity: different conceptions of inequality of opportunity; documentation of the extent to which different social groups experience inequality, with special reference to low socio-economic groups, migrants and women; the possible causes of difference in the achievement rates of different social groups; compensatory education and to implications for social policy.

58.603   Theory of Education II   F L1½

Prerequisite: 58.602.

Educational Psychology: Extension of the introductory studies of learning, cognition, individual differences and cognitive development with a concentration upon child development. Classroom applications are emphasized. Where possible, phenomena described is experimentally demonstrated. *Sociology of Education:* Stresses the sociological factors which influence educational practice and on the social consequences of educational practices, highlighting sociological phenomena which it is useful to be aware of in the process of educating and some of the connections between education and society which increase insight into the nature and purpose of education.

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Topics: the socialization function of education, along with related concepts such as social control, social order, anomie and deviance; perspectives offered by contemporary critics on the role of education in society; some major societal trends and the implications for education; sociological aspects of teaching, including the sociology of knowledge, the sociology of the school and the teaching profession.

58.612   Teaching Practice I

A gradual introduction to teaching in the school situation.

58.613   Teaching Practice II

Prerequisites: 58.612, 58.622 or 58.632 or 58.642 or 58.652 or 58.662. Co-requisites: 58.623 or 58.633 or 58.643 or 58.653 or 58.663.

Extensive opportunities for students to develop teaching competence. Each student is placed in a high school for two weeks and works in close association with a teacher.

58.632   Science Curriculum and
Instruction I   S1L2 S2L1

Prerequisites: 1.001 or 1.011; 2.121, 2.131. Co-requisite: 58.602.

Introduction to the application of educational studies to the teaching of the Science curriculum in high schools. Lesson planning and classroom management. Stress on the subject which is taught in Teaching Practice I. Students join other trainee-teachers in a segment known as 'Applied Studies in Teaching Practice'. Here, problems of communication are discussed and the nature, use and role of language in learning situations examined. The development of communication and teaching skills is furthered by peer-group microteaching.

58.633   Science Curriculum and
Instruction II   F L2T3

Prerequisites: 17.021, 17.031; 25.110, 25.120; 58.602, 58.632. Co-requisite: 58.603.

Learning in science and the role of teacher demonstrations/pupil practical work. Preparation and use of audio-visual aids, lesson planning and classroom management. Assistance in the development of teaching skills is provided in peer group microteaching situations. The teaching of selected topics in biology, chemistry, geology and physics is commenced and this is developed in the fourth year. A segment known as 'Applied Studies in Teaching Practice' is common to all third year curriculum and instruction subjects: study of a number of topics dealing with specific classroom problems, measurement and evaluation.

58.642   Mathematics Curriculum and
Instruction I   S1L2 S2L1

Prerequisite: 10.001 or 10.011. Co-requisite: 58.602.

Introduction to the application of educational studies to the teaching of the Mathematics curriculum in high schools. Lesson planning and classroom management. Stress on the subject which will be taught in Teaching Practice I. Students join other trainee-teachers in a segment known as 'Applied Studies in Teaching Practice'. Here, problems of communication are discussed and the nature, use and role of language in learning situations examined. The development of communication and teaching skills is furthered by peer-group microteaching.

58.643   Mathematics Curriculum and
Instruction II   F L3

Prerequisites: 58.602, 58.642. Co-requisite: 58.603.

A continuation of the application of educational studies to the teaching of the mathematics curriculum in high schools. Lesson preparation and presentation, classroom management and organization. An introduction to special mathematics courses being used in high schools, eg elective and slow learner courses. Stress on preparation for Teaching Practice II. A segment known as 'Applied Studies in Teaching Practice' is common to all third year curriculum and instruction subjects: study of a number of topics dealing with specific classroom problems, measurement and evaluation.

History and Philosophy of Science

Undergraduate Study*

Level II/III

62.012   The origins of Modern Science   S1 L2T1

Prerequisites: A pass in four Level I units from Table I excluding Philosophy and Engineering units.

An introductory subject dealing with the Scientific Revolution of the seventeenth century, the philosophical issues being discussed in their historical context. It surveys the major achievements of science during the period, particularly the Copernican Revolution, the construction of dynamics from Galileo to Newton, and Harvey's physiology. The cultural and intellectual background of these achievements and their effects on European thought will be discussed.

62.022   The Social History of
Technology in the Eighteenth
and Nineteenth Centuries   S2 L2T1

Prerequisites: As for 62.012.

The rise of technology in its social and cultural context before, during and since the Industrial Revolution. This Revolution, which has been described as the most significant event in human history since the Agricultural Revolution of the New Stone Age, is examined in some detail and concentrates on technology and its effects on human beings; considers the professionalization of engineering, the spread of industrialization in Britain, Europe and the USA, and the Second Industrial Revolution. Emphasis on social and economic effects of the interactions of technology and society.

62.032   The Scientific Theory   S2 L2T1

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 subjected to analysis. Includes: the principles of theory construction; perception and observation; the

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* Students undertaking subjects in History and Philosophy of Science are required to supplement the class contact hours by study in the Library.

structure of scientific revolutions; scientific apologetics; the structure of theories; scientific explanation; the status of laws and theoretical terms; the 'existence' of theoretical entities; relationships between theory and observation; the functions of models; the principles of theory establishment and rejection.

62.042 Scientific Education and the Dynamics of Scientific Development S2 L3T1

Prerequisite: 58.632.

The role of science education within the economy of scientific activity and development. *Topics:* Education in relation to the scientific community as a whole; theories of scientific development and change, with special reference to the critique of Thomas Kuhn's *The Structure of Scientific Revolutions;* science education in relation to the life-cycles of scientific paradigms; the structures and functions of the different classes of scientific publications, with special reference to textbooks; the uses and 'misuses' of the history of science in the teaching of science; the relationships of syllabuses and teaching techniques to research methodology and the dynamics of scientific development; science education considered as a factor in the determination of scientific 'style' and philosophies of science; the effects of moral, political and other values on science and science education. The topics are discussed with special reference to suitable examples selected from the histories of science and of science education.

62.052 Scientific Knowledge and Political Power S1 L2T1

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.

62.033 Development of Theories of Matter* S1 L1T2

Prerequisite: As for 62.012.

The development of man's ideas about the nature of matter: 'the oldest conceptual tool in the Western speculative tradition'. A broad coverage of this many-sided topic is offered, from antiquity to the mid-twentieth century, though the emphasis is placed largely on ideas in the nine-

teenth and twentieth centuries. The main areas of study are: Greek matter theory; the 'organic' theories of the Renaissance; the 'mechanical philosophy'; Newton, Leibniz and Boscovich, eighteenth century chemistry; Dalton's atomic theory and the 'atomic debates'; the establishment of the atomic weight scale; nineteenth century theories of bonding and structure; Faraday, Maxwell and Hertz and the origins of field theory; radioactivity; Thomson and Rutherford; the Bohr theory of the atom; the wave/particle model, the uncertainty principle, and associated controversies; anti-matter; electronic theories of valency.

A net of notes is distributed each week and the subject is conducted entirely by seminars.

62.043 Historical Foundations of Experimental Biology S1 L2T1

Prerequisite: As for 62.012.

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 homeostatis; relations between theories of biological equilibrium and social stability in the twentieth century.

62.053 Theories of Generation and Heredity* S2 L2T1

Prerequisites: As for 62.012.

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 L2T1

Prerequisite: As for 62.012.

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.

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* Not offered in 1980.

**62.093   Science and the Strategy of
           War and Peace   S1 L2T1**

Prerequisite: As for 62.012.

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 antiwar movements; the role of the military industrial complex; the
dynamics of the arms race and its limitation; the technological elaboration of armaments in the 1960s; the opportunity cost of military expenditure and limits to growth.

62.103   The Discovery of Time   S1 L2T1

Prerequisite: As for 62.012.

The evolution of ideas concerning the age and history of the earth,
devoting particular attention to the period from the seventeenth century
to the present. Consideration is given to such questions as changing
attitudes towards the authority of the scriptures, social theories, the
concept of Nature, the rise of the Romantic Movement and the important growth of historical consciousness that occurred during the eighteenth and nineteenth centuries, the intention being to provide an
understanding of the intellectual setting within which geological
theories and ideas about time developed.

62.104   The Darwinian Revolution   S2 L1T1

Prerequisite: As for 62.012.

The scientific, philosophical and social antecedents and consequences
of Darwin's theory of evolution. The prevailing ideas in biology before
Darwin, in the context of the general climate of ideas in the eighteenth
and early nineteenth centuries. Darwin's life and work. The work of
Mendel and the establishment of the 'synthetic' theory of evolution.
Major portion of subject is devoted to an examination of the impact of
evolutionary ideas in such diverse fields of thought as religion, literature, music, political theory, epistemology, ethics, and the social and
behavioural sciences. The subject is conducted entirely by seminars.

Level III

**62.013   History of the Philosophy
           and Methodology of Science   F L0T2**

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; Galileo; 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;
Russell and Wittgenstein; Einstein and the relativists; Eddington's selective subjectivism; Bridgman and operationalism; the Vienna Circle and
logical positivism; Carnap and positivist reductionism; Popper and
falsificationism; Hesse and modelism; Kuhn; Feyerabend and
methodological anarchism.

A set of notes is distributed each week and the subject is conducted by
seminars.

62.083   Marxism and Science   S1 L2T1

Prerequisite: As for 62.013.
Not offered in 1980.

Introductory lectures on aspects of Marxist theory and practice relevant
to the sciences, followed by more detailed consideration of the following topics: Marxist interpretations of the social role of the sciences and
of their historical development; the materialist theory of knowledge and
ideology, and the critique of non-Marxist philosophies of science; relations between science, technology, and social theory; the Marxist
analyses of technological change and its effects on education and
employment.

**62.105   Research Methods in History and
           Philosophy of Science   F L2T½**

*Prerequisite: Completion of three HPS units with an average grade of
Credit or better, or by permission of the Head of School.*

A series of methodological studies designed to prepare students and to
carry out honours level research in HPS. The historiography of science,
and its relations to philosophical and social studies of science, analyzed
through discussion of texts representing predominant approaches to
HPS during the last 30-40 years. Bibliographical, editorial, and other
research exercises.

Level IV Honours Programs

62.014   History and Philosophy of Science Honours

Candidates are required to present a thesis and to complete, as determined by the Head of the School, EITHER four one session Honours
Seminar units OR at least two one session Honours Seminar units
together with additional approved work, provided that the total coursework component is at least equivalent to four Honours Seminar units.

62.024   Science Studies Honours

Candidates are required to present a thesis and to complete a two
session Honours Seminar unit together with additional coursework, of
equivalent weight, to be determined by the Head of the School of History and Philosophy of Science.

Graduate Study

For students enrolled in the MScSoc degree course

**62.701G   Philosophy and Methodology
           of Science   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.

62.709G The Scientific Community   S2 L2

The sociological analysis of the pure science community, which establishes the characteristics of this subgroup of society by examining its internal and external social relations. The *internal* relations refer to cognitive and behavioural factors within the community itself that promote or retard the advancement of science. The *external* relations refer to the political, ideological, economic and bureaucratic forces in society that shape and control the scientific community and the knowledge it produces.

62.710G Science, Philosophy, and Social Values   S2 L2

Exposition and appraisal of some of the classical ethical theories. Examination of the claims of science to be able to provide a basis for moral judgements. Attempted establishment of an ethical framework which may serve as a basis for decision making when problems of an ethical nature arise in science. Selected case studies, in which decisions as to the most appropriate form of action are evaluated in the light of the ethical framework previously established. The social responsibility in science movement and its problems.

62.711G Marxism and the
Critique of Science   S1 L2

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 Societ 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 technogracy.

67.712G Science, War and the State   S1 L2

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 Seminary and Project   F L2

Chosen in consultation with the Program Co-ordinator. Topics aim to exploit students' special interests.

62.714G Knowledge, Power and Public Policy   S2 L2

The growth of government interest in science during the 20th century. Issues, institutions and policies. The nature and consequences of government support for research. The debate over the 'planning' of science. The arguments in favour of 'science policy'.

Science policy placed against the general background of the growth of government intervention in economic and social life during the last 100 years. The impacts of two world wars and the 'cold war'. Differences between countries in scientific organization and science policy.

62.715G Cause, Belief and Progress in
the History of Science   S1 L2

An historical perspective on general ideas relating to scientific knowl-edge 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.

Board of Studies in Science and Mathematics

Undergraduate Study

68.302   Introductory Marine Science   S1 L3T1

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

68.313   Physical Oceanography   S2 L2T2

Prerequisites: 10.001 or 10.011; 1.001 or 1.011.

The physical properties of the oceans, and their measurement. Oceanographic instrumentation. The design of small and large scale ocean experiments. Laboratory and field work.

68.503   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.

Anatomy

Undergraduate Study

70.011A Histology I   S1 L2T4

Prerequisite: 17.021.

Cell form and tissue structure. Cell structure and function. Cell function and evolution. Epithelial cells and tissue. Connective tissues and connective cells. Muscle cells and muscle tissue. Nerve cell and nervous tissue. Cellular interrelations. Structure of organs and organ systems. Skin and derivatives. Development and structure of teeth. Circulatory system. Oral cavity. Alimentary canal and associated glands. Respiratory system. Urinary system. Eye, ear. Reproductive system.

70.011B   Mammalian Embryology   S2 L2T4

Prerequisite: 70.011A.

History of embryology and its development as a science. The mammalian reproductive system. Gametogenesis. Fertilization and cleavage. Development and implantation of blastocyst. Development of embryonic disc, embryonic membranes, placenta. Comparative mammalian placentation. Human embryogenesis. Development of human foetus. Characteristics of external form. Teratology. Human organology. Comparative mammalian development. Biochemistry and embryogenesis.

70.011C   Introductory Anatomy   S1 L2T4

Prerequisite: 17.021.

Introduction to gross anatomy, based on a study of prosected specimens. Musculoskeletal, cardiovascular, respiratory, gastrointestinal, genitourinary and nervous systems. General topographical and surface anatomy. Normal variations including those related to sex and age (childhood, adolescence, maturity, senescence).

70.012A   Musculoskeletal Anatomy   S1 L2T4

Prerequisites: 70.011A, 70.011C.

The topographical anatomy of the limbs and the musculoskeletal framework of the trunk. Distribution of nerves and vessels. Living and radiological anatomy.

70.012B   Visceral Anatomy   S2 L2T4

Prerequisites: 70.011A, 70.011C.

The topographical anatomy of the great visceral systems — gastrointestinal, respiratory, cardiovascular, and genitourinary — and of the head and neck. Living and radiological anatomy.

70.012C   Neuroanatomy   S1 L2T4

Prerequisites: 70.011A, 70.011C.

The neurons, neuronal satellite cells. Functional anatomy of the central nervous system. Blood supply of central nervous system. Organs of special sense. Endocrine glands. Principles of peripheral nerve distribution.

70.013   Anatomy IV   F

Prerequisite: Completion of the first three years of any Science program with a major in Anatomy (see Table 3).

An honours program consisting of the preparation of an undergraduate thesis together with advanced tutorial courses and participation in School seminars.

70.303   Kinesiology   S2 L2T4

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   S2 L2T4

Prerequisite: 70.011A.

Mammalian histology, with particular reference to the human. Practical histological procedures: fixation, section preparation, staining. Microscopy. Theoretical, practical and applied histochemistry.

70.3041   Histological and Histochemical
Techniques   S2 L1T2

Prerequisites: 17.021, 17.031, and any one of 41.101, 45.301, 70.011A.

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

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. Co-requisite: 41.101.

Introduction to fundamental physiological principles, dealing first, with basic cellular function in terms of chemical and physical principles, and second, with the operation of the various specialized systems in the body, for example, the cardiovascular system, whose function it is to transport materials to and form the tissues of the body; the respiratory system which must maintain the exchange of oxygen and carbon dioxide between the atmosphere and the blood; the gastrointestinal system which enables food materials to be modified by digestion and absorbed into the circulation; the kidney which is involved in the regulation of body fluid and electrolyte balance and with the excretion of the waste products of metabolism; the endocrine system which releases chemical messengers, called hormones, that are carried in the blood stream to regulate a great variety of body functions, eg metabolism and reproductive activity; the nervous system which by means of very rapidly propagated electrical impulses is responsible for all our movements, sensations, memories, emotions and consciousness itself. A substantial series of practical class experiments on these different areas of physiology is included in the course. This subject is taken by students enrolled in any of the Physiology programs.

73.121   Physiology IB   F L2T4
73.011A   Principles of Physiology (Optometry)   F L2T4

Prerequisites: As for Physiology IA except that 2.131 may be accepted as a co-requisite. Excluded: 73.111.

Covers the same general areas of physiology as Physiology IA but in less detail and with less intensive practical courses. Physiology IB may be taken by students not intending to study physiology in Level III. Principles of Physiology is taken only by students in the BOptom degree course.

73.012   Physiology II   F L4T8

Prerequisites: 73.111, 41.101, 41.111. Students enrolled in the Program 7302 (Physiology/Chemistry) may choose 2.003J and 10.2111 and 10.2112 in place of 41.101 and 41.111.

A major subject offered in third year, providing a more advanced course of study in Physiology. Students spend considerable time performing laboratory experiments which illustrate various physiological principles and introduce them to the techniques used in physiological investigation. The course is orientated towards the areas of physiology constituting the major research interests of the School. It is divided into several sections which may be available in special circumstances as separate 1 and 2 unit Level III courses, including Membrane Biology, Neurophysiology and Organ Physiology, details of which are given below.

73.012A   Membrane Biology   S1 L2T4

For entry consult Head of School of Physiology.

The properties of cell membranes including permeation of ions, solutes and water across membranes, generation of electrical signals in nerve and muscle cells produced by ion movements, and transmission of information between cells. Stress on modern research techniques and on a critical examination of appropriate classical papers.

73.012B   Neurophysiology   S1 L2T4

For entry consult Head of School of Physiology.

A detailed study in two broad areas, neural mechanisms in sensation and the control of posture and movement. Includes the regulation of visceral and other autonomic effector structures and the neural substrates and correlates of certain higher functions such as speech, memory and consciousness. Directed towards the experimental analysis of nervous system function, to introduce the techniques and approaches used in neurophysiological research. Sensation: an integrated lecture and experimental course is given on somatic, visual and auditory sensory mechanisms. Laboratory work: students conduct psychophysical experiments to evaluate subjective sensory capabilities. The neural mechanisms underlying these subjective abilities are examined in animals in electrophysiological experiments which involve recording the impulse patterns from individual neurones within the sensory systems. Students are required to analyze the mechanisms employed by the nervous system to code information about specific parameters of sensory stimuli.

Lectures and experiments on motor function are directed towards an understanding of the various reflex and voluntary mechanisms controlling posture and movement. The section dealing with nervous control of visceral function is concerned mainly with the regulation of cardio-respiratory activity.

73.012C   Organ Physiology   S2 L4T8

Prerequisites: for 73.012A, B, CD: normally as for 73.012. For entry consult Head of School of Physiology.

An advanced study dealing with major physiological systems of the body. The cardiovascular and respiratory systems, the endocrine systems, and the kidneys are usually studied in depth, and important aspects of gastro-intestinal and fetal physiology are also treated. Concentrates on the functions of the individual organs within these systems, on the operation of the systems as wholes, and on the mechanisms (including neural mechanisms) controlling the systems. Emphasis on the approaches and techniques involved in physiological research. Students are therefore required to carry out an extensive series of experiments which usually employ mammalian (including human) preparations.

73.022   Pharmacology   F L2T4

Prerequisites: 73.111 or 73.121. Co-requisites: 73.102 or 41.102A & 41.102B or 2.003J and 2.033A.

Includes a study of the absorption, distribution and metabolism of drugs as well as a study of the pharmacology of the autonomic nervous system, the cardiovascular system, the central nervous system, the kidney, the endocrine system and also a study of pharmacokinetics. A practical class program complements the lecture program by demonstrating a variety of basic pharmacological techniques.

Honours and Graduate Study

Depending on their undergraduate records students may be accepted by the Head of the School to undertake a fourth year of study towards an honours degree in Physiology. This would usually be done by students planning a career in physiology. During the honours year the student carries out a research project under the supervision of a staff member and submits a thesis based on the research project. The student can usually nominate the general research area in which he wishes to work from those being studied in the School. Within this research area the student is given a specific project by the supervisor.

Higher degree study for an MSc or PhD degree may also be undertaken by selected students.

Community Medicine

Undergraduate Study

79.201   Population Genetics Theory   S1 L2T3

Prerequisites: 45.101, or 10.311A and 10.311B, or 10.321A and 10.321B, or 10.331.

Models of genetic systems and growth of populations, with essential mathematical and statistical theory; illustrated by examples from human genetics. Limitations of models.

Models of population growth in discrete and continuous time with nonoverlapping and overlapping generations. An extension of the Hardy-Weinberg principle to finite populations and several loci. The concept of inbreeding, calculation of coefficients of consanguinity, effects of inbreeding, effective population number. Fisher's Fundamental Theorem of Natural Selection. Advanced treatment of factors maintaining gene frequency equilibria in populations, including balance between mutation and selection, heterozygotic advantage, and genetic loads. Effects of finite population number, including random gene frequency drift.

**79.202   Quantitative Methods in
              Human Genetics   S2 L2T3**

*Prerequisites: 9.801 or 43.101; 9.811 or 10.311A and 10.311B, or
10.321A and 10.321B or 10.331 or 12.152 or 45.101.*

Application of the principles of genetics and the theory of statistics to
the study of human populations.

Estimates of population parameters, uses of measures of relatedness,
discrimination between models of inheritance, design and analysis of
surveys of families and twin pairs, genetic models of qualitative and
quantitative variation, use of probability models in genetic counselling
and determining effects of medical intervention.

79.302   Biochemical Genetics of Man   S2 L2T4

Prerequisite: 41.101.

Inherited variation of blood group antigens, serum proteins and red-cell
enzymes, their possible selective roles, and their application to the
study of differences between and within populations. Application of
statistical techniques to analyzing population data.

79.402   Genetics of Behaviour I   S1 L2T3

Prerequisite: 17.011 or 17.031.

Behavioural traits in invertebrates and mammals, including man, in
which genetic factors can be identified.

Principal subject areas: Models for behaviour genetics in invertebrates
and mammals, with discussion of and practice in research
methodologies; mathematical treatment of data; genetic factors in
human intelligence; genetics of mental retardation and psychological ill-
ness in man, with appropriate clinical contact and discussion.

79.403   Genetics of Behaviour II   S2 L2T3

Prerequisite: 79.402.

An advanced subject in the area of behaviour genetics in man and ani-
mals, including more complex aspects of statistical analysis of data, and
options for in depth studies and practical experience in specific aspects
of human and animal behaviour genetics.

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.

Donor	Value	Year/s of Tenure	Conditions
General			
Bursary Endowment Board*	$150 pa	Minimum period of approved degree/combined degree course	Merit in HSC and total family income not exceeding $4000

* Apply to The Secretary. Bursary Endowment Board. Box 7077. GPO. Sydney 2001 immediately after sitting for HSC.

Undergraduate Scholarships (continued)

Donor	Value	Year/s of Tenure	Conditions
Sam Cracknell Memorial	Up to $3000 pa payable in fort-nightly instalments	1 year	Prior completion of at least 2 years of a degree or diploma course and enrolment in a full-time course during the year of application; academic merit; participation in sport both directly and administratively; and financial need
Girls Realm Guild	Up to $1500 pa	1 year renewable for the duration of the course subject to satisfactory progress and continued demonstration of need	Available only to female students under 35 years of age enrolling in any year of a full-time undergraduate course on the basis of academic merit and financial need

Science

Mathematics

Olivetti Australia Pty Ltd	Up to $600 pa	2 years subject to satisfactory progress	Eligibility for admission to the third year of an honours program in the School of Mathematics in Pure/Applied Mathematics, Theoretical Mechanics or Statistics and leading to the award of the degree of Bachelor of Arts, Bachelor of Science or Bachelor of Science Diploma in Education
George Szekeres Award	$200 pa	1 year	Open to students entering the final year of the honours course in Pure Mathematics

Optometry

Gibb & Beeman (Spectacle Makers) Pty Ltd	Up to $500 pa	1 year renewable for the duration of the course subject to satisfactory progress	Residents of NSW under the age of 21 who are eligible for admission to the full-time degree course in Optometry
Optometric Associates Co-operative Limited	Up to $250 pa	1 year	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

Graduate Scholarships

Application forms and further information are available from the Student Employment and Scholarships Unit, located in the Chancellery. This Unit 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.

Donor	Value	Year/s of Tenure	Conditions
General			
University of New South Wales Research Awards		1-2 years for a Masters and 3-4 years for a PhD degree	Applicants must be honours graduates (or equivalent). Applications to Registrar by 31 October (30 November in special circumstances)
Commonwealth Postgraduate Research Awards	Living allowance of $4000 Other allowances may also be paid	As above	Applicants must be honours graduates (or equivalent) who will graduate with honours in current academic year, and who are permanent residents of Australia
Commonwealth Postgraduate Course Awards		1-2 years; minimum duration of course	Preference is given to applicants with employment experience. Applicants must be graduates or scholars who will graduate in current academic year and who are permanent residents of Australia, and who have not previously held a Commonwealth Postgraduate Award. Applications to Registrar by 30 September (in special circumstances applications will be accepted 30 November)
Australian American Educational Foundation Travel Grant*			Applicants must be graduates, senior scholars or post-doctoral Fellows. Applications close 30 September
Australian Federation of University Women	Amount varies, depending on award	Up to 1 year	Applicants must be female graduates who are members of the Australian Federation of University Women

* Application forms are available from: The Secretary, Department of Education, AAEF Travel Grants, PO Box 826, Woden, ACT 2606

Graduate Scholarships (continued)

Donor	Value	Year/s of Tenure	Conditions
The British Council Commonwealth University Interchange Scheme	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 in December for visits to commence during ensuing 1 April to 31 March
The Caltex Woman Graduate of the Year	$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.	2 years	Applicants must be female graduates who will have completed a University degree or diploma this year and who are Australian citizens or have resided in Australia for at least seven years. Selection is based on scholastic and literary achievements, demonstrable qualities of character and accomplishments in cultural and/or sporting/recreational activities
Commonwealth Scholarship and Fellowship Plan	Varies for each country. Generally covers travel, living, tuition fees, books and equipment, approved medical expenses. Marriage allowance may be payable.	Usually 2 years, sometimes 3	Applicants must be graduates who are Commonwealth citizens or British Protected Persons, and who are not older than 35 years of age. Applications close with Registrar by 1 October
Sam Cracknell Memorial	Up to $3000 pa		See above under **Undergraduate Scholarships, General**
Ruth A. Cumming (ESU)	$500-$2000		Applicants must be residents of NSW or ACT. Awarded to young graduates to further their studies outside Australia
Gowrie Graduate Research	Maximum $2000 pa in Australia, and $2750 if tenable overseas	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
Harkness Fellowships of the Commonwealth Fund of New York*	Living and travel allowances, tuition and research expenses, health insurance, book and equipment and other allowances for travel and study in the USA	Between 12 to 21 months	Candidates must be either: **1.** Members of the Australian or a State Public Service or semi-government Authority. **2.** Staff or graduate students at an Australian university. **3.** Individuals recommended for nomination by the Local Correspondents. The candidate will usually have an honours degree or equivalent, or an outstanding record of achievement, and be not more than 30 years of age. Applications close July

* Application forms must be obtained from the Australian representative of the Fund, Mr L. T. Hinde, Reserve Bank of Australia, Box 3947, GPO, Sydney, N.S.W. 2001. These must be submitted to the Registrar by 24 July.

Graduate Scholarships (continued)

Donor	Value	Year/s of Tenure	Conditions

General (continued)

Donor	Value	Year/s of Tenure	Conditions
Frank Knox Memorial Fellowships at Harvard University	Stipend of $3800 pa plus tuition fees	1, sometimes 2 years	Applicants must be British subjects and Australian citizens, who are graduates or near graduates of an Australian University
Nuffield Foundation Commonwealth Travelling Fellowships†	Living and travel allowances	1 year	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
The Rhodes Scholarship**	Approximately £3300-£3600	2 years, may be extended for a third year	Unmarried male and female Australian citizens between the ages of 19 and 25 who have been domiciled in Australia at least 5 years and have completed at least 2 years of an approved university course. Applications close in July each year
Rothmans Fellowships Award‡	$14,000 pa	1 year, renewable up to 3 years	The field of study is unrestricted. Applications close early September each year

Biological Sciences

Donor	Value	Year/s of Tenure	Conditions
Queen Elizabeth II Postdoctoral Fellowships in the Physical and Biological Sciences§	Stipend of $17,131 pa increased to $18,403 pa at age 28 years. $500 pa for dependent wife, $200 pa for each dependent child, plus other allowances.	2 years	Applicants must be Australian citizens or citizens of 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

† 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 Science and the Environment, PO Box 449, Woden, ACT 2606; the Minister (Scientific), Canberra House, 10-16 Maltravers Street, London WC2R3E UK; or the Australian Embassy, 1601 Massachusetts Avenue, Washington DC 20036, USA.

Graduate Scholarships (continued)

Donor	Value	Year/s of Tenure	Conditions

Science

Donor	Value	Year/s of Tenure	Conditions
American Optical Corporation Scholarship			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
Contavue Laboratories Contact Lens Graduate Research Scholarship	$1000 pa	1 year renewable	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
Hydron Laboratories Contact Lens Research Scholarship			
Contact Lens Society of Australia			
Science Research Scholarship of the Royal Commission for the Exhibition of 1851	£2200 stg pa	2 years. Renewal for further year possible	To enable graduates, usually not more than 26 years of age, to undertake research in some branch of pure or applied science at an overseas university. Applicants must be British Commonwealth citizens or citizens of the Republic of Ireland, Pakistan, or South Africa, who have done at least 3 years of a university Science Course
The Rutherford Scholarship	Travel, fees, etc. A stipend which, if held in the UK, is worth £2250 stg pa	3 years	To enable graduates under 26 years of age, 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
Shell Scholarship in Science and Engineering	Approximately £3600 stg pa plus travelling expenses	2 years, sometimes 3	Applicants must be Australian citizens under 25 years of age, with at least 5 years' domicile in Australia and who are 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

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Prizes

Undergraduate University Prizes

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.

Donor/Name of Prize	Value $	Awarded for
General		
Sydney Technical College Union Award	50.00 and medal	Leadership in the development of student affairs, and academic proficiency throughout the course
University of New South Wales Alumni Association	Statuette	Achievement for community benefit — students in their final or graduating year
School of Accountancy		
Australian Society of Accountants	75.00 75.00	14.501 Accounting and Financial Management IA 14.522 Accounting and Financial Management IIA or 14.532 Accounting and Financial Management IIA (Honours)
Chamber of Manufacturers of New South Wales	15.00	14.703 Advanced Auditing
Hungerfords	25.00	14.511 Accounting and Financial Management IB
	25.00	14.593 Accounting and Financial Management IIIB (Honours)
Law Book Co Ltd	50.00 Books	14.511 Accounting and Financial Management IB
Wilson Bros (Printers) Pty Ltd	30.00	14.583 Accounting and Financial Management IIIB
Arthur Young & Co	50.00	14.613 Business Finance II
School of Anatomy		
The Winifred Dickes Rost	30.00	Outstanding merit in Anatomy in final year of the Science and Mathematics Course
School of Biological Technology		
Mauri Brothers & Thomson (Aust) Pty Ltd	150.00	Best result in the Level II biological technology subject
	150.00	Best result in one of the Level III biological technology subjects
	150.00	Best result in the biological technology honours program

Undergraduate University Prizes (continued)

Donor/Name of Prize	Value $	Awarded for
School of Chemical Technology		
Australian Paper Manufacturers Ltd	21.00	Subject selected by Head of School
Stauffer Australia Limited	50.00	Subject selected by Head of School

School of Chemistry

Donor/Name of Prize	Value $	Awarded for
Advanced Analytical Chemistry	100.00	2.013D Advanced Analytical Chemistry
Australian Consolidated Industries Ltd	30.00	Subject selected by Head of School
Borden Chemical Co (Aust) Pty Ltd	50.00	Subject selected by Head of School
Chamber of Manufactures of New South Wales	15.00	Subject selected by Head of School
CSR Chemicals Ltd	100.00	Chemistry Honours
Inglis Hudson Bequest	Advised annually	2.002B Organic Chemistry I
Merck, Sharp & Dohme (Aust) Pty Ltd	52.50	Chemistry — Level II subjects in the Science and Mathematics Course
	52.50	Chemistry — Level III subjects in the Science and Mathematics Course
The Nestlé Co (Aust) Ltd	50.00	Subject selected by Head of School
Tooth & Co Ltd	20.00	Subject selected by Head of School
Unilever Aust Pty Ltd	21.00	2.013A Introductory Quantum Chemistry
UNSW Chemical Society George Wright	20.00	Subject selected by Head of School
UNSW Chemical Society Parke-Pope	20.00	Subject selected by Head of School

School of Economics

Donor/Name of Prize	Value $	Awarded for
Australian Finance Conference	50.00	15.083 Public Finance
Brinds Ltd	100.00	15.013 Economics IIIA (Honours) and 15.033 Economics IIIB (Honours)
Unilever Aust Pty Ltd	21.00	15.011 Economics IB
	21.00	15.022 Economics IIB and 15.042 Economics IIC
	21.00	15.023 Economics IIIB

Undergraduate University Prizes (continued)

Donor / Name of Prize	Value $	Awarded for

School of Electrical Engineering

Donor / Name of Prize	Value $	Awarded for
Chamber of Manufactures of New South Wales	15.00	Subject selected by Head of School
J. Douglas Maclurcan	30.00 book order	Control Systems

School of Mathematics

Donor / Name of Prize	Value $	Awarded for
ICI Theory of Statistics IV	50.00	Theory of Statistics IV
School of Mathematics	30.00	Excellence in 10.011 Higher Mathematics I
	30.00	Excellence in basic second year Higher Mathematics subjects (10.121A, 10.1213, 10.1214, 10.2211, 10.2212)
	30.00	Excellence in 5 or more Level II Mathematics subjects (Arts: 20 credit points or more)
Head of School's	50.00	Excellence in 5 or more Level II Mathematics subjects (Arts: 20 credit points or more)
The Pure Mathematics	40.00	Excellence in Level III Pure Mathematics subjects
The Applied Mathematics	40.00	Excellence in Level III Applied Mathematics subjects
The Theoretical Mechanics	40.00	Excellence in Level III Theoretical Mechanics subjects
Statistical Society of Australia (New South Wales Branch)	50.00	General proficiency — Theory of Statistics subjects
The Broken Hill Proprietary Theory of Statistics II	50.00	Higher Theory of Statistics II
W. D. & H. O. Wills (Aust) Ltd Theory of Statistics III	50.00	Higher Theory of Statistics III

School of Metallurgy

Donor / Name of Prize	Value $	Awarded for
Alcan Australia Ltd	100.00	
Austral Crane	100.00	
Australian Institute of Metals	50.00	
Australian Welding Institute	30.00 book order	
Chamber of Manufactures of New South Wales	15.00	Subject selected by Head of School
The Broken Hill Proprietary Co Ltd	50.00	
The Eagle & Globe Steel Co Ltd	50.00	
The Electrolytic Refining and Smelting Co of Australia Ltd	20.00	
Zinc Corp Ltd	30.00	

Undergraduate University Prizes (continued)

Donor/Name of Prize	Value $	Awarded for

School of Optometry

Donor/Name of Prize	Value $	Awarded for
Australian Optometrical Association	50.00	Subject selected by Head of School
Chamber of Manufactures of New South Wales	15.00	
Cocks & Halls	25.00	
Bausch & Lomb Soflens	Diagnostic set of contact lenses	31.841 Clinical Optometry
Contavue	Trial fitting set of contact lenses	Best essay or project on contact lenses
L. G. Darcey Memorial	30.00	31.811 Optometry I
Filmer Sceats	30.00	31.812 Optometry II
Hoya Australia Pty Ltd	250.00	Highest aggregate academic records in the Optometry degree course
Hydron (Australia) Pty Ltd	25.00	31.813 Optometry III
	25.00	Optometry Year IV
Theo Kannis	250.00	31.841 Clinical Optometry
Martin Wells Pty Ltd	150.00	31.821 Special Anatomy and Physiology
	150.00	31.831 Diseases of the Eye
	150.00	Final Year Essay
G. Nissel & Co Aust Pty Ltd	Trial fitting set of contact lenses	31.813 Optometry III and 31.841 Clinical Optometry — Contact Lenses sections
Optical Products Pty Ltd	50.00	Subject selected by Head of School
Opticians and Optometrists' Association of NSW	40.00	
The Optometric Vision Research Foundation	100.00	Research project
Optyl (Australia) Pty Ltd	100.00	31.812 Optometry II

School of Physics

Donor/Name of Prize	Value $	Awarded for
Institute of Physics	50.00	Highest aggregate marks in three of the Units 1.013, 1.023, 1.033 and 1.043
Head of School's in Physics	30.00	Most creditable Year IV honours thesis
Physics Staff for Applied Physics	30.00	Highest aggregate marks in two units of the following subjects: 1.133, 1.3033, 1.3133, 1.3233, 1.3333, 1.343 and 1.3533
Physics Staff for Physics I	50.00	Highest mark in 1.011
Physics Staff for Physics II	50.00	Highest mark in 1.012, 1.022 and 1.032
Physics Staff for Physics IV Honours	50.00	Highest mark in 1.104, 1.304 or 1.504
Physics Staff for Theoretical Physics	30.00	Highest marks in 1.513 and 1.523

Undergraduate University Prizes (continued)

Donor/Name of Prize	Value $	Awarded for
School of Psychology		
Psychology Staff	10.00	Best Psychology Year II

W. S. and L. B. Robinson University College

Donor/Name of Prize	Value $	Awarded for
Mining Managers Association Broken Hill	70.00	Best overall performance in a complete course
Mining Managers Association	40.00	Three prizes: one for each — best pass in any complete stage of the degree courses in, respectively, Mechanical Engineering, Mining Engineering, Science
Mining Managers Association	30.00	Seven prizes to be awarded in individual subjects selected by the Director
Western Mining Corporation Limited	150.00	Four prizes to be awarded for best performance in 7.314R Mineral Process Technology 7.313R Mineral Processing 7.214R Mine Economics and Planning 7.224R Operational Management
Broken Hill Women's Auxiliary of the Australasian Institute of Mining and Metallurgy	30.00	Performance by a student who achieves second place in a complete stage of a degree course

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Graduate University Prizes

The following table summarizes the graduate prizes awarded by the University.

Donor/Name of Prize	Value $	Awarded for
School of Biological Technology		
Mauri Brothers & Thomson (Aust) Pty Limited	150.00	Best overall performance in the Master of Science (Biotechnology) degree course

Graduate University Prizes (continued)

Donor / Name of Prize	Value $	Awarded for
School of Chemistry		
Smith, Kline and French	50.00	Best performance in the Graduate Diploma in Food and Drug Analysis Course
School of Optometry		
Hydron Contact Lens	A trial fitting set of contact lens	31.705G Advanced Contact Lens Theory and Practice
Theo Kannis	250.00	31.701G Advanced Clinical Optometry

Faculty of Biological Sciences*

Staff

Comprises Schools of Biochemistry, Biological Technology, Botany, Microbiology, Psychology and Zoology.

Dean
Professor B. J. F. Ralph

Chairman
Professor D. J. Anderson

Administrative Officer
Patrick James MacGinley, BA *N.S.W.*

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John Stuart Dryden, DIC, MSc *Melb.*, PhD *Lond.*, FAIP
Gordon Hay Godfrey, MA BSc *Syd.*, FInstP, FAIP, Hon.FIO
John Lloyd Symonds, BSc *Adel.*, PhD *Birm.*, FInstP, FAIP
Guy Kendall White, MSc *Syd.*, DPhil *Oxf.*, FAA, FInstP, FAIP

Honorary Visiting Fellow
Victor Kastalsky, BSc PhD *N.S.W.*, ASTC, MInstP, MAIP

.

Department of Applied Physics

Associate Professors
Brian Ronald Lawn, BSc PhD *W.Aust.*, GradInstP
David Henry Morton, MA *Oxf.*, FInstP, FAIP
Howard Frank Pollard, MSc *W.Aust.*, PhD *N.S.W.*, MInstP, MAAS, MASA, MAIP

Senior Lecturers
John Ian Dunlop, BSc PhD *N.S.W.*, MAIP, MAASATI
John Robert Hanscomb, BSc *Qld.*, MSc PhD *N.S.W.*, MAIP, GradInstP
Leslie Bevan Harris, BSc *Lond.*, BA DipEd *Durh.*, PhD *N.S.W.*, AIM, AInstP
Victor Raymond Howes, BSc PhD *Lond.*

Lecturer
Kenneth Mann, BSc *Qld.*, MSc *N.S.W.*

Tutor
Christopher David Miller, BE *Syd.*, BSc *N.S.W.*

Department of Theoretical Physics

Associate Professor
Jaan Oitmaa, BSc PhD *N.S.W.*, FAIP

Lecturers
David Neilson Lowy, BSc *Melb.*, MS PhD *S.U.N.Y.*
John Richard Shepanski, MSc *Syd.*, MAIP

Tutors
Ting Hun Ho, BSc *H.K.*
Marlene Noella Read, BSc PhD *N.S.W.*

Teaching Fellow
Roderick Ian Sutherland, BSc *La T.*, MSc *N.S.W.*

Broken Hill Division

Staff

Director
Professor J. E. Andersen

Department of Mining and Mineral Sciences

Professional Officer
Kenneth James Murray, BSc *Syd.*, MSc *N.S.W.*, AMAusIMM

Mechanical Engineering

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

W.S. and L.B. Robinson University College

Head of Department of Science
Professor John Everard Andersen, BE *Melb.*, PhD *N.S.W.*,
FIEAust, MAusIMM, ARACI

Head of Department of Mining and Mineral Sciences
Professor Leon John Thomas, BSc PhD *Birm.*, CEng, FIEAust,
MAusIMM, MIMinE

Mining Engineering

Senior Lecturer
Venkata Satyanarayana Vutukuri, BSc(Eng) *Ban.*, MS *Wis.*,
MMGI, AIME, AMAusIMM

Mineral Science

Senior Lecturer
Barenya Kumar Banerji, MSc *Patna*, PhD *Leeds*, MAusIMM

Geology

Senior Lecturer
Gerrit Neef, BSc *Lond.*, PhD *Well.*, FGS

Lecturers
Ian Rutherford Plimer, BSc *N.S.W.*, PhD *Macq.*, AMAusIMM, AMIMM
Kevin David Tuckwell, BSc PhD *N.S.W.*, AMAusIMM

Department of Science

Chemistry

Lecturer
Derek Richard Smith, BSc PhD *Wales*

Senior Tutor
Robert Edward Byrne, MSc *N.S.W.*, ARACI, AMAusIMM

Mathematics

Senior Lecturer
Zdenek Kviz, DipPhys *Brno*, CSc RerNatDr *Charles*, PhD *Prague*

Lecturers
David Charles Guiney, BSc PhD *Adel.*
Dennis William Trenerry, BSc PhD *Adel.*

Physics

Senior Lecturer
Robert John Stening, MSc *Syd.*, PhD *Qld.*, DipTertEd *N.E.*, MAIP

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 1980

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 Theatrette   K14
Parade Theatre   E3
Science Theatre   F13
Sir John Clancy Auditorium   C24

Buildings

Affiliated Residential Colleges
New (Anglican)   L6
Shalom (Jewish)   N9
Warrane (Roman Catholic)   M7
Applied Science   F10
Architecture   H14
Arts (Morven Brown)   C20
Banks   F22
Barker Street Gatehouse   N11
Basser College   C18
Biological Sciences   D26
Central Store   B13
Chancellery   C22
Chemistry
Dalton   F12
Robert Heffron   E12
Civil Engineering   H20
Commerce (John Goodsell)   F20
Dalton (Chemistry)   F12
Electrical Engineering   G17
Geography and Surveying   K17
Goldstein College   D16
Golf House   A27
Gymnasium   B5
House at Pooh Corner   N8
International House   C6
John Goodsell (Commerce)   F20
Kensington Colleges   C17
Basser   C18
Goldstein   D16
Philip Baxter   D14
Main Building   K15

Maintenance Workshop   B13
Mathews   F23
Mechanical and
Industrial Engineering   J17
Medicine (Administration)   B27
Menzies Library   E21
Metallurgy   E8
Morven Brown (Arts)   C20
New College (Anglican)   L6
Newton   J12
Parking Station   H25
Philip Baxter College   D14
Robert Heffron (Chemistry)   E12
Sam Cracknell Pavilion   H8
Shalom College (Jewish)   N9
Sir Robert Webster
(Textile Technology)   G14
Squash Courts   B7
Swimming Pool   B4
Unisearch House   L5
University Regiment   J2
University Union
(Roundhouse) — Stage I   E6
University Union
(Blockhouse) — Stage II   G6
University Union
(Squarehouse) — Stage III   E4
Wallace Wurth School of Medicine   C27
Warrane College (Roman Catholic)   M7
Wool and Pastoral Sciences   B8

General

Accountancy   F20
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
Committee in Postgraduate Medical
Education   B27
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
Graduate School of the Built
Environment   H14
Health Administration   C22
History   C20
History and Philosophy of Science   C20
Industrial Arts   C1
Industrial Engineering   J17
Institute of Languages   G14
Institute of Rural Technology   B6
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
Organizational Behaviour   F20
Pathology   C27
Patrol and Cleaning Services   F20
Philosophy   C20
Physics   K15
Physical Education and
Recreation Centre (PERC)   B5
Physiology and Pharmacology   C27
Political Science   C20
Postgraduate Extension Studies (Closed
Circuit Television)   F20
Postgraduate Extension Studies (Radio
Station and Administration)   F23
Psychology   F23
Public Affairs Unit   C22
Regional Teacher Training Centre   C27
Russian   C20
Science and Mathematics Course
Office   F23
Social Work   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