The University of New South Wales

Sciences

Board of Studies in Science
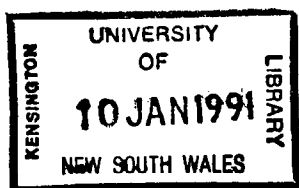and Mathematics

Faculty of Biological and
Behavioural Sciences

Faculty of Science

1991
Faculty Handbook

The University of New South Wales

Sciences

Board of Studies in Science and Mathematics

Faculty of Biological and Behavioural Sciences

Faculty of Science

1991
Faculty Handbook

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

Information in this Handbook has been brought up to date as at 8 October 1990, but may be amended without notice by the University Council.

Contents

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Calendar of Dates

The academic year is divided into two sessions, each containing 67 days for teaching. There is a recess of approximately six weeks between the two sessions and there are short recesses of one week within each of the sessions.

Session 1 commences on the Monday nearest 1 March.

	1991	1992	
Session 1 (67 teaching days)	4 March to 28 March	2 March to 16 April	**Faculties other**
Recess:	*29 March to 7 April*	*17 April to 26 April*	**than Medicine**
	8 April to 14 June	27April to 10 June	
Study Recess:	*15 June to 20 June*	*11 June to 16 June*	
Examinations	21 June to 9 July	17 June to 3 July	
Midyear Recess:	*10 July to 28 July*	*4 July to 26 July*	
Session 2 (67 teaching days)	29 July to 27 September	27 July to 25 September	
Recess:	*28 September to 7 October*	*26 September to 5 October*	
	8 October to 6 November	6 October to 4 November	
Study Recess:	*7 November to 12 November*	*5 November to 10 November*	
Examinations	13 November to 29 November	11 November to 27 November	

Important Dates for 1991

January
T	1	New Year's Day - Public Holiday
Th	3	Last day for acceptance of applications by Office of the Admissions Section for transfer to another undergraduate course within the University.
W	9	Last day for applications for review of assessment
M	14	Term 1 begins - Medicine IV
M	21	Term 1 begins - Medicine V
S	26	Australia Day - Public Holiday

February
T	5	Enrolment period begins for new undergraduate students and undergraduate students repeating first year
M	11	Re-enrolment period begins for second and later year undergraduate and graduate students enrolled in formal courses Students should consult the "Re-enrolling 1991" leaflet for their course for details.

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March
F	1	Last day for acceptance of enrolment by new and re-enrolling students. (Late fee payable thereafter if enrolment approved).
M	4	Session 1 begins - all courses except Medicine IV and V
F	15	Last day applications are accepted from students to enrol in Session 1 or whole year subjects.
F	29	Good Friday - Public Holiday
		Mid-session Recess begins
S ,	30	Easter Saturday - Public Holiday
Su	31	HECS Census Date for Session 1

April
M	1	Easter Monday - Public Holiday
Th	25	Anzac Day - Public Holiday

May
T	14	Publication of Provisional Timetable for June examinations
W	22	Last day for students to advise of examination clashes

June
T	4	Publication of Timetable for June Examination
M	10	Queen's Birthday - Public Holiday
F	14	Session 1 ends
S	15	Study Recess begins
Th	20	Study Recess ends
F	21	Examinations begin

July
T	9	Examinations end
Su	28	Midyear Recess ends
M	29	Session 2 begins

August
F	9	Last day applications are accepted from students to enrol in Session 2 subjects
S	31	HECS census date for Session 2

September
F	27	Closing date for applications to the Universities Admissions Centre
S	28	Mid-session Recess begins

October
M	7	Labour Day - Public Holiday
		Mid-session Recess ends
T	8	Publication of provisional timetable for November Examinations
W	16	Last day for students to advise of examination clashes
T	29	Publication of timetable for November examinations

November
W	6	Session 2 ends
Th	7	Study Recess begins
T	12	Study Recess ends
W	13	Examinations begin
F	29	Examinations end

December
W	25	Christmas Day - Public Holiday
Th	26	Boxing Day - Public Holiday

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Associate Professor
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Senior Lecturers
Peter John Cooke, BSc MSc *N.E.*, MS PhD *Stan.*
Marek Musiela, MMath *Wroclaw*, PhD *Polish Acad. Sc.*, DSc *Grenoble*
Deborah Jane Street, BSc *Qld.* PhD *Syd.*
Manohar Khanderao Vagholkar, MSc *Bom.*, DIC PhD *Lond.*

Lecturers
David Byron, BSc BE PhD *N.S.W.*
Geoffrey Kennedy Eagleson, BSc PhD *Syd.*
Yer Van Hui, BSc Chinese *H.K.*, M.S.I.E. Texas Tech., PhD Virginia

Professional Officer
Peter Allen Wright, BA Macq., MStatsMEng *N.S.W.*

Honorary Associate
James Bartram Douglas, BSc MA DipEd *Melb.*

School of Optometry

Professor of Optometry and Head of School
Hermann Barry Collin, BSc MAppSc PhD Melb., LOSc *V.C.O.*, FAAO

Associate Professor
David Philip Crewther, MSc *Melb.*, PhD Cal. Tech.
Stephen John Dain, BSc PhD City *Lond.*, FBCO, FAAO, FVCO MIEAust
Brien Anthony Holden, BAppSc *Melb.*, PhD *City Lond.*, LOSc *V.C.O.* FAAO, DCLP, FVCO, FBCO

Senior Lecturers
John Andrew Alexander, MSc PhD *N.S.W.*, ASTC, FIO, FAAO
Philip James Anderton, BOptom BSc PhD *N.S.W.*, MScOptom *Melb.*
Daniel James O'Leary, BSc City *Lond.*, MSc PhD *Wales*, FBOA, FSMC

Lecturers
Graham Leslie Dick, MSc *N.S.W.*, ASTC, FIO
Barbara Maria Junghans, BOptom PhD *N.S.W.*
Jil Klein, BA City N.Y., OD *Suny*
Angela Kathleen McCarthy, MSc *N.S.W.*, ASTC, FIO
David Cecil Pye, MOptom *N.S.W.*

Part-time Tutor
Lisa Jean Asper, OD, SCCO

Instructor
Ian William Robinson

Senior Technical Officers
Trevor Dawson
Illia Rogerson

Technical Officers
Paul Gravitis
Deborah A. Milne
Brian L. Pirie

Administrative Assistant
Maureen Therese Valentine

Cornea and Contact Lens Research Unit

Director
Associate Professor Brien Anthony Holden

Senior Research Manager
Deborah Sweeney, BOptom *N.S.W.*, FAAO

Senior Research Officers/Research Managers
Arthur Back, BOptom *N.S.W.*
Ruth Cornish, BScOptom *Melb.*
Timothy Grant, BOptom *N.S.W.*
Donna LaHood, BOptom *N.S.W.*
Robert Terry, BOptom *N.S.W.*

Senior Research Assistants
Julia Newton-Howes, BSc(Hons) PhD *Lond.*
Pao Cheong Wong-Chung-Lung, FIS *Bristol College of Commerce*

Senior Research Optometrists
Narelle Hine, DipOpt *Q.I.T.*, DCLP
Maki Shiobara, BOptom *N.S.W.*

Research Associate
Christina Baleriola-Lucas, MScAgr *Syd.*, PhD *Complutense Univ. Madrid*

Honorary Associates
Christine Craigie, BOptom *N.S.W.*
Emmanual Calligeros BOptom *N.S.W.*
Anthony Chapman-Davies, MOptom *N.S.W.*
Charles McMonnies, ASTC BSc *N.S.W.*, FAAO MSc FAAO(CL)
Les Donovan, BOptom *N.S.W.*

Research Optometrist
Claire Fleming, BOptom *N.S.W.*

Research Assistants
Mee Sing Chong, BOptom *N.S.W.*
Sylvie Sulaiman, BOptom *N.S.W.*

Senior Technical Officer
Sue Donahue

Technical Officers
Ian Brett, BSc, DIPAudEng *N.S.W.*
Angela Ivancic, BSc *N'cle(N.S.W.)*
Denise Lawler
Paul Pavlou, BA(Vis Arts) *S.C.A.*
Ami Tan, BSc *Monash*

Administrative Assistant
Janette Button

School of Physics

Professor of Physics and Head of School
John William Vanstan Storey, BSc *LaT.*, PhD *Monash*

Professors of Experimental Physics
Kenneth Norman Robert Taylor, BSc PhD *Birm.*
Robert Graham Clark, BSc PhD *N.S.W.*, MA *Oxf.*

Professor of Theoretical Physics and Head of Department of Theoretical Physics
Heinrich Hora, DiplPhys Halle, DrRerNat *Jena*, DSc *N.S.W.*, FInstP, FAIP

Professor
Hans Gerard Leonard Coster, MSc PhD *Syd.*, MInstP, MAIP
Dan Haneman, DSc *Syd.*, PhD *R'dg.*, FAA, FAIP, FRACI

Senior Lecturer and Executive Assistant to Head of School
Kenneth Reid Vost, BSc *Glas.*, MSc PhD *N.S.W.*, DipEd *N'cle C.A.E.* MAIP

Associate Professor and Director of First Year Studies
Graeme John Russell, BSc PhD *N.S.W.*, MInstP., MAIP

Administrative Officer
Stephen Kwai Hung Lo

Principal Tutor
Philip George Spark, MSc DipEd *Melb.*, GradAIP
Krystyna Wilk, MSc *Cracow*

Senior Tutors
Jaan Ferdinand Jouke Boersma, MSc Tas.
Gail Patricia Box, BSc PhD *N'cle.(N.S.W.)*
Gabriel Chircu, MSc *Buch.*
Ian Richard Dunn, BSc BA *Melb.*, MIEEE
Edward Peter Eyland, BSc MPhysics *N.S.W.*, BD Lond.

Tutors
Paul Westley Brooks, BSc *Adel.*
Kevin Michael Fleming, BSc *N.E.*
Mansour Khoury, BSc *N.S.W.*
Darren John Pearce, BSc DipEd *N.E.*, Grad AIP

Mark James Prandolini, BSc, BE *N.S.W.*
Kenneth George White, BSc PhD *Tas.*

Professional Officers

Meral Aydin, BS MS PhD M.E.Tech., *Ankara*
Bradley Darren Carter, BSc PhD *Qld*
Terence Calvin Chilcott, BE *Qld.*, MEngSc *N.S.W.*
Jack William Cochrane, BAppISc *Canberra C.A.E.*, MPhysics *N.S.W.*
David Ronald Jonas, BSc BE *N.S.W.*
Patrick Thomas McMillan, BSc DipEd Syd.
Barry Perczuk, BSc PhD *Monash*
John McLarem Tann, BAppSc *Melb.*
Jeremy Karl Walter, BSc *Lond.*

Honorary Visiting Fellows

Zdenek Kviz, DipPhys *Brno,* CScRerNatDr *Charles,* PhD *Prague*
David Henry Morton, MA *Oxf.*, FInstP, FAIP
Roderick Ian Sutherland, BSc *LaT.*, DipEd PhD *N.S.W.*

Honorary Visiting Professor

John Charles Kelly, BSc *Syd.*, PhD *R'dg*, DSc *N.S.W.*, CPhys, FInstP, FAIP, MAmPS

Visiting Professor

Jack Foster McConnell, MSc *Syd.*, PhD *N.S.W.*

Department of Applied Physics

Senior Lecturer and Head of Department of Applied Physics
John Ian Dunlop, BSc PhD *N.S.W.*, MAIP, MAAS

Department of Astrophysics and Optics

Senior Lecturer and Head of Department of Astrophysics and Optics
Peter Mitchell, BSc PhD *Adel.*, MAIP

Lecturers

Michael Charles Brewster Ashley, MSc *Cal.Tech.*, BSc, PhD *A.N.U.*
Warrick Couch, BSc, MSc *Well.* PhD *A.N.U.*

Department of Biophysics

Senior Lecturer and Head of Department of Biophysics
John Robert Smith, BSc *Syd.*, PhD *N.S.W.*, MAIP

Associate Professors

Veronica Jean James, BA BSc *Qld.*, PhD *N.S.W.*, MAIP

James Martin Pope, MSc *Brist.*, DPhil *Sus.*, AInstP

Joseph Albert Wolfe, BSc *Qld.*, BA *N.S.W.*, PhD *A.N.U.*

Senior Lecturers

Raymond Gary Simons, BSc *Syd.*, MSc *Tel Aviv,* PhD *N.S.W.*

Lecturer
Paul Marie Gerard Curmi, BSc PhD *Syd.*

Department of Condensed Matter Physics

Associate Professor and Head of Department of Condensed Matter Physics
Graham James Bowden, BSc DipAdvStudSc PhD *Manc.*, FAIP

Associate Professor
David John Miller, BSc PhD *N.S.W.*, DipEd *Syd.*, MAIP, MAmPS, MAAPT

Senior Lecturers
Robert Louis Dalglish, BSc PhD *N.S.W.*
Peter Russell Elliston, BSc *Melb.*, PhD *Monash*
Michael Gal, MSc PhD *E.L.Bud.*
George Lange Paul, MSc *Syd.*, PhD *Edin.*, FAIP

Lecturer
John Michael Cadogan, BSc Monash, PhD *N.S.W.*, MAIP

Department of Theoretical Physics

Associate Professors
David Neilson, BSc *Melb.*, MS PhD *N.Y. State*
Jaan Oitmaa, BSc PhD DSc *N.S.W.*, FAIP, MAmPS

Senior Lecturers
Michael Allister Box, BSc *Monash*, PhD *Syd.*, MAIP
Christopher John Hamer, MSc *Melb.*, PhD *Calif. Inst. Tech.*, DipCompSc *Canberra C.A.E.*, FAIP
Robert John Stening, MSc *Syd.*, PhD *Qld.*, DipTertEd *N.E.*, MAIP, MAMOS

Lecturers
Gary Phillip Morriss BMath *N'cle(N.S.W.)*, PhD *Melb.*
Marlene Noella Read, BSc PhD *N.S.W.*, MAIP, MAmPS, MACS

Message to New Students

Welcome to the University of New South Wales!

The Sciences Handbook sets out information about the Faculty of Science, the Faculty of Biological and Behavioural Sciences and the Board of Studies in Science and Mathematics. The Board is responsible for the undergraduate studies of students specialising in disciplines associated with the two faculties and several schools from other faculties.

The Science program is amongst the most varied and flexible available in our University. Some of you have already decided on a professional career in a clinical discipline, while others have a clear preference for some field of experimental science. Some of you may choose theoretical scientific studies, while a great many will opt to maintain a broad program of varied subjects throughout your course. But all of you will have the opportunity to be taught by active scientists who are engaging in research of international significance and all of you will acquire skills of great importance to the future of the community.

While this handbook sets out the possibilities, we hope that you will feel free to take personal advice over your subject and career choices. General course advice is always available from the BSSM office and every science-based School will be happy to discuss course options with interested students.

Not all new students are new to universities, of course, and many of the new students this year will have chosen to pursue higher degree work in science at the University of New South Wales. For postgraduate students the link with an individual school and discipline is even closer but all of you should feel that the general faculty resources are very much at your disposal.

And please do not forget that science should be fun! We wish you every success and sincerely hope that your student years as valued members of our community will be stimulating, happy and rewarding.

Gavin Brown
Dean
Faculty of Science
Board of Studies in Science and Mathematics

Faculty Information

Some People Who Can Help You

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 and Behavioural Sciences and the Faculty of Science, later in this handbook.

It is University policy to promote equal opportunity in education (refer to EOE Policy Statement, *The University of New South Wales Calendar and Guide for Students 1991*).

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

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

All students re-enrolling in 1991 should obtain a copy of the leaflet *Re-Enrolling 1991: Procedures and Fees for Science Courses*, available from Course Administration Offices and the Admissions Office. Students enrolling in graduate courses should contact the Postgraduate Section.

The subject timetable for the Science and Mathematics Course (Course 3970) is available in late October/early November from the Science and Mathematics Course Office, Room L-G06G, Biological Sciences Building. All re-enrolling students should collect one of these timetables along with a preliminary enrolment form (SM91). The preliminary enrolment form is to be completed and returned to the Science and Mathematics Office by late December.

Sciences Library Facilities

Although any of the University Libraries may meet specific needs, staff and students of the Faculty of Biological and Behavioural Sciences are served mainly by the Biomedical

Library and the undegraduate collection while those of the Faculty of Science are served mainly by the Physical Sciences Library. The undergraduate collection and services are useful to students from both faculties.

The Biomedical Library

The Biomedical Library provides library services for staff and students from the Faculties of Medicine and Biological and Behavioural Sciences, and from the Schools of Biological Technologies, Health Services Management and Fibre Science and Technology. It is closely associated with the libraries of the teaching hospitals of the University.

The Biomedical Library is located on Levels 2, 3 and 4 of the Mathews Building Annexe and is connected to the other Special Libraries via a link through the undegraduate collection.

Professional staff are available at the Reader Assistance Unit on Level 2 to provide reference services and to assist in the use of the online catalogues. Instructional classes in the use of the library and in specific subject material can be arranged through the Reader Assistance Unit.

Serials in the Biomedical Library are now shelved in alphabetical order by title and carry the prefix MB.

Details about Biomedical Library books, serials and audiovisual material can be found in the Library Catalogue, (OPAC).

The Biomedical Library offers the following facilities:

Computerised Literature Searches; a wide range of Database on CD-ROM; remote access to databases on CD-ROM throughout the campus; access to the Family Medicine Program (MCQ self assessment); interlibrary loans.

Biomedical Librarian   Monica Davis

The Physical Sciences Library

The library, located on Levels 6 and 7 of the Library tower, caters for the information needs of staff, postgraduate and undergraduate students in the pure and applied sciences, engineering and architecture.

Physical Sciences Library materials are listed in the Library's online catalogues, microfiche book finding list or microfiche serials catalogue.

The Library provides reference, reader assistance and reader education services, including interlibrary loan, online search and CD-ROM facilities. Photocopying facilities are also available.

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

Physical Sciences Librarian   Rhonda Langford

Undergraduate Services

- The Open Reserve Section houses books and other materials which are required reading. Level 2.
- The Audio Visual Section contains multimedia, videos and cassette tapes of lectures. The section has wired study carrels and cassette players for student use. The Map Collection is also housed here. Level 3.

- The Reader Education program provides orientation tours and introductory library research method lectures to students.

Students 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 Academic Registrar for approval by the University Council.

The Psychological Society

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

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

Statistical Society of Australia: New South Wales Branch

The Branch offers student membership to undergraduates who are following a recognized course of study which includes Statistics. The subscription for a student member is $21 per annum with a $6 rebate if paid before 31 December of the previous year.

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 S. H. Huxham, School of

Mathematical Sciences, U.T.S., P.O. Box 123, Broadway, NSW 2006.

General Education Requirement

The University requires that all undergraduate students undertake a structured program in General Education as an integral part of studies for their degree.

Among its objectives, the General Education program provides the opportunity for students to address some of the key questions they will face as individuals, citizens and professionals.

The program requires students to undertake studies in three categories of the program:

CATEGORY A. An introduction in non-specialist terms to an understanding of the environments in which humans function.

CATEGORY B. An introduction to, and a critical reflection upon, the cultural bases of knowledge, belief, language, identity and purpose.

CATEGORY C. An introduction to the development, design and responsible management of the systems over which human beings exercise some influence and control. This category is required only of students in four-year professional and honours programs.

The key questions addressed by the Program are:

CATEGORY A: The External Context

Course requirement: 2x28 hr subjects

1. How do we, can we, generate wealth? (Australia and the Development of the World Economy)

2. How can we, ought we, distribute wealth, status and power? (Human Inequality)

3. What steps should we take, and what policies should we adopt, in science and technology? (Science and Civilization)

4. What effects do our wealth generating and techno-scientific activities have on the environment? (Ecosystems, Technology and Human Habitation)

5. What are the effects of the new mass media of communication? (Mass Media and Communication)

6. What are the key social and cultural influences on Australia today? (Australian Society and Culture)

CATEGORY B: The Internal Context of Assumptions And Values

Course requirement: 2x28 hr subjects.

1. How do we define ourselves in relation to the larger human community? (The Self and Society)

2. How do our conceptions of human nature and well being influence both individual and social behaviour? (Changing Conceptions of Human Nature and Well-Being)

3. What are the prevailing conceptions of and challenges to human rationality? (The Pursuit of Human Rationality)

4. How do language, images and symbols function as means and media of communication (The Use of Language, Images and Symbols)

5. What is the impact of the computer on human society and culture? (The Computer: Its Impact, Significance and Uses)

6. Which systems of belief and configurations of values are most conducive to the survival and enhancement of the human species and the planet earth? (Beliefs, Values and the Search for Meaning)

CATEGORY C: An Introduction To The Design And Responsible Management Of The Human And Planetary Future

The central question to be addressed by students in a systematic and formal way is:

For what purpose or purposes will I use my intellectual skills, my expertise, or my technological prowess?

Will these abilities be used, for example:

(i) in a creative and innovative way?

(ii) to widen the circle of human participation in the benefits they bring?

(iii) to break down the barriers of exclusion and discrimination?

(iv) to enhance the prospects for survival of the human species?

(v) to enhance the capacity of the planet earth to sustain life?

The exact form in which Category C will be satisfied is still being decided and should be finalized during 1991. This could involve, however, a slight change to the later years of each of the courses. There are differing requirements for students commencing before, in, and after 1988. Students must complete a program of general education in accordance with the requirements in effect when they commenced their degree program. Students Should Consult The Appropriate Course Authority or The Centre for Liberal and General Studies in Morven Brown Building, Room G58.

Undergraduate Study:
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.

The Board of Studies also supervises the undergraduate courses in Optometry (3950) and Psychology (3431).

Students seeking *general advice* should contact the Board of Studies in Science and Mathematics Office (Room L-G06G, Biological Sciences Building, map reference D25) and for *advice in specific disciplines* should contact the representative of the relevant School as listed below:

First Year Biology	Dr R. S. Vickery
School of Anatomy	Dr K. W. S. Ashwell
Department of Applied Geology	Ms L. A. Bruce
	Dr P. G. Lennox
Department of Biotechnology	Associate Professor N. W. Dunn
School of Biochemistry	Associate Professor P.J. Schofield
School of Biological Science	Dr. P.I. Dixon
or	Dr. R.G. Vickery
School of Chemistry	Dr D. S. Alderdice
	Dr T.J.V. Findlay Year 1
	Dr D. N. Duffy Year 4
School of Community Medicine	Dr A. E. Stark
School of Electrical Engineering and Computer Science	Ms V. Joubert
School of Geography	Dr M. D. Melville
School of Information Systems	Associate Professor R. Edmundson

School of Mathematics . . . . .Dr D.C. Hunt (Year 1)
Miss J. Todd
Marine Science . . . . .Dr P.I. Dixon
School of Mechanical and Manufacturing Engineering . . . . Associate Professor E. J. Hahn
School of Microbiology and Immunology . . . . Mrs N. Lee
School of Optometry . . . . .Mr G.L. Dick
School of Philosophy . . . . Mr P. Staines
School of Physics . . . . .Associate Professor G. J. Russell (Year 1)
Dr K. R. Vost
School of Physiology and Pharmacology . . . . .Dr B. S. Nail *or*
Dr I. Neering or
. . . . Professor M. J. Rowe
School of Psychology . . . . .Professor B. J. Gillam
Mr T. J. Clulow
School of Science and Technology Studies . . . . Professor W.R. Albury
. . . . .Dr D. P. Miller

**Board of
Studies in
Science
and
Mathematics**

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

The Dean is the Dean of the Faculty of Science, Professor Gavin Brown.

The Chairman is Associate Professor G. Russell.

The Co-ordinator of Studies in Science and Mathematics is Associate Professor R. J. King. The Administrative Officer is Mr P. Buist.

*See Staff, listed earlier in this handbook.

3970
Science and Mathematics Course

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

Aims of the Science and Mathematics Course

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

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

Objectives of the Science and Mathematics Course

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

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

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

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

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

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

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

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

8. To promote understanding of the significance of science, technology, economics and social factors in modern society, and of the contributions they can make in improving humans' material conditions and in widening their imaginative horizons and their understanding of the universe.

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

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

The Structure of the Science and Mathematics Course

The Science and Mathematics Course consists of a number of individual programs, based on subjects ranked as Level I, Level II, Level II III, Level III and Level IV.

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

The Bachelor of Science degree is awarded on completion of

* **a three year program**

or

* **a four year program**

chosen from specific programs approved by the Board of Studies in Science and Mathematics.

The time specified is a minimum time required for completion of the degree. It may be taken over a longer period of time.

* A student must select and be enrolled in one of the prescribed programs.

* A student may not undertake more than 8 Science units in any one year unless approval is given by the Co-ordinator or the Dean of the Board of Studies in Science and Mathematics.

* With the exception of quota restricted programs and with approval of the Co-ordinator of Studies, 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 L-G06G (Biological Sciences Building, map reference D25).

* The programs listed are made up of a sequence of subjects. Where a choice of subjects is indicated within a program care must be taken to satisfy all 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 specialization is a program specifying only 4 Level III units in a discipline.

* A double specialization is a program specifying 4 Level III units of each of 2 disciplines or 8 Level III units in a single discipline.

* Upon sufficient cause being shown in a particular case or cases, the Board of Studies in Science and Mathematics may vary any of these rules.

The three year program

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

1. 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 MATH1032 Mathematics I or MATH1042 Higher Mathematics, or MATH1011 and MATH1021;

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

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

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

The four year program

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

1. all requirements of the three year program see above;

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

For Entry to Year 4 students are required:

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

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

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

4. to have the approval of the appropriate Head of School at the end of Year 3.

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 subjects completed, if during his or her studies for the pass degree, he or she has satisfied the prerequisites for proceeding to honours level laid down by the School or Schools concerned.

Workload

The expected maximum workload for students devoting most of their time to this course is four science units per session. This can only be exceeded in exceptional circumstances by students with a good academic record and requires the permission of the Co-ordinator of Studies.

Students with external commitments, such as part-time employment, in excess of ten hours per week, should take fewer units. External commitments are not to be taken into consideration in relation to such matters as extensions of time for written work or failure to attend examinations, which may, for some subjects, be scheduled on Saturday mornings.

Re-enrolment

Students not lodging a completed enrolment form before the first day of Session 1 have no guarantee that a place will be available in the subjects offered in that year. This is particularly important for subjects where laboratory space is limited or for subjects where quota restrictions may apply.

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

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

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

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

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

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

Programs

Students are advised that it is not possible to complete their studies by attendance at evening classes alone. Each program has a four-digit identifying number. Most programs have been set out as Years 1, 2, 3 and 4 for the four year program and in these cases Years 1, 2 and 3 comprise a three year program. A few programs are set out as Years 1, 2 and 3 and lead to the pass degree only.

Students wishing to take a double specialization are warned that due to timetabling difficulties it may take longer than three years to complete degree requirements, and any additional units above the minimum 23 required for the pass degree will attract an additional fee as voluntary subjects. To progress through a program a student must meet all the prerequisites and co-requisites as detailed in Tables 1, 2 and CEIC.

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

Anatomy	see *program* 7000
Biological Science	see *program* 1700
Biochemistry	see *program* 4100
Biotechnology	see *program* 4200
Botany	see *program* 1743
Business Information Technology	see *course* 3971
Chemistry	see *programs* 0200, 0205
Community Medicine	subjects available in some programs
Computer Science	see *program* 0600
Ecology	see *programs* 6851, 6852, 6853

Earth and Environmental Science	see *program* 2527
Genetics	see *program* 6840
Geography	see *program* 2700
Geology	see *programs* 2500, 2503
Information Systems	see *program* 1400
Marine Science	see *programs* 6831, 6832, 6833, 6834
Mathematics	see *programs* 1000, 1006, 1060, 1061, 6810
Microbiology	see *program* 4400
Pharmacology	see *program* 7300
Philosophy	see *program* 5200, 5262
Physics	see *programs* 0100, 0161, 2503
Physiology and Pharmacology	see *program* 7300
Psychology see also course 3431	
BSc(Psychol)	see *program* 1200, 1206
Science and Technology	
Studies	see *program* 6200
Zoology	see *program* 1745

In addition to Course 3970 programs are also included for Courses 3611 (Science/Aeronautical Engineering), 3661 (Science/Industrial Engineering), 3681 (Science/Mechanical Engineering), 3701 (Science/Naval Architecture), 3725 (Science/Electrical Engineering), 3730 (Science/Civil Engineering), 3820 (Science/Medicine), 3951 (Science/Optometry), 3995 (Science/Commerce), 4075 (Science/Education), 4770 (Science/Law).

Physics

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

The features are summarized in the following table:

Professional Training in Physics in other Courses

Physics

Program		Courses
0100	Physics Including: Theoretical Physics; Applied Physics; Biophysics; Physics/Geology;	3170 Textile Physics 3611 Aeronautical Engineer- ing with Physics 3661 Industrial Engineering with Physics 3681 Mechanical Engineering with Physics
0161	Physics/Computer Science	3701 Naval Architecture with Physics 3725 Electrical Engineering with Physics 3730 Civil Engineering with Physics and Mathematics 4770 Law with Physics 4075 Education with Physics

Professional Training

Program 0161 (Physics/Computer Science) has been carefully structured to include not only the basic areas of Physics but also those Mathematics and Computer Science subjects necessary to meet the specific aims of the program. Only minor variations from this program can be considered. On the other hand, Program 0100 Physics offers greater flexibility in the choice of subjects particularly for the student who intends to take out the BSc degree at Pass level after 3 years. Also, for those students who intend to proceed further, Honours may be taken in either Physics, Theoretical Physics, Applied Physics, Physics/Geology or Biophysics.

Sample programs of study, and guidance as to the choice of subjects can be obtained from the School. The following information relating to Program 0100 should be particularly noted:

Program 0100

1. It is suggested that the subjects chosen in Year 1 might comprise COMP1811, PHYS1061, CHEM1002.

2. Students wishing to proceed to Year 4 (Honours) must complete at least 7 Level III units. These will normally be taken from the Physics subjects on offer (unless the student is specializing in Biophysics or in Geology) and include at least one subject from PHYS3110, PHYS3120, PHYS3631, PHYS3760 for students specializing in Physics or in Applied Physics.

3. For the study of Applied Physics certain Level III subjects are strongly recommended. These are subjects of a more applied nature eg PHYS3631 Electronics.

4. For the study of Theoretical Physics, additional mathematics subjects are specified. Thus in Year 2 students should include subject MATH2501 (or MATH2601) and in Year 3, subject MATH3121. Certain Level III Physics subjects of a theoretical nature are also strongly recommended.

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

6. For the study of Biophysics, students are required to take Chemistry and Biology subjects in Year 1 and Biochemistry in Year 2 in addition to Physics subjects.

7. In addition to the above there are other areas of study of major interest. Thus an introduction to Astrophysics and Optics is available to students choosing the elective subjects PHYS3160, PHYS3710, PHYS3720, PHYS3760 and the study of Condensed Matter (Solid State) Physics may be furthered by the inclusion of elective subjects such as PHYS3310 and PHYS3320.

8. Subject descriptions of the subjects may be found in another section of this handbook. Elective subjects reflect the research interests of the various Departments of this School. These are at present five in number: Applied Physics, Astrophysics and Optics, Biophysics, Condensed Matter Physics, Theoretical Physics.

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

Physics in other Courses

The previous page lists courses other than the BSc which have been arranged with other schools. Several of these can lead to honours in Physics (eg 3725) so it must not be thought that the only avenue to specialization in Physics is via the professional programs 0100 and 0161 etc.

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

0100
Physics**

Year 1
PHYS1002	Physics
MATH1032 or MATH1042	Mathematics

Choose 4 Level I units from:**[6]
1. Table 1 *and/or*
2. Table 2 for program 0100

Year 2

PHYS2001, PHYS2011, PHYS2021, PHYS2031
MATH2100, MATH2120, MATH2510, MATH2520
Choose 2 units from:**
1. Table 1 *and/or*
2 Table 2 for program 0100
1 General Education subject

Year 3

PHYS3010, PHYS3021, PHYS3030, PHYS3041, PHYS3050[6], PHYS3060[6]
Choose at least 3 units from:**
1. Table 1 *and/or*
2. Table 2 for program 0100
1 General Education subject

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

Year 4 (Honours)

Choose one of PHYS4103, PHYS4303, PHYS4403, PHYS4503, BSSM4013

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

**Students should read carefully the above description relating to program 0100 and seek advice from the School of Physics regarding the choice of subjects. An incorrect choice of subjects could exclude a student from the study of certain areas of Physics and or prevent the combination of Physics with other disciplines.
[6]Students with a special interest in Biophysics may replace PHYS3050 (or PHYS3060) with PHYS3410 provided CHEM1101, CHEM1201, BIOS1011 and BIOS1021 are completed in Year 1 and BIOC2312 is taken in Year 2.

0161
Physics/Computer Science

Year 1††
PHYS1002, PHYS1601	Physics
COMP1811	Computer Science
MATH1032 or MATH1042	Mathematics

Choose 2 Level I units from Table 1**

Year 2

PHYS2011, PHYS2021, PHYS2031
COMP1821
MATH2100, MATH2120, MATH2510, MATH2520
Choose 1 Level II Computer Science unit
Choose 1 further unit from PHYS2601, MATH2501, MATH2301
or Level II Computer Science
1 General Education subject

Year 3

PHYS2001, PHYS3010, PHYS3021, PHYS3030
Choose 2 further Level III Physics units**
Choose 1 Level III Computer Science unit
Choose 1 unit from:**
1. PHYS2601, MATH3101, MATH3121, MATH2301, MATH3301
2. Level III Physics
3. Computer Science
1 General Education subject

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

Year 4 (Honours)**
PHYS4103 or PHYS4303 or PHYS4503

**Students intending to proceed to Year 4 are required to choose appropriate subjects. See program 0100. Students are required to consult the School of Physics.

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

Geophysics

See program 2503

Recommended Elective Subjects

Geology

Chemistry

The School has four departments (Physical, Organic, Inorganic and Nuclear and Analytical) and a First Year Teaching unit. Each department contributes to first year teaching and offers specialty courses in its own area for the

Science and Mathematics programs, and servicing to other faculties.

The study program 0200 offered by the School of Chemistry provides both a basic scientific education and a professional training in chemistry. Fundamental, applied, environmental and industrial aspects of chemistry are included. The program allows the study of chemistry to be combined with the study of another discipline, for example, physics, biochemistry, mathematics or computer sciences, by suitable choice of subjects.

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

Students wishing to undertake the maximum number of chemistry subjects should follow Program 0205 Pure and Applied Chemistry. This involves 14 chemistry subjects and is referred to as a double major in terms of the Science and Mathematics course. It is designed for specialization in chemistry and should be selected by students who wish to devote their studies at Level III entirely to chemical topics.

The Chemistry programs are open to all students who have satisfied the requirement for entry into the Science and Mathematics course. Students who are taking a full year of first year chemistry are advised to enrol in CHEM1002 if they meet the prerequisites, otherwise in CHEM1302. Although each subject is also available in two parts (CHEM1101 plus CHEM1201 are equivalent to CHEM1002; CHEM1401 plus CHEM1501 are equivalent to CHEM1302), the two parts are intended primarily for those students who intend to take only one unit of chemistry. Students should choose their subjects carefully as transfer from a full-year subject to a single-session subject will not be possible after the end of week 12 of first session. The Chemistry programs have a first year of study which includes chemistry, physics and mathematics, and two elective units. It is in the choice of this elective that special care has to be given as an incorrect choice could exclude the combination of chemistry with another selected discipline at Level II or III, (eg omission of biology units would preclude taking biochemistry at Level II). Advice from the course advisors should be sought on this point.

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

0200
Chemistry*

Year 1

PHYS1002 or PHYS1022	*Physics*
CHEM1002	*Chemistry*
MATH1032 or MATH1042 *or both* MATH1011 and MATH1021	*Mathematics*

Choose 2 Level I units from Table 1

Year 2**

CHEM2011, CHEM2021, CHEM2031, CHEM2041
Choose 3 units from Table 1
2 General Education subjects

Year 3

Choose 4 Level III Chemistry units of which at least 3 are from:
CHEM3011, CHEM3021, CHEM3031, CHEM3041
Choose 4 units from Table 1

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

Year 4 (Honours)

CHEM4003

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

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

0205
Pure and Applied Chemistry*

Year 1

PHYS1002	*Physics*
CHEM1002	*Chemistry*
MATH1032 or MATH1042 *or both* MATH1011 *and* MATH1021	*Mathematics*

Choose 2 Level I units from Table 1

Year 2

CHEM2011, CHEM2021, CHEM2031, CHEM2041
Choose 3 units from Table 1
2 General Education subjects

Year 3

CHEM3011, CHEM3021, CHEM3031, CHEM3041
Choose 4 Level III Chemistry units

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

Year 4 (Honours)

CHEM4003

*Student should read carefully the above description relating to program 0205 and seek advice from the School of Chemistry regarding the choice of units.

Recommended Elective Subjects

Biochemistry
Biotechnology
Computer Science
Geology
Mathematics
Physics
Physiology

Computer Science

Computer Science involves the study of the design, construction and uses of computer systems. It is concerned with the representation of data and data structures in computer systems and the design of algorithms for automatic manipulation of this information by programming languages and machine systems. It is very much concerned with the design and development of hardware and software tools by which computer applications may be developed, but not so much with the applications themselves. It is, however, noted that non-computing elements (such as human interface or psychological aspects) can often dicatate the level of success of computing systems. At the University of New South Wales, particular emphasis is given to comprehension of the basic principles behind computing tools, operating systems, compilers and translators, and computer hardware.

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

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

Entry to a Computer Science major is normally by direct selection at university entry.

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

Students majoring in other disciplines may undertake all Level I and Level II Computer Science subjects and thus undertake a substantial amount of Computing. Programs available are Physics/Computer Science (0161) and Mathematics/Computer Science (1061). Students with very good academic records may be permitted to enrol in further Computer Science units with the agreement of the Head of the Department of Computer Science.

There are many ways to study Computer Science and computer applications at this University, apart from the Science and Mathematics Course. A new 4-year professional Computer Engineering degree course was launched in 1989. This course combines subjects from Computer Science, Electrical Engineering and Mathematics. Students may also major in

Computer Science as part of the 5 year combined degree programs in Electrical Engineering, Aeronautical Engineering, Industrial Engineering, Mechanical Engineering and Naval Architecture which leads to the award of the two degrees of BE and BSc (see under Courses 3725, 3611, 3661, 3681 and 3701) respectively and the Faculty of Engineering Handbook.

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

0600
Computer Science*

Year 1*

| COMP1011, COMP1021 | Computer Science |
| MATH1032 OR MATH1042, MATH1081 | Mathematics |

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

Year 2
COMP2011, COMP2021, COMP2031
Choose 5 units from:**
1. Table 1 and/or
2. Table 2 for program 0600 and/or
3. The BA course
1 General Education subject

Year 3
Choose 4 Level III Computer Science units including at least 1 unit from COMP3111, COMP3121, COMP3131 and at least 1 unit from COMP3211, COMP3221, COMP3231, COMP3331.

1. Table 1 and/or
Choose further units to make a total of 7 from **
2. Table 2 for program 0600 and/or
3. The BA course
1 General Education subject

Students may not include more than 6 Level 111 Computer Science units.

Students proposing to proceed to Year 4 (Honours) must complete 7 Level 111 Units.

Year 4 (Honours)
COMP4914
* Entry to Year 1 of this program is restricted to students who have been offered a place directly (UAC code NCS). Entry to later years will be considered only in exceptional circumstances.

**The program may include up to 8 units other than Computer Science units that are not in Table 1. Subjects chosen from the BA degree course are restricted to those offered by the following schools: Economics, English, French, German Studies, History, Music, Political Science, Russian Studies, Sociology, Spanish and Latin American Studies and Theatre Studies. Science and Technology Studies subjects are available in Table 1. Upper Level subjects from the School of Economics are restricted to all those in Economic History plus ECON2103, ECON2104 (6 BA degree credit points at Level I or 4 credit points at Upper Level are equivalent to 1 science unit).

Computer Science/Physics

See program 0161 Physics/Computer Science

Computer Science/Mathematics/Statistics

See program 1061 Mathematics or Statistics/Computer Science

See also

1400 Information Systems

Mathematics

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

Pure Mathematics is concerned with the whole structure of mathematics. Research focuses on the creation of new mathematical systems and the finer analysis of partially understood fields. Problems of mathematics come from many sources of science and industry but the pure mathematician is more concerned with the problems themselves than with the sources from which they arise. Courses in the Department of Pure Mathematics are designed to provide the necessary equipment for those who intend to use mathematics in any way, to give basic familiarity with the fundamental language of modern science and technology and to develop appreciation for and insight into one of our major cultural achievements. The Pure Mathematics Department offers undergraduate courses across the mathematical spectrum.

Applied Mathematics is concerned with the development of mathematics and mathematical models for understanding scientific phenomena, for the solution of technical and industrial problems, and for use in the social, economic and management sciences. Problems originate not only from the physical and engineering sciences, but also from such diverse areas as the biological sciences, computer science, the communication industry and commerce. Courses in Applied Mathematics are designed to provide basic mathematical and computational skills needed for a wide range of applications, to develop the capability to construct, analyse, and interpret mathematical models, and to encourage enthusiasm for the role of the mathematician in a variety of contexts.

The major research interests of the Department of Applied Mathematics are:

1. Optimization, control theory and operations research, with applications in a wide range of areas.

2 Numerical analysis and mathematical computing.

3. Nonlinear dynamical systems.

4. Fluid dynamics, with a special interest in oceanographic and environmental applications.

The Department of Applied Mathematics offers training to graduate research level in each of these areas.

Statistics is the science and art of using factual material for modelling and inference. Its mathematical foundations are in the theory of probability and it deals with how to estimate and make decisions using knowledge which is uncertain or observational material which is subject to error. There is a rich interplay of ideas between the theory of statistics and fields such as engineering, medicine and biological and behavioural sciences where statistical problems constantly arise. The department has strong interest in the areas of applied statistics, stochastic processes, biometry, inference, design of experiments, sequential analysis, discrete distributions, nonparametrics and statistical computing.

Programs of study

Program 1000 (Mathematics)

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

Pure Mathematics major

Any completed 1000 program will be deemed to be a major in Pure Mathematics if it has included the equivalent of four units madeup of units and half units listed in Table 1 as Pure Mathematics Level III or Higher Pure Mathematics Level III. It is strongly recommended that students choose, among the many optional mathematics units, those which are appropriate to their interest. In particular, MATH1081 in Year 1 is highly recommended.

Furthermore:

1. Pure Mathematics subjects relevant to the mathematical aspects of Computer Science are MATH2400 and MATH2410 in Year 2, and MATH3400, MATH3410 and MATH3420 in Year 3.

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

3. Pure Mathematics subjects relevant to the applications of mathematics in physics or engineering are MATH3540, MATH3550, MATH3570 and MATH3580 in Year 3.

Pure Mathematics Department staff will be happy to advise students on choices of subjects appropriate to their study goals.

Pure Mathematics (Honours)

Honours in Pure Mathematics is obtained by completing MATH4603, for which the normal prerequisites are at least three Pure Mathematics III subjects (total value) at the Higher Level. However, students with a credit average in at least four Level

III Mathematics units may also be considered for entry into Pure Mathematics 4. Usually, students doing Honours in Pure Mathematics do Higher level courses from Year 1 onwards.

Students considering an honours year in Pure Mathematics should consult Pure Mathematics Department staff to arrange courses to suit their interests.

Applied Mathematics major

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

Year 2: At least two of MATH2160, MATH2180, MATH2200, MATH2301.

Year 3: At least three of MATH3101, MATH3121, MATH3161, MATH3181, MATH3201, MATH3241, MATH3261, MATH3301.

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

1. Applied mathematics for physical and engineering sciences or for theoretical oceanography and fluid mechanics: either PHYS1002 or appropriate level I Engineering subjects.

2 Applied mathematics for economic or management sciences: ACCT1501, ACCT1511, ECON1101, ECON1102. Note that if ACCT1501 and ACCT1511 are chosen then all four must be taken in first year and permission must be obtained through the Board of Studies office as there is a quota. For further details see program 6810.

3 Applied mathematics for social or biological sciences, choose at least two of the following groups:
a. BIOS1011 and BIOS1021,
b. PSYC1002,
c. PHYS1002,
d. CHEM1002 or both CHEM1101 and CHEM1201.

4 Applied mathematics for computational methods or computer science: COMP1821, MATH1081.

Applied Mathematics Department staff will be happy to advise students on choices of subjects appropriate to their study goals.

Applied Mathematics (Honours)

A student interested in taking an Honours degree in Applied Mathematics must enrol in MATH1032 in first year and complete at least one Level II and three Level III Applied Mathematics units (total value). Students who have obtained a credit average in at least four Level III Mathematics units (total value) may be considered for entry into MATH4103 Applied Mathematics MATS.

Students are advised to select optional subjects according to the recommendations above for an Applied Mathematics major. Students should obtain a copy of recommended programs for Applied Mathematics from the School of Mathematics office before entering Year 2, and they are

strongly encouraged to consult a staff member in Applied Mathematics regarding appropriate courses of study.

Program 1006 (Statistics)

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

Statistics (Honours)
Honours in Statistics are obtained by completing MATH4903, the prerequisite for which is the completion of 3 years of program 1006 (Statistics) with all corresponding Higher Statistics Level II and Level III units preferably all Higher Mathematics Level I, II and III units.

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

Program 6810 (Mathematics of Management) includes subjects given by the Schools of Accountancy and of Economics. There has been an increasing trend towards more use of mathematics, and the use of more advanced mathematics, in scientific management. This program is intended to train mathematicians with an interest in the application of mathematics to management science. The mathematics content is very solid indeed, amounting to a full mathematics degree. A student completing this course with a good record is eligible for entry to the Master of Commerce graduate degree program in the School of Accountancy. If appropriate subjects are selected, then this degree (MCom), which may be awarded by part-time study, qualifies the graduate for provisional membership of the Australian Society of Accountants; full membership is then granted after appropriate experience.

Mathematics/Computer Science

See Computer Science/Mathematics

1000
Mathematics***

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

Year 1
MATH1032 or MATH1042   *Mathematics*
Choose 6 Level I units from:*
1. Table 1 and/or
2. The BA course and/or
3 Table 2 for program 1000

Year 2
MATH2100, MATH2120, MATH2501, MATH2510, MATH2520
Choose 1 further Level II or III Mathematics unit
Choose 4 units from:*
1. Table 1 and/or
2 The BA course and/or

3. Table 2 for program 1000
1 General Education subject

Year 3

Choose 4 Level III Mathematics units
Choose 3 units from:*
1. Table 1 *and/or*
2 The BA course *and/or*
3 Table 2 for program 1000
1 General Education subject

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

Year 4 (Honours)

MATH4003 *or* MATH4103 *or* MATH4603

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*Not more than 8 units of this program may be from subjects not in Table 1. The BA degree subjects are limited to those offered by the following schools: Economics, English, French, German, History, Music, Political Science, Russian, Sociology, Spanish and Latin American Studies and Theatre Studies. Science and Technology Studies and Philosophy subjects are available in Table 1. Upper Level subjects from the School of Economics are restricted to all those in Economic History plus ECON2103, ECON2104. (6 BA credit points at Level I or 4 credit points at Upper Level are equivalent to 1 science unit).

**Students proposing to take Honours in Pure Mathematics are advised to include at least three units of Level III Higher Pure Mathematics units (total value). However, students who have obtained a credit average in at least four Level III Mathematics units may also be considered for entry into Pure Mathematics Honours.

***Students should read carefully the above description relating to program 1000 and seek advice from the School of Mathematics regarding the choice of subjects.

1006
Statistics

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

Year 1††

MATH1032 *or* MATH1042   *Mathematics*
Choose 6 units from:*
1. Table 1 *and/or*
2 The BA course *and/or*
3. Table 2 for program 1000

Year 2

MATH2120, MATH2501, MATH2510, MATH2520, MATH2801, MATH2810, MATH2821, MATH2830
Choose 25 units from:*
1. Table 1 *and/or*
2 The BA course *and/or*
3 Table 2 for program 1000
1 General Education subject

*See footnote to program 1000.
††See footnote to program 0161.

Year 3

Choose 4 units from MATH3801, MATH3811, MATH3820, MATH3830, MATH3840, MATH3850, MATH3861, MATH3971
Choose 3 Level III Mathematics *and/or* Computer Science units *1 General Education subject*

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

Year 4 (Honours)
MATH4903

Program 1060 - Mathematics with Computing†

It is suggested that Higher Level equivalents should be taken where available.

Year 1
COMP1811	Computing 1 (Procedural)
COMP1821	Computing 2
MATH1042	Higher Mathematics 1
MATH1081	Discrete Mathematics

Choose 3 further Level 1 units from:

1. Table 1 and/or

2. Table 2 for program 1000 and/or

3. The BA course

Year 2
COMP2011	Data Organisation
COMP2031	Concurrent Computing
MATH2501	Linear Algebra
MATH2301	Mathematical Computing A
MATH2510	Real Analysis or Vector analysis*/MATH2100
MATH2400	Finite Mathematics
MATH2801	Probability and Random Variables or Statistics SS*/MATH2841

Choose 2 further Level II units from

1. Table 1, including the Level II units from one of the strands below, and/or

2. Table 2 for Program 1000 and/or

3. The BA course.

1 General Education Subject

Year 3

Choose 2 Computer Science Level III units, from a schedule of 4 to be advised (Databases, Algorithms, Software Engineering, A.I.)
MATH3301	Mathematical Computing B
MATH3400	Logic and Computability

Choose 3.5 further units from:

1. Table 1, including the Level III units from the strand below chosen in Year 2, and/or

2. Table 2 for Program 1000 and/or

3. The BA Course

1 General Education Subject

Students proposing to proceed to Year 4 (Honours) must complete at least 6 level III units.

Year 4 (Honours)**
MATH4603 or MATH4103 or MATH4903 or MATH4003

Strand 1. Statistics

Level II
| MATH2821 | Basic Inference |
| MATH2810 | Statistical Computing and Simulation |

Level III
| MATH3811 | Linear Models |
| MATH3861 | Statistical Computation |

Strand 2. Pure Maths

Level II
| MATH2410 | Automata and Algorithms |

Level III
MATH3520	Number Theory
MATH3410	Combinatorial Structure and Applications
MATH3410	Communication, Codes and Ciphers

Strand 3. Applied Maths

Level II
| MATH2120 | Mathematical Methods |

Level III
| MATH3101 | Numerical Analysis |

and at least one of the following three units:
MATH3161	Optimization Methods
MATH3181	Optimal Control
MATH3201	Dynamical Systems

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† In Year 1, students who wish to but cannot enter this program should enrol in program 1000 or another science program and apply for entry to this program at the end of Session 2. Enrolment in Year 2 is based on academic performance in Year 1.

* for those planning to take the Statistics strand, MATH2510 Real Analysis and MATH2801 Probability and Random Variables must be taken.

†† alternatives to the proposed strands may be arranged by consultation with the Head of School.

** Potential honours students should consult the head of the appropriate department by the beginning of their third year.

1061
Mathematics or Statistics/Computer Science

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

Year 1††
| COMP1821 | Computer Science |
| MATH1032 or MATH1042, MATH1081 | Mathematics |

Choose 4 Level I units from:
1. Table 1 and/or
2. Table 2 for program 1000 and/or
3. The BA course

Year 2
COMP1821
MATH2120, MATH2501, MATH2510, MATH2520
Choose one of the strands:
a. MATH2100, MATH2301, MATH2841
Choose at least 1 unit from: MATH2400, MATH2410, MATH2160, MATH2200.
or
b. MATH2801, MATH2810, MATH2821, MATH2830.

Choose further units from Mathematics and/or Computer Science to make a total of 8 for the year.
1 General Education subject

Year 3
Continue the strand chosen in Year 2:
a COMP2011
MATH3301
3 Level III Mathematics units
or
b. MATH3861
4 Level III Statistics units

Choose further units from Mathematics and or Computer Science to make a total of 8 for the year.
1 General Education subject

Year 4 (Honours)*
MATH4603 or MATH4103 or MATH4903 or MATH4003

*The requirements for entry to the Honours year are as for programs 1000 or 1006.

††See footnote to program 0161.

Mathematics/Marine Science (Physical Oceanography)

See program 6831

Recommended Elective Subjects

Computer Science
Geology

Psychology

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

Program 1200 leads to a specialization in Psychology after 3 years and to Honours after 4 years. Choice of support subjects will depend upon which facet of Psychology is of interest to the student. Suitable supporting subjects include Anatomy, Physiology, Genetics of Behaviour, Science and Technology Studies, and Philosophy. Students may contact the School for advice.

Program 1206 is intended for students with interests in computational modelling and artificial intelligence, on the one hand, and human information processing, cognition, and group decision making, on the other. The program should be particularly useful for those who will work in a commercial environment that requires both 'people skills' and an application oriented knowledge of computing. It would also serve as a good basis for interdisciplinary research in areas that include both Psychology and Computer Science.

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

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

1200
Psychology

Year 1
MATH1032 *or* MATH1042 *or both*
MATH1011 & MATH1021   *Mathematics*
PSYC1002   *Psychology*
Choose 4 Level I units from:
1. Table 1 *and/or*
2. Table 2 for program 1200

Year 2*
PSYC2001
Choose 2 units from:
PSYC2011, PSYC2021, PSYC2031, PSYC2051
Choose 5 units from Table 1 (no more than 1 additional unit from Level II Psychology)
1 General Education subject

Year 3*
Choose 4 Level III Psychology units
Choose 3 units from Table 1
1 General Education subject

Year 4 (Honours)*
PSYC4023 or PSYC4033

*Students intending to proceed to honours in Psychology must take PSYC2001, PSYC2011, PSYC2021 and PSYC2031 in

Year 2, together with 3 other units from Table 1 (a total of 7 units in Year 2). In Year 3 students must take 8 Level III Psychology units including PSYC3001 PSYC3021 and PSYC3031 for PSYC4033 in Year 4. Additionally, students intending to take PSYC4023 in Year 4 are required to also include PSYC3011.

1206+
Computer Science/Psychology

Year 1
COMP1011 & COMP1021   *Computer Science*
MATH1032 or MATH1042   *Mathematics*
MATH1081
PSYC1002   *Psychology*
Choose 1 unit from Table 1.

Year 2
COMP2011 & COMP2031
PSYC2001, PSYC2011 & PSYC2021
Choose 3 units from Table 1, including
2 from the list below
1 General Education subject

Year 3
COMP3111, COMP3411 & COMP3511
PSYC3001 & PSYC3191
Choose 3 units from the list below including at least 2 Level III Psychology units
1 General Education subject

Year 4 (Honours)
COMP4913 or PSYC4023 or PSYC4043

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

** Students proposing to proceed to honours in Computer Science must take 4 Level III Computer Science units.

*** Progression to Year 4 (Honours) is subject to the approval of the relevant Head of School.

Elective List

COMP2021

PSYC2031, PSYC3011, PSYC3021, PSYC3031, PSYC3041, PSYC3061, PSYC3141, PSYC3151, PSYC3161

Other subjects from Level III Computer Science.

+ Entry to this program is via the NCS direct-entry Computer Science intake.

Recommended Elective Subjects

Anatomy
Physiology

Information Systems

Information Systems is concerned with information systems analysis and design, data management, computer processing, edp audit, management information systems and applied expert systems within business and government organisations. There is a growing maturity in the discipline as the underlying theory and associated principles become better understood and as advanced information processing techniques emerge. In many respects the development of the knowledge base which forms the discipline parallels developments in computing technology as new opportunities become apparent for the solution of information processing problems. Hence, information systems is concerned with the way in which computer systems are used within organisations – mainly business and government. There is a high degree of complementarity between the roles of Computer Science and the discipline of Information Systems. The program is intended to develop students' conceptual and practical skills in the discipline. After an introductory first year students study systems design, database, communications and commercial programming in parallel with computer science, mathematics and management accounting units. In the honours year well qualified students are offered to specialize in advanced information systems and data management topics.

See also Course 3971

1400
Information Systems

Year 1

COMP1811	*Computer Science*
MATH1032 or MATH1042	*Mathematics*
ACCT1501, ACCT1511	*Accounting*
INFS1602	*Information Systems*
ECON1101, ECON1102	*Economics*

Year 2 (Year 1 Entrants)
COMP1821

INFS2603, INFS2609
MATH2841 or MATH2801
Choose 1 unit from:
1. Table 1 *or*
2. Table 2 for program 1400
1 General Education subject

Year 2 (Direct Year 2 Entrants)**

COMP1821 or COMP1021

ACCT1051, ACCT1511, INFS1602, INFS2603, INFS2609

MATH2801 or MATH2841

1 General Education Subject

Choose 1 unit from Table 1 or Table 2 for Program 1400

Year 3
ACCT2522, INFS3605, INFS3607, INFS3608
Choose 3 units including at least one at Level III from:
1. Table 1 *and/or*
2. Table 2 for program 1400 *and/or*
3. INFS3611
1 General Education subject

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

Year 4 (Honours)
INFS4794

**Those students intending to enter the 1400 program in Year 2 must enrol in another science program for Year 1 and apply for transfer to the 1400 program at the end of Session 2. Enrolment in Year 2 is based on academic performance in Year 1.

Biological Science

Biological Science encompasses all aspects of plants and animals including their relationship to each other and to the environment. The courses leading to the award of a science degree in Biological Science include cell biology, plant and animal physiology, ecology, genetics, taxonomy, marine biology, entomology and evolutionary studies. These studies are particularly relevant in the fields of agriculture, forestry, wild-life management, conservation and related environmental sciences. Specializations are available in both Botany and Zoology as well as Ecology (Program 6853) and Marine Science-Biological Oceanography (6832).

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

1700
Biological Science

Year 1

CHEM1002 *or both* CHEM1101 *and* CHEM1201	*Chemistry*
MATH132 *or* MATH1042 *or both* MATH1011 *and* MATH1021	*Mathematics*
BIOS1011, BIOS1021	*Biology*
Choose 2 level 1 units from Table 1	

Year 2
BIOS2011, BIOS2021
BIOC2312
BIOS2051, BIOS2041 *and* 2 units from BIOS2031, BIOS2061 *and* MICR2011
1 General Education subject

Year 3
Choose 5 units from BIOS3021, BIOS3031, BIOS3041, BIOS3051, BIOS3061, BIOS3071, BIOS3081, BIOS3091, BIOS3011, BIOS3101, BIOS3111, BIOS3121, BIOS3131, BIOS3141, MICR3031
Choose 2 units from Table 1
1 General Education subject

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

Year 4 (Honours)
BIOS4013

1743
Botany

Year 1
CHEM1002 *or both* CHEM1101 *and* CHEM1201   *Chemistry*
MATH1032 or MATH1042 *or both* MATH1011   *Mathematics*
and MATH1021
BIOS1011, BIOS1021   *Biology*
Choose 2 Level I units from Table 1

Year 2
BIOS2011, BIOS2021
BIOC2312
BIOS2041, BIOS2051
Choose additional units from Table 1 to make a total of 8 for the year
1 General Education subject

Year 3
Choose 4 units from BIOS3041, BIOS3061, BIOS3091, BIOS3101, BIOS3121, BIOS3141, MICR3031
Choose 3 units from Table 1*
1 General Education subject

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

Year 4 (Honours)
BIOS4023

*Students with an interest in molecular aspects of plant science should choose at least two of BIOC3131, BIOC3271 or BIOC3281.

1745
Zoology

Year 1
CHEM1002 *or both* CHEM1101 *and* CHEM1201   *Chemistry*
MATH1032 *or* MATH1042

or both MATH1011   *Mathematics*
and MATH1021
BIOS1011, BIOS1021   *Biology*
Choose 2 Level I units from Table 1

Year 2
BIOS2011, BIOS2021
BIOC2031
BIOS2041, BIOS2061, BIOS2031
Choose 1 unit from Table 1
1 General Education subject

Year 3
Choose 4 units from BIOS3011, BIOS3021, BIOS3031, BIOS3051, BIOS3071, BIOS3081, BIOS3111, BIOS3131, BIOS3141
Choose 3 units from Table 1
1 General Education subject

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

Year 4 (Honours)
BIOS4033

Recommended Elective Subjects

Anatomy
Biochemistry
Geography
Geology
Mathematics
Microbiology
Physiology

Geology and Geophysics

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

Geology is the study of the nature and evolution of our planet. It is concerned with the composition and modes of formation and deformation of the igneous, sedimentary and metamorphosed rocks and concentrations of minerals that comprise the earth's crust and interior. Geology enquires into the essential controls on the development and distribution of such rocks and minerals in space and geologic time. Likewise it is concerned with the nature, distribution, and evolution of life forms through time. Resource geology is concerned with the application of all geological knowledge to the location and extraction of mineral and energy deposits, and to engineering and environmental tasks, ie activities that are fundamental to the well-being of modern society. Thus geology has an applied, professional function as well as being a scientific discipline.

Geophysics employs sophisticated instrumentation in order to construct physical earth models and is a companion discipline to Geology.

Program for Professional Geology

Since June 1986, the Australasian Institute of Mining and Metallurgy has required that its corporate members, including professional geologists, shall have completed a four year course. Students wishing to enter the geology profession should preferably undertake the four year Course 3000 Applied Geology in the Faculty of Applied Science that is specifically designed to meet the needs of a professional geologist. However, an identical course of study is available in the Science Faculty program 2500 by taking the three year program with a double specialization in Applied Geology and by achieving a standard that enables progression to the Year 4 program and graduation with Honours. Training of a professional geologist demands a thorough understanding of basic geological principles; accordingly, in the early part of the course students receive instruction in fundamental geological subjects. As with other science based disciplines, appropriate standards in Physics, Chemistry and Mathematics are also required. As the course progresses, increasing emphasis is placed on practical applications of geological principles to mineral and energy exploration and development, and to engineering and environmental geology. Mineral and energy exploration techniques including geochemical and geophysical methods are also studied. Year 4 is divided between a core of advanced geological topics, and one strand chosen from mineral resources, sedimentary basin resources, engineering and environmental geology, or geophysics. Session 2 of Year 4 is devoted to a specialized research project.

Geophysics

Professional geophysicists work closely with geologists and, appropriately, studies of both disciplines are undertaken in the one school. Fundamental and applied geophysics are taught to geology students in program 2500 (and Course 3000), but students who intend to become professional geophysicists should take program 2503.

Single Specialization in Geology

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

Geology with Biological Science

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

Geology in Marine Science

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

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

2500
Geology

Year 1

PHYS1002 or PHYS1022	*Physics*
CHEM1002 or both CHEM1101 *and* CHEM1201	*Chemistry*
or CHEM1401 and CHEM1501	
MATH1032 *or* MATH1042 *or both* MATH1011	*Mathematics*
and MATH1021	
GEOL1101, GEOL1201	*Geology*

Year 2

GEOL2111, GEOL2121, GEOL2211
Choose at least 4.5* units from:
1. GEOL2230, GEOL2231 and
2. Table 1 other than units offered by Applied Geology
1 General Education subject

Year 3

GEOL3111, GEOL3121
Choose at least 2 Applied Geology units from:
GEOL3130, GEOL3141, GEOL3211, GEOL3241, GEOL3251, GEOL3271, GEOL3281, GEOL3331
Choose further units from Table 1 to give a total of 23 for the complete program*.
1 General Education subject

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

Year 4 (Honours)

GEOL4303

Carefully read the description of program 2500 and seek advice from the Department of Applied Geology about the choice of subjects. Students following a combination of Applied Geology with Botany and/or Zoology are permitted in Year 1 to substitute the two Biology subjects, BIOS1011, BIOS1021, for PHYS1002. In Year 2 they should take BIOS2031, BIOS2041, BIOS2051, BIOS2061, in Year 3 GEOL3241, either GEOL3211 or GEOL3251, BIOS3131 and 2 units chosen from BIOS3101, either BIOS3015, BIOS3071, BIOS3081, BIOS3091, BIOL3121.

2503
Geophysics

Year 1

PHYS1002	*Physics*
CHEM1002 or both CHEM1001 *and* CHEM1201	*Chemistry*
MATH1032 *or* MATH1042	*Mathematics*
GEOL1101, GEOL1201	*Geology*

Year 2

PHYS2001, PHYS2011, PHYS2021, PHYS2031
MATH2100, MATH2120
GEOL8220, GEOL2231, GEOL2230
2 General Education subjects

Year 3

GEOL3130, GEOL3331, GEOL8320, GEOL8330, GEOL8340, GEOL8350, GEOL8360
Choose 2 units from Level III Physics and Mathematics
Choose 2 units from:
1. Table 1 *and/or*
2. Table 2 for program 2503

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

Year 4 (Honours)

GEOL4303

Recommended Elective Subjects

Biological Science
Chemistry
Geography
Mathematics
Physics

Earth and Environmental Science

This program is a combined course in Geology and Geography. It is designed to enable the graduate to understand and evaluate present geological processes and their relationships with the land surface. The effects on the natural processes of the various human activities, from industrial pressures to urban developments, are considered in detail and form an integral part of the course. The community's needs for future developments in a variety of environments and the vital role of environmental interdisciplinary safeguards have been among the main guide-lines in the selection of subjects within the course.

2527
Earth and Environmental Science

Year 1

CHEM1002 *or both* CHEM1101 *and* CHEM1201 or CHEM1401 and CHEM1501	*Chemistry*
MATH1032 *or* MATH1042 *or both* MATH1011 *and* MATH1021	*Mathematics*
GEOL1101, GEOL1201	*Geology*
GEOG1012, GEOG1031, GEOG1043	*Geography*

Year 2

BIOS1011, BIOS1021
GEOL2111, GEOL2121, GEOL7221
GEOG2021, GEOG2032, GEOG3232
1 General Education subject

Year 3

GEOL3121, GEOL6231
GEOG3011, GEOG3021
Choose at least 3 units from:
GEOL2130, GEOL3111, GEOL3251 GEOL3281, GEOL6321
GEOG3032, GEOG3062, GEOG3071, GEOG3122
BIOS2031, BIOS2051, BIOS2061, BIOS3061, BIOS3101
1 General Education subject

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

Year 4 (Honours)

GEOL4303 *or* GEOG4050/GEOG4100

Geography

Geography is the scientific study of variations from place to place on the earth's surface. It provides an analytical framework for understanding and investigating many of society's pressing problems such as the use and management of scarce resources, the impact of environmental hazards on human activities, soil erosion and conservation, land use conflicts, and the spatial organization of human affairs.

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

Considerable flexibility exists in Program 2700 for students to combine subjects in Geography with those from cognate disciplines to suit individual interests and career aspirations. Studies in Geography with other sciences, especially Geology and Biological Science, are encouraged. Geography may also be studied together with Geology in the Earth and Environmental Science Program 2527, or in conjunction with Biological Science in the Ecology Program 6851. Details of particular courses of study and subject combinations offered within these programs are available from the School Office.

2700
Geography

Year 1

MATH1032 *or* MATH1042 *or both*
MATH1011   *Mathematics*
and MATH1021
Both GEOG1051 *and* GEOG1062   *Geography*
or both GEOG1012 *and* GEOG1031
Choose further Level I units from Table 1 to make a total of 8

Year 2

Choose 3 Geography units
Choose 5 units from Table 1
1 General Education subject

Year 3

Choose 4 Level III Geography units
GEOG3000
Choose 3 units from Table 1
1 General Education subject

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

Year 4 (Honours)
GEOG4100/GEOG4050

Recommended Elective Subjects

Biological Science
Geology

Biochemistry

Biochemistry is at the foundation of the biological sciences and is concerned with an understanding of life processes, especially with regard to molecular aspects of living organisms. Historically, the diverse approaches of chemistry and physiology were applied to biological systems but now Biochemistry has achieved its own techniques, approaches and body of knowledge and its ideas pervade the whole of biology. It, however, retains a molecular basis and is an ideal study for those students who are interested in understanding and appreciating biological processes at the molecular rather than descriptive level. Integration of this molecular approach at the cellular, tissue, organ and whole organism level is an important part of Biochemistry. Biochemistry also represents a fundamental component of medical science and has an important role in many aspects of modern medicine.

Study of Biochemistry begins at Level II (BIOC2312 Principles of Biochemistry and Molecular Biology) building on a base of Level I Chemistry and Biology. The material in this double unit introduces the basic concepts of the subject, describes

biological molecules, their interconversions in cells and tissues and the relationship between the structures and functions of enzymes, other proteins, hormones and biological membranes.

At Level III, further subjects are offered which cover various aspects of Biochemistry. These include BIOC3111 Molecular Biology of Proteins, BIOC3121 Molecular Biology of Nucleic Acids, BIOC3261 Human Biochemistry, BIOC3271 Cellular Biochemistry and Control, BIOC3281 Recombinant DNA Techniques and Eukaryotic Molecular Biology and BIOC3131 Biochemistry and Genetic Engineering of Plants.

In Year 4, the Honours Course in Biochemistry (BIOC4318 Biochemistry Honours) offers the opportunity for those students who have obtained above average results to carry out a research project under supervision and to receive training in the latest research techniques.

Program 4100 Biochemistry

The program outlined below describes a major study in Biochemistry with provision for a considerable choice of subjects offered by other Schools and Departments. It can be used as a framework to combine Biochemistry with major studies in other disciplines, for example Microbiology, Chemistry, Physiology, Biotechnology, Biological Science, Genetics or Anatomy; other combinations are also possible. In arranging the combination of these major studies, the programs of the two relevant Schools or Departments should be consulted, especially if there is a possibility of proceeding to Year 4 (Honours). Program 4100 can also be followed for a major study in Biochemistry that is supported by one or two minor sequences - for example, Biochemistry with some Chemistry and some Microbiology, or Biochemistry with some Physiology and some Anatomy. The program also permits up to 6 Level III Biochemistry units to be taken rather than the usual minimum of 4. The structure of the usual program (with 4 Level III Biochemistry units) can be modified to replace one of the 4 Level III Biochemistry units with one of a small number of approved Level III units offered by other Schools and Departments. The approved Level III replacement units include any of those offered by the Department of Biotechnology, the Immunology units offered by the School of Microbiology and BIOS3141 Ultrastructure and Function of Cells offered by the School of Biological Science. Other replacements may be approved by the Head of the School of Biochemistry. All of these combinations can serve as prerequisites for an Honours Year in Biochemistry provided that passes are obtained in a total of 8 Level III units including above average results in Biochemistry.

4100
Biochemistry

Year 1

CHEM1002 or both CHEM1101 and CHEM1201   Chemistry

MATH1032 or MATH1042 or both MATH1011 and
MATH1021   Mathematics

BIOS1011, BIOS1021   Biology

Choose 2 Level I units from Table 1*

Year 2

CHEM2021 or CHEM2041

BIOS2011, BIOS2021

BIOC2312

Choose 2 or 3 units from Table 1

1 General Education subject

Year 3

BIOC3111 or BIOC3121 or both BIOC3111 and BIOC3121

Choose 2 or more units from Level III Biochemistry to make a total of at least 4 Level III Biochemistry units. (Note: One of these units may be replaced by a Level III unit from the Department of Biotechnology or by another approved Level III unit from those offered by the Schools of Microbiology or Biological Science - see the description above for Program 4100 Biochemistry)

Choose further units from Table 1 to give a total of 23 for the complete Program.

1 General Education subject

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

Year 4 (Honours)

BIOC4318

* Recommended are units offered by the School of Physics and the Department of Computer Science.

Recommended Elective Subjects

Biological Science
Biotechnology
Chemistry
Microbiology
Physiology

Biotechnology

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

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

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

4200
Biotechnology

Year 1

CHEM1002 *or both* CHEM1101 *and* CHEM1201	*Chemistry*
MATH1032 *or* MATH1042 *or both* MATH1011 *and* MATH1021	*Mathematics*
BIOS1011, BIOS1021	*Biology*

Choose 2 Level 1 units from Table 1

Year 2

BIOS2011, BIOS2021

BIOC2312, MICR2011

Choose 2 additional units from Table 1 to make a total of 7 for the year

2 General Education subjects

Year 3

BIOT3011, BIOT3021, BIOT3031, BIOT3061

Choose additional units from Table 1 to give a total of 23 for the complete program

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

Year 4 (Honours)

BIOT4073 (F/T) BIOT4083 (P/T)

Recommended Elective Subjects

Biochemistry
Chemistry
Microbiology

Microbiology and Immunology

The discipline of microbiology encompasses the scientific study of the smallest forms of life, namely bacteria, viruses, algae, fungi and protozoa. Microorganisms are probably best known as agents of disease in people, in other animals and in

plants. Other microorganisms cause food spoilage, as well as serious deterioration in textiles and structural materials. Not all microorganisms are harmful. We depend on microorganisms for the recycling of organic wastes, for the biodegradation of pollutants, for the maintenance of soil fertility, and for the production of foods, beverages, pharmaceuticals (especially antibiotics), and other industrially important materials.

Immunology, the study of the immune system, has contributed significantly to modern medicine in areas such as: blood transfusion, organ transplantation, allergic reaction and immunity to disease. In the field of cell biology, immunology has advanced our understanding of differentiation, cell-cell co-operation and the triggering of proliferation and differentiation by cell surface receptors.

The program in Microbiology and Immunology requires students to take basic courses in Chemistry, Mathematics and Biology in Year 1.

4400
Microbiology*

Year 1
CHEM1002 or both CHEM1101 and
CHEM1201   *Chemistry*
MATH1032 or MATH1042 or both MATH1011
and MATH1021   *Mathematics*
BIOS1011, BIOS1021   *Biology*
Choose 2 Level 1 units from Table 1

Year 2
BIOS2011, BIOL2021
BIOC2312
MICR2011
Choose 2 or 3 units from Table 1
1 General Education subject

Year 3
MICR3011, MICR3021
Choose at least 2 units from BIOS3041, MICR3031, MICR3041, MICR3051, MICR3061, MICR3071, MICR3081
Choose other units from Table 1 to give a total of 23 for the complete program
1 General Education subject

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

Year 4 (Honours)
MICR4013, MICR4023

*Students wishing to include MICR3041 Immunology 1 in their program are strongly advised to take ANAT2211 Histology I in Year 2. The subject BIOS2041 Biometry is recommended as a useful elective. In particular, students interested in MICR3071 Environmental Microbiology or in a research career in any area are strongly advised to take this subject.

Recommended Elective Subjects

Biochemistry
Biotechnology
Biological Science

Philosophy

Philosophy is a wide-ranging discipline, catering for a great diversity of interests, for instance, in science, reasoning, persons, and social issues, and encouraging critical and imaginative thought about the foundations of other subjects. Apart from providing considerable choices for students majoring in Philosophy, the diversity of Upper Level subjects makes it possible for students majoring in other disciplines to select subjects complementing their main interest.

First Enrolment in Philosophy
There are two Level I subjects:
PHIL1006   Introductory Philosophy A (Session 1).
PHIL1007   Introductory Philosophy B (Session 2).

Each of these has one unit value. They can be taken separately, and a student can gain Level II status in Philosophy (ie qualify to enrol in Upper Level subjects) by passing in only one. However, students enrolling in one normally enrol in both, and students wishing to major in Philosophy must do so.

Value of Upper Level Subjects in Philosophy
All Level II/III subjects in Philosophy have one unit value.

Specialization in Philosophy
Students specializing in Philosophy must complete, in addition to PHIL1006 and PHIL1007 (Introductory Philosophy A and Introductory Philosophy B), the equivalent of six full-point Upper Level (II/III) units. Of these, at least four units must be chosen from List A, which includes subjects in Logic, Philosophy of Mind, Philosophy of Science, and areas of History of Philosophy relevant to those subject areas. Students normally take the equivalent of two Level I II/III units in Year 2, and the equivalent of four Level I II/III units in Year 3.

List A
PHIL2106   Logic
PHIL2216   Human Nature and Human Understanding:
                 the Empiricist Approach
PHIL2806   Contemporary Philosophy of Mind
PHIL2207   Issues in the Philosophy of Psychology
PHIL2108   Ways of Reasoning
PHIL2308   Reason and the Passions:
                 Descartes, Spinoza and Hume
PHIL2218   Philosophical Foundations of Artificial Intelligence
PHIL2217   Personal Identity
PHIL2107   Advanced Philosophy of Science
PHIL3106   Pre-Honours Seminar
PHIL2109   Metaphysics (Realisms)
PHIL2208   Epistemology (Skepticisms)
PHIL2209   Epistemology (Beliefs and Knowledge)

The remaining two units are to be chosen from other Upper-Level Philosophy subjects in Table 1 or EURO2400 in Table 2.

Level II/III

Some Level II/III subjects deal with particular philosophical topics; others can be taken in sequence to give more sustained treatments of larger areas. Students may select freely among these, subject to stipulations regarding prerequisites. They are welcome to seek advice and further information from the School.

In certain circumstances the prerequisite specified for subjects may be waived; for example, in the case of students who have already studied similar material, or who wish to take isolated subjects relevant to another discipline. Students who feel they have a case for a concession of this kind should consult the School.

Honours Entry Requirements

Students intending to proceed to an Honours degree in Philosophy, complete Years 1 – 3 of Programs 5200 or 5262 with an overall credit record – and some indications of Distinction ability – in the Philosophy units included in those programs; plus PHIL3106 Pre-Honours Seminar.

science, or who merely wish to deepen their comprehension of the subject matter of a major in another field. The program leads towards a core subject PHIL2107 Advanced Philosophy of Science in Year 3.

Students should note, however, that they may not 'double-count' subjects towards a second specialization and they must satisfy general requirements for the Science and Mathematics Course. Also, students must meet certain prerequisite requirements within the programWhile the program given below is to be taken as normative, variations may be approved by the Co-ordinator. In particular, students otherwise deemed suitably prepared may be permitted to enter the program in Year 2, without being required to complete all of the usual Year 2 subjects, provided they complete an additional option from within the program.

Suitably qualified students may proceed from the program to a fourth year honours program in Philosophy or Science and Technology Studies. The regulations are set out below under the school headings. Intending students should consult the School of Philosophy at the earliest opportunity.

5200
Philosophy

Year 1

MATH1032 or MATH1042 or both MATH1011 and MATH1021	Mathematics
PHIL1006, PHIL1007	Philosophy

Choose 4 Level I Units from Table 1

Year 2

Choose 2 Philosophy units*
Choose 6 units from Table 1
1 General Education subject

Year 3

Choose 4 Philosophy units*
Choose 3 units from Table 1
1 General Education subject

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

Year 4 (Honours)

PHIL4000

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

Philosophy of Science

The Philosophy of Science program is designed to provide a coherent sequence of subjects for students who wish to prepare themselves for the undertaking of advanced study within the areas of logic, methodology and philosophy of

5262
Philosophy of Science

Year 1

MATH1032 or MATH1042 or both MATH1011 and MATH1021	Mathematics
Choose 1 unit from:	
PHIL1006 PHIL1007 or	Philosophy
HPST1106, HPST1108, HPST1107	STS

Choose 5 Level I units from Table 1

Year 2

PHIL2106
PHIL2116 or HPST2106
HPST2116
Choose further units from Table 1 to make a total of 8 for the year.
1 General Education subject

Year 3

PHIL2107
Choose 3 units from:
PHIL2207, PHIL2116, HPST3106, HPST3117, SCTS301U
Choose 3 units from Table 1
1 General Education subject

Year 4 (Honours)

PHIL4000 or SCTS4106

Science and Technology Studies

The School of Science and Technology Studies offers BSc students an integrated program (6200) combining subjects in the History and Philosophy of Science and Technology (HPST) and in Science, Technology and Society (SCTS). Students may also take units in either or both areas as elective subjects in other BSc programs.

Subjects in the History and Philosophy of Science and Technology (HPST) examine the history of scientific and technological development, the nature and philosophical implications of the knowledge and methods involved in this development, and the historical dynamics of scientific and technological change. Subjects in Science, Technology and Society (SCTS) examine the social, economic and political dimensions of scientific and technological change, especially in the twentieth century.

The Pass Degree
The program offered by the School gives students a wide range of options from which to choose in studying the historical, philosophical and social aspects of science and technology. Students intending to complete the pass degree are required to take eight HPST and/or SCTS units. The remaining units in this program may be chosen from those listed in Table I, which allows sufficient flexibility for the completion of a second specialization in a scientific discipline, if this is desired. Students wishing to enquire about such a second specialization within program 6200 are invited to contact the School and the relevant second School for further information.

HPST and SCTS subjects with numbers in the 1000 range are Level 1 units. Those in the 2000 and 3000 range are all Level II/III units and may be taken in any order provided that the prerequisites for each individual unit are met.

The Honours Degree

Students intending to proceed to an honours degree in Science and Technology Studies must complete the first three years of program 6200 with marks that result in an average of Credit or better in the eight HPST and/or SCTS units included. The three-year program leading to honours entry offers sufficient scope for the completion of a second specialization in a scientific field, if this is desired. All students intending to complete an honours degree within program 6200 are invited to contact the School for further information.

6200
Science and Technology Studies

Year 1
MATH1032 or MATH1042 or both
MATH1011 and MATH1021   *Mathematics*
Choose any Level I HPST or   *Science and*
SCTS unit   *Technology Studies*
Choose 5 Level I units from Table 1

Year 2
HPST2106
SCTS2106 or SCTS 2107
Choose 1 additional HPST or SCTS unit
Choose 5 units from Table 1
1 General Education subject

Year 3
Choose 4 HPST or SCTS units
Choose 3 units from Table 1
1 General Education subject

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

Year 4 (Honours)
SCTS4106

Board of Studies in Science and Mathematics

6801
For Anatomy Programs

Year 1
MATH1032 or MATH1042 or both MATH1011
and MATH1021   *Mathematics*
BIOS1011, BIOS1021   *Biology*
Choose 4 appropriate Level I units from Table 1

Enrolment in Year 2 of program 7000 is based on academic performance in Year 1. Students should select the subjects 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 Biological Sciences Building.

6810
Mathematics of Management*†

Year 1
MATH1032 or MATH1042   *Mathematics*
ACCT1501, ACCT1511   *Accounting*
ECON1101, ECON1102E   *Economics*
Choose 2 Level I units from:
1. Table 1 or
2. Table 2 for program 6810

Year 2
MATH2100, MATH2120, MATH2160, MATH2180, MATH2501
MATH2510, MATH22520, MATH2801 or MATH2841
ACCT2522, INFS1602
Choose 1 unit from: ACCT2542, INFS2603, FINS2613.
1 General Education elective

Year 3
Choose 2 units from: MATH2821, MATH3101, MATH3121, MATH3161, MATH3181, MATH3801, MATH3870, MATH3880.
Choose 2 further Level III Mathematics units
Choose 2 units from one of the strands:
1. ACCT3563, ACCT3583
2. INFS3605, INFS3607, INFS3608
3. FINS3614, FINS3615

Choose 1 unit from:
1. Table 1 *or*
2. Table 2 for program 6810
1 General Education elective

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

**Throughout this program Mathematics subjects can be replaced by the corresponding Higher Mathematics subject.*

†For details see preamble to Mathematics programs.

6817
For Biological Sciences Programs

Year 1
CHEM1002 *or both* CHEM1101 *and* CHEM1201	*Chemistry*
MATH1032 *or* MATH1042 *or both* MATH1011 *and* MATH1021	*Mathematics*
BIOS1011, BIOS1021	*Biology*

Choose 2 Level I units from Table 1

In Year 2 students transfer to an appropriate program in one of the biological sciences. Advice should be sought from the Office of the School in which they intend to specialize.

In 1989 the Faculty of Biological and Behavioural Sciences introduced a compulsory common core in Level II consisting of four units as follows: Principles of Biochemistry and Molecular Biology (2 units), Introductory Genetics, and Evolutionary and Physiological Ecology.

The core is compulsory for all students taking programs other than Psychology programs that are offered within the Faculty of Biological and Behavioural Sciences (in particular 1700 Biological Science, 1743 Botany, 1745 Zoology, 4100 Biochemistry, 4200 Biotechnology, and 4400 Microbiology). The changes have been made in order to avoid duplication of effort (eg between biochemistry, microbiology and genetics) and to present basic material covering a broad spectrum of biological science in a more cohesive manner.

Individual subjects within the core are available to students in other programs and are prescribed in such programs as 6832 Marine Science (Biological Oceanography) and 6840 Genetics.

Marine Science

The Marine Science programs are designed to provide opportunities for students to specialize in selected areas of marine science, yet ensure that they receive an adequate exposure to other pertinent disciplines within this broad field.

The programs have been constructed from subjects currently available in the faculties of Science, Biological and Behavioural Sciences and Applied Science. Introductory Marine Science is a subject common to all these programs.

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

Physical Oceanography includes units of basic and advanced Mathematics and Physics, as well as units in MATH3241 Fluid Mechanics and MATH3261 Oceanography. At Honours level, units in waves, turbulence and geophysical fluid mechanics are offered.

Biological Oceanography includes basic Mathematics, Chemistry and Biology as well as advanced courses in, BIOS2031 Biology of Invertebrates, BIOS2051 Flowering Plants, BIOS3081 Marine Ecology, BIOS3091 Phycology and Marine Botany, MICR2201 Introductory Microbiology and MICR3021 Environmental Microbiology. Further options include MATH2841 Statistics and BIOC2312 Principles of Biochemistry and Molecular Biology.

Earth Science Oceanography consists of basic Geology and Mathematics, and advanced units in Geology and Geography leading to GEOL6330 Exploration Seismic Methods, GEOL6310 Marine Mineral Deposits and Resources, GEOL6311 Marine Geology, GEOL6312 Estuarine Geology and GEOL6231 Hydrological and Coastal Surveying.

Environmental Chemistry includes basic Chemistry and Mathematics, and CHEM2011 Physical Chemistry, CHEM2041 Analytical Chemistry, CHEM3041 Analytical Chemistry and CHEM3311 Environmental Chemistry.

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

6831
Marine Science
(Physical Oceanography)

Year 1
PHYS1002	*Physics*
PHYS1611 *or*	
MATH1032 *or* MATH1042	*Mathematics*

Choose 2 units from 1 of the strands:
1. CHEM1002 *or both* CHEM1101 *and* CHEM1201 *or*	*Chemistry*
2. BIOS1011, BIOS1021 *or*	*Biology*
3. GEOL1101, GEOL1201	*Geology*

MATH1081 or choose 1 further unit from the above strands

Year 2
MATH2120, MATH2160, MATH2180, MATH2501
PHYS2001
MSCI2001
MATH2200 or MATH2220

Continue the strand chosen in Year 1:
1. CHEM2011 *or*
2. CHEM2041 at least 1 unit from: BIOS2011, BIOS2051, BIOS3111 *or*
3. GEOL6201
Choose 2 additional units from Table 1 to give a total of 8
1 General Education subject

Year 3
MATH2280
MATH3121
MATH3201
MATH3241
MATH3261
MSCI3001

Choose 25 units from: PHYS2021, PHYS2031, PHYS2601, PHYS3150, PHYS3631, MATH3101, MATH3301, GEOL6330, BIOS3081 *or* GEOL6311 *or* GEOL6231 *or* BIOS3091

1 General Education subject

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

Year 4 (Honours)
MSCI4003

6832
Marine Science
(Biological Oceanography)

Year 1
CHEM1002 *or both* CHEM1101 *and*
CHEM1201   *Chemistry*
MATH1032 *or* MATH1042 *or both*
MATH1101   *Mathematics*
and MATH1021
BIOS1011, BIOS1021   *Biology*
Choose 2 units from 1 of the strands:
1. PHYS1002 *or* PHYS1022 *or*   *Physics*
2. GEOL1101, GEOL1201   *Geology*

Year 2
CHEM2011
CHEM2041
MICR2201
BIOS2031

MSCI2001
Choose 1 unit from the subjects related to the strand chosen in Year 1:
1. MATH2021 *or* MATH2801 *or*
MATH2841 *or*
2. GEOL6231
Choose units from: BIOS2011, BIOS2021, BIOS2041, BIOS2061, BIOC2312 to give a total of 8 for the year
1 General Education subject

Year 3
BIOS3081, BIOS3091
MICR3021
Choose 2 Level III units from Table 1 which may include the

subjects corresponding to the strand chosen in Years 1 and 2:
1. MATH3021, MSCI3001 *or*
2. GEOL6321
Choose 2 units from Table 1
1 General Education subject

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

Year 4 (Honours)
MSCI4003

6833
Marine Science (Earth Science Oceanography)

Year 1
MATH1032 *or* MATH1042 *or both* MATH1011   *Mathematics*
and MATH1021
GEOL1101, GEOL1201   *Geology*
Choose 4 units from 2 of the strands:
1. PHYS1002 *or* PHYS1022 *and/or*   *Physics*
2. BIOS1011, BIOS1021 *and/or*   *Biology*
3. CHEM1002 *or both* CHEM1101 *and*
CHEM1201   *Chemistry*

Year 2
MSCI2001
GEOL6201, GEOL6231
Continue both of the strands chosen in Year 1:
1. MATH2021 *or* MATH2841 *or* MATH2801 *and/or*
2. At least 1 unit from: BIOS2011, BIOS2031, BIOS2051 *and/or*
3. CHEM2011 or CHEM2081
Choose additional units from Table 1 to give a total of 8
1 General Education subject

Year 3
GEOL6310, GEOL6330, GEOL6311, GEOL6321
Choose 3 Level III units from Table 1 which may include the subjects corresponding to the strands chosen in Years 1 and 2:
1. MSCI3001, MATH3021 *and/or*
2. BIOS3081, BIOS3091 *and/or*
3. CHEM3311
Choose 1 unit from Table 1
1 General Education subject

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

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

6834
Marine Science (Environmental Chemistry)

Year 1
CHEM1002 *or both* CHEM1101 *and* CHEM1201   *Chemistry*
MATH1032 *or* MATH1042   *Mathematics*
Choose 4 units from 2 of the strands:
1. PHYS1002 *and/or*   *Physics*
2. BIOS1011, BIOS1021 *and/or*   *Biology*
3. GEOL1101, GEOL1201   *Geology*

Year 2
CHEM2011, CHEM2041
MSCI2001
Continue both of the strands chosen in Year 1:
1. MATH2021 *or* MATH2841 *and/or*
2. At least 1 unit from: BIOS2011, BIOS2051, BIOS2031 *and/or*
3. GEOL6231
Choose additional units from Table 1 to give a total of 8
1 General Education subject

Year 3
CHEM3041, CHEM3311
Choose 2 Level III units from Table 1 which may include the subjects corresponding to the strands chosen in Years 1 and 2:
1. MSCI3001, MATH3021 *and/or*
2. BIOS3081, BIOS3091 *and/or*
3. None
Choose 3 units from Table 1
1 General Education subject

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

Year 4 (Honours)
MSCI,4003 (F/T) MSCI4009 (P/T)

Genetics

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

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

The choice of Year 1 subjects available include Physics, Psychology and Geography.

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

6840
Genetics

Year 1
CHEM1002 *or both* CHEM11101 *and*
CHEM1201   *Chemistry*
MATH1032 *or* MATH1042 *or both*
MATH1011 *and* MATH1021   *Mathematics*
BIOS1011, BIOS1021   *Biology*
Choose 2 Level I units from Table 1

Year 2
BIOS2011, BIOS2021
BIOC2312
MATH2841 *or* BIOS2041
Choose 1 unit from: BIOS2031, BIOS2051, BIOS2061, MICR2011
Choose 2 further units from one of the following groups:
1. CHEM2021, MICR2011
2. COMP1011 and either WOOL3803 or BSSM2101
3. BIOS2051, BIOS2031 *or* BIOS2061, WOOL3803, HPST2107 *or*
BSSM2101
1 General Education subject

Year 3
Choose at least 4 units from:
WOOL4813, BIOC3121, BIOC3281 BIOT3031 or MICR3021, BIOS3071 or CMED8201, BSSM3101, CMED8202 or CMED8302, CMED8303 *and* other units from Table 1 to give a total of 23 for the complete program. The following are recommended: COMP1021, WOOL3901, BIOC3111, BIOC3131, BIOT3011, MICR3011, MICR3041, BIOS3141.
1 General Education subject

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

Year 4 (Honours)
BSSM4103 (F/T)
BSSM4109 (P/T)

Ecology

The ecology programs are designed to allow students to obtain a specialization in selected areas of Ecology while at the same time providing the opportunity to obtain experience in a wide range of cross disciplinary subjects that reflect the related disciplines contributing to the science of ecology. Three programs have been devised from subjects currently available in the Faculties of Science, Biological & Behavioural Sciences and Applied Science. Program 6851 Geographical Ecology provides for a concentration of subjects in Botany, Zoology, and Geography; Program 6852 Mathematical Ecology provides for a concentration of subjects in Botany, Zoology and Statistics and Program 6853 Biological Ecology provides for its major concentration within the Biological

Sciences but includes contributions from other faculties. Some optional subjects are available in each program to allow students to choose subjects which match their own interests and career aspirations. The selection of these subjects must be discussed with a program adviser. A fourth (Honours) year in Ecology is available in all programs.

6851
Geographical Ecology

Year 1
MATH1032 or MATH1042 or both MATH1011 and MATH1021	Mathematics
BIOS1011, BIOS1021	Biology
GEOG1012, GEOG1031,	Geography

Choose 1 of the strands:
1. GEOL1101, GEOL1201	Geology
2. CHEM1002 or both CHEM1101 and CHEM1201	Chemistry
3. 2 Level I units from Table 1	

Year 2*
BIOS2051
BIOS2031 or BIOS2061
BIOS2041 or GEOG2013
GEOG2021, GEOG3062

Choose at least 2 units from:
BIOS2011, BIOS2021, BIOS2031, BIOS2061, GEOL2121, GEOL6231, GEOG2032, GEOG3032, GEOG3042, MICR2201, MICR2011
1 General Education subject

Year 3
BIOS3101, BIOS3111
GEOG3011, GEOG3021
Choose at least 2 units from:

BIOS3011, BIOS3031, BIOS3051, BIOS3061, BIOS3081, BIOS3121, BIOS3131, BIOS3051 and

GEOG2021, GEOG2032, GEOG3032, GEOG3042, GEOG3051, MICR3071 and further units from Table 1 to give a total of 23 for the complete program
1 General Education subject

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

Year 4 (Honours)

BSSM4023 (F/T), BSSM4029 (P/T)

*Students should make sure they are able to satisfy prerequisites and must consult with advisers from the Ecology Program.

6852
Mathematical Ecology

Year 1
MATH1081, COMP1181	Computer Science
MATH1032 or MATH1042	Mathematics
BIOS1011, BIOS1021	Biology

Choose 1 of the strands:
1. PHYS1002 or PHYS1022	Physics
2. CHEM1002 or both CHEM1101 and CHEM1201	Chemistry
3. GEOG1012, GEOG1031	Geography

Year 2*
MATH2501, MATH2510, MATH2801, MATH2821, BIOS2031 and

BIOS2051 and BIOS2061 or BIOS2031

Choose at least 2 units from:
MATH2810, MATH2830, BIOS2011, BIOS2021, BIOS2031, BIOS2061, GEOG2021, GEOG2032, GEOG3032, GEOG3042, GEOG3062, MICR2201 or MICR2011
1 General Education subject

Year 3
BIOS3101, BIOL3111, GEOG3021
Choose at least 3 units from:

MATH2810, MATH2830, MATH3801, MATH3811, MATH3820, MATH3830, MATH3840, MATH3850, MATH3861

Choose at least 1 unit from:

BIOS3121, BIOS3011, BIOS3021, BIOS3051, BIOS3061, BIOS3071, BIOS3081, BIOS3141, BIOS3131, GEOG2013, GEOG3011, GEOG3051, GEOG3062, MICR3071
Choose further units from Table 1 to give a total of 23 for the complete program
1 General Education subject

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

Year 4 (Honours)
BSSM4023

*Students should make sure they are able to satisfy prerequisites and must with advisers from the Ecology Program.

6853
Biological Ecology

Year 1
CHEM1002 or both CHEM1101 and CHEM1201	Chemistry
MATH1032 or MATH1042 or both MATH1011 and MATH1021	Mathematics
BIOS1011, BIOS1021	Biology
GEOG1012, GEOG1031	Geography

Year 2*
BIOS2011, BIOS2021, BIOC2312, BIOS2041, BIOS2051,
Choose at least 2 units from:
BIOS2031 BIOS2061, MICR2201 or MICR2011
1 General Education subject

Year 3
BIOS3101, BIOS3111, GEOG3021
Choose 2 further units including at least 1 at Level III from:

BIOS3011, BIOS3021, BIOS3031, BIOS3041, BIOS3051 and BIOS3061, BIOS3071, BIOS3081, BIOS3121, BIOS3131, BIOS3141, GEOG2013, GEOG3011, GEOG3051, GEOG3062, MICR3031, MICR3071
Choose further units from Table 1 to give a total of 23 for the complete program
1 General Education subject

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

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

*Students should make sure they are able to satisfy prerequisites and must consult with advisers from the Ecology Program.

Anatomy

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

Anatomy subjects are, in general, only available to students who have been admitted to the Anatomy quota. However, students in programs 4400 (Microbiology-Immunology strand) and 6840 (Genetics) may apply to take ANAT2211, ANAT2111, ANAT3211 and ANAT3220.

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

A major in Anatomy may suitably be combined with elective subjects from Biochemistry (ANAT3211 or ANAT3220 recommended), Physiology or Psychology.

PATH3201 Basic and Applied Pathology may be counted as a Level III Anatomy unit.

7000
Anatomy

Year 1*
MATH1032 *or* MATH1042 *or both* MATH1011   *Mathematics and* MATH1021
BIOS1011, BIOS1021   *Biology*
Choose 4 Level I units from Table 1
Apply for entry to the Anatomy quota for following year

Year 2
ANAT2111, ANAT2211

Choose 5 or 6 units from:
1. Table 1 *and/or*
2. Anatomy units in Table 2 (ANAT3311 is recommended)
1 General Education subject

Year 3
Choose at least 4 Level III Anatomy units (may include PATH3201)
Choose further units from Table 1 to give a total of 23 for the complete program
1 General Education subject

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

Year 4 (Honours)
ANAT4508

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

Recommended Elective Subjects

Biological Science
Biochemistry
Physiology
Psychology

Physiology and Pharmacology

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

Prior to commencing these subjects, students are required to have satisfactorily completed Level I courses in Mathematics, Biology and Chemistry, as a background in these subjects is considered essential to an understanding of how the body functions. Students intending to major in Physiology should note Physiology 2 prerequisites.

Physiology 2 is a major (third year level) subject in Physiology and in this subject various systems of the body are treated in considerable detail. Progression to this full year subject normally requires the satisfactory completion of Physiology 1 and the Level II Biochemistry subject. Physiology 2 provides the 4 units at third year level required for a degree with a single specialization in Physiology. Alternatively it may be undertaken concurrently with a Level III subject offered by other schools in allied disciplines, such as Chemistry,

Psychology, Zoology, Biochemistry or Anatomy, to form a program leading to the award of a degree with a double specialization. Students who wish to take Physiology as a major subject should follow Strand 1 of the program 7300.

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

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

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

Year 3
Continue the strand chosen in Year 2:
Either
1. PHPH3114
or
2. PHPH3152
and either
2 Level III Chemistry units
or
BIOC3111 and BIOC3121, BIOC3271 *or*
PHPH3114

Choose further units from Table 1 to give a total of 23 for the complete program.
1 General Education subject

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

Year 4 (Honours)
PHPH4218 or PHPH4258

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

Recommended Elective Subjects

Anatomy
Biological Science
Biochemistry
Chemistry
Psychology

7300
Physiology and Pharmacology

Year 1

CHEM1002 *or both* CHEM1101 *and*	
CHEM1201	*Chemistry*
MATH1032 *or* MATH1042 *or both* MATH1011	*Mathematics*
and MATH1021	
BIOS1011, BIOS1021	*Biology*
Choose 2 Level I Units from Table 1	

Year 2*

PHPH2112
Choose one of the strands
1. BIOC2312
or
2. Choose 3 Level II units (should normally include prerequisite subjects for one of the Pharmacology co-requisite subjects shown for year 3)
Choose 4 units from Table 1
1 General Education subject

Board of Studies in Science and Mathematics

Course Outline 3431

3431
Psychology Degree Course
–Full-time Course

Bachelor of Science (Psychology)
BSc(Psychol)

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

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

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

2. supporting studies in mathematics and or biology a minimum of one such course is compulsory;

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

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

For these reasons, no course patterns are prescribed The patterns to be completed by students who are admitted with advanced standing will take into account the subjects credited.

Students commencing university studies for the first time will arrange their pattern of supporting subjects in consultation with the Head of the School or her representative before completing enrolment.

The course is available on a full-time basis only Entry into the course is subject to a quota which is determined from time to time.

In the fourth year, students undertake a program of study which includes courses in the major areas of general psychology and in a number of applied fields In addition, each student must complete either a research thesis or a group research project

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

Rules governing the Psychology Course

1. Applicants for admission to the Course must be matriculated to this University; and also have satisfied either the entrance requirements for MATH1032 Mathematics 1 *or* MATH1011 General Mathematics 1B and MATH1021 General Mathematics 1C or for BIOS1011 Biology A and BIOS1021 Biology B

2. (1) In order to qualify for admission to the award of degree of BSc(Psychol) under these regulations a candidate must attend classes and satisfy the examiners in the following program:

Year 1

BIOS1011 *and* BIOS1021 *or*
MATH1032 *or both* MATH1011 *and* MATH1021 *or*
PSYC1002

45

ECON1101 *and* ECON1102 *or* PHIL1006 *and* PHIL1007 *or*
12 Arts credit points of Level I Sociology *or*
Political Science or other approved discipline
Choose 1 elective Year 1 subject from Arts or Science

Year 2

PSYC2001, PSYC2011, PSYC2021, PSYC2031, PSYC2042
Choose one Year 2 subject following on from one of the Year
1 non-psychology subjects – this constitutes a recognized
sequence (one Year 2 subject is equivalent to 2 Science Level
II units or 12 Arts Upper Level credit points)

1 Category A General Education elective (56 hours)
1 Category B General Education elective (56 hours)

Note: If one of the Year 1 non-psychology subjects is divided
into 2 single session subjects students may be able to replace
the Session 2 subject by the Category A General Education
elective and in Year 2 take the other non-psychology subject
and the Category B General Education elective.

Year 3

PSYC3001, PSYC3021, PSYC3031
Choose 5 further Level III Psychology units

Note: Students intending to take PSYC4003 in Year 4 must
take PSYC3011

Year 4

PSYC4003 or PSYC4013

Examples of recognized sequences are:
Mathematics or Statistics
Year 1
MATH1032
Year 2
Choose *either 2 Level II units of Pure or Applied Maths or*
MATH2801 *and* MATH2810 for Statistics

Biochemistry
Year 1
BIOS1011, BIOS1021
CHEM1002,

Year 2
BIOC2312

Physiology*
Year 1
BIOS1011, BIOS1021
CHEM1002,
Year 2
PHPH2112

Zoology
Year 1
BIOS1011, BIOS1021
Year 2
Choose 2 units from BIOS2011, BIOS2031, BIOS2061,
BIOS3011

Genetics
Year 1
BIOS1011, BIOS1021
CHEM1002 (for BIOS2021 only)
Year 2
Choose 2 units from BIOS2021 and BIOC2312, BIOS3071
BSSM2101, BSSM3101

Arts
Year 1
12 Level I credit points of Economics, Philosophy, Political
Science, Sociology or other approved discipline.
Year 2
12 Upper Level credit points following on from the Year 1
choice

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

NOTES 1. For details of Psychology and Science subjects,
including pre- and co-requisites, refer to Table 1 of Course
3970 Science and Mathematics set out earlier in this
handbook

2. For details of Arts subjects, including pre- and co-requisites,
refer to the Faculty of Arts handbook.
(2) The proposed course must be approved by the Head of
the School of Psychology or her representative prior to or
during enrolment. The courses must be chosen in such a way
as to fit in with the timetable.
(3) Progression in the Course shall be by subjects, and the
subjects in the Course may be completed in any order
consistent with the requirements concerning prerequisites
and co-requisites for the subjects chosen.

3. *Prerequisites and Co-requisites*
Before enrolling in any course (or equivalent units of a subject)
the student shall have attended the classes and shall have
satisfied the examiners in all relevant prerequisite subjects.
The student should refer to the appropriate Faculty Handbook
for a statement of subject prerequisites and/or co-requisites

4. The degree of BSc(Psychol) will be awarded at either Pass
level or with Honours, after a minimum of four years of full-time
study.

Rules governing admission to the Psychology Course with advanced standing

1. Graduates of the University of New South Wales may be
admitted to the Psychology Course leading to the award of the
degree of BSc(Psychol) with exemption from no more than five
subjects or their unit equivalents that they have completed.
No more than two Psychology subjects may be included in
these exemptions.

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

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

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

Board of Studies in Science and Mathematics

Course Outline 3971

3971
Business Information Technology

Bachelor of Science
BSc

This is an industry linked education course leading to the award of the qualification BSc The course draws on three core disciplinary areas: Information Systems, Accounting, and Computer Science.

The course has been designed in conjunction with the Information Systems industry to provide for the needs of Australian Businesses The course combines the normal requirements for the award of the degree with co-ordinated industrial experience in the sponsoring organisations A scholarship is payable from a fund donated by the sponsoring organisations Entry to the course is limited to students awarded a scholarship through the BIT selection Procedure.

Consideration for entry to the course may proceed only on the basis of an application directly to the Office of Industry Linked Education at the University of New South Wales *and* application through UAC.

Students who are academically acceptable for the 3971 program but who are not offered a scholarship should consider registering for first year entry into the 1400 program If scholarships become available at the end of year 1, students undertaking the 1400 program may be offered transfer to the 3971 program.

An Honours option is also available within the four year BIT program This option is available to students who perform well in years 1 and 2 and require additional courses in years 3 and 4; although it may also be possible to finalise the Honours

program within the first semester of a fifth year (possibly part-time).

Objectives of the Course
This four year program teaches Information Systems (see Program 1400 in Course 3970 for a description) and provides industrial training linked to that teaching The three industrial training periods in the program are each of approximately six months duration, running from January of Years 2 and 4, and July of Year 3 of the program.

3971
Business Information Technology

Year 1

COMP1811,	*Computer Science*
MATH1032 *or* MATH1042	*Mathematics*
ACCT1501 ACCT1511	*Accounting*
INFS1602	*Information Systems*
ECON1101, ECON1102	*Economics*

Year 2
INFS2603, INFS2609
INFS2691
COMP1821
Choose 2 units from:
1. Table 1 *and/or*
2. Table 2 for program 1400
1 General Education subject

47

Year 3
MATH2841
ACCT2522, INFS3605, INFS3608, INFS3616
INFS3692
Choose 1 unit from:
1. Table 1
2. Table 2 for program 1400

Honours students additionally take INFS3607 and a second
unit from Table 1 or Table 2

Year 4 (Pass Degree)
INFS3607, INFS3611
INFS4695
Choose 2 units including at least one at Level III from:
1. Table 1 *and/or*
2. Table 2 for program 1400
1 General Education subject

Year 4 (Honours Degree)
INFS3611
INFS4886, INFS4887
INFS4693, INFS4893
INFS4794, INFS4898

One option must be chosen from INFS4805, INFS4810,
INFS4811, INFS4812, INFS4825, INFS4853, INFS4857,
INFS4891

Choose 1 unit at Level 111 from Table 1 and/or Table 2 for
Program 1400.

1 General Education subject (which alternatively could be
taken in year 3).

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

3611
Combined Science/
Aeronautical Engineering Course

3661
Combined Science/
Industrial EngineeringCourse

3681
Combined Science/
Mechanical Engineering Course

3701
Combined Science/
Naval Architecture Course

3725
Combined Science/
Electrical Engineering Course

3730
Programs in the
Combined Science/
Civil Engineering Course

For details of the Combined Science/Aeronautical Engineering, Industrial Engineering, Mechanical Engineering, Electrical Engineering, Civil Engineering and Naval Architecture Courses refer to the Faculty of Engineering Handbook.

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

3820
Combined Science and
Medicine Course
(BSc MB BS)

For details of the Combined Science/Medicine Course refer to the Faculty of Medicine Handbook.

Board of Studies in Science and Mathematics

Course Outlines

Optometry

3950
Optometry Course

The School provides a four year full-time course in Optometry leading to the award of the degree of Bachelor of Optometry, at either the Pass or Honours level. A new course structure has been implemented from 1991. Professional training including clinical optometry will be interwoven with basic studies of visual and ocular science over the four years of the course. As distinct from past practice the only entry point into Optometry will be at the first year level.

3950
Optometry – Full-time Course

Bachelor of Optometry
BOptom
OLD COURSE

Year 1		Hours per week
PHYS1022	Introductory Physics 1 (For Health and Life Scientists)	6
CHEM1011	Chemistry 1A and	
CHEM1021	Chemistry 1B or	
CHEM1002	Chemistry 1M	
MATH1032	Mathematics 1 or	
MATH1042	Higher Mathematics 1 or	
MATH1011	General Mathematics 1B and	6
MATH1021	General Mathematics 1C	
BIOS1011	Biology A and	
BIOS1021	Biology B	6
		24

3950
Optometry - Full-time Course

Bachelor of Optometry
BOptom
NEW COURSE

Year 1		Hours per week	
		S1	S2
BIOS1011	Biology A	6	-
CHEM1809	Biological Chemistry for Optometry Students	6	6
MATH1051	Mathematics 1F	6	-
PHYS1999	Physics (Optometry)	6	-
OPTM9012	Physical & Geometrical Optics	-	6
OPTM9014	Measurement of Light and Colour	-	2
OPTM9015	Clinical Optometry 1	-	6
OPTM9016	Dispensing	-	2
OPTM9013	Visual Optics	-	4
		24	26

Year 2			
Full Year		S1	S2
OPTM9022	Optics	8	4
OPTM9023	Visual Optics	2	3
OPTM9024	Measurement of Light and Colour		2
OPTM9021	Anatomy and Physiology of the Eye and Visual System	6	7
PHPH2011	Principles of Physiology	6	6
General Education subject (A)		2	2
		24	24

Year 3

PSYC1002	Psychology	5
OPTM9031	Optometry A	6
OPTM9032	Diagnosis and Management of Ocular Disease	5.5
OPTM9033	Theory of Spectacle Lenses and Optical Intruments	1.5
OPTM9034	Clinical Methods	5
One General Education subject (B)		2
		25

Year 4

PSYC4106	Psychology (Optometry)	2
OPTM9042	Optometry B	6
OPTM9041	Clinical Optometry	16
MDCN8001	Principles of Medicine for Optometry Students	1
1 General Education Subject (C)		2
		27

3951
Combined Science/ Optometry Course –

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

1. Undergraduates* of The University of New South Wales who have satisfied the examiners in at least the first two years of the Optometry degree course may be admitted to the Science degree course with advanced standing for the purpose of qualifying for the award of the two degrees of BSc BOptom. Such undergraduates' performance shall have been of a high standard and their admission shall be subject to the approval of the Dean of the Faculty of Science.

2. In order to qualify for the award of the degree of BSc, students so admitted shall be required to complete the appropriate general studies subjects and no less than four units of either Level II or Level III and four other Level III units, in accordance with the Science and Mathematics Course regulations. The units submitted for the award of the Bachelor's degree under these regulations must include at least four Level III units chosen from related disciplines in accordance with the Science Course regulations.

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

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

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

3995
Combined Science/
Commerce Course

Finance and Mathematics

For details of the Combined Science/Commerce Course refer to the Faculty of Commerce and Economics Handbook.

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

4075
Combined Science/
Education Course

For details of the Combined Bsc BEd Course refer to the Faculty of Professional Studies Handbook.

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

4770
Combined Science/
Law Course

For details of the Combined Science/law course refer to the Faculty of Law Handbook.

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).

Biochemistry

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
BIOC3281	Recombinant DNA Techniques and Eukarytic Molecular Biology	III	1	S2	6	BIOC3121		41.132 41.102E
BIOC2312	Principles of Biochemistry and Molecular Biology	II	2	F	6	BIOS1011 *and* BIOS1021, CHEM1101 *and* CHEM1201 *or* CHEM1002		CHEM2929
BIOC3111	Molecular Biology of Proteins	III	1	S1	6	BIOC2312, CHEM2021 *or* CHEM2041		41.102, 41.102A
BIOC3121	Molecular Biology of Nucleic Acids	III	1	S1	6	BIOC2312, CHEM2021 *or* CHEM2041		41.102, 41.102A
BIOC3131	Biochemistry and Genetic Engineering of Plants	III	1	S1	6	BIOC2312		
BIOC3261	Human Biochemistry	III	1	S2	6	BIOC2312		
BIOC3271	Cellular Biochemistry and Control	III	1	S2	6	BIOC2312		

Biological Science

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
BIOS1011	Biology A	I	1	S1	6	See Subject Descriptions later in this Handbook		
BIOS1021	Biology B*	I	1	S1	6	BIOS1011		
BIOS2011	Evolutionary and Physiological Ecology	II	1	S1	6	BIOS1011 and BIOS1021		
BIOS2021	Introductory Genetics	II	1	S2	6	BIOS1011 and BIOS1021	BIOC2132	
BIOS2031	Biology of Invertebrates	II	1	S2	6	BIOS1011 and BIOS1021		
BIOS2041	Biometry	II	1	S1	6	BIOS1011 and BIOS1021		MATH2801 MATH2901 MATH2841
BIOS2051	Flowering Plants	II	1	S2	6	BIOS1011 and BIOS1021		
BIOS2061	Vertebrate Zoology	II	1	S1	6	BIOS1011 and BIOS1021		
BIOS3011	Animal Behaviour	III	1	S2	6	BIOS2041(and (BIOS2031 or BIOS2061)		
BIOS3021	Comparative Animal Physiology	III	1	S1	6	BIOS2031 or BIOS2061		
BIOS3031	Ecological Physiology	III	1	S2	6	BIOS2031 or BIOS2061		
BIOS3041	Plant Microbe Interactions	III	1	S2	6	BIOS2011 and BIOS2051 or MICR2210		
BIOS3051	Entomology	III	1	S1	6	BIOS1011, BIOS1021, BIOS2031		
BIOS3061	Environmental Botany	III	1	S1	6	BIOS1011 and BIOS1021		
BIOS3071	Evolution and Population Genetics	III	1	S1	6	BIOS1011 and BIOS1021		
BIOS3081	Marine Ecology**	III	1	S1	6	BIOS1011 and BIOS1021 BIOS2031 or GEOL6201 or CHEM2041		
BIOS3091	Phycology and Marine Botany	III	1	S2	6	BIOS2051		
BIOS3101	Plant Community Ecology	III	1	S2	6	BIOS2051 or GEOG1012 and GEOG1031 or BIOS2011		
BIOS3111	Population and Community Ecology	III	1	S1	6	BIOS1021 and MATH1032 or MATH1042 or MATH1021		
BIOS3121	Taxonomy and Systematics	III	1	S1	6	BIOS2051		
BIOS3131	Vertebrate Zoogeography and Evolution	III	1	S2	6	BIOS2061		
BIOS3141	Ultrastructure and Function of Cells	III	1	S1	6	BIOS2051 or BIOS2031 or BIOS2061 or BIOC2312 or MICR2201		

Note: A student will not be admitted to Level III Biological Science subjects without special permission of Head of School, unless Chemistry CHEM1101 and CHEM1201, or CHEM1002, have been completed.
*Students with percentile range 65-100 in HSC Examination 4 unit Science with Biology, or 2 unit Biology may apply to enrol in level 2 Biological Science units in lieu of BIOS1021 after completion of BIOS1011. Students are selected by the Director of Biology for enrolment in these units. If successful, students will have met the prerequisite requirement of BIOS1021 Biology B for all units.
**Students intending to enrol in this unit should register with the School of Biological Science for the February field trip by 13 January.

Biotechnology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
BIOT3011	Biotechnology A	III	1	S1	6	BIOC2132		
BIOT3021	Biotechnology B	III	1	S2	6	BIOT3011		
BIOT3031	Microbial Genetics	III	1	S1	6	BIOS2011, BIOS2021 BIOC2312, MICR2011		MICR3021
BIOT3061	Modern Techniques in Biotechnology	III	1	S2	6	BIOC2312		

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No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
BSSM2101	Genetics of Behaviour 1	II	1	S1	5	BIOS1011		
BSSM3101	Genetics of Behaviour 2	III	1	S2	5	BSSM2101		
MSCI2001	Introductory Marine Science	II	1	S1	4			
MSCI3001	Physical Oceanography	III	1	S2	4	MATH1032 or MATH1042		

Chemistry

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
CHEM1002	Chemistry 1	I	2	F	6	See Subject Descriptions later in this Handbook		
CHEM1101	Chemistry 1A	I	1	S1 or S2	6	See Subject Descriptions later in this Handbook		
CHEM1201	Chemistry 1B	I	1	S1 or S2	6	See Subject Descriptions later in this Handbook		
CHEM1302	Introductory Chemistry	I	2	F	6	See Subject Descriptions later in this Handbook		
CHEM1401	Introductory Chemistry A	I	1	S1	6	See Subject Descriptions later in this Handbook		
CHEM1501	Introductory Chemistry B	I	1	S2	6	See Subject Descriptions later in this Handbook		
CHEM2011	Physical Chemistry	II	1	S1 or S2	6	CHEM1002 MATH1032 or MATH1042 or MATH1011 and MATH1021		2.002A
CHEM2021	Organic Chemistry	II	1	F or S2	6	CHEM1002		2.002B

Chemistry (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
CHEM2031	Inorganic Chemistry and Structure	II	1	S1 or S2	6	CHEM1002		2.042C
CHEM2041	Chemical and Spectroscopic Analysis	II	1	S1 or S2	6	CHEM1002, MATH1032 or MATH1042 or MATH1011 and MATH1021		2.002D, 2.003H
CHEM3011	Physical Chemistry	III	1	S1	6	PHYS1002, CHEM2011, CHEM2031 CHEM2041		2.013A
CHEM3021	Organic Chemistry	III	1	S1	6	CHEM2021		2.003B
CHEM3031	Inorganic Chemistry	III	1	S1	6	CHEM2031		2.003C
CHEM3041	Analytical Chemistry	III	1	S1	6	CHEM2041		2.003D
CHEM3111	Kinetics and Mechanism of Chemical Change	III	1	S2	6	CHEM3011		2.053A
CHEM3121	Synthetic Organic Chemistry	III	1	S2	6	CHEM3021		2.013B
CHEM3131	Advanced Inorganic Chemistry	III	1	S2	6	CHEM3031		2.013C
CHEM3141	Advanced Instrumental Analysis	III	1	S2	6	CHEM3041		2.013D
CHEM3211	Biophysical and Interfacial Chemistry	III	1	S2	6	CHEM2011		2.033A
CHEM3221	Biological Organic Chemistry	III	1	S2	6	CHEM3021		2.023B
CHEM3231	Nuclear and Radiation Chemistry	III	1	S2	6	CHEM2011 or CHEM2021 or CHEM2031 or CHEM2041		2.003E
CHEM3311	Environmental Chemistry	III	1	S2	6	CHEM2011, CHEM2041		2.043A
CHEM3321	Applied Organic Chemistry	III	1	S2	6	CHEM3021		2.003L
CHEM3510	Quantum Chemistry and Symmetry	III	.5	S2	3	CHEM2031		2.023A
CHEM3530	Molecular Structure Determination	III	.5	S2	3	CHEM2031, CHEM2041		
CHEM3630	Organometallic Chemistry	III	.5	S2	3	CHEM2021, CHEM2031		2.003M
CHEM3640	Computers in Chemistry	III	.5	S2	3	CHEM2011, CHEM2041		

Community Medicine

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
CMED8201	Population Genetics	III	1	S1	5	See [6] below		
CMED8202	Human Genetic Analysis	III	1	S2	5	See * below		
CMED8302	Biochemical Genetics of Man	III	1	S2	6	BIOC2312 and BIOS2021 or BSSM2101		
CMED8303	Human Genetics	III	1	S1	6	BIOS2021		

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

Electrical Engineering and Computer Science

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
COMP1021*	Computing 1B	II	1	S2	6	COMP1011		COMP1821, 6.620, 6.621, 6.021D
COMP1811	Computing 1 (Procedural)	I	1	S1 or S2	6	As for MATH1032	MATH1032	COMP1011, 6.611, 6.600
COMP1821**	Computing 2	II	1	S1 or S2	6	COMP1811		COMP1021, 6.621 6.021D
COMP2011	Data Organisation	II	1	S1 or S2	5	COMP1021 or COMP1821		6.641
COMP2021	Digital Systems Structures	II	1	S1 or S2	5	COMP1021 or COMP1821		ELEC2012
COMP2031	Concurrent Computing	II	1	S1 or S2	5	COMP1021 or COMP1821		

* COMP1021 Computing 1B will count as a Level 1 subject for students in Program 0600.
** Not available in Year 1 of any program except 1060 (Mathematic with Computing)

Geography

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
GEOG1012	Land Studies	I	1	S1	4			
GEOG1031	Environmental Processes	I	2	S2	4			GEOG1051 26.424
GEOG1051	Global Environmental Problems and Processes*	I	1	S1	4			GEOG1031, 26.424
GEOG1062	Australia and Global Development*	I	1	S2	4			26.455
GEOG2013	Geographical Data Analysis	II	2	F	4	Both GEOG1012 and GEOG1031 or both GEOG1051 and GEOG1062		GEOG3232 GEOG3221
GEOG2021	Introduction to Remote Sensing	II	1	S1	4	See Subject Descriptions later in this Handbook		
GEOG2032	Geomorphology	III	1	S1	5	GEOL1201 GEOG1031 or GEOG1051		

Geography (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
GEOG2081	Australian Environmental Problems**	II	1	S2	4	GEOG1031 or GEOG1051		26.425
GEOG2092	Australian Social and Economic Landscapes**	II	1	Not offered in 1991	4	GEOG1021 or GEOG1062		
GEOG2102	Environmental Issues In Australia	II	1	Not offered in 1991	4			
GEOG3000	Field Project 3	III	0	S2	3	GEOG3011 or GEOG2032 or GEOG3021 or GEOG2081		
GEOG3011	Pedology	III	1	S2	5	GEOG1031 or GEOG1051 and any one of CHEM1101 or CHEM1002, or both GEOL1101 and GEOL1201, or both BIOS1011 and BIOS1021		
GEOG3021	Biogeography	III	1	S2	5	GEOG1031 or GEOG1051, or both BIOS1011 and BIOS1021		
GEOG3032	Remote Sensing Applications	III	1	S2	4	GEOG2021		
GEOG3042	Environmental Impact Assessment	III	1	S1	4	GEOG1031 or GEOG1051		
GEOG3051	Soils and Landforms	III	1	S1	4	GEOG3011 or GEOG2032 or GEOG2081; or by permission of Head of School		
GEOG3062	Environmental Change	III	1	S2	4	See Subject Descriptions later in this Handbook		
GEOG3122	Geographic Information Systems	III	1	S1	4	See Subject Descriptions later in this Handbook		
GEOG3152	Social Welfare and Urban Development	III	1	S1	4	GEOG2092 or GEOG1012		
GEOG3161	Computer Mapping and Display	III	1	S1	4	See Subject Descriptions later in this Handbook		
GEOG3172	Spatial Population Analysis	III	1	S2	4	GEOG2092 or GEOG1012		
GEOG3181	Urban Activity Systems	III	1	S1	4	GEOG2092 or GEOG1012		
GEOG3192	Urban and Regional Development	III	1	S2	4	GEOG2092 or GEOG1012		
GEOG3202	Australian Social Environments	II	1	S1	4	GEOG1012 or GEOG1051		
GEOG3211	Australian Environment and Natural Resources	III	1	S1	4	GEOG2081 or GEOG2032		
GEOG3221	Advanced Geographic Methods	III	1	S1	4	GEOG3232		GEOG2013
GEOG3232	Geographic Methods**	II	1	S2	4	Both GEOG1012 and GEOG1031 or both GEOG1051 and GEOG1062		GEOG2013
GEOG3333	Special Topic	III	1	S1 or S2	4	See Subject Descriptions later in this Handbook		

*A field excursion, equivalent to 8 tutorial hours, is a compulsory part of the subject.
**Three days fieldwork, equivalent to 24 tutorial hours, is compulsory.

Applied Geology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
GEOL1101	Geological Processes**	I	1	S1	6	See Subject Descriptions later in this Handbook		
GEOL1201	Geological Environments ****	I	1	S2	6	GEOL1101		
GEOL2111	Earth Materials 1**	II	1	S1	6	GEOL1201		GEOL6321
GEOL2121	Earth Environments 1	II	1	S1	6	GEOL1201		
GEOL2211	Earth Materials 2****	II	1	S2	6	GEOL2111		
GEOL2230	Mathematical Geology 1	II	.5	S2	3	GEOL1201		
GEOL2231	Earth Physics**	II	1	S2	6	GEOL1101		
GEOL3111	Earth Materials 3	III	1	S1	6	GEOL2211		
GEOL3121	Earth Environments 2	III	1	S1	6	GEOL2121		
GEOL3130	Mathematical Geology 2	III	.5	S1	3	GEOL2230		
GEOL3141	Mineral and Energy Resources 1***	III	1	S1	6	GEOL2211		
GEOL3211	Earth Materials 4****	III	1	S2	6	GEOL2211		
GEOL3241	Mineral and Energy Resources 2****	III	1	S2	6	GEOL2121 or GEOL8220		
GEOL3251	Engineering and Environmental Geology***	III	1	S2	6			
GEOL3271	Advanced Structural Geology****	III	.5	S2	2	GEOL2211		
GEOL3281	Exploration Geochemistry	III	.5	S2	2	GEOL3111 GEOL3141		
GEOL3331	Exploration Geophysics***	III	1	F	3 2	GEOL1201		
GEOL6201	Marine Geology 1**	II	1	F	3	GEOL1101 and GEOL1201		Program 2500, 2503††
GEOL6231	Coastal Monitoring Techniques	II/III	1	F	3			Program 2500, 2503††
GEOL6330	Exploration and Seismic Methods*	III	.5	S2	3			GEOL8360
GEOL8320	Gravity and Magnetic Methods*	III	.5	S1	3	PHYS1002 MATH1032		
GEOL8330	Seismic Methods*	III	.5	S1	3	PHYS1002 MATH1032		
GEOL8340	Electrical Methods*	III	.5	S1	3	PHYS1002 MATH1032		

Field tutorials are an essential part of the subject, and are held during weekends and/or recesses. Dates and costs are available during the first week of the subject. Attendance is compulsory.
*Field work of up to 1 day.
**Field work of up to 2 days.
***Field work of up to 3 days.
****Field work of up to 4 days.
‡Field work of up to 5 days.
‡‡Field work of up to 8 days.
††Not available for programs 2500, 2503 nor in Geology program of Course 4770, nor in Geology with some Mathematics program of Course 3730.
†††It is desirable that students taking GEOL3121 should also have taken GEOL2231.

Mathematics

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
MATH1011	General Mathematics I 1B	1	1	S1	6	See Subject Descriptions later in this Handbook		MATH1032 MATH1042
MATH1021	General Mathematics I 1C	1	1	S2	6	MATH1011		MATH1042 MATH1032
MATH1032	Mathematics 1	I	2	F	6	See Subject Descriptions later in this Handbook		MATH1042 MATH1011 MATH1021
MATH1042	Higher Mathematics 1 I	2	F	6	See Subject Descriptions later in this Handbook		MATH1032 MATH1011 MATH1021
MATH1061	Introductory Applied I Computing	1	S2	6	As for MATH1011	MATH1021 or MATH1032	Any subject offered by Computer Science
MATH1081	Discrete Mathematics I	1	S1 or S2	6	As for MATH1032	MATH1032 or MATH1042	
MATH2021	Mathematics	II	1	F	2	MATH1032 or MATH1021CR		
MATH3021	Mathematics	III	1	F	2	MATH2021		

(Mathematics MATH2021 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, MATH2021 Mathematics will not be counted.
Mathematics MATH3021 is included for students desiring to attempt only one Level III Mathematics unit. If other Level III units in Pure Mathematics or Applied Mathematics are taken, MATH3021 Mathematics will not be counted except that MATH3261 may be taken with MATH3021.

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

Pure Mathematics

Pure Mathematics Level II

MATH2400	Finite Mathematics	II	.5	S1	2	MATH1032 or MATH1042**		
MATH2410	Automata and Algorithms	II	.5	S2	2	MATH1032 or MATH1042**		
MATH2501	Linear Algebra	II	1	F	2.5	MATH1032 or MATH1042		MATH2601
MATH2510	Real Analysis	II	.5	S1 or S2	2.5	MATH1032 or MATH1042		MATH2610
MATH2520	Complex Analysis	II	.5	S1 or S2	2.5	MATH1032 or MATH1042		MATH2620

** MATH1081 Discrete Mathematics is advised.

Higher Pure Mathematics Level II"

| MATH2601 | Algebra | II | 1 | S2 | 4.5 | MATH1042 or MATH1032CR | | MATH2501 MATH3500 |
| MATH2610 | Real Analysis | II | .5 | S1 | 2.5 | MATH1042 or MATH1032CR | | MATH2510 |

Mathematics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
MATH2620	Complex Analysis	II	.5	S1	2.5	MATH1042 or MATH1032 CR		MATH2520

Pure Mathematics Level III***

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
MATH3400	Logic and Computability	III	.5	SS	2	***		
MATH3410	Combinatorial Structures and Applications	III	.5	SS	2	***		
MATH3420	Communication, Codes and Ciphers	III	.5	SS	2	***		
MATH3500	Group Theory	III	.5	S1	2	***		MATH2601
MATH3510	Geometry	III	.5	S2	2	***		MATH3640
MATH3520	Number Theory	III	.5	SS	2	***		MATH3610
MATH3530	Combinatorial Topology	III	.5	SS	2	***		
MATH3540	Ordinary Differential Equations	III T	.5	S1	2	MATH2501, ***		MATH3650
MATH3550	Partial Differential Equations	III	.5	S2	2	MATH2510, MATH2520, ***	MATH3540	MATH3660
MATH3560	History of Mathematics	III	.5	SS	2	***		
MATH3570	Foundations of Calculus	III	.5	SS	2	***		MATH3601
MATH3580	Differential Geometry	III	.5	SS	2	MATH2510 ***		MATH3750

Higher Pure Mathematics Level III '"

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
MATH3601	Real Analysis and Functional Analysis	III	1	F	2	MATH2601 or MATH2501 CR MATH2610 or MATH2510 CR †††		MATH3570 10.1523
MATH3610	Number Theory	III	.5	S1‡‡	2	†††		MATH3520
MATH3620	Groups and *Representations*	III	.5	S2‡‡	2	MATH2601 or both MATH2501 CR and MATH3500 CR†††		
MATH3630	Complex Analysis	III	.5	S1‡‡	2	MATH2620 or MATH2520 CR†		
MATH3640	Geometry	III	.5	S2‡‡	2	MATH2601 or both MATH2501 CR and MATH3500 CR, †††		MATH3510
MATH3650	Ordinary Differential Equations	III	.5	S1‡‡	2	MATH2601 or MATH2501 CR MATH2610 or MATH2510 CR †††		MATH3540
MATH3660	Partial Differential Equations	III	.5	S2‡‡	2	†††	MATH3650	MATH3550

Mathematics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
MATH3710	Rings and Fields	III	.5	S1‡	2	MATH2610 or MATH2510 CR †††		
MATH3720	Galois Theory	III	.5	S2‡	2	†††	MATH3710	
MATH3730	Topology	III	.5	S1‡	2	MATH2610 or MATH2510 CR		
MATH3740	Integration and Fourier Analysis	III	.5	S2†††	2	†††	MATH3601	
MATH3750	Differential Geometry	III	.5	S1‡	2	MATH2601 or MATH2501 CR MATH2610 or MATH2510 CR †††	MATH3580	
MATH3760	Calculus on Manifolds	III	.5	S2‡	2	†††	MATH3750	

Applied Mathematics Level II

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
MATH2100	Vector Calculus	II	.5	S1 or S2	2.5	MATH1032 or MATH1042		MATH2110
MATH2120	Mathematical Methods II for Differential Equations	II	.5	S1 or S2	2.5	MATH1032 or MATH1042		MATH2130
MATH2160	Linear Programming	II	.5	S1	2	MATH1032 or MATH1042	MATH2501 or MATH2601	10.2213
MATH2180	Operations Research	II	.5	S2	2	MATH2160		
MATH2200	Discrete-Time Systems II	II	.5	S2	2	MATH1032 or MATH1042	MATH2501 or MATH2601	10.2215
MATH2220	Continuous-Time Systems	II	.5	S2	2	MATH1032 or MATH1042		10.2216
MATH2301	Mathematical Computing A	II	1	S1	4	MATH1032 or MATH1042		

Higher Applied Mathematics Level II

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
MATH2110	Vector Calculus	II	.5	S1	2.5	MATH1042 or MATH1032 CR		MATH2100
MATH2130	Mathematical Methods II for Differential Equations		.5	S2	2.5	MATH1042 or MATH1032 CR		MATH2120

† MATH3601 is highly recommended.
†† 1. Students who gain good grades in Year 1 may be allowed to take Higher Pure Mathematics 2 units subject to the approval of the Head of Department. MATH1081 Discrete Mathematics is highly recommended.
2. Students majoring in Physics who wish to take Higher Pure Mathematics 2 should attempt MATH2601, MATH2610, MATH2620, either MATH2110 or MATH2100 and either MATH2130 or MATH2120.
3. Students considering doing Higher Pure Mathematics in years III or IV should take MATH2601, MATH2610, MATH2620 and MATH2110 or MATH2100, and MATH2130 or MATH2120; MATH2400 and MATH2410 are also advised.
*** Normal prerequisites for attempting Level III Pure Mathematics subjects are at least two Level II Mathematics units, including any course prerequisites. For any listed prerequisite or co-requisite subject, an appropriate higher degree subject may be substituted.
††† Students wishing to enrol in Level III Higher Pure Mathematics subjects should consult with the Department before enrolling.ormal prerequisites for attempting Level III Higher Pure Mathematics subjects are at least two Level II Mathematics units, including any course prerequisites, at an average of distinction level, or their higher equivalents. Subject to the approval of the Head of Department, these may be relaxed.
‡ These subjects are offered in odd numbered years.
‡‡ These subjects are offered in even numbered years.

Mathematics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Applied Mathematics Level III								
MATH3150	Transform Methods	III	.5	S2		MATH2520, MATH2100		10.033 10.2921
MATH3101	Numerical Analysis	III	1	S1	4	A total of two level II Mathematics units, including any course prerequisites.		MATH3141 10.222A
MATH3121	Mathematical Methods III	III	1	S1	4	MATH2120, MATH2501, MATH2510, MATH2520		MATH3150 MATH3141 10.033, 10.222D 10.412D, 10.422D 10.4331, 10.2921
MATH3161	Optimization Methods III	III	1	S1	4	MATH2501, and MATH2100 or MATH2510		10.222L
MATH3181	Optimal Control	III	1	S2	4	A total of two level II Mathematics units which must include either MATH2100 or MATH2510		10.222M
MATH3201	Dynamical Systems and Chaos	III	1	S2	4	MATH2501 and either MATH2120 or MATH3540		10.222N
MATH3241	Fluid Dynamics	III	1	S1	4	MATH2100, MATH2120		10.222B 10.422A
MATH3261	Oceanography	III	1	S2	4	MATH2100, and MATH2120 or MATH2021, PHYS1002		10.412A
MATH3301	Mathematical Computing B	III	1	S2	4	MATH2120, MATH2501, and MATH2301		10.612
Theory of Statistics Level II								
MATH2801	Probability and Random Variables	II	1	S1‡	4	MATH1032 or MATH1042 or MATH1021 CR		MATH2901 MATH2841 MATH2819 BIOS2041
MATH2810	Statistical Computing and Simulation	II	.5	S1	2	MATH1032 or MATH1042 or MATH1021 CR	MATH2801	MATH2910
MATH2821	Basic Inference	II/III	1	S2	4	MATH2801		MATH2921 MATH2841 MATH2819 BIOS2041
MATH2830	Nonparametric Statistical Inference	II	.5	S2	2	MATH2801	MATH2821	MATH2930
MATH2841	Statistics SS	II	1	F	2	MATH1032 or MATH1021 CR		MATH2801 MATH2821 MATH2901 MATH2921 MATH2819 BIOS2041

Mathematics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
Higher Theory of Statistics Level II								
MATH2901	Probability and Random Variables	II	1	S1	4	MATH1032 or MATH1042		MATH2801 MATH2841 MATH2819 BIOS2041
MATH2910	Statistical Computing and Simulation	II	.5	S1	2	MATH1032 or MATH1042	MATH2901	MATH2810
MATH2921	Basic Inference	II/III	1	S2	4	MATH2901		MATH2821 MATH2841 MATH2819 BIOS2041
MATH2930	Nonparametric Statistical Inference	II	.5	S2	2	MATH2901	MATH2921	MATH2830
Theory of Statistics Level III**								
MATH3801	Stochastic Processes	III	1	S1	4	MATH2801, MATH2501, MATH2510		MATH3901 MATH3880
MATH3811	Linear Models	III	1	S1	4	MATH2821, MATH2501, MATH2510		MATH3911 MATH3870
MATH3820	Sample Survey Theory	III	.5	S1	2	MATH2821		MATH3920
MATH3830	Design and Analysis of Experiments	III	.5	S2	2	MATH2821 MATH3811		MATH3930
MATH3840	Statistical Inference	III	.5	S2	2	MATH2821		MATH3940 MATH3870
MATH3850	Nonparametric Methods	III	.5	S2	2	MATH2821 MATH2830		MATH3950
MATH3861	Statistical Computation	III	1	S2	4	MATH2821 or MATH2921, MATH2810 or MATH2910.		
MATH3870	Regression Analysis and Experimental Design	III	.5	S1	2	MATH2841 or MATH2821 or MATH2921		MATH3830 MATH3930 MATH3811 MATH3911
MATH3880	Applied Stochastic Processes	III	.5	S2	2	MATH2841 or MATH2801 or MATH2901		MATH3801 MATH3901
Higher Theory of Statistics Level III								
MATH3901	Stochastic Processes	III	1	S1	4.5	MATH2501, MATH2510, MATH2901		MATH3801 MATH3880
MATH3911	Linear Models	III	1	S1	4.5	MATH2921, MATH2501, MATH2510		MATH3811 MATH3870
MATH3920	Sample Survey Theory	III	.5	S1	2	MATH2921		MATH3820
MATH3930	Design and Analysis of Experiments	III	.5	S2	2	MATH2921 MATH3911		MATH3930 MATH3870

Mathematics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
MATH3940	Statistical Inference	III	.5	S2	2	MATH2921		MATH3840
MATH3950	Nonparametric Methods	III	.5	S2	2	MATH2921 MATH2930		MATH3850
MATH3971	Probability Theory	III	1	Not offered in 1991	4	MATH2901, MATH2501, MATH2510		
MATH3980	Statistics Project	III	.5	F		MATH2901 MATH2921		

** A student taking four of the higher units MATH3901, MATH3911, MATH3971, MATH3870, MATH3880, MATH3940, MATH3950, MATH3861 is required to take MATH3980.
*At least four units from MATH3901, MATH3911, MATH3920, MATH3930, MATH3940, MATH3950, MATH3971, MATH3861.

Mechanical and Manufacturing Engineering

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
MECH0160	Introductory Engineering Design & Drawing Practice	I	1	S1	3	See Subject Descriptions later in this Handbook	MECH0360	50012 5.030 MECH0130 5.010 5.0016
MECH0360	Introductory Engineering Mechanics	I		S1	3		MECH0160	5.010 5.0101 5.0201 MECH1300
MECH1110	Graphical Analysis and Communications	I	1	S2	3		5.0016	5.030 MECH0130
MANF1110	Manufacturing Technology	I		S2	3			5.030

(These subjects must be studied in pairs as indicated by the parenthesis)

Microbiology and Immunology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
MICR2011	Microbiology 1	II	1	S2	6	BIOS2011	BIOC2312 and BIOS2021	MICR2201
MICR2201	Introductory Microbiology	II	1	S1	6			
MICR3011	Microbiology 2	III	1	S1	6	BIOS2011, BIOS2021 BIOC2312 and MICR2011		
MICR3021	Microbial Genetics	III	1	S1	6	BIOS2011, BIOS2021 BIOC2312 and MICR2011		BIOT3031
MICR3041	Immunology 1	III	1	S1	6	BIOC2312		

Microbiology   (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
MICR3031	Applied Mycology	III	1	S1	6	MICR2201 or MICR2011 or MICR2218		
MICR3051	Immunology 2	III	1	S2	6	MICR3041		
MICR3061	Animal Virology	III	1	S2	6	MICR2011		
MICR3071	Environmental Microbiology	III	1	S2	6	MICR2201 or MICR2011		
MICR3081	Medical Bacteriology	III	1	S2	6	MICR2011 and MICR3011		

Pathology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
PATH3201	Basic and Applied Pathology	III	1	F	3	ANAT2211, ANAT2111 PHPH2112 or equivalent		

Philosophy

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
PHIL1006	Introductory Philosophy A	I	1	S1	3			
PHIL1007	Introductory Philosophy B	I	1	S2	3			
PHIL2106	Logic	II/III	1	S1	3	Any Level I Subject		52.2030 52.2031
PHIL2107	Advanced Philosophy of Science	III	1	S1	3	PHIL2106 and PHIL2116 or HPST2106		
PHIL2108	Ways of Reasoning	II/III	1	S2	3	Any Level I Subject		52.233
PHIL2109	Metaphysics Realisms	II/III	1	S2	3	Level II Status in Philosophy**		
PHIL2206	Contemporary Philosophy of Mind	II/III	1	S1	3	Level II status in Philosophy**		52.2002
PHIL2207	Issues in the Philosophy of Psychology	II/III	1	S2	3	Either PHIL2206 or 52.2001 or 52.250 or PSYC1002		52.2003
PHIL2208	Epistemology (Scepticisms)	II/III	1	S1	3			
PHIL2209	Epistemology (Belief and Knowledge)	II/III	1	Not offered in 1991		Level II Status in Philosophy		
PHIL2216	Human Nature and Human Understanding	II/III	1	Not offered in 1991				52.2130, 52.2170
PHIL2217	Personal Identity	II/III	1	S1				52.2180, 52.232

Philosophy (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
PHIL2218	Philosophical Foundations of Artificial Intelligence	II/III	1	S1	3			52.2026
PHIL2308	Reason and the Passions: Descartes, Spinoza and Hume	II/III	1	Not offered in 1991	3			52.2021 52.2024
PHIL2309	The Heritage of Hegel	II/III	1	S1	3			
PHIL2407	Culture and Critique	II/III	1	Not offered in 1991	3			
PHIL2409	Spealing through the Body: Feminism Psychoanalysis and Literature	II/III	1	S1	3			
PHIL2506	Classical Political Philosophy	II/III	1	S1	3			52.203, 52.213, 52.2050
PHIL2507	The Ethics of Plato and Aristotle	II/III		Not offered in 1991	3	Level II Status in Philosophy**		52.523, 52.222 52.5231
PHIL2508	Theories in Moral Philosophy	II/III	1	S2	3			52.523, 52.5232, 52.2230
PHIL2509	Philosophy of Law	II/III	1	S2	3			52.105, 52.2150
PHIL2516	Philosophical Foundations of Marx's Thought	II/III	1	S2	3			52.373
PHIL2517	Philosophy and Gender	II/III	1	S1	3			52.216
PHIL2606	Aesthetics	II/III	1	S1	3			52.237
PHIL2607	Philosophy and Literature	II/III	1	S2	3			
PHIL2706	Seminar A	II/III	1	S1	3			
PHIL2707	Seminar B	II/III	1	S2	3			
PHIL2708	Reading Option	II/III	1	S1 or S2	3			
PHIL3106	Pre-Honours Seminar	III	1	S2	3	5 units in Philosophy		

**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.
***Level III Status in Philosophy consists of having an overall standard of credit or higher in 8 Philosophy units.
(Due to the extra library work required in the preparation of essays a combination of three half-unit Philosophy subjects count as the equivalent of two Science units.

Sciences

Physiology and Pharmacology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
PHPH2112	Physiology 1*	II	2	F	6	CHEM1002 or CHEM1101 and CHEM1201 MATH1032 or MATH1042 or MATH1011 and MATH1021, BIOS1021		
PHPH3114	Physiology 2	III	4	F	12	PHPH2112, BIOC2312		
PHPH3121	Membrane Biology	III	1	S1	6	Normally as for PHPH3114,		
PHPH3131	Neurophysiology	III	1	S1	6	but may be studied only		
PHPH3142	Organ Physiology	III	2	S2	12	with permission of the Head of School		
PHPH3152	Pharmacology	III	2	F	6	PHPH2112	PHPH3114 or BIOC3111, BIOC3121 and BIOC3261 or 2 Level III Chemistry units	

Note: The above represent the normal prerequisites for the courses in Physiology, but the Head of School may recommend that students with a good academic record be granted exemption from them.
*Students intending to major in Physiology and/or Pharmacology should note Physiology 2 prerequisites.

Physics

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

Physics Level 1

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
PHYS1002	Physics 1	I	2	F	6	See Subject Descriptions later in this Handbook	MATH1021 or MATH1032*	
PHYS1022	Introductory Physics 1 (For Health and Life Scientists)	I	2	F	6		MATH1011 and MATH1021 or MATH1032*	
PHYS1601	Computer Applications in Experimental Science 1	I	1	S1 or S2	6		PHYS1002 or PHYS1022 MATH1032	PHYS1611
PHYS1611	Laboratory Computers in Physical Science	I	1	Not offered in 1991	6		MATH1011 and MATH1021 or MATH1032* and PHYS1002 or PHYS1022	Programs 0600

Physics Level II*

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
PHYS2001	Mechanics and Computational Physics	II	1	S1	4	PHYS1002, MATH1032	MATH2100	PHYS2999
PHYS2011	Electromagnetism and Thermal Physics	II	1	S2	4	PHYS1002, MATH1032	MATH2100	ELEC2013, PHYS2999
PHYS2021	Quantum Physics and Relativity	II	1	F	2	PHYS1002, MATH1032		PHYS2989
PHYS2031	Laboratory	II	1	F	3	PHYS1002, MATH1032		PHYS2920

Physics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
PHYS2500	Methods in Mathematical Physics	II	.5	Not offered in 1991	2	PHYS1002, MATH1032	MATH2100, MATH2120, MATH2510	
PHYS2601	Computer Applications in Experimental Science 2	II	1	S1	5	PHYS1601		
PHYS2630	Electronics	II	.5	S2	3	PHYS1002 or PHYS1022		PHYS2920
PHYS2920	Electronics	II	.5	S1	3	PHYS1022 or PHYS1002		PHYS2031,
PHYS2940	Introduction to Physics of Measurement	II	.5	S1	3	PHYS1002		PHYS2603

Physics Level III*

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
PHYS3021	Statistical Mechanics and Solid State Physics	III	1	S1	4	MATH2120, PHYS2011, PHYS2021		
PHYS3010	Quantum Mechanics	III	.5	S1	2	PHYS2021, MATH2120		
PHYS3030	Electromagnetism	III	.5	S1	2	PHYS2011, MATH2100, MATH2120		
PHYS3060	Advanced Optics	III	.5	S2	2		PHYS2001	
PHYS3041	Experimental Physics A	III	1	F	4	PHYS2031		
PHYS3050	Nuclear Physics	III	.5	S2	2		PHYS3010	
PHYS3110	Experimental Physics B1 III	III	.5	S1	4	PHYS2031		
PHYS3120	Experimental Physics B2 III	III	.5	S2	4	PHYS2031		
PHYS3150	Marine Acoustics	III	.5	S2	2			
PHYS3160	Astrophysics	III	.5	S2	2	PHYS2021		
PHYS3631	Electronics	III	1	S1	6	PHYS2031 or PHYS2920		
PHYS3180	Atmospheric Physics	III	.5	S2	2	PHYS1002, PHYS2011 or CHEM2011		
PHYS3310	Physics of Solid State Devices	III	.5	S2	2		PHYS3021	
PHYS3320	Topics in Condensed Matter Physics	III	.5	S2	2		PHYS3021	
PHYS3410	Biophysics	III	.5	S2	3	PHYS2011, PHYS2021		
PHYS3510	Advanced Mechanics, Fields and Chaos	III	.5	S1	2	PHYS2001, MATH2100 MATH2510		
PHYS3520	Relativistic Electrodynamics	III	.5	S2	2	PHYS2021, MATH2510 MATH2100, MATH2120	PHYS3030	
PHYS3530	Advanced Quantum Mechanics	III	.5	S2	2		PHYS3010	
PHYS3540	Plasmas and Laser Fusion	III	.5	Not offered in 1991	2	PHYS2011, PHYS2021		
PHYS3550	General Relativity	III	.5	S2	2	PHYS2021, MATH2510, MATH2100		

Physics (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
PHYS3601	Computer Applications in Instrumentation	III	1	S1	5	PHYS2601		
PHYS3620	Computer Based Signal Processing	III	.5	S2	3	PHYS2031, MATH2120		6.042
PHYS3710	Lasers and Applications	III	.5	S1‡	2			
PHYS3720	Optoelectronics	III	.5	S1‡‡	2			
PHYS3760	Laser and Opto-electronics Laboratory	III	.5	S2	4		PHYS2031	

† For students who enrol in and successfully complete the subjects PHYS1022 Introductory Physics 1 (2 units) and PHYS1002 Physics 1 (2 units) the total unit value of the combined subjects will be counted as 3 units.
* Where mathematics subjects are specified as prerequisites or as co-requisites, the higher levels of such subjects are acceptable and preferable. Similarly Physics PHYS1002 is acceptable in place of PHYS1022. Students are also advised that other subjects may be acceptable equivalent prerequisites or co-requisites to those listed, eg Unit PHYS2989 of course 3640 may be acceptable in place of PHYS2021. Enquiry should be made to the School of Physics.
‡ Offered in odd-numbered years only.
‡‡ Offered in even-numbered years only.

Psychology

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

Psychology Level I

| PSYC1002 | Psychology 1 | I | 2 | F | 5 | | | GENS4620 GENS5050 |

Psychology Level II See Notes

PSYC2001	Research Methods 2	II	1	S1	4	PSYC1002		
PSYC2011	Psychological Assessment	II	1	S2	3	PSYC2001		
PSYC2021	Attention, Memory and Thought	II	1	S1	4	PSYC1002		
PSYC2031	Personality and Social Psychology	II	1	S2	4	PSYC1002		
PSYC2051	Human Development	II	1	S1	4	PSYC1002		PSYC3111

Psychology Level III See Notes

PSYC3001	Research Methods 3AIII	III	1	S1	4	PSYC2001		
PSYC3011	Research Methods 3BIII	III	1	S2	4	PSYC3001		
PSYC3021	Perception	III	1	S2	4	PSYC2001 and either PSYC2021 or PSYC2031		
PSYC3031	Behavioural Neuroscience	III	1	S1 or S2	4	PSYC2001 and either PSYC2021 or PSYC2031		
PSYC3041	Learning	III	1	S1	4	PSYC3031		
PSYC3051	Physiological Psychology	III	1	S2	4	PSYC3031		

Psychology

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
PSYC3061	Perceptual Theory	III	1	Not offered in 1991	4	PSYC3021		·
PSYC3071	Abnormal Psychology	III	1	S1	4	PSYC2001		
PSYC3081	Experimental Psychopathology	III	1	S2	4	PSYC3071		
PSYC3091	Counselling and Evaluation	III	1	S1	4	PSYC2001 and PSYC2011		PSYC2042
PSYC3101	Individual Differences	III	1	S1	4	PSYC2011 and PSYC2031		
PSYC3111	Developmental Psychology	III	1	S2	4	PSYC2001 and either PSYC2021 or PSYC2031		PSYC2051
PSYC3121	Social Psychology	III	1	S1	4	PSYC2001 and PSYC2031		PSYC3131 and PSYC3141
PSYC3131	Cross-Cultural Social Behaviour	III	1	Not offered in 1991	4	PSYC2001 and PSYC2031		PSYC3121 and PSYC3141
PSYC3141	Behaviour in Organizations	III	1	S2	4	PSYC2001 and PSYC2031		PSYC3121 and PSYC3131
PSYC3151	Cognition and Skill	III	1	S2	4	PSYC2001 and PSYC2021		PSYC3061
PSYC3161	Language and its Development	III	1	S1	4	PSYC2001 and PSYC2021		PSYC3051
PSYC3171	Recent Developments in Experimental Psychology	III	1	Not offered in 1991	4	PSYC2001 and PSYC2021		
PSYC3181	Issues in Applied Psychology	III	1	Not offered in 1991	4	PSYC2001 and PSYC2011		
PSYC3191	Computer Science and Psychology	III	1	Not offered in 1991	5	COMP1011, COMP3411 PSYC2001 and PSYC2021		

Notes:
1. A student may not enrol in more than four Level II Psychology units.
2. A student may not enrol in more than three Level III Psychology units unless either PSYC2001 Research Methods 2 has been passed.
3. A student may not enrol in more than six Level III Psychology units unless PSYC3001 Research Methods 3A has been passed.
4. A student may not enrol in more than eight Level III Psychology units in course 3970.
5. Not all Level III Psychology units will necessarily be offered in each year.

Science and Technology Studies

Students undertaking subjects in Science and Technology Studies are required to supplement the class contact hours by study in the Library.

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
HPST1106	Myth, Megalith and Cosmos'	I	1	S1	3			62.111
HPST1107	From the Closed World to the Infinite Universe'	I	1	S2	3			62.211
HPST1108	Science: Good, Bad and Bogus — An Introduction to the Philosophy of Science'	I	1	S2	3			

Science and Technology Studies (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
SCTS1106	Science, Technology and Social Change'	I	1	S1	3			62.110
SCTS1107	Understanding Technological Controversy'	I	1	S2	3	SCTS1106		
HPST2106	The Scientific Theory	II/III	1	S2	3	Completion of at least 4 Level 1 units from Table 1		62.032
HPST2107	The Darwinian Revolution	II/III	1	S1	2	As for HPST2106		62.104
HPST2108	History of Medicine	II/III	1	S1	3	As for HPST2106		62.043 26.568, 26.2506, 62.109
HPST2109	Computers, Brains and Minds: Foundations of Cognitive Science	II/III	1	S2	3	As for HPST2106		62.554
HPST2116	History of the Philosophy and Methodology of Science	II/III	1	S1	3	As for HPST2106		62.543 62.551 62.561 62.215U 62.216U
HPST2117	Technology and Society	II/III	1	Not offered in 1991	3	As for HPST2106		26.251 62.022
HPST2118	Body, Mind and Soul: The History and Philosophy of Psychology	II/III	1	S1	3	As for HPST2106		62.106
HPST3106	The Discovery of Time	II/III	1	S2	3	As for HPST2106		62.103
HPST3107	Relations Between Science and the Arts	II/III	1	Not offered in 1991	3			
HPST3108	Man, Woman and Deity	II/III	1	S2	3	As for HPST2106		62.285
HPST3109	Issues in the Philosophy of Science	II/III	1	Not offered in 1991	3	Completion of at least 2 HPST units.		62.3005
HPST3116	Language and Minds: The Impact of Chomsky's Revolution in Linguistics and Philosophy	II/III	1	Not offered in 1991	3	As for HPST2106		62.570
HPST3117	Philosophical Problems in Evolutionary Biology	II/III	1	S2			HPST2106 or HPST2107	
SCTS2106	Scientific Knowledge and Political Power	II/III	1	S1	3	As for HPST2106		62.052

Science and Technology Studies (continued)

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded
SCTS2107	The Sociology of Science and Technology	II/III	1	S2	3	As for HPST2106		62.062
SCTS2108	Information, Technology, Politics and Policies	II/III	1	Not offered in 1991	3	SCTS1106 or completion of at least 4 Level 1 science units.		
SCTS2109	The New Biotechnologies and their Social Context	II/III	1	Not offered in 1991	3	SCTS1106, or by permission of the Head of School for 3rd and 4th Year students in the biological sciences		62.245
SCTS3106	Science, Technology and Developing Countries	II/III	1	S2	3	As for HPST2106		62.082
SCTS3108	Technological Development in Twentieth Century Australia	II/III	1	S2	3	SCTS1106		62.246
SCTS3109	Technology, Environment and Risk	II/III	1	S2	2	SCTS1106 or completion of at least 4 Level 1 science units.		
SCTS3116	The Politics of Energy	II/III	1	S2	3	As for SCTS3109		
SCTS3117	Technology, Globalizationand the Role of the State	II/III	1	Not offered in 1991	2	Completion of at least 2 SCTS units.		62.3003

'Note: only two Level 1 units may be counted towards Course 3970.

Course 3970
Units available in specific programs and double degree courses

Table 2

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded	Specific Programs
ACCT1501	Accounting and Financial I Management 1A***""		1	S1	4.5				0600, 1000, 1400, 6810 Course 3681
ACCT1511	Accounting and Financial I Management 1B		1	S2	4.5	ACCT1501			0600, 1000 1400, 6810
ACCT2522	Accounting and Financial II Management 2A		1	S2	4.5	ACCT1511			0600, 1000 1400, 6810
ACCT2542	Accounting and Financial II Management 2B		1	S2	4.5	ACCT1511			0600, 1000, 1400, 6810
ACCT3563	Accounting and Financial III Management 3A		1	S1	4.5	ACCT2542			1400, 6810
ACCT3573	Accounting and Financial III Management 3A (Honours)		1	S1	6	ACCT2522			6810
ACCT3583	Accounting and Financial III Management 3B		1	S2	4.5	ACCT2522			1400, 6810
ACCT3593	Accounting and Financial III Management 3B (Honours)		1	S2	6	ACCT2522			6810
ANAT2111	Introductory Anatomy	II	1	S1	6	BIOS1011 BIOS1021			
ANAT2211	Histology 1	II	1	F	3	BIOS1011 BIOS1021	ANAT2111		
ANAT3121	Visceral Anatomy	III	1	S2	6	ANAT2111			
ANAT3131	Functional Anatomy 1	III	1	S1	6	ANAT2111			4770

Sciences

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded	Specific Programs
ANAT3141	Functional Anatomy 2	III	1	S2	6	ANAT3131			(Anatomy)
ANAT3211	Histology 2	III	1	F	3	ANAT2211		ANAT3225	Quota.
ANAT3220	Histological and Histochemical Techniques	III	.5	S1	3	BIOS1011, BIOS1021 and any 1 of BIOC2312, BIOS2061 or ANAT2211		ANAT3211	3820
ANAT3311	Mammalian Embryology	III	1	F	3		ANAT2211, ANAT2111		
ANAT3411	Neuroanatomy 1	III	1	S1	6	ANAT2211 ANAT2111			7000 or in the Anatomy Courses
ANAT3421	Neuroanatomy 2	III	1	S2	3	ANAT3411			
CHEM1807	Chemistry 1 ME	I	1	S1	6	As for CHEM1806		CHEM1101, CHEM1201, CHEM1002	Course 3681
CHEM1806	Chemistry 1EE	I	.5	S1	3	See Subject Descriptions			Course 3640 Course 3725
CHEM1808	Chemistry for Civil Engineers	I	1	S2	6	As for CHEM1806		CHEM1101, CHEM1201, CHEM1002	Course 3730
CHEM1809	Biological Chemistry for Optometry Students	I	2	F	6	See Subject Descriptions			Course 3950
COMP1011	Computing 1A	I	1	S1	6	As for MATH1032	MATH1032 or MATH1042	COMP1811	0600 and Courses:
COMP3111	Software Engineering	III	1	S1	5	COMP2011, COMP2031		6.642, 6.660G	3611 3661 3681
COMP3121	Algorithms and Programming Techniques	III	1	S2	5	COMP2011		6.642, 6.660G	
COMP3131	Parsing and Translation	III	1	S2	5	COMP2011		6.643, 6.664G	3701
COMP3211	Computer Organisation and Design	III	1	S1	5	COMP2021 or ELEC2012		6.654G, ELEC3020	
COMP3221	Microprocessors and Interfacing	III	1	S2	5	COMP2021		6.0318, 6.060G 6.613, ELEC3020	
COMP3231	Operating Systems	III	1	S1	5	COMP2031		6.632, 6.663G, 6.672	
COMP3311	Database Systems	III	1	S1	5	COMP2011		6.663, 6.005G 6.659G, INFS3608	3725 3730 4770
COMP3321	Business Systems Organisation	III	1	S2	5	COMP2011		6.647, 6.661G	
COMP3331	Computer Networks and Applications	III	1	S2	5	COMP2011, COMP2031		6.633, 6.659G	
COMP3411	Artificial Intelligence	III	1	S1	5	COMP2011		6.666G	
COMP3421	Computer Graphics	III	1	S2	5	COMP2011		6.668G	
COMP3511	Human Computer Interaction	III	1	SS	5	COMP2011		6.006G	
ECON1101	Microeconomics 1	I	1	S1 or S2	3.5	See Subject Descriptions later in this Handbook		15.001	0600, 1000, 1400, 6810

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded	Specific Programs
ECON1102	Macroeconomics 1	I	1	S1 or S2	3.5	ECON1101		15.011	0600, 1000 1400, 6810
ECOH1301	Australia in the International Economy in the Twentieth Century	I	1	S1	3.5	See Subject Descriptions later in this handbook		15.901	6810
ECON2101	Microeconomics 2	II	1	S1	4	ECON1102, ECON1203		15.002, 15.072, ECON2103, 15.012, ECON2121	0600, 1000, 6810
ECON2102	Macroeconomics 2	II	1	S2	4	ECON1102, ECON1203		15.042, 15.062 ECON2104, ECON2122, 15.052	0600, 1000 6810
ECON2103	Applied Microeconomics	II	1	S2	3.5	ECON1102 and ECON1203 or ECON2200		15.002 15.072, ECON2101, ECON2121, 15.012	6810
ECON2104	Applied Macroeconomics	II	1	S1 or S2	3.5	ECON1102 and ECON1203, ECON2200		15.042, 15.062, 15.202E, 15.052, 15.222E	6810
ECON3101	Microeconomics 3	III	1	S1	4	ECON2101 ECON2102 ECON2206		15.143 15.321E 15.153	0600, 1000
ECON3102	Macroeconomics 3	III	1	S2	4	ECON2101 ECON2102 ECON2206		15.003 15.013 15.322E	0600
ELEC1011	Electrical Engineering	I	1	S2	6		PHYS1002		0100, 0600, 1000
ELEC2010	Circuit Theory	II	.5	S1	4	ELEC1011, PHYS1002, MATH1032	MATH2520 or MATH2620	6.021A	0600
ELEC2020	Analog Electronics	II	.5	S2	4	PHYS2989 ELEC2010		6.021C	0600
FINS2612	Australian Capital Markets	II/III	1	S1 or S2	3			14.864	1400
FINS2613	Business Finance 2A	II	1	S1 or S2	3	ACCT1511, ECON1102, and MATH1032		14.613	1400, 6810
FINS2614	Business Finance 2B	III	1	S1 or S2	3	FINS2613		14.614	1400, 6810
FINS3615	Business Finance 3	III	1	S1	3	FINS2614		14.615	6810

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded	Specific Programs
GEOL6321	Coastal Environmental Assessment	III	1	F	3			GEOL2111	6832, 6833, 6870
GEOL6310	Marine Mineral Deposits	III	.5	S1	3	GEOL6201	GEOL6311		6833, 6870
GEOL6311	Marine Geology 2	III	1	F	3	GEOL6201			6833, 6870
GEOL7221	Surficial Materials and Processes	II	1	S2	5	GEOL2111			2527
GEOL8220	Sedimentology	II	.5	S1	2	GEOL1201		GEOL2121	2503
GEOL8310	Stratigraphy	III	.5	S1	2	GEOL8220		GEOL3121	2503
GEOL8350	Geological Applications	III	.5	S1	4	GEOL1201			2503
GEOL8360	Geophysical and Geological Applications	III	.5	S2	3	GEOL1201		GEOL6330	2503
GEOG1043	Data Processing Systems	I	0	F	2				6851, 6852, 6853
INFS1602	Computer Information Systems 1	II	1	S1 or S2				14.602	0600, 1000, 1400, 6810
INFS2603	Computer Information Systems 2	II	1	S2	3	INFS1602		14.603 INFS3606	0600, 1000, 1400, 6810
INFS2609	Computer Information Systems Technology	II	1	S1	3	COMP1811 or INFS1602			1400, 6810, 1000, 0600
INFS2691	Industrial Training 1	II/III	0	S1	1	INFS1602			Course 3971
INFS3605	Computer Systems Implementation	III	1	S1	3	INFS2603 or INFS2609		14.605	0600, 1400, 6810
INFS3607	Distributed Computer Systems	III	1	S2	3	INFS2603 and INFS2609		6.633, 14.607	0600, 1400, 6810
INFS3608	Database Systems	III	1	S1	3	INFS2603 or INFS3606 or INFS2609		14.608	0600, 1400, 6810
INFS3611	Information Systems Development	III	1	S2	3	INFS2603 and approval from Head of School		14.611	0600, 6810, 1400
INFS3616	Commercial Programming Principles	II	1	S2	3	INFS3605	INFS3692		Course 3971
INFS3692	Industrial Training 2	III	0	S2	1	INFS1602	INFS3616		Course 3971
INFS4693	Industrial Training 3	III	0	S1	1		INFS3611		Course 3971
JAPN1000	Japanese 1A (Core) or	I	1	S1	5	Nil		28.809	
JAPN1100	Japanese 1A (Intermediate) or	I	1	S1	5	70% in 2-unit NSW HSC Japanese; 80%+ in 2-unit Z NSW HSC Japanese, or equivalent (subject to placement test).		28.809	
JAPN1200	Japanese 1A (Advanced)	I	1	S1	5	35/50+ in 3-unit NSW HSC Japanese. Those students who have acquired competence in Japanese by being exchange students in Japan or by some other means (both subject to placement test).		28.809	
JAPN1001	Japanese 1B (core) or	I	1	S2	5	JAPN1000 or equivalent		28.810	
JAPN1101	Japanese 1B (Intermediate) or	I	1	S2	5	JAPN1100 or equivalent		28.810	
JAPN1201	Japanese 1B (Advanced)	I	1	S2	5	JAPN1200 or equivalent (subject to placement		28.810	

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded	Specific Programs
LAWS2160	Administrative Law			S1 *or* S2	4				Course 4770
LAWS1120	Legal System of Torts			F	4				Course 4770
LAWS1410	Contracts			F	4				Course 4770
LAWS1610	Criminal Law			F	4				Course 4770
LAWS3010	Property and Equity			F	4				Course 4770
LAWS6210	Law, Lawyers and Society			S1 *or* S2	4				Course 4770
LAWS7410	Legal Research and Writing 1			F	2				Course 4770
LEGT7711	Legal Environment of Commerce	I	1	S1 *or* S2	3	See Subject Descriptions later in this handbook		14.774	1400, 6810
LEGT7721	Legal Transactions in Commerce	II	1	S1 *or* S2	3	See Subject Descriptions later in this handbook		14.775	1400
LEGT7731	Legal Regulations of Commerce	II	1	S1 *or* S2	3	LEGT7711		14.776	1400
LEGT7741	Legal Organisation of Commerce	III	1	S2	3	LEGT7721 or		14.777	1400, 3971
LEGT7751	Taxation Law	III	1	S1	4	LEGT7721 *or* LEGT7731		14.783	1400
MATH1051	Mathematics 1F	I	1	S1	6	See Subject Descriptions later in this Handbook		MATH1011 MATH1021 MATH1032 MATH1042	3950
MATH2009	Engineering Mathematics 2	II	1	F	4	MATH1032			Courses 3681, 3730
MATH2819	Statistics SA	II	1	F	2	MATH1032 *or* MATH1021			6832, 6833
MATH2839	Statistics SM	II	1	F	2	MATH1032		MATH2841, MATH2801, MATH2821, MATH2901, MATH2921	Course 3681
MATS1042	X-ray Diffraction and Electron Microscopy	III	.5	S2	4	MATS8193			Course 3681
MATS1072	Physics of Materials	II	.5	S2		PHYS1002			Course 3681
MATS1083	Non-ferrous Alloys	III	.5	S2	3		MATS8193		Course 3681
MATS1253	Ferrous Alloys	II	.5	S2	3	MATS8193			Course 3681
MATS1263	Alloy Steels	III	.5	S2	2	MATS1253			Course 3681
MATS4053	Metallographic Techniques	II	.5	S1	2				Course 3681
MATS9323	Mechanical Behaviour of Materials (Units 1-3)	III	1	S1/S2	2/4	MATS8193 *and* MATS1062 *or* MECH2400			Course 3681
MATS8193	Origins of Microstructure (Units 1 and 3)	II	1	S1	5		CHEM1011, *and* MATS1062 *or* MECH2400	Course 3681	
MATS9193	Origins of Microstructure (Units 2 and 4)	III	.5	S1/S2	2/3	MATS1253			Course 3681
MATS9520	Engineering Materials	II	.5	S1	3	PHYS1002 CHEM1807		5.4222	Course 3681

Sciences

No.	Name	Level	Unit Value	When Offered	Hpw	Prerequisites	Co-requisites	Excluded	Specific Programs
MECH1100	Mechanical Engineering Design	I	.5	S2	3		MECH1000	5.0012	Course 3681
MECH1300	Engineering Mechanics 1	I	1	S1 or S2				MECH0360	Course 3681
MECH1400	Mechanics of Solids 1	I	.5	S2	3		MECH1300		Course 3681
MECH1500	Computing 1M	I	.5	S2	3		MATH1032	10.211E	Course 3681
MECH2300	Engineering Mechanics 2A	II	.5	S1 or S2	3	PHYS1002, MATH1032			Course 3681
MECH2310	Engineering Mechanics 2B	II	.5	S2	2		MECH2300		Course 3681
MECH2400	Mechanics of Solids 2 Materials	II	1.5	F	3.5	MECH1400 MATH1032		5.4220	Course 3681
MECH2600	Fluid Mechanics 1	II	1.5	F	2	PHYS1002, MECH1300			Course 3681
MECH2700	Thermodynamics 1	II	1.5	F	2	MATH1032			Course 3681
PHYS2989	Solid State Physics (Electrical Engineering)	II	1	S1	4.5	PHYS1002 MATH1032	MATH2100	PHYS2021	Course 3681
POLY3010	Polymer Science	III	1	F	3	CHEM2011, CHEM2021, MATH2021, MATH2819	MATH2841		Course 3681
PSCY2201	Human Behaviour	II	1	F	3				Course 3820
WOOL3803	Genetics 1	II	1	F	3				6840
WOOL3901	Biostatistics 1	III	1	S1	4	MATH2819 or BIOS2041			6840
WOOL4813	Genetics 2	III	1	F	4	WOOL3801			6840

***Not available in Year 1 of programs 0600, 1000, 1400.
**May be counted in Courses 3611, 3661, 3681 and 3701 in special circumstances only.
ANAT3211 and ANAT3225 are mutually exclusive (see Subject Descriptions later in this handbook).
Anatomy units may be counted as Table 1 units in any program on obtaining special permission of the Head of the School of Anatomy.

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

Table 3

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

No.	Name	Level	Unit Value	When Offered	Prerequisites in Years 1, 2, 3 or 4	Number of Level III Units Required
ANAT4508/ ANAT4504	Anatomy 4	IV	10	F	4 Level III Anatomy units	6
BIOC4318/ BIOC4618	Biochemistry 4 (Honours)	IV	10	F	4 Level III Biochemistry units	8
BIOS4013/ BIOS4019	Biological Science 4 (Honours)	IV	10	F	Program 1700	7
BIOS4023/ BIOS4029	Botany 4 (Honours)	IV	10	F	4 Level III Botany units or a closely related discipline,	7
BIOS4033/ BIOS4039	Zoology 4 (Honours)	IV	10	F	4 Level III Zoology units,	7
BIOT4073/ BIOT4083	Biotechnology 4	IV	10	F	4 Level III units in Biotechnology or related discipline.	8
BSSM4013/ BSSM4019	Geology and Physics 4 (Honours)	IV	10	F	Program 0100	8
BSSM4023/ BSSM4029	Ecology 4	IV	10	F	Programs 6851, 6852, 6853	6
BSSM4103/ BSSM4109	Genetics 4	IV	10	F	Program 6840	6
CHEM4003/ CHEM4103	Chemistry 4	IV	10	F	4 Level III Chemistry units	8
CMED8001	Human Genetics	IV	10	F	At least 3 of the following: BIOC3111 and BIOC3121, BIOT3031, MICR3041, BIOS3071, CMED8201, CMED8202, CMED8302, CMED8303 BSSM3101	8

Sciences

No.	Name	Level	Unit Value	When Offered	Prerequisites in Years 1, 2, 3 or 4	Number of Level III Units Required
COMP4914/ COMP4913	Computer Science 4	IV	10	F	Program 0600	7
GEOG4100/ GEOG4050	Geography 4 (Honours)	IV	10	F	Program 2700, 2527, 6851 GEOG2013, GEOG3221	8
GEOL4303	Geology 4 (Honours)	IV	10	F	Programs 2500, 2503, 2527	8
INFS4003/ INFS4004	Information Systems (Honours) Thesis	IV	10	F	Program 1400	6
MATH4003/ MATH4004	Mathematics and Computer Science (Honours)	IV	10	F	Program 0600 Program 1000 Program 1061	7 7 7
MATH4103/ MATH4104	Applied Mathematics 4 (Honours)	IV	10	F	Program 1000 Program 6810	6 6*
MATH4603/ MATH4604	Pure Mathematics 4 (Honours)	IV	10	F	Program 1000	6*
MATH4903/ MATH4904	Theory of Statistics 4 (Honours)	IV	10	F	Program 1006	6*
MICR4013/ MICR4023	Microbiology and Immunology	IV	10	F	4 Level III Microbiology and Immunology units	8
MSCI4003/ MSCI4009	Marine Science 4	IV	10	F	Program 6831, 6832, 6833 or 6834	6
PATH0005/ PATH0006	Pathology (Honours)	IV	10	F	PATH3201	6
PHIL4050	Philosophy (Honours)	IV	10	F	Programs 5200, 5262, 52.395	7
PHPH4218/ PHPH4224	Physiology 4	IV	10	F	4 Level III Physiology units	7
PHPH4258/ PHPH4264	Pharmacology	IV	10	F	Program 7300 (Strand 2 I see Program 7300)	7
PHYS4403/ PHYS4413	Physics 4 (Honours)	IV	10	F	Progam 0100 Program 0161	7 6
PHYS4303/ PHYS4313	Applied Physics 4 (Honours)	IV	10	F	Program 0100 Program 0161	7 6
PHYS4503/ PHYS4513	Theoretical Physics 4 (Honours)	IV	10	F	Program 0100 Program 0161	7 6
PHYS4503/ PHYS4513	Biophysics 4 (Honours)	IV	10	F	Program 0100	6
PSYC4023	Psychology 4 Thesis (Honours)	IV	10	F	Program 1200	8
PSYC4033	Psychology 4 (Honours)	IV	10	F	Program 1200	8
PSYC4043	Computer Science and Psychology 4 (Honours)	IV	10	F	Program 1206	8
SCTS4106	Science and Technology Studies (Honours)	IV	10	F	Program 6200	7

*Some Higher Mathematics subjects should normally be included at Levels II and III in order to enter Level IV Mathematics. Students should discuss their Year 3 program in Department concerned.
Students entering PHYS4503/PHYS4513 from the 0100 program should have demonstrated adequate mathematical ability.

Undergraduate Study

Subject Descriptions

Identification of Subjects

A subject is defined by the Academic Board as 'a unit of instruction approved by the University as being a discrete part of the requirements for a course offered by the University'.

In 1991 a new system of subject identification is introduced. Each approved subject of the University is identified by a sequence of eight characters, consisting of a four character alphabetical prefix which identifies the organizational unit responsible for administering the subject, and a four digit numeric suffix identifies the subject.

Subject identifiers are approved by the Registrar and the system of allocation is based on the following guidelines:

1. The authority offering the subject, normally a School of the University, is indicated by the four character alphabetical prefix.

2. Each subject identifier is unique and is not used for more than one subject title.

3. Subject numbers which have previously been used are not used for new subject titles.

Subjects taught are listed in full in the handbook of the faculty or board of studies responsible for the particular course within which the subjects are taken. Subject descriptions are contained in the appropriate section in the handbooks.

Appropriate subjects for each school appear at the end of each school section.

The identifying alphabetical prefixes for each organizational unit are set out on the following pages.

Servicing Subjects are those taught by a school or department outside its own faculty. Their subject descriptions are published in the handbook of the faculty which originates the subject and are also published in the handbook of the faculty in which the subject is taught. The following pages contain descriptions for most of the subjects offered for the courses described in this book, the exception being General Education subjects. For General Education subjects see the General Education Handbook which is available free of charge.

HSC Exam Prerequisites

Subjects which require prerequisites for enrolment in terms of the HSC Examination percentile range, refer to the 1978 and subsequent Examinations.

Candidates for enrolment who obtained the HSC in previous years or hold other high school matriculation should check with the appropriate school on what matriculation status is required for admission to a subject.

Information Key
The following is the key to the information which may be supplied about each subject:

S1 Session 1, **S2** Session 2

F Session 1 *plus* Session 2, ie full year

S1 or S2 Session 1 or Session 2, ie choice of either session

SS single session, but which session taught is not known at time of publication

CCH class contact hours

L Lecture, followed by hours per week

T Laboratory/Tutorial, followed by hours per week

P/T part-time

hpw hours per week

wks weeks of duration

C Credit point value

CR Credit

DN Distinction

HD High Distinction

X External

Sciences

Prefix	Organizational unit	Faculty
ABIO	School of Applied Bioscience	Applied Science
ACCT	School of Accounting	Commerce & Economics
ACHM	Department of Chemistry	University College
ACMA	Department of Civil Engineering	University College
ACSC	Department of Computer Science	University College
AECM	Department of Economics & Management	University College
AELE	Department of Electrical Engineering	University College
AENG	Department of English	University College
AERO	Aeronautical Engineering	Engineering
AGOC	Department of Geography & Oceanography	University College
AHIS	Department of History	University College
AINT	University College (Interdisciplinary)	University College
AMAT	Department of Mathematics	University College
AMEC	Department of Mechanical Engineering	University College
ANAT	School of Anatomy	Medicine
APHY	Department of Physics	University College
APOL	Department of Politics	University College
APSE	Faculty of Applied Science	Applied Science
ARCH	School of Architecture	Architecture
ARTS	Faculty of Arts	Arts
ASIA	Asian Studies	Arts
AUST	Australian Studies	Arts
BIOC	School of Biochemistry	Biological & Behavioural Sciences
BIOM	Centre for Biomedical Engineering	Engineering
BIOS	School of Biological Science	Biological & Behavioural Sciences
BIOT	Department of Biotechnology	Applied Science
BLDG	School of Building	Architecture
BSSM	Board of Studies in Science & Mathematics	
CEIC	School of Chemical Engineering & Industrial Chemistry	Applied Science
CHEM	School of Chemistry	Science
CHEN	Department of Chemical Engineering	Applied Science
CHIN	Chinese	Arts
CIVL	School of Civil Engineering	Engineering
CMED	School of Community Medicine	Medicine
COFA	College of Fine Arts	
COMM	Faculty of Commerce	Commerce & Economics
COMP	Computer Science	Engineering
ECOH	Department of Economic History	Commerce & Economics
ECON	School of Economics, and Departments of Econometrics and Economics	Commerce & Economics
EDST	School of Education Studies	Professional Studies
ELEC	School of Electrical Engineering & Computer Science	Engineering
ENGL	School of English Studies	Arts
EURO	European Studies	Arts
EXPA	School of Arts and Music Education	Professional Studies
FIBR	School of Fibre Science & Technology	Applied Science
FINS	School of Banking & Finance	Commerce & Economics
FOOD	Department of Food Science and Technology	Applied Science
FREN	School of French	Arts
FUEL	Department of Fuel Technology	Applied Science
GENS	Centre for Liberal & General Studies	
GEOG	School of Geography	Applied Science
GEOL	Department of Applied Geology	Applied Science
GERS	School of German Studies	Arts
GREK	Modern Greek	Arts
GSBE	Graduate School of the Built Environment	Architecture
HEAL	School of Health Services Management	Professional Studies
HIST	School of History	Arts
HOSP	Asian Studies Unit	Commerce & Economics
IDES	Department of Industrial Design	Architecture
INDC	Department of Industrial Chemistry	Applied Science
INDO	Indonesian	Arts
INFS	School of Information Systems	Commerce & Economics
INTD	Interdisciplinary Studies	Arts
IROB	School of Industrial Relations & Organ. Behaviour	Commerce & Economics
JAPN	Asian Studies Unit	Commerce & Economics
KCME	Key Centre for Mines	Applied Science
LAND	School of Landscape Architecture	Architecture
LAWS	School of Law	Law
LEGT	Department of Legal Studies & Taxation	Commerce & Economics
LIBS	School of Librarianship	Professional Studies
MANF	Manufacturing Management	Engineering
MARK	School of Marketing	Commerce & Economics
MATH	School of Mathematics	Science
MATS	School of Materials Science and Engineering	Applied Science
MDCN	School of Medicine	Medicine
MDSG	Med/Surg.Clinical Studies	Medicine
MECH	School of Mechanical Eng. & Manufacturing Eng.	Engineering
MEED	School of Medical Education	Medicine
MFAC	Medical Faculty (Admin)	Medicine

Prefix	Organizational unit	Faculty
MICR	School of Microbiology and Immunology	Biological & Behavioural Sciences
MINE	Department of Mining Engineering	Applied Science
MNGT	Australian Graduate School of Management	
MSCI	Centre for Marine Sciences	
MUSI	Department of Music	Arts
NAVL	Naval Architecture	Engineering
OBST	School of Obstetrics & Gynaecology	Medicine
OPTM	School of Optometry	Science
PAED	School of Paediatrics	Medicine
PATH	School of Pathology	Medicine
PHIL	School of Philosophy	Arts
PHPH	School of Physiology & Pharmacology	Medicine
PHYS	School of Physics	Science
PLAN	School of Town Planning	Architecture
POLS	School of Political Science	Arts
POLY	Department of Polymer Science	Applied Science
PSCY	School of Psychiatry	Medicine
PSYC	School of Psychology	Biological & Behavioural Sciences
PTRL	Department of Petroleum Engineering Studies	Applied Science
REMO	Centre for Remote Sensing	Engineering
RUSS	Department of Russian Studies	Arts
SAFE	Centre for Safety Science	Engineering
SCTS HPST	School of Science & Technology Studies	Arts
SLSP	Department of Social Science & Policy	Arts
SLST	School of Sport & Leisure Studies	Professional Studies
SOCI	School of Sociology	Arts
SOCW	School of Social Work	Professional Studies
SPAN	Spanish & Latin American Studies	Arts
SURG	School of Surgery	Medicine
SURV	School of Surveying	Engineering
TEDG	School of Teacher Education (grad)	Professional Studies
TEED	School of Teacher Education (undergrad)	Professional Studies
TESL	TESOL	Arts
TEXT	Department of Textile Technology	Applied Science
THST	Department of Theatre Studies	Arts
USOM	School of Mines	Applied Science
WOMS	Women Studies	Arts
WOOL	Department of Wool & Animal Science	Applied Science

Accounting

ACCT1501 Accounting and Financial Management 1A   S1 or S2 L2 T2.5

Prerequisite: Nil.

This is the first unit in a sequence of subjects dealing with aspects of the practice of financial reporting, and reviewing the analytical and investigative tools and processes used within the discipline of accounting. The basic accounting process, whereby financial data from source documents are recorded, processed, summarised and adjusted (in terms of a given set of accounting concepts) culminating in the preparation of financial reports. Design of accounting systems and incorporation of internal controls. Accounting for cash debtors, inventories and property, plant and equipment. Uses and limitations of traditional financial reports. **(Old No. 14.501)**

ACCT1511 Accounting and Financial Management 1B   S1 or S2 L2 T2.5

Prerequisite: ACCT1501.

The second unit in a sequence of financial accounting subjects including the definition and recognition of assets, liabilities, revenues and expenses, partnerships, joint ventures and corporations. Financing decisions and financial management. Financial statement analysis. Aspects of the comtemporary institutional and regulatory environment of external financial reporting. Alternative accounting systems incorporating different measurement unit. Capital maintenance and valuation concepts. Overview of accounting for investments. Preparation of simple funds statement. **(Old No. 14.511)**

ACCT2522 Accounting and Financial Management 2A   S1 or S2 L2 T2.5

Prerequisites: ACCT1511. Excluded: ACCT2532.

The design and operation of management accounting systems, including product costing systems and budgeting planning and control systems. In particular, attention is focused on the theoretical and practical implications of management accounting system design on organisational functioning, with emphasis on both manufacturing and service organisations. Involves the use of spread sheet modelling and the use of personal computers. **(Old No. 14.522)**

ACCT2542 Accounting and Financial Management 2B   S2 L2 T2.5

Prerequisites: ACCT1511. Excluded: ACCT2552.

The third financial reporting unit after ACCT1501 and ACCT1511 with a consideration of more complicated transactions and events as well as the accounting problems in certain specific industries. The contracting cost and other frameworks for the analysis of financial reporting. More advanced aspects of accounting for shareholders' equity, liabilities and assets including interperiod company tax allocation and lease accounting. Accounts of a company. Profit and Loss account, balance sheet, and summary of sources and applications of funds. Application of computer technology to financial accounting problems. **(Old No. 14.542)**

ACCT3563 Accounting and Financial Management 3A   S1 or S2 L2 T2.5

Prerequisite: ACCT2542.

The practices and problems associated with reporting on the affairs of complex organisations and structures including the technique of sonsolidation accounting; reporting on relationships with subsidiaries, associated companies, joint ventures, trusts, etc; segment reporting, reporting where the affairs of subsidiaries or associates are stated in foreign currencies, and other foreign currency translation issues. Overall view of developments in financial accounting and perspectives on the process whereby regulations governing the practice of external reporting are produced and compliance with those rules is administered. **(Old No. 14.563)**

ACCT3573 Accounting and Financial Management 3A (Honours)   S1 LT5

Prerequisite: ACCT2542. Excluded: ACCT3563.

Includes ACCT3563 Accounting and Financial Management 3A as well as additional and more advanced work in both accounting theory and in the financial management and accountability of corporate enterprises. **(Old No. 14.573)**

ACCT3583 Accounting and Financial Management 3B   S1 or S2 L2 T2.5

Prerequisite: ACCT2522. Excluded: ACCT3593.

Management Accounting for decision making: development of skills in financial analysis, and analytical skills and techniques for modelling and solving a variety of typical managerial decision problems with regard to organisational content. Involves the used of the mainframe computer financial modelling package IFPS. **(Old No. 14.583)**

ACCT3593 Accounting and Financial Management 3B (Honours)   S2 LT5

Prerequisite: ACCT2522. Excluded: ACCT3583.

Includes ACCT3583 Accounting and Financial Management 3B, as well as more advanced work dealing with theoretical and research issues in management accounting. **(Old No. 14.593)**

Anatomy

ANAT2111 Introductory Anatomy   S1 L2 T4

Prerequisites: BIOS1011, BIOS1021.

Introduction to gross anatomy, based on a study of prosected specimens. Musculoskeletal, cardiovascular, respiratory, gastrointestinal, genitourinary and nervous systems. General topographical and surface anatomy. **(Old No. 70.011C)**

ANAT2211 Histology 1   **F L1 T2**

Prerequisites: BIOS1011, BIOS1021. Co-requisite: ANAT2111.

Elementary theory of light and electron microscopy. Mammalian cell morphology and ultrastructure. Introduction to simple histological techniques. Basic histology, including the morphological and functional properties of epithelial, connective, muscle and nervous tissues. Systematic histology, including a histological examination of the major systems of the body; cardiovascular, respiratory, lymphatic, integumentary, digestive, endocrine, urinary, reproductive and nervous including eye and ear. Emphasis on the ability to interpret histological sections and selected electron micrographs of mammalian tissues and organs and to relate morphology to tissue and organ function. One lecture per week and a 2-hour practical-tutorial class. **(Old No. 70.011A)**

ANAT3121 Visceral Anatomy   **S2 L2 T4**

Prerequisite: ANAT2111.

A detailed study of the visceral system, including autonomic nervous system, head and neck regions and the cardiovascular, respiratory, gastrointestinal and genitourinary systems. In addition, tutorials include clinical cases and surface and radiological anatomy. **(Old No. 70.012B)**

ANAT3131 Functional Anatomy 1   **S1 L2 T4**

Prerequisite: ANAT2111.

Introduction to fundamental issues in the morphology and dynamics of human movement systems. Includes: physical properties of bone, muscle and connective tissue; biomechanics, movement analysis and neuromuscular control. These basic principles are applied to a study of musculoskeletal components of head and neck and upper limb. Emphasis on modern analytical techniques and findings. Tutorials include limb and joint dissections plus study of surface and radiological anatomy. **(Old No. 70.306)**

ANAT3141 Functional Anatomy 2   **S2 L2 T4**

Prerequisite: ANAT3131.

A continuation of ANAT3131. Includes: a detailed study of the musculoskeletal components of trunk and lower limb, functional morphology of muscle, biomechanics and energetics of walking and running. **(Old No. 70.307)**

ANAT3211 Histology 2   **F L1 T2**

Prerequisite: ANAT2211. Excluded ANAT3220. (If ANAT3211 is taken after ANAT3220 total counts only 1 unit).

Advanced mammalian histology, with particular reference to the human. Practical histological procedures: fixation, section preparation, staining. Microscopy. Theoretical, practical and applied histochemistry. Project work. Electron microscopy. **(Old No. 70.304)**

ANAT3220 Histological and Histochemical   **S1 L1 T2**
Techniques

Prerequisites: BIOS1011, BIOS1021 and either BIOC2312 or BIOS2061 or ANAT2211. Excluded: ANAT3211.

Practical histological procedures: fixation, section preparation, staining. Microscopy. Theoretical, practical and applied histochemistry. **(Old No. 70.3041)**

ANAT3311 Mammalian Embryology   **F L1 T2**

Co-requisites: ANAT2111, ANAT2211.

History of embryology and its development as a science. The mammalian reproductive system. Gametogenesis. Fertilization and cleavage. Development and implantation of blastocyst. Development of embryonic disc, embryonic membranes, placenta. Comparative mammalian placentation. Human embryogenesis. Development of human fetus. Characteristics of external form. Teratology. Human organogenesis. Comparative mammalian development. Biochemistry and embryogenesis. **(Old No. 70.011B)**

ANAT3411 Neuroanatomy 1   **S1 L2 T4**

Prerequisites: ANAT2111, ANAT2211.

Nerve cells and glial cells, cytoarchitecture of brain and spinal cord. Functional anatomy of sensory and motor processing, and higher cerebral functions such as language and emotions. Blood supply of the central nervous system, cerebrospinal fluid and membranous coverings. Comparative anatomy of the brain. **(Old No. 70.012C)**

ANAT3421 Neuroanatomy 2   **S2 L1 T2**

Prerequisite: ANAT3411.

Topics of contemporary neuroanatomy and neuroscience. Includes: sensory, motor and associational areas of the cerebral cortex, cerebral asymmetry, hippocampus, regulatory centres of the brainstem, organization of cerebellum, sensory organs. Recent advances in chemical neuroanatomy and neuroendocrinology. Neuroanatomy of major neurological diseases, scientific basis of novel approaches to treatment. Recent work on the development of the brain. The course is organized in seminar format, and is based primarily on original publications. Students are required to undertake a substantial amount of private study. **(Old No. 70.305)**

ANAT4508 Anatomy 4   **F**

Prerequisite: Completion of the first three years of any Science program with a major in Anatomy (see Table 3 of Combined Sciences Handbook).

An honours program consisting of the preparation of an undergraduate thesis and participation in School seminars. **(Old No. 70.013)**

Biochemistry

BIOC2312 Principles of Biochemistry   **F L2 T4**
and Molecular Biology

Prerequisites: BIOS1011 and BIOS1021, CHEM1101 and CHEM1201 or CHEM1002. 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 relationship between structure and function of enzymes, other proteins, hormones and biological membranes, metabolic networks and control

mechanisms. The molecular mechanism of gene expression and protein synthesis. Regulation of gene expression. Recombinant DNA technology and protein engineering. Introduction to biotechnology. Photosynthesis. Practical work to complement the lectures. (Old No. 41.101)

BIOC3111   Molecular Biology of Proteins   S1 L2 T4
Prerequisites: BIOC2312, CHEM2021 or CHEM2041. Excluded: 41.102A, 41.102.

Modern aspects of the structure-function relationships of proteins including discussion of the latest techniques of protein characterization. Topics will include: separation and analytical procedures; determination of amino acid sequence data; the nature of protein-protein and protein-ligand interactions including aspects of substrate binding, enzyme kinetics and enzyme mechanisms; the molecular architecture of proteins from the standpoint of the relationships among primary, secondary, tertiary and quaternary structures; aspects of protein engineering. Practical work to illustrate and complement the lectures and to provide experience with modern techniques of protein molecular biology.

BIOC3121   Molecular Biology of Nucleic Acids S1 L2 T4
Prerequisites: BIOC2312, CHEM2021 or CHEM2041. Excluded: 41.102A, 41.102.

Detailed analysis of gene structure and function including: structure and properties of polynucleotides such as DNA and RNA; structure of chromatin; mechanisms and regulation of gene replication, transcription and translation; recombinant DNA technology, nucleic acid sequencing, DNA-DNA and DNA-RNA hybridization as important tools of modern molecular biology; protein production using recombinant DNA systems. Practical work to illustrate and complement the lectures and to provide experience with contemporary biochemical techniques.

BIOC3131   Biochemistry and Genetic   S1 L2 T4
Engineering of Plants
Prerequisite: BIOC2312

The techniques of recombinant DNA technology and plant tissue culture with their applicaiton to the modification and improvement of plant productivity.

Plant organ, tissue and cell culture, organogenesis, embryogenesis and clonal plant propagation. The long term preservation of germplasm and plant genetic resources. Products from cultures, plant cells and the technology of plant cell culture. Structure and expression of plant genes. Plant molecular biology including cloning plant genes and vectors for gene cloning. Genetic manipulation of plants to improve their natural resistance to pests, disease and environmental stress. Practical work provides training in the basic techniques of plant tissue culture with application of selected techniques to plant genetic engineering. (Old No. 41.142)

BIOC3261   Human Biochemistry   S2 L2 T4
Prerequisite: BIOC2312.

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

The role of triglyceride, cholesterol and lipoprotein metabolism in human health, and other selected areas of human nutrition.

Exercise, the metabolic fuels utilized and the use of *in vivo* NMR to monitor changes in energy metabolism. Specialized aspects of endocrinology and neurochemistry including prostaglandins, leukotrienes, enkephalins and endorphins. The interrelation of purines, pyrimidines, folate and cobalamin metabolism in humans. Xenobiotics: the metabolism of foreign compounds by humans. Biochemical aspects of genetic disease including the use of recombinant DNA techniques for prenatal diagnosis and carrier detection. Practical work to amplify the lectures. (Old No. 41.112)

BIOC3271   Cellular Biochemistry and Control   S2 L2 T4
Prerequisite: BIOC2312.

Cell biology from a molecular physicochemical viewpoint. Biochemical aspects of cellular organization and how they are integrated and controlled. The arrangement of the component molecules of organelles, their function in integrated cellular metabolism to molecular interactions between the cells of multicellular organisms. The biochemistry of the cytoskeleton, carriers and intracellular transport systems. The regulation of cellular processes at the molecular endocrine level. Growth and differentiation. Aspects of cancer metabolism, the biochemistry of cell to cell communication and the structure and function of the extracellular matrix. This subject is complementary to BIOS3141 Ultrastructure and Function of Cells and students with a special interest in cell biology are encouraged to take both subjects. Practical work to amplify the lectures. (Old No. 41.122)

BIOC3281   Recombinant DNA Techniques   S2 L2 T4
and Eukarytic Molecular Biology
Prerequisite: BIOC3121. Excluded: 41.102E, 41.132.

The organization of the genomes of higher organisms derived mainly from the application of recombinant DNA technology and related techniques. Methods used for the isolation, identification and characterization of eukaryotic genomes in terms of the organization of single-copy and repeated sequences and of coding and non-coding sequences and of several gene clusters, eg the alpha and beta globin gene cluster. Mechanisms known to operate in the control of eukaryotic gene expression, both at the DNA level and at the level of RNA processing. Review of several specialized genetic systems in plants and animals such as mitochondria, chloroplasts and RNA and DNA tumour viruses. Practical work provides training in the use of sterile techniques and in working with polynucleotides under nuclease-free conditions, using basic techniques such as hybridization and DNA sequencing. (Old No. 41.132)

BIOC4318/BIOC4618   Biochemistry 4 (Honours)

Advanced training in selected areas of biochemistry including a supervised research program that places emphasis on the use of specialized techniques relevant to the research area. A written thesis on the research is required. (Old No. 41.103)

Servicing Subjects

These subjects taught within courses offered by other faculties.

For further information regarding the following subjects see the Faculty of Medicine Handbook.

BIOC1319   Biochemistry for Medical Students (Old No. 41.001)

BIOC2329   Medical Biochemistry and Genetics (Old No. 41.002)

Biological Science

BIOS1011   Biology A   S1 L2 T4

Prerequisite:	HSC Exam Score Range Required
2 unit Science (Physics) or	*53-100*
2 unit Science (Chemistry) or	*53-100*
2 unit Science (Geology) or	*53-100*
2 unit Science (Biology) or	*53-100*
3 unit Science or	*90-150*
4 unit Science	*1-50*

Basic cell structure; membranes, organelles, prokaryotic and eukaryotic cells; cellular locomotion; basic biological molecules; enzymes; structure and metabolic roles, cellular compartmentalization and enzyme function; diffusion, osmosis and active transport; theory of inheritance, linkage, mutation, information transfer and protein synthesis. **(Old No. 17.031)**

Requirements for Practical Work

Equipment required for practical work is set out in the Course Guide, available during enrolment time at the First Year Registration Centre (Physics Building). Students must purchase this prior to the first week of session.

BIOS1021   Biology B   S2 L2 T4

Prerequisite: BIOS1011 (however, students without this prerequisite may seek the permission of the Co-ordinator of First Year Biology to enrol).

Excluded BIOS.021.

The evolution, diversity and behaviour of living things and the ways in which they have adapted to varying environments. Emphasis on the structure and function of flowering plants and vertebrate animals, and their roles in Australian ecosystems. The theory covered in lectures and tutorials is illustrated by observation and experiment in laboratory classes. **(Old No. 17.041)**

**BIOS2011   Evolutionary and   S1 L2 T4
               Physiological Ecology**

Prerequisites: BIOS1011 and BIOS1021.

An introduction to functional relationships between living organisms and the environments in which they live. Illustration of structural, physiological, ecological and behavioural characteristics at both cellular and organismic level as examples of adaptations or neutral traits, and the evaluation of these attributes as the outcome of ecological and evolutionary selection. Selected areas of the course will also serve as an introduction to the process of scientific enquiry. **(Old No. 17.050)**

BIOS2021   Introductory Genetics   S2 L2 T4

Prerequisite: CHEM1201 or CHEM1002, BIOS1011, BIOS1021, Co-requisite: BIOC2312. Excluded WOOL3803, 45.601

Structure, function and organization of DNA in prokaryotes and eukaryotes. Genetic bases of life cycles in prokaryotes and eukaryotes. Genetic aspects of development. Gene control. Genetic engineering. Mutation, gene interaction and linkage analysis in prokaryotes and eukaryotes. Binomial Square Law and extensions. Effects of population size on levels of genetic variation. Selection in natural populations. Molecular evolution and levels of selection. Cytogenetics, gene mapping, levels of variation and selection in human populations. Recombination in prokaryotes and eukaryotes.

Students are not admitted to Level III Biological Science units without special permission of the Head of School unless Chemistry CHEM1002 or both CHEM1101 and CHEM1201 have been completed. **(Old No. 17.601)**

BIOS2031   Biology of Invertebrates   S2 L2 T4

Prerequisite: BIOS1011, and BIOS.1021. Excluded: 45.201.

A comparative study of morphology, taxonomy and functional biology of invertebrate animals. Emphasis is placed on the major groups (Anthropods and Molluscs) and on marine forms. Practical classes and a compulsory field camp illustrate the lecture material. **(Old No. 17.722)**

BIOS2041   Biometry   S1 L2 T4

Prerequisites: BIOS1011, BIOS1021. Excluded MATH2801, MATH2901, MATH2841, 45.101.

Statistical methods and their application to biological data, including introduction to probability; the binomial, Poisson, normal distributions; student's t, 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 2, the Kruskal-Wallis test, Fisher's exact probability test and rank correlation methods. Introduction to programming in BASIC. **(Old No. 17.712)**

BIOS2051   Flowering Plants   S2 L2 T4

Prerequisites: BIOS1011 and BIOS1021. Excluded 43.111, 45.111.

This covers basic aspects of plant biology and provides practical skills required in level III units. It is essential for students intending to specialise in the plant sciences. The course follows the development of plants from seedling stage to maturity, examining the structural and environmental controls, and the close relationship between structure and function in major plant systems. The following topics are dealt with in detail: the properties of plant cells and their walls in relation to growth; differentiation and how cells are organised into different tissues; transport systems and the movement of water and photosynthetic products; seed structure, the physiology of germination and its regulation by internal and external factors; primary and secondary growth and its regulation by plant hormones; shoot systems; leaf development; aborescence; adaptation to particular environments; root systems; mineral acquisition and water unpake; root growth and development; interactions of roots with microorganisms and the impact of symbiotic associations

such as mycorrhizas on root structure and physiology; evolution of the land plants; the significance of having an enclosed carpel and the evolution of the gynoecium. Practial work provides: basic skills in plant anatomy and light microscopy; an introduction to the character states of flowering plant families in the Sydney region; how to use a key to identify a plant; growth and mineral nutrition, including collection of numerical data and a statistical approach to data handling; inoculation of plants with microorganisms; an integrated approach to salt secretion in mangroves **(Old No. 17.702)**

BIOS2061   Vertebrate Zoology   S1 L3 T3
Prerequisite: BIOS1011, BIOS1021. Excluded: 45.301.

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. **(Old No. 17.732)**

BIOS3011   Animal Behaviour   S2 L2 T4
Prerequisites: BIOS2041 and BIOS2031 or BIOS2061. Excluded: 45.122.

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. **(Old No. 17.783)**

BIOS3021   Comparative Animal Physiology   S1 L2 T4
Prerequisite: BIOS2031 or BIOS2061. Excluded: 45.142

A study of the physiology of invertebrates and vertebrates including the special features of Australian mammals. The systems and functions examined include reproduction, hormones, nerves, blood, circulation, respiration and kidneys with emphasis on the control and integration of organ systems and body functions. **(Old No. 17.803)**

BIOS3031   Ecological Physiology   S2 L2 T4
Prerequisites: BIOS2031 or BIOS2061. Excluded: 45.132.

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 attentional is given to Australian fauna and conditions. **(Old No. 17.793)**

BIOS3041   Plant-Microbe Interactions   S2 L2 T4
Prerequisites: BIOS2011 and BIOS2051 or MICR2201.

The relationship between microbes and plant surfaces particularly in the soil environment, rhizosphere organisms, role of microorganisms in mineral acquistion by plants, mutualistic symbioses between roots and microorganisms, dynamics of infection and host invasion, plant pathogen interactions. Examination of fungi in culture and basic fungal taxonomy. Inoculation of plant material to produce symbioses and examination of infection processes, histochemistry and light microscopy. **(Old No. 17.833)**

BIOS3051   Entomology   S1 L2 T4
Prerequisites: BIOS1011, BIOS1021, BIOS2031. Excluded: 45.402, 45.422, 17.8231, 178232.

Classification, external morphology and internal anatomy of insects, studies on environmental sensory physiology and behaviour ! especially reproductive behaviour, social organization and pheromones. Ecology, Chemical, Biological and Physical control of insect pests which attack man, crops or livestock and side effects of pest control methods. Practical work to illustrate the lectures. **(Old No. 17.8231/17.8232)**

BIOS3061   Environmental Botany   S1 L2 T4
Prerequisites: BIOS1011 and BIOS1021. Excluded: 43.142.

The soil and atmospheric environments in which plants live and a study of the interaction of plants with their environment. Energy and mass transfer. **(Old No. 17.713)**

BIOS3071   Evolution and   S1 L3 T3
             Population Genetics
Prerequisites: BIOS1011 and BIOS1021. Excluded: 45.121.

Current evolutionary theory, emphasizing the population level. Ecological genetics, speciation, evolution of social behaviour, molecular evolution and general evolutionary genetics. Some background in genetics is desirable. **(Old No. 17.773)**

BIOS3081   Marine Ecology   S1 L2 T4
Prerequisites: BIOS2031 or MSCI2001. Excluded: 45.112.

A study of the ocean environment and its effect on the life of marine organisms, together with the effects of human intervention. Emphasis is placed on the biology of fishes, fisheries and aquaculture. Estuarine field studies are an essential component of the course.

Students intending to enrol in this unit should register with the School of Biological Science by 11th January so that field work can be arranged. **(Old No. 17.763)**

BIOS3091   Phycology and Marine Botany   S2 L2 T4
Prerequisite: BIOS2051. Excluded 43.172, 45.172.

The biology and taxonomy of algae with particular emphasis on marine algae, both macroalgae (seaweeds) and phytoplankton. The biology of marine angiosperms (seagrasses). The ecology of coastal plant communities, rocky coasts and estuarine shores. The commercial uses of algae and their products; algae mariculture. Fieldwork is part of the subject. **(Old No. 17.743)**

BIOS3101   Plant Community Ecology   S2 L2 T4
Prerequisites: BIOS2051 and GEOG1012 and GEOG1031 or BIOS2011.
Excluded 43.152.

Recognition and delimitation of plant communities. Ecology of selected Australian vegetation types. Use of numerical methods and application of community concepts to palaeoecology. Field work is an integral part of this course. **(Old No. 17.723)**

BIOS3111   Population and   S1 L2 T4
**   Community Ecology**

Prerequisite: BIOS1021 and MATH1032 or both MATH1011 and MATH1021.
Excluded: 45.152.

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. **(Old No. 17.733)**

BIOS3121   Taxonomy and Systematics   S1 L2 T4

Prerequisite: BIOS2051. Excluded: 43.112.

The assessment, analysis and presentation of data for classifying organisms both at the specific and supra-specific level. **(Old No. 17.703)**

BIOS3131   Vertebrate Zoogeography   S2 L2 T4
**   and Evolution**

Prerequisite: BIOS2061. Excluded: 45.302.

A geographic approach to the current distribution, abundance and types of vertebrate species in the Australian region. Particular emphasis is placed on the basic principles of speciation, the history of the Australian continent, vertebrate adaptations and changes in the distribution and abundance of the Australian vertebrate fauna under the influence of humans. Field excursions as arranged. **(Old No. 17.813)**

BIOS3141   Ultrastructure and   S1 L2 T4
**   Function of Cells**

Prerequisite: At least 1 core level II Biological Science subject.
Excluded 43.192, 45.192.

The concepts and techniques in modern ultrastructure and cell biological research will be taught. Emphasis is on areas where ultrastructural and cell biological studies interface with molecular and biochemical studies in understanding how living cells work. The material in this unit covers aspects of cell motility, secretion, cell recognition, development, transport and communication. Practical work: students use transmission and scanning electron microscopes to investigate material they themselves prepare, using negative staining and ultramicrotomy. They are also trained in the principles and practice of fixation and sectioning tissues for light and electron microscopy, techniques that use antibodies to label specific proteins, and methods used in the investigation of nerve cells.

This unit is complementary to BIOC3271 Cellular Biochemistry and Control and students with a special interest in cell biology are encouraged to take both units. **(Old No. 17.753)**

Level 1V Subjects

BIOS4013/BIOS4019   Biological Science 4 (Honours)

BIOS4023/BIOS4029   Botany 4 (Honours)

BIOS4033/BIOS4039   Zoology 4 (Honours)

Biotechnology

BIOT3011   Biotechnology A   S1 L3 T3

Prerequisites: BIOC2312 and MICR2011.

The basic principles involved in the operation of microbial processes on an industrial scale. Includes: the selection, maintenance and improvement of microorganisms; the influence of physical and chemical factors on the microbial environment; the control of environmental factors; the effects of operational patterns on batch and continuous flow cultivation; aeration and agitation; scale-up of microbial processes; air and media sterilization; the harvesting, purification and standardization of products; the principles involved in microbial processes for chemical, pharmaceutical and food production, microbial waste treatment and environmental control. The laboratory component includes manipulation of micro-organisms, laboratory-scale fermenter operation, microbial enzyme isolation, visits to industrial fermentation plants and industrial seminars. **(Old No. 42.102A)**

BIOT3021   Biotechnology B   S2 L2 T4

Prerequisite: BIOT3011

Application of principles of biotechnology to the analysis and design of microbial processes of industrial relevance (antibiotics, microbial enzymes, single cell protein from carbohydrates and hydrocarbons, fermented foods and beverages, amino acids and vitamins, microbial polysaccharides, activated sludge and photosynthetic processes for waste treatment, microbial teaching of low-grade minerals). Emphasis on quantitative approach; mass and heat balance calculations, kinetic and thermodynamic analysis, detailed equipment design and specification, process design and layout, process simulation, plant location, application of optimization techniques. The economics of microbial processes are considered and comparison made with alternative modes of production or treatment. The economics of agroindustry in Australia using microbial processes. Marketing of fermentation products, clinical trials required, legal constraints, patent rights. Technical and economic feasibility studies, and a design project. **(Old No. 42.102B)**

BIOT3031   Microbial Genetics   S1 L2 T4

Prerequisites: BIOS2011, BIOS2021, BIOC2312 and MICR2011.
Excluded: MICR3021.

This unit is suitable for students majoring in Microbiology, Biochemistry, Biotechnology or Genetics. It deals with major aspects of the genetics of bacteriophage, bacteria and yeast. Topics include plasmids and transposible genetic elements, gene transfer, mutagenesis and DNA repair, mutants, bacteriophage genetics, gene cloning (vectors, recombinant DNA techniques) and genetics of nitrogen fixation. **(Old No. 42.102C)**

Sciences

**BIOT3061   Modern Techniques
in Biotechnology   S2 L2T4**

Prerequisite: BIOC2312.

Recent developments in biotechnology have resulted in techniques which are widely applied in industrial, clinical, veterinary, agricultural and research laboratories. Many of these techniques have resulted from the development of monoclonal antibodies and the development of gene probes. The course includes: anitbody structure; production of monoclonal antibodies, cell fusion, hybridoma selection, culture techniques, purification; analytical techniques employing monoclonal antibodies (RIA, ELISA); therapeutic applications of antibodies, immunotoxins; gene probes; restriction fragment length polymorphisms (RFLP); gene probes for disease detection, identification of bacteria and viruses; forensic application of DNA fingerprinting. Tutorial and practical work to complement the lectures. **(Old No. 42.102H)**

BIOT4073/BIOT4083   Biotechnology (Honours)

Advanced formal training in selected areas of biotechnology and participation in one of the school's research projects. **(Old No. 42.103)**

Board of Studies in Science and Mathematics

**BSSM4103/BSSM4109   Genetics 4 (Honours)
(Old No. 68.404)**

BSSM4013/BSSM4019 Geology and Physics 4 (Honours)

An honours program combining Geology and Physics in Program 0100, made by arrangement with the Heads of the two Schools. **(Old No. 68.430)**

BSSM2101   Genetics of Behaviour 1   S1 L2 T3

Prerequisite: BIOS1011.

Introductory behaviour genetics with most examples coming from human genetics. Single gene, polygene and chromosomal genetics which illuminate normal and abnormal behaviour; mathematical treatment of data, non-human mammalian behaviour. Practical classes and limited clinical contact. **(Old No. 68.601)**

BSSM3101   Genetics of Behaviour 2   S2 L2 T3

Prerequisite: BSSM2101.

The topics of 68.601 at a more advanced level. Continued emphasis on human behaviour with essential consideration of microbial and invertebrate studies. Extended mathematical treatment of data. Projects involving community contact replace some of the practical sessions. **(Old No. 68.602)**

MSCI2001   Introductory Marine Science   S1 L3 T1

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

Field work in mid-year recess. **(Old No. 68.302)**

**MSCI4003/MSCI4009   Marine Science 4 (Honours)
(Old No. 68.304)**

MSCI3001   Physical Oceanography   S2 L2 T2

Prerequiste: MATH1032 or MATH1042.

The physical properties and motions of the oceans, and their measurement, Oceanographic instrumentation. The design of small and large scale ocean experiments. Laboratory and field work. **(Old No. 68.313)**

Chemistry

Chemistry Level I Subjects

CHEM1002 Chemistry 1   F L3T3

Prerequisites	HSC Exam Score Range required
2 unit Mathematics or	55-100
3 unit Mathematics or	1- 50
4 unit Mathematics	1-100
and	
2 unit Chemistry or	53-100
3 unit Science or	90-150
4 unit Science or	1- 50
2 unit Physics	53-100

Stoichiometry and solution stoichiometry. Atomic and molecular structure. Electron configurations and the periodic table. Types of chemical bonds, electronegativity. States of matter, changes of state, phase diagrams, gases, liquids, solids, solutions. Chemical thermodynamics, enthalpy, entropy, free energy. Chemical equilibrium, equilibrium constants, quantitative calculations applied to acid-base and solubility equilibria, buffers, titrations, chemical analysis. Oxidation and reduction reactions, electrode potentials. Chemical kinetics. Molecular structure, valence bond theory, hybridization of orbitals, common geometries. Periodicity of physical and chemical properties of common representative elements and compounds. Chemistry of carbon compounds, stereoisomerism; alkanes, alkenes, alkynes, aromatic compounds, alcohols, ethers, aldehydes, ketones, carboxylic acids and derivatives, amines. Polymers. **(Old No. 2.141 or both 2.121/2.131)**

Note: CHEM1002 is the normal prerequisite for Level II Chemistry.

CHEM1101 Chemistry 1A   **S1 L3T3**

	HSC Exam Score
Prerequisites	*Range required*
2 unit Mathematics or	*55-100*
3 unit Mathematics or	*1- 50*
4 unit Mathematics	*1-100*
and	
2 unit Chemistry or	*53-100*
3 unit Science or	*90-150*
4 unit Science or	*1- 50*
2 unit Physics	*53-100*

Stoichiometry and solution stoichiometry. Atomic and molecular structure. Electron configurations and the periodic table. Types of chemical bonds, electronegativity. States of matter, changes of state, phase diagrams, gases, liquids, solids, solutions. Chemical thermodynamics, enthalpy, entropy, free energy. Chemical equilibrium, equilibrium constants, quantitative calculations applied to acid-base and solubility equilibria, buffers, titrations, chemical analysis. Oxidation and reduction reactions, electrode potentials. Chemical kinetics.

CHEM1201 Chemistry 1B   **S2 L3T3**

Prerequisites CHEM1101 Chemistry 1A

Molecular structure, valence bond theory, hybridization of orbitals, common geometries. Periodicity of physical and chemical properties of common representative elements and compounds. Chemistry of carbon compounds, stereoisomerism; alkanes, alkenes, alkynes, aromatic compounds, alcohols, ethers, aldehydes, ketones, carboxylic acids and derivatives, amines. Polymers.

Note: The two subjects CHEM1101 and CHEM1201, taken sequentially, are equivalent to CHEM1002.

CHEM1302 Introductory Chemistry   **F L3T3**

	HSC Exam Score
Prerequisites	*Range required*
2 unit Mathematics or	*55-100*
3 unit Mathematics or	*1- 50*
4 unit Mathematics	*1-100*

Stoichiometry and solution stoichiometry. Atomic and molecular structure. States of matter, changes of state, phase diagrams, gases, liquids, solids, solutions. Chemical thermodynamics, enthalpy, entropy, free energy. Oxidation and reduction reactions, electrode potentials. Chemical kinetics. Electron configurations and the periodic table. Types of chemical bonds, electronegativity. Molecular structure, valence bond theory, hybridization of orbitals, common geometries. Chemical equilibrium, equilibrium constants, quantitative calculations applied to acid-base and solubility equilibria, buffers, titrations, chemical analysis. Periodicity of physical and chemical properties of common representative elements and compounds. Chemistry of carbon compounds, stereoisomerism; alkanes, alkenes, alkynes, aromatic compounds, alcohols, ethers, aldehydes, ketones, carboxylic acids and derivatives, amines. Polymers.

Note: CHEM1002 is the normal prerequisite for Level II Chemistry. However, students who perform very well in CHEM1302 will be permitted to continue on to Level II

Chemistry with the permission of the Head of School of Chemistry.

CHEM1401 Introductory Chemistry A   **S1 L3T3**

	HSC Exam Score
Prerequisites	*Range required*
2 unit Mathematics or	*55-100*
3 unit Mathematics or	*1- 50*
4 unit Mathematics	*1-100*

Stoichiometry and solution stoichiometry. Atomic and molecular structure. States of matter, changes of state, phase diagrams, gases, liquids, solids, solutions. Chemical thermodynamics, enthalpy, entropy, free energy. Oxidation and reduction reactions, electrode potentials. Chemical kinetics.

CHEM1501 Introductory Chemistry B   **S2 L3T3**

	HSC Exam Score
Prerequisites	*Range required*
CHEM1401 Introductory Chemistry A or	
2 unit Mathematics or	*55-100*
3 unit Mathematics or	*1- 50*
4 unit Mathematics	*1-100*
and	
2 unit Chemistry or	*53-100*
3 unit Science or	*90-150*
4 unit Science or	*1- 50*
2 unit Physics	*53-100*

Electron configurations and the periodic table. Types of chemical bonds, electronegativity. Molecular structure, valence bond theory, hybridization of orbitals, common geometries. Chemical equilibrium, equilibrium constants, quantitative calculations applied to acid-base and solubility equilibria, buffers, titrations, chemical analysis. Periodicity of physical and chemical properties of common representative elements and compounds. Chemistry of carbon compounds, stereoisomerism; alkanes, alkenes, alkynes, aromatic compounds, alcohols, ethers, aldehydes, ketones, carboxylic acids and derivatives, amines. Polymers. Note: The two subjects CHEM1401 and CHEM1501, taken sequentially, are equivalent to CHEM1302.

Chemistry Level II Subjects

CHEM2011 Physical Chemistry   **S1 or S2 L3 T3**

Prerequisites: CHEM1002 and MATH1042 or MATH1032 or MATH1011 and MATH1021. Excluded 2.002A

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. **(Old No. 2.102A)**

CHEM2021 Organic Chemistry   **F or S2 L3 T3**

Prerequisite: CHEM1002. Excluded 2.002B

Discussion of the major types of organic reaction mechanisms eg addition, substitution, elimination, free-radical, molecular

rearrangement within context of important functional groups eg aliphatic hydrocarbons, monocyclic aromatic hydrocarbons, halides, organometallic compounds, alcohols, phenols, aldehydes, ketones, ethers, carboxylic acids and their derivatives, nitro compounds, amines and sulfonic acids. Introduction to application of spectroscopic methods to structure determination. **(Old No. 2.102B)**

CHEM2031 Inorganic Chemistry and   S1 or S2 L3 T3
                    Structure
Prerequisites: CHEM1002. Excluded 2.042C

Fundamentals of spectroscopy as experimental basis for theories of electronic structures of atoms and molecules. Concepts and consequences of quantum theory. Molecular orbitals. Ligand field theory, magnetochemistry. Geometrical structure and chemical bonding, molecular and non-molecular structures, molecular symmetry, ionic covalent and metallic bonds. Occurrence, preparation, properties and reactions of compounds of the p-block elements, of transition metals and of post-transition metals. Principles of co-ordination chemistry. Thermodynamics applied to inorganic systems in solid and solution phases. **(Old No. 2.102C)**

CHEM2041 Chemical and Spectroscopic S1 or S2 L3 T3
                    Analysis
Prerequisites: CHEM1002 and MATH1042 or MATH1032 or MATH1011 and MATH1021. Excluded 2.002D and 2.003H

General procedures in analytical science, accuracy, propagation of errors, precision. Analytical reaction chemistry, titrimetric, and gravimetric, analysis. Solvent extraction. Electroanalytical methods. Chromatography. Instrumental aspects of all major spectroscopic methods. Optical spectroscopy, nuclear magnetic and electron spin resonances, mass spectrometry. Sample handling. **(Old No. 2.102D)**

Chemistry Level III Core Subjects

CHEM3011 Physical Chemistry   S1 L3 T3
Prerequisites: PHYS1002, CHEM2011, CHEM2031 and CHEM2041. Excluded 2.013A

States of matter: gases, liquids, solutions and solids. Equations of state. Intermolecular forces and condensed phases. Gas kinetic theory and distribution of molecular energy. Statistical thermodynamics and prediction of properties of simple gases, liquids and solids. Structure and properties of liquids, solutions and solids. *Molecular energies and spectra.* Quantum properties of radiation and molecules. Molecular vibration (harmonic and anharmonic). Infrared and Raman spectra of gases. Molecular rotation. Rotational structure in molecular spectra. Intensity distributions in molecular spectra. Applications of molecular spectroscopy. **(Old No. 2.103A)**

CHEM3021 Organic Chemistry   S1 L3 T3
Prerequisite: CHEM2021. Excluded 2003B

Heterocyclic Chemistry: synthesis and reactions of the following heteroaromatic systems; pyridine, quinoline, isoquinoline, pyrimidine, pyrrole, furan, thiophen, indole, imidazole; exampoles of naturally occuring alkaloids where relevant. *Alicyclic Chemistry:* stereochemistry of acyclic systems; classical and nonclassical strain in cyclic systems;

stereochemistry and conformation of monocylic and polycyclic compounds; synthesis, reactions and rearrangement of monocyclic compounds including stereochemical selectivity; transannular reactions in mediam rings; synthesis and reactions of fused and bridged polycyclic systems; examples of steroids and terpenes where relevant. *Structure Determination:* application of spectroscopic methods (eg nuclear magnetic resonance, mass spectroscopy) to determination of organic structures. **(Old No. 2.103B)**

CHEM3031 Inorganic Chemistry   S1 L2 T4
Prerequisite: CHEM2031. Excluded 2.003D.

Transition metal chemistry: bonding theory; energies and population of d-orbitals and their correlations with stereochemistry, thermodynamic properties, spin states; theory and applications of magnetism; theory and applications of electronic spectra; stabilities of metal complexes; stabilisation of oxidation states; metal carbonyls; descriptive chemistry of transition metals; special characteristics of second and third transition series metals; *Lanthanide elements:* lanthanide contraction and its consequences: electronic configurations and oxidation states; spectral and magnetic properties; stabilities of complexes; separation. *p-block elements:* the inert pair effect; bonding, structure, and reactivity of representative compounds; halogen chemistry. **(Old No. 2.103C)**

CHEM3041 Analytical Chemistry   S1 L2 T4
Prerequisite: CHEM2041. Excluded 2.003D.

Instrument design, theory and operating principles for the following instrumental areas: electrochemical, atomic and molecular spectroscopy, chromatography, mass spectrometry, automated analysis, thermal analysis. **(Old No. 2.103D)**

Chemistry Level III Elective Subjects

CHEM3111 Kinetics and Mechanism of   S2 L3 T3
                    Chemical Change
Prerequisite: CHEM3011. Excluded 2.053A.

Molecular collision dynamics, reactions in molecular beams, energy disposal and equilibration in chemical reactions gas phase energy transfer. Mechanisms and kinetic applications of lasers. Theories of bimolecular and unimolecular gas reactions, potential energy surfaces. Free radical reactions, chain reactions, explosions, mechanisms in pyrolysis and oxidation of hydrocarbons, polymerisation reactions, catalytic mechanisms.

Experimental methods for studying fast ractions. Reactions in solution: structure l reactivity relationships. **(Old No. 2.113A)**

CHEM3121 Synthetic Organic Chemistry S2 L2 T4
Prerequisite: CHEM3021. Excluded 2.013B.

Synthetic methods. Modern functional group transformations with particular reference to positional and sterochemical control; organometallic and carbonionic reagents. *Pericyclic reactions and photochemistry.* Electrocyclic sigmatropic reactions, DielsAlder and related cycloadditions. Woodward-Hoffman rules, ring formation and cleavage.

Synthetic strategy. Principles of planning or organic synthesis; disconnection approach to representative syntheses of compounds of theoretical and biological interest; use of protecting groups. **(Old No. 2.113B)**

CHEM3131 Advanced Inorganic Chemistry S2 L2 T4
Prerequisite: CHEM3041. Excluded 2.013C.

Spectroscopy and magnetism of transition metal compounds; applications of infrared, electronic and Moessbauer spectra; magentic properties of polynuclear complexes. *Inorganic reactivity;* rates and mechanisms of ligand substitution and electron transfer; molecular rearrangements; reactions of co-ordinated ligands and activation of co-ordinated molecules; excited state reactivity. *Bio-inorganic chemistry:* the occurrence and co-ordination of metals in biology; heme proteins and dioxygen coordination redox and proteolytic metalloenzymes; metal storage and transport proteins; *Innovations and technological developments;* accounts of current advances, including topics such as inorganic polymers, inclusion compounds, zeolites, electronically delocalised compounds, and metal clusters. **(Old No. 2.113C)**

CHEM3141 Advanced Instrument Analysis S2 L2 T4
Prerequisite: CHEM3041. Excluded 2.013D.

Advanced approaches to problem solving in analytical science using modern instrumental techniques and microcomputers for the analysis of complex organic, biological, inorganic and environmental materials. Sample selection procedures; extraction and recovery of major, minor, trace and untra-trace constituents; origins, identification and elimination of interference effects. Selection and optimisation of instrumental parameters; theory of separation strategies for identification and quantitative determinations. Networking of computer-controlled workstations for laboratory automation and management. **(Old No. 2.113D)**

CHEM3211 Biophysical and Interfacial S2 L3 T3
Chemistry
Prerequisite: CHEM2011. Excluded 2.033A.

Interplay of interfacial, colloidal and macromolecular science. Physical properties of macromolecules. Determination of molecular size from gel permeation chromatography, diffusion, sedimentation, viscometry, osmometry and light scattering. Spectroscopic properties: circular dichroism, optical rotary dispersion and X-ray diffraction; conformation of macromolecules; Helix random coil transitions. The use of modern spectroscopic techniques in surface chemistry including low energy electron diffraction, Auger electron, UV and X-ray photo-electron spectroscopy; electron energy loss, ion scattering and secondary ion emission at the gas solid interface. Surface free energy and related thermodynamic concepts applied to the study of solutes at interfaces; wetting behaviour, capillarity, detergency, mineral flotation, micelles and bio-physical membranes. Adsorption and its significance in resulting biological and synthetic catalytic processes. **(Old No. 2.123A)**

CHEM3221 Biological Organic Chemistry S2 L2 T4
Prerequisite: CHEM3021. Excluded 2.023B.

Interdisciplinary aspects of selected classes of organic compounds of biological significance. *Natural polymers:*

Synthesis and properties of proteins, poly-saccharides, nucleic acids. *Pharmacological chemistry:* Discussion of structural and synthetic aspects of several selected drugs; structure-activity relationships, metabolism, methods of analysis. *Herbicides, fungicides, pesticides.* Synthesis, degradation and mode of action of selected compounds. **(Old No. 2.123B)**

CHEM3231 Nuclear and Radiation Chemistry S2 L2 T4
Prerequisite: CHEM2011 or CHEM2021 or CHEM2031 or CHEM2041. Excluded 2.003E.

Radioactivity, isotopes, fundamental atomic particles, nuclear structure and properties. Properties of nuclear radiations, their interaction with matter and their detection and measurement. Nuclear instrumentation. Factors to be considered when making radioactive measurements. Radioactive decay equation, halflife and radioactive equilibrium situations. Nuclear reactions initiated by neutrons. Effect of nuclear radiation on matter, ionisation, free radical formation, effect on living cells, contamination and radiation hazards, factors affecting radiotoxicity, shielding and inverse square law calculations. Applications of isotopes as tracers and radiation sources factors associated with selection and application. Radioactive dating methods. The chemistry of the reactor fuel cycle. **(Old No. 2.113E)**

CHEM3311 Environmental Chemistry S2 L3 T3
Prerequisites: CHEM2011 and CHEM2041. Excluded 2.043A.

Physico-chemical aspects of the environment. Factors affecting the chemistry of rivers, estuaries, oceans, surface and sub-surface water. Photolysis reactions in the atmosphere, primary and secondary pollutants. Distribution of elements, nutrient elements, carbon and oxygen in ecological systems (chemical models of these cycles). Analysis of naturally occurring species and pollutants. Requirements, validation and performance monitoring of standard analytical procedures. **(Old No. 2.123E)**

CHEM3321 Applied Organic Chemistry S2 L2 T4
Prerequisite: CHEM3021. Excluded 2.003L.

Discussion at advanced level of the chemistry of selected commercially important groups of organic materials with emphasis on reaction mechanisms and model systems. *Polymerization processes and synthetic polymers:* Thermal and oxidative polymerization, treatment of initiators, chain transfer agents, retarders; sulfur-olefin reactions. *Pigments and dyestuffs:* Basis of colour in organic compounds, azo, carbonyl, cationic dyes, colour photography; synthetic and natural pigments, eg phthalocyanines, carotenes, flavones, anthocyanins; fluorescent whiteners. *Oxidation and reduction processes:* Oxidation of allylic compounds, phenols, sulfur compounds etc; catalytic dehydrogenation and hydrogenation; hydride and dissolving metal reductions. **(Old No. 2.133B)**

CHEM3510 Quantum Chemistry and S2 L1 T1
Symmetry
Prerequisites: CHEM2031. Excluded 2.023A.

Principles of quantum mechanics. Eigenvalue-eigenfunction problem and its representation by matrix algebra; approximate methods for quantum mechanical calculations.

Molecular orbital theories (eg Huckel, *ab initio;* SCF) and properties derivable therefrom; choice of basis functions. Group theory. Symmetry operations. Reducible and irreducible representations; applications of character tables eg direct products, selection rules. Correlation diagrams for chemical reactions, and for bonding. Applications to vibrational spectroscopy. **(Old No. 2.1813)**

CHEM3530 Molecular Structure Determination   S2 L1.5 T1.5

Prerequisites: CHEM2031 and CHEM2041.

The theory and practice of 1. crystal structure determination by x-ray diffraction. 2. multinuclear NMR spectroscopy, and 3. mass spectrometry, in the determination of molecular structure. Experimental requirements and procedures; instrumentation. Interpretation of results; applications to contemporary chemical systems; examples from current research problems. Databases and computing. Evaluation of complementary information from these techniques about molecular structure, chemical bonding, and chemical reactivity. **(Old No. 2.1833)**

CHEM3630 Organometallic Chemistry   S2 L1 T2

Prerequisites: CHEM2021 and CHEM2031. Excluded 2.003M.

Preparation, structure and reactions of transition metal and main group organometallic compounds; metal vapour syntheses. Structure and bonding of ligands; ligand stabilisation and activation; novel effects of ligand bulk and geometry. Catalytic applications of organometallic compounds. **(Old No. 2.1843)**

CHEM3640 Computers in Chemistry   S2 L1 T2

Prerequisites: CHEM2011 and CHEM2041.

Computing techniques introduced through specific chemical applications; simple and complex equilibria, rate equations, analysis of multicomponent mixtures, instrumental calibration curves. Treatment of transient signals. Specific case studies selected from spectroscopy, chromatography, and electrochemistry. Chemical databases and the literature, spectroscopic databases. **(Old No. 2.1823)**

Level IV Subject

CHEM4003/CHEM4103   Chemistry 4 (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 program should consult the School re selection of units in the earlier years and apply to the Head of the School for consideration for admission at the end of Year 3 (or completion of requirements for the pass degree). **(Old No. 2.004)**

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subjects see the Faculty of Applied Science and Engineering Handbooks.

CHEM1806 Chemistry 1EE   S1 L2 T1

Prerequisites:	*HSC Exam Score Range Required*
2 unit Mathematics or	*67-100*
3 unit Mathematics or	*1-50*
4 unit Mathematics and	*1-100*
2 unit Science (Physics) or	*53-100*
2 unit Science (Chemistry) or	*53-100*
4 unit Science or	*1-50*
3 unit Science	*90-150*

Atomic and molecular structure and bonding. Chemical equilibrium. Rates of reactions. Thermochemistry. Ionic equilibria. Metals, electro-chemistry and corrosion. Colloids and clays. Colligative properties of solutions. Organic chemistry, polymers. Applications of chemical principles to engineering. **(Old No. 2.9111)**

CHEM1807 Chemistry 1ME   S1 L3 T3

Prerequisite: As for CHEM1806.

A treatment of chemistry which illustrates the application of the principles of chemistry to problems of concern to mechanical engineers. Topics: chemistry of materials, thermochemistry, chemical kinetics and equilibrium, radioactivity and nuclear power, electrochemistry and corrosion of metals. Introduction to organic chemistry, structure and properties of polymers, fuels and lubricants. Surface chemistry. **(Old No. 2.951)**

CHEM1808 Chemistry 1CE   S2 L3 T3

Prerequisites: As for CHEM1806.

Atomic and molecular structure and bonding. Chemical equilibrium. Rates of reactions. Thermochemistry. Ionic equilibria. Metals, electro-chemistry and corrosion. Colloids and clays. Colligative properties of solutions. Organic chemistry, polymers. Applications of chemical principles to engineering. **(Old No. 2.991)**

CHEM1809 Biological Chemistry for Optometry Students   F L3 T3

Prerequisites:	*HCS Exam Score Range Required*
2 unit Mathematics or	*60-100*
3 unit Mathematics or	*1-50*
4 unit Mathematics and	*1-100*
2 unit Chemistry or	*53-100*
3 unit Science or	*90-150*
4 unit Science or	*1-50*
2 unit Physics	*53-100*

Stoichiometry and solution stoichometry. Gas laws. Liquids and solutions, phase changes, colligative properties. Thermochemistry and therodynamics. Reaction kinetics. Atomic structure, electron configurations and the periodic table. Types of chemical bonds. Molecular geometry. Periodic classification of elements, oxides, hydrides, hydroxides and halides. Chemical equilibrium; equilibrium constants, quantitative calculations applied to acid-base and solubility equilibria. Oxidation and reduction reactions, electrode potentials. Chemistry of carbon compounds. Nucliophiles, electrophiles and free radicals. Stereoisomerism. Alkanes,

alkenes, alkynes, aromatic compounds, alcohols, ethers, aldehydes, ketones, carbozylic acids and derivatives, amines. Spectroscopy. Molecular basis of life. Identification of sugars, lipids, amino acids, proteins and nucleic acids. Glycolysis, respiration and oxidative phosphorylation. Molicular biology of proteins; primary, secondary and tertiary structure. Molecular basis of retinal photochemistry. Retinaldehyde and opsin in rhodopsin. Techniques for investigating photochemical reactions. Haemoglobin. Modes of action of certain enzymes. Molecular concepts of immunology. Nitrogen metabolism. Lipid metabolism. Enzymes and bionergetics. Vitamins and trace elements.

CHEM2828 Organic and Inorganic Chemistry   F L2
for Chemical Engineers

Prerequisites: CHEM1002.

Discussion of selected types of organic reactions (eg addition, substitution, elimination, free radical, rearrangement) to provide a broad cover of the chemistry of aliphatic hydrocarbons, halides, alcohols, ethers and amines. Addition reactions of aldehydes and keytones. Substitution reactions of acid derivatives. Chemistry of benzene and its derivatives with a brief extension to include napthalene chemistry. Survey of geometrical structures, energetics, bonding, reactions and reactivity, spectroscopic and magnetic properties of representative inorganic compounds, including selected main group compounds, compounds of selected transition metals and rare earth elements, and coordination complexes. Applications of inorganic chemistry. (Old No. 2.002E)

CHEM2929 Fundamentals of Biological and   S1 L2 T4
Agricultural Chemistry

Prerequisites: CHEM1002. Excluded 2.013L, BIOC2312.

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. (Old No. 2.003J)

CHEM3229 Organic Chemistry   S1 L2 T4

Prerequisite: CHEM2021.

The spectroscopic identification of organic compounds, free radical chemistry and electro-organic processes, various aspects of the organic industrial processes such as industrial synthesis based on petrochemicals, and organometallic reactions of industrial interest. Selected topics from the dyestuff, pharmaceutical and agricultural industries discussing syntheses and reactions including degradation. (Old No. 2.030)

CHEM3926 Instrumental Methods of Food   S2 L1 T2
Analysis

Treatment of theory and practice of modern instrumental methods of analysis, with strong emphasis on the analysis of food constituents. Methods studied include the following:

Spectrophotometry Ultra-violet. Visible. Infra-red. Near infra-red. Fluorimetry. Nuclear magnetic resonance. Mass spectrometry I also coupled with gas chromatography. Atomic absorption. Inductive coupled plasma.

Other techniques Gas liquid chromatography. High pressure liquid chromatography. Electrophoresis. Selective ion electrodes. Differential scanning colorimetry. Surface colour measurements. (Old No. 2.0433)

CHEM3929 Food Chemistry   S1 L2 T4

Treatment of the following aspects of food chemistry.

Water

The concept of free and bound water, mechanisms of water binding in foods, measurement of free, bound and total water.

Proteins

Chemical properties of different protein types in foods, rheological properties, chemical and thermal coagulation, chemical modification of proteins, methods of analysis: kjeldahl, chlorimetric, NIR.

Carbohydrates

Structures and reactions of sugars, starch, cellulose, pentosans. Vegetable gums, pectins. Caramelisation reactions. Analytical methods. Maillard reaction.

Minerals in foods

Presence and chemical importance of minerals in foods. Effects of minerals on food properties (Ca^{2+}, Fe^{2+}, Mg^{2+} inter alia), electrochemistry.

Vitamins

Structure, chemical reactions and sources of common vitamins C, B1, B2, B6, Niacin, B12, A, D, Folate. Analytical methods.

Food flavour chemistry

Chemistry of essential oils and volatile food flavour components. Techniques of food flavour research.

Pigments

Chemical structure of natural and synthetic pigments in plant and animal foods. Mechanisms of pigment breakdown, effects of oxidation and pH. (Old No. 2.043B)

Community Medicine

CMED8201 Population Genetics   S1 L2 T3

Prerequisite: one unit of statistical methods, or theory, as approved by the Head of School.

The genetic structure of populations: demographic structure, genetic relationships, mating systems random and assortative mating, inbreeding, sexual selection, finite populations, systematic forces selection, mutation, migration, genetic distance between populations, genetic load, stable populations, molecular population genetics, evolutionary trees; observed human population structures; computer methods. (Old No. 79.201)

CMED8202 Human Genetic Analysis   S2 L2 T3

Prerequisites: one unit of genetics and one unit of statistical methods, or theory, as approved by the Head of School.

Principles and methods of human genetics: design of surveys, including twin and family studies; estimation and applications of genic and genotypic frequencies, selective values, mutation and migration rates, coefficients of kinship, inbreeding and assortative mating, effective population sizes, recombination fractions and heritabilities; segregation analysis; risks of recurrence of disease; genetical consequences of human intervention; computer methods. **(Old No. 79.202)**

CMED8302 Biochemical Genetics of Man   S2 L2 T4

Prerequisite: BIOC2312.

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. Inherited DNA variation or restriction fragment length polymorphism, its application to studies of genetic diseases and of human populations. Applicaton of statistical techniques to analyzing population data. Laboratory techniques to illustrate principles and uses of selected polymorphic systems. **(Old No. 79.302)**

CMED8303 Human Genetics   S1 L2 T4

Prerequisites: BIOC2021.

The principles and concepts of human genetics, appreciation of the methods used to study the nature and extent of genetic differences, present and future applications, of human genetics; mechanisms of inheritance and gene expression, gene linkage and patterns of inheritance; population genetics with examples of genes of importance in human disease and the immune system; principles and applications of cytogenetics; modern molecular techniques for human gene mapping with discussion of the implications for gene expression, disease and the prospects of gene therapy; genetic fingerprinting and current ethical issues in human genetics.

Electrical Engineering and Computer Science

COMP1011 Computing 1A   S1 or S2 L3 T3

Prerequisite: as for MATH1032. Co-requisite: MATH1032. Excluded: 6.611, COMP1811.

Defining problems. Reasoning about and solving problems using Logic, Abstraction, Specification, Algorithms and Data Structures. Exposure to a functional programming language for practical experience with these concepts. Introduction to Computing Systems: Hardware (CPU, Memory, Peripherals), Software (Operating Systems, Networks, Languages) and Users. Introduction to Computing Applications: Document Processing, Spreadsheets, Data Bases, Graphics and Communications. **(Old No. 6.711)**

COMP1021 Computing 1B   S1 or S2 L3 T3

Prerequisite: COMP1011. Excluded: 6.620, 6.621, 6.021D, COMP1821.

Expansion of the functional approach to computing in COMP1011. Introduction to procedural and logic programming styles. Data structure implementation. Control structures: recursion and interation. The software development process. Program efficiency and complexity - time and space analysis. Practical experience in using a procedural language. The basic structure of a computer, the layered model of a computer, instruction execution, assembly language, computer building blocks, the function of the operating system. **(Old No. 6.712)**

COMP1811 Computing 1 (Procedural)   S1 L3 T3

Prerequisite: As for MATH1032. Co-requisite: MATH1032. Excluded: 6.600, 6.611, COMP1011, 6.620, 6.021D, MATH1061.

Defining problems. Reasoning about and solving problems using Logic, Abstraction, Specification, Algorithms and Data Structures. Exposure to a procedural programming language for practical experience with these concepts. Introduction to Computing Systems: Hardware (CPU, Memory, Peripherals), Software (Opeating Systems, Networks, Languages) and Users. Introduction to Computing Applications: Document Processing, Spreadsheets, Data Bases, Graphics and Communications. **(Old No. 6.718)**

COMP1821 Computing 2   S1 or S2 L3T3

Prerequisites: COMP1811. Excluded: COMP1021, 6.621, 6.021D.

Abstract data types. Lists, stacks, queues, trees. Implementation in a procedural language using linked structures. Searching and sorting. Introduction to functional programming. The layered model of a computer, instruction set, execution cycle, data storage, assembly language programming. **(Old No.6.719)**

COMP2011 Data Organisation   S1 or S2 L3 T2

Prerequisite: COMP1021. Excluded: 6.641.

Data types and data structures: abstractions and implementations. Data representation: logical and physical. Files and file organisation, database structures Knowledge representation. Concepts of state, scope and binding within programs. Storage policies (VM, cacheing), addressing and accessing methods. Analysis of performance. **(Old No. 6.721)**

COMP2021 Digital System Structures   S1 or S2 L3T2

Prerequisites: COMP1021 or COMP1821. Excluded: ELEC2012.

Analysis, design, and realisation of modest digital subsystems, and the organisation and design of major subsystems in a model computer: data path, instruction decode, address generation, arithmetic algorithms, and the fetch-execute cycle of a typical computer. Timing, minimisation techniques, switch and gate logic, combinational and sequential circuits, flip-flops, hardware description techniques, circuit schematics and simulation tools.

The translation of higher level programming abstractions and data structures to a real computer using a macro assembler as the target; study of the relationships between a hardware model, a programming model, and the I/O subsystem of a computer. An understanding of the inter-relationships between the fundamental layers of a modern digital computer system. **(Old No.6722).**

COMP2031 Concurrent Computing   S2 L3 T2

Prerequisiste: COMP1021.

The process model - sequential versus parallel computation. Interprocess communication and synchronisation mechanisms: coroutines, message passing, buffers, pipes, remote procedure calls, semaphores, monitors. Resource sharing, exclusion, deadlock, livelock, scheduling. Distributed algorithms: detection of deadlock, detection of termination. Protocols for data transfer. **(Old No. 6.723)**

COMP3111 Software Engineering   S1 L3T2

Prerequisites: COMP2011, COMP2031. Excluded: 6.642, 6.660G.

Informal specification: Data flow diagram methodology, analysis, design, testing, management and documentation of software. Formal specification: set theory, logic, schema calculus, case studies. The Z specification notation. Managing the project lifecycle. CASE tools. A major group project will be undertaken. **(Old No.6.731)**

**COMP3121 Algorithms and Programming
                      Techniques   S2 L3T2**

Prerequisites: COMP2011. Excluded: 6.642, 6.660G.

Computability theory. Deterministic and non-deterministic algorithms. Stochastic algorithms. Computational complexity: time and space bounds. Algorithms for parallel computation and their hardware implementation. Game playing. Branch and bound. Discrete event simulation. Linear programming. Dynamic programming. **(Old No.6.733)**

COMP3131 Parsing and Translation   S2 L3T2

Prerequisites: COMP2011. Excluded: 6.643, 6.664G.

This subject covers some of the common theories and techniques used for syntax-directed parsing and translation. These techniques are adequate for parsing many well-structured objects encountered in computing, but are not intended for natural language parsing.

Grammars: terminal symbols, non-terminal symbols, productions, phrase structure grammars, Chomsky classification, context-free grammars, logic grammars. Parsing: LL(k) grammars, top-down parsing; LR(k) grammars, bottom-up parsing; parser generators. Translation: action symbols, translation grammars, syntax-directed translation, attributed-grammars, abstract syntax, unparsing. Lexical analysis: finite-state grammars, finite-state machines, regular expressions, lexical analyzer generators. **(Old No.6.735)**

COMP3211 Computer Organisation and Design

Prerequisites: COMP2021 or ELEC2012. Excluded: 6.654G.

Topics will be chosen from: Advanced Design Strategies: combinational and sequential circuit design and realisation; synchronisation, communication and arbitration; register transfer specification (Modal). Arithmetic Design Strategies. Memory Organisation: physical and virtual address space: memory hierarchy; operating system and compiler support; memory mapping and caching. Communications Organisation: shared memory, memory mapping; network systems. Processor Design: the instruction pipeline; hardwired and micro-programmed control' instruction sets; RISC and object-based processor organisation. Error Detection/Correction and Fault Tolerance: testing and

testability; faults, errors, and failures; coding theory; diagnosing and correcting errors. **(Old No.6.612)**

COMP3221 Microprocessors and Interfacing   S2 L3T2

Prerequisites: COMP2021. Excluded: 6.0318, 6.060G, 6.613, 6.732E.

The concept of a microprocessor system, busses, address spaces, memory devices, bus timing, bus standards, the VME bus, I/O device interfacing, polling, interrupts, DMA interfaces, the 68000 processor family, the C programming language, device drivers, the device driver software environment, other microprocessors, advanced topics. Laboratory work involves interfacing to and programming MC68000-series microprocessor-based systems. **(Old No.6.732)**

COMP3231 Operating Systems   S1 L3T2

Prerequisites: COMP2031. Excluded: 6.632, 6.663G, 6.672.

Services provided by operating systems. System calls and user commands (command languages, menus, etc.) Virtual machines. Efficient techniques and methods of process management, memory management, input/output and communication handling. Performance evaluation and tuning. Protection and security. **(Old No.6.734)**

COMP3311 Database Systems

Prerequisites: COMP2011. Excluded: 6.005G, 6.633, 6.659G, 19.608.

The relational database model, object data bases, 4GL query languages, database design and implementation, deductive databases. Concurrency, optimisation, distribution. A major project involving both design and realisation is included. **(Old No.6.730)**

**COMP3321 Business Systems
                      Organisation   S2 L3T2**

Prerequisites: COMP2011. Excluded: 6.647, 6.661G.

Review of the organisation of accounting systems - journals, accruals, merchandising. The structure, design, development, and integration of various business systems selected from the following: general ledger; financial reporting; debtors; creditors; stock control; invoicing; purchasing and receiving; fixed assets; payroll. Systems for generating application systems and packages. User interfaces. File specifications and B-tree index files. Distributed commercial systems. The partial implementation of a business system is undertaken as a group project. **(Old No.6.7310)**

**COMP3331 Computer Networks and   S2 L3T2
                      Applications**

Prerequisites: COMP2011, COMP2031. Excluded: 6.633, 6.659G.

History of digital communication and early computer networks. Circuit and packet switching. Digital data transmission. Error detection and recovery. Protocols for message transmission. Decomposition of network designs: the seven layer OSI model. Standards and standards organisations. The data link layer; character-oriented and bit-oriented channels; common channel systems, local area networks. Network configurations; the OSI network layer; Internetworking: repeaters, bridges, gateways; Transport layer protocols: the OSI transport layer; the TCP protocol family. Other OSI layers: the session layer; the presentation layer. Data encoding, compression, encryption. Network management: security,

privacy, integrity, synchronisation, recovery from failures. Studies of network applications, e.g. file transfer, electronic mail, remote procedure calls, remote program execution, distributed file systems, distributed computing, electronic funds transfer, windowing systems. **(Old No.6.7311)**

COMP3411 Artificial Intelligence S1 L2T3

Prerequisites: COMP2011. Excluded: 6.666G.

Machine intelligence. Principles: knowledge representation, automated reasoning, machine learning. Tools: A1 programming languages, control methods, search strategies, pattern matching. Applications: computer vision, speech recognition, natural language processing, expert systems, game playing, computer-aided learning. Philosophical and psychological issues. **(Old No.6.738)**

COMP3421 Computer Graphics S2 L3T2

Prerequisites: COMP2011. Excluded: 6.668G.

Graphics hardware: raster, random scan, and storage tube displays, graphical input devices. Scan conversion of lines and polygons. Basic 2D transformations, windowing, clipping, viewports, display segmentation. The user interface for graphics. Basic 3D transformations, perspective transformation, 3D clipping, hidden line and surface removal, shading, texture maps and lighting. Hierarchical modelling of objects, modelling curves and surfaces with splines and fractals. Existing graphics standards: X, GKS, PostScript, CGM, PHIGS, RenderMan. **(Old No.6.737)**

COMP3511 Human-Computer Interaction S2 L3T2

Prerequisites: COMP2011. Excluded: 6.006G.

Not offered in 1991.

Communication between computing systems and their users, with an emphasis on applications related to high-level query languages and searching techniques. Cognitive issues will figure prominently in the treatment. Topics include: theories and principles of interface design, interaction styles, interactive devices, interface and language testing, the null value problem natural language systems. **(Old No.6.739)**

ELEC1011 Electrical Engineering 1 S2 L3 T3

Co-requisite: PHYS1961 or equivalent.

Passive electrical components. Electric circuit concepts and relationship to field theory. Kirchoff's laws. Node and mesh analysis of resistive networks. Network theorems. Controlled sources. Transient conditions. Sources of periodic signals. Sinusoidal steady state operation. Concepts of impedance, resonance, bandwidth and filtering. Power in DC and AC circuits. Circuit models of diodes and transistors. Transistor switching. Combinational logic principles and circuits. Diode and transistor logic implementations. Sequential logic circuit elements: monostable, bistable and astable circuits. **(Old No. 6.010)**

ELEC2010 Circuit Theory S1 L2 T.5

Prerequisites: ELEC1011, MATH1032. Co-requisite: MATH2620 or MATH2520.

Dynamic response of linear circuits: 1st and 2nd order circuits with DC sources, introduction to higher order circuits. Sinusoidal steady state operation: phasors, impedance and admittance; dynamic response of circuits driven by sinusoidal sources, concepts of power electronics; linearity, network theorems; resonance, bandwith, and quality factor. Two-port networks: parameters, circuits as filters. Power in steady-state circuits: average and reactive power, power factor, power factor correction. Three-phase circuits: balanced and unbalanced steady-state operation; real and reactive power in balanced circuits, transient analysis. **(Old No. 6.821)**

ELEC2020 Analog Electronics S2 L2 T.5

Prerequisistes: ELEC2010, PHYS2981.

Operating principles and terminal characteristics of PN diodes, bipolar and field effect transistors, and thyristors. Small signal models of devices, including h-parameter model. Analysis and design of low-frequency Class-A amplifiers, including choice of biasing method. **(Old No. 6.823)**

Economics

ECOH1301 Australia in the S1 or S2 L2 T1.5 International Economy in the 20th Century

	HSC minimum mark required
Contemporary English	60
2 unit English (General) or	60
2 unit English or	53
3 unit English	1

The international economy at the end of the 19th century: trade, factor flows, and payments arrangements. Problems of the international economy between the wars. The impact of World War II and the international economy in the post-war era. Australian economic development and its relationship with the international economy; economic fluctuations; problems of the inter-war period; growth of manufacturing; government policy and action; the importance of the mining industry; economic development and the distribution of income and wealth. **(Old No. 15.101H)**

ECON1101 Microeconomics 1 S1 or S2 L2 T1.5 or L2 T2

	HSC minimum mark required
Contemporary English or	60
2 unit English (General) or	60
2 unit English or	53
3 unit English	1

Economics as a social science; scarcity, resource allocation and opportunity cost. An introductory analysis of consumer behaviour. The economics of firms and markets: production and costs; the classification and analysis of markets. Efficiency

concepts and market failure. The gains from international trade and the impact of trade restrictions. Economic growth and structural change. **(Old No. 15.101E)**

ECON1102   Macroeconomics 1 S1 or S2 L2 T1.5 or L2 T2
Prerequisite: ECON1011.

Introduction to the analysis of aggregate output, employment and economic growth and their relationship to the policy issues of unemployment, inflation and the balance of payments. Social accounting and aggregate income and expenditure analysis. Introduction to macroeconomic models of income determination; consumption and investment functions. The role of money and financial institutions; interactions between goods and money markets in equilibrium and disequilibrium situations. Analysis of recent Australian macroeconomic experience. **(Old No. 15.102E)**

ECON2101   Microeconomics 2   S1 L2 T2
Prerequisite: ECON1102, ECON1203. Excluded: ECON2121, ECON2103.

Choice theory, including intertemporal choice, labour supply. Extensions of price theory. The theory of production, costs and supply. Market structures including oligopoly models. Introduction to general equilibrium and welfare analysis. Externalities. **(Old No. 15.201E)**

ECON2102   Macroeconomics 2   S2 L2 T2
Prerequisite: ECON1102, ECON1203. Excluded: ECON2104, ECON2122.

Models of aggregate income determination in open economies. Theories of aggregate economic behaviour with respect to consumption and investment expenditures and financial transactions. Balance of payments and exchange rate analysis. Theories of inflation and unemployment. Introduction to dynamic analysis. Theories of growth and cycles. **(Old No. 15.202E)**

ECON2103   Applied Microeconomics   S1 or S2 L2 T1.5
Prerequisite: ECON1102. Excluded: ECON2101, ECON2021.

Structural change in the Australian economy. The effect of different market structures on firms and consumer welfare. The consequences of market failure and the effects of government regulation. Investment decisions in the public and private sectors, including the estimation of future benefits, revenues and costs, the measurement of consumer and producer surplus. The economics of non-renewable and other resources. Australia's international trade and investment and the effects of restrictions on international trade and investment. **(Old No. 15.203E)**

ECON2104   Applied Macroeconomics   S1 or S2 L2 T1.5
Prerequisite: ECON1102. Excluded: 2101, ECON2102.

Economic growth and fluctuations in Australia. Inflation, unemployment and balance of payments issues. Fiscal, monetary, exchange rate and incomes policies. Changes in the structure of the Australian financial system and its links with the international monetary system. Effects of restrictions on capital markets. **(Old No. 15.204E)**

ECON3101   Microeconomics 3   S1 L2 T2
Prerequisite: ECON2101, ECON2102 and ECON2206. Excluded: ECON3122.

Extensions of microeconomic theory; general equilibrium approaches to economic analysis; international trade including analysis of trade restrictions and distortions. Limitations of the general competitive model; uncertainty and risk with applications to modern theories of corporate behaviour. **(Old No. 15.301E)**

ECON3102   Macroeconomics 3   S2 L2 T2
Prerequisite: ECON2101, ECON2102 and ECON2206. Excluded: ECON3122.

Theory of economic policy. Extended macroeconomic models, theory of fiscal policy and the problems of the budget deficit. International policy dependence and the exchange rate. Australian financial system, monetary theory and policy. Inflation and unemployment and incomes policy. Rational expectations and economic policy. Australian macroeconomic models. **(Old No. 15.302E)**

Banking and Finance

FINS2612   Australian Capital Markets   S1 or S2 L2 T1
Prerequisite: Nil.

As for FINS5512. See Graduate Study Subject Descriptions. **(Old No. 98.864)**

FINS2613   Business Finance 2A   S1 or S2 LT3
Prerequisites: ACCT1511, ECON1102 and MATH1032.

The essential aspects of financial decision-making in business including: factors influencing capital expenditure decisions; alternative approaches to valuation; factors affecting the formulation of the capital structure; influence of the capital market environment. **(Old No. 98.613)**

FINS2614   Business Finance 2B   S1 or S2 L2T1
Prerequisite: FINS2613. Excluded: FINS2714.

Financial decision making within the framework of capital market theory. Includes diversification, risk and return, determinants of risk, efficient market hypothesis with emphasis on Australian evidence, capitalization changes and performance measures, takeovers and mergers. **(Old No. 98.614)**

FINS3615   Business Finance 3   S1 L3
Prerequisite: FINS2614. Excluded: FINS3715.

Theory and analytical techniques relevant to investment analysis and management. Includes analysis and valuation of securities, properties of accounting numbers, portfolio theory and asset pricing models, capital asset returns and information, bond ratings and yields and financial distress predictions. **(Old No. 98.615)**

Geography

GEOG1012 Land Studies   S1 L2 T2

Concepts, significance and problems of land. Land as territory and land as resource in Australia. Constraints imposed by the physical environment on human occupancy and settlement patterns, the variety of conflicts that result and management strategies. Practical work involves study of the ways in which the attributes and characteristics of land are displayed on maps, air-photos and satellite imagery, and introduces these as basic information sources and research tools in applied geography. **(Old No. 27.010)**

GEOG1031 Environmental Processes   S2 L2 T2

Excluded: GEOG1051, 26.424.

Essential and continuing links between components of the physical environment. Movement of energy and matter in the physical environment, including consideration of Earth's energy balance, the hydrological cycle, nutrient cycles in vegetation and soil, imbalances leading to land degradation and instability, alterations to and movement of materials. **(Old No. 27.030)**

GEOG1043 Data Processing Systems   F T2

Measurement, processing and display of spatial data. Basic knowledge and skills for using the University's computing system effectively; the use of computer software packages in geographic enquiry; exploratory data analysis and graphic information processing; and the presentation of data in tables, graphs and diagrams. **(Old No. 27.040)**

GEOG1051 Global Environmental Problems   S1 L2 T1
and Processes

Prerequisite: Nil

The subject outlines the principles and processes necessary to appreciate the physical background behind major global-scale environment problems. Principles and processes include the linkages between the lithosphere, hydrosphere and biosphere, atmospheric circulation, energy and radiation balance and ecosystem function. Problems covered are the issues of desertification, deforestation, 'greenhouse', ozone depletion, energy conservation and pollution. **(Old No. 27.818)**

GEOG1062 Australia and Global Development   S2 L2 T1 ✓

Prerequisite: Nil

The main concern is the progressive intergration of Australia into global capitalism and developmental and environmental consequences of this process in Australia and Pacific Rim countries and adjacent territories. Topics covered include colonial and dependent development in Australia and resource use; applications of development theory as applied to core-periphery relationships between world financial centres and Australia, and between Australia and Pacific Island territories; transnational organisations and technology transfer and investment in Australia and Pacific countries; the relationship between changing trade patterns, production and development in Australia and Pacific Rim countries; Australia in a future world. **(Old No. 27.819)**

GEOG2013 Geographical Data Analysis   F L2 T2

Prerequisites: Both GEOG1012 and GEOG1031 or both GEOG1051 and GEOG1062. Excluded: GEOG2093, GEOG3221.

Inferential statistics and hypothesis testing in the analysis of spatial data. Methods of analysing categorical data, identifying spatial correlation and associations, and multivariate methods applicable to topics in physical and economic geography. **(Old No. 27.050)**

GEOG2021 Introduction to Remote Sensing   S1 L2 T2

Prerequisite: Successful completion of a Year 1 program in Applied Science, Science or Arts or equivalent as approved by the Head of School.

Principles and technical aspects of remote sensing. Forms of available imagery, their utility and facilities for interpretation. Basic airphoto interpretation techniques relevant to environmental assessment. Introduction to principles of the electro-magnetic spectrum, photometry and radiometry. Sensor types, image formation and end products associated with selected satellite programs, including Landsat. Land-cover and land-use interpretation procedures in visual image analysis. Basic procedures in machine-assisted image enhancement. **(Old No. 27.175)**

GEOG2032 Geomorphology   S1 L2 T3

Prerequisites: GEOG1031 or GEOG1051 or GEOL1201.

Hillslope materials, processes and form; models of slope and landscape evolution. Fluvial geomorphology including water movement and sediment transport in river channels, hydraulic geometry, channel patterns, river types, flood plain formation, alluvial fans, river channel changes. Erosional and depositional landforms in coastal, arid, humid and glacial environments. Field work in fluvial and hillslope geomorphology, and laboratories on field measurements of geomorphic processes, sediment analyses and airphotograph interpretation. **(Old No. 27.183)**

GEOG2081 Australian Environmental   S1 L2 T2
Problems

Prerequisite: GEOG1031 or GEOG1051.

The nature of the Australian environment is outlined and selected major environmental problems are considered. The nation's landforms, soils and vegetation are described and considered in relation to the patterns of climate and land-use to appreciate how the problems of drought, bushfires, salinisation, soil acidification, loss in species diversity and land degradation arise. Options for abatement and tolerance are discussed as appropriate. **(Old No. 27.828)**

GEOG2092 Australian Social and
Economic Landscapes   L2 T2

Not offered in 1991.

Prerequisite: GEOG1012 or GEOG1062.

Analysis of the principal factors and forces shaping the contemporary social and economic landscapes of Australia and the problems arising. Themes include Australia's changing population profile and distribution, the changing face of Australian cities, regional disparities in social and economic well-being, changing patterns of employment and industrial location, and the declining fortunes of rural Australia. Planning and policy responses to the problems of spatial

change and reorganisation are emphasised and future scenarios addressed.

GEOG2093 Geographic Methods   S2 L2 T2

Prerequisites: Both GEOG1012 and GEOG1031 or both GEOG1051 and GEOG1062. Excluded GEOG2013.

Statistical procedures and field methods used in both human and physical geography. Includes: measures of dispersion; measures of spatial distribution; samples and estimates; correlation and regression; tests for distribution in space; data collection and analysis; field observations. Three days field work is a compulsory part of the subject and students will incur some personal expenses with this. **(Old No. 27.813)**

GEOG2102 Environmental Issues in Australia   L2 T1

Prerequisite: GEOG1051 or GEOG1062.

Not offered in 1991.

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

GEOG3000 Field Project 3   S2 T3

Prerequisites: One of GEOG3011, GEOG3021, GEOG2032. This prerequisite does not apply to students in Course 3010.

A five days field project normally undertaken during a recess, designed to support teaching in Year 3 (Level III) subjects in physical and economic geography and to demonstrate the application of field methods in problem solving and research projects. Students will incur some personal expenses in connection with this subject, which is a compulsory part of the course. **(Old No. 27.300)**

GEOG3011 Pedology   S2 L2 T3

Prerequisites: GEOG1031 or GEOG1051 and any one of CHEM1292 or CHEM1492, or both GEOL1101 and GEOL1201 or both BIOS1011 and BIOS1021.

Methodology of pedogenic studies and the application of these studies to the understanding of soil-landform relationships. Soil physical and chemical properties and their interrelationships, emphasizing clay-mineral structure and behaviour, soil solution chemistry, soil water movement and the application of these properties to elements of soil mechanics. Soil properties in natural, rural and urban landscapes, including assessment of soil fertility, swelling characteristics, dispersibility, erodibility and aggregate stability. Laboratory analysis of soil physical and chemical characteristics with emphasis on properties associated with land capability assessment. Statistical analysis of soil data and its application to mapping. The use of soil micromorphological and mineralogical studies in pedology. **(Old No. 27.133)**

GEOG3021 Biogeography   S1 L2 T3

Prerequisites: GEOG1031 or GEOG1051 or both BIOS1011 and BIOS1021.

Distribution of taxa. Floras of the Southern Hemisphere with particular reference to Australia. Endemic, discontinuous and relict taxa. Dispersal and migration of species. Origin, evolution and geological history of Angiosperms. The development of the Australian biogeographic element. Study of the recent past to understand present distributions of taxa. The role of humans and climatic change on Australian vegetation. Detection of pattern and association and their causes. Classification, ordination and mapping of vegetation. Ecology of selected Australian vegetation types. Composition, structure, productivity and environmental control of heathland, woodland, grassland and rainforest communities. Management of vegetation in different climate regimes. **(Old No. 27.143)**

GEOG3032 Remote Sensing Applications   S2 L2 T2

Prerequisites: GEOG2021 or SURV8711.

Spectral characteristics of natural phenomena and image formation. Ground truthing, collection and calibration. Introduction to computer classification procedures. Multitemporal sampling procedures, image to image registration and map to image registration. Major applications of remote sensing in the investigation of renewable and non-renewable resources to include: soils, geology, hydrology, vegetation, agriculture, rangelands, urban analysis, regional planning, transportation and route location and hazard monitoring. **(Old No. 27.176)**

GEOG3042 Environmental Impact   S1 L2 T2
Assessment

Prerequisites: GEOG1031 or GEOG1051 or by Permission from Head of School.

Rationale and basic objectives; standardized types of environmental impact assessment (EIA), including matrix approach, adopted methods of EIA in Australia. Frequently used assessment and predictive techniques for meteorological, hydrological, biological, socio-economic impacts. Techniques of impact evaluation in terms of socio-economic criteria. Environmental decision making and planning under conditions of uncertainty. Case studies exemplifying procedures, techniques and issues. Trends, changes and possible future developments in EIA. Practical exercises representing components of typical EIAs. **(Old No. 27.193)**

GEOG3051 Soils and Landforms   S1 L2 T2

Prerequisite: GEOG3011 or GEOG2032 or GEOG2081 or by permission of Head of School.

Organization of soil material: stratigraphic layers versus profiles. Models of soil formation zonal, leaching and landscape approaches. Australian and international soil classification systems. Soil development on hillslopes: texture contrast soils. Floodplain landforms: river terraces and chrono-sequences. Litho- and chronostratigraphic use of soils in residual aeolian, fluviatile and coastal deposits. **(Old No. 27.213)**

GEOG3062 Environmental Change   **S2 L2 T2**

Prerequisite: Successful completion of a Year 2 Programme in Applied Science, Science, or Arts or equivalent as approved by the Head of School.

The nature of environmental change on the land, oceans biosphere and atmosphere. Evolution of the continents, oceans, life and atmosphere. Techniques for environmental reconstruction and chronology building. Quaternary climatic change and modelling. Human impact on the atmosphere and climatic consequences. **(Old No. 27.223)**

GEOG3122 Geographic Information Systems   S1 L2 T2

Prerequisite: GEOG3161 or by permission of Head of School. This prerequisite does not apply to students in Course 3010.

An introduction to information systems of particular relevance for geographers with special reference to computer-based systems for resource evaluation. Case study evaluation, application of the MAP and other GIS software. **(Old No. 27.652)**

**GEOG3152 Social Welfare and Urban   S1 L2 T3
              Development**

Prerequisite: GEOG1012 or GEOG3202 Note: This prerequisite does not apply to students enrolled in course 3010.

A consideration of welfare aspects of urban development, including social policies and urban structure; social costs and benefits of urban renewal especially in the inner city; growth centres and new towns; distributional aspects of social services; and spatial disparities in social well-being. **(Old No. 27.753)**

**GEOG3161 Computer Mapping and   S1 L1 T3
              Data Display**

Prerequisite: Successful completion of a Year 1 program in Applied Science, Science or Arts or equivalent as approved by Head of School.

Introduction to theoretical and practical problems in displaying data graphically and constructing thematic maps by computer using the GIMMS mapping package. The emphasis is on developing skills in automated cartography through hands-on experience culminating in the preparation of a folio of maps of selected census data. No previous computing expertise is required. **(Old No. 27.432)**

GEOG3172 Spatial Population Analysis   S2 L2 T2

Prerequisite: GEOG3202 or GEOG1012.

Population growth and structure in an international urban and regional context. The components and processes of population change; fertility, mortality and migration set within the framework of demographic transition and development theory. Theories of migration and mobility and of optimal populations. Demographic and social indicators for urban and regional analysis and their implications for disparities in living conditions at local, regional, and international scales. The adjustment of immigrant and migrant populations to the urban environment. **(Old No. 27.824)**

GEOG3181 Urban Activity Systems   S1 L2 T2

Prerequisites: GEOG3202 or GEOG1012.

Focus is on trip making, movement, and activity patterns in urban areas. Topics include: the activity concept, travel behaviour and urban spatial structure; constraints to individual travel behaviour and activity pattern linkages; the urban transport disadvantaged; public transport problems and issues in Australian capital cities; travel and activity consequences of transport infrastructure developments. **(Old No. 27.825)**

GEOG3192 Urban and Regional Development   S2 L2 T2

Prerequisite: GEOG3202 or GEOG1012.

Theories of urban and regional change leading to assessment of the role of planning. Emphasis on resource allocation, conflict resolution and evaluation techniques including cost-benefit analysis and environmental impact assessment. Examples are taken principally from the fields of recreation and tourism. **(Old No. 27.826)**

GEOG3202 Australian Social Environments   S1 L2 T2

Prerequisite: GEOG1012 or GEOG1062.

Focus is on the interaction between human communities and the built environment in Australia: the effects of the natural environment on the evolution of settlement patterns; detailed analysis of rural and metropolitan social environments. Emphasis on inner city, suburbia, behavioural and social area approaches, and to managerialist and structural theories of social change on areas and their communities. **(Old No. 27.829)**

**GEOG3211 Australian Environment and   S1 L2 T2
              Natural Resources**

Prerequisites: GEOG2032 or GEOG2081.

Continental and regional patterns of land, water and energy resources in Australia and its territorial waters, and natural factors affecting their development, including climate, soils and terrain; problems of limited surface and underground water resources and of conflicting demands, exemplified through particular basin studies; comparable reviews of energy, minerals and forest resources, human resources and development. **(Old No. 27.862)**

GEOG3221 Advanced Geographic Methods   S1 L2 T2

Prerequisites: GEOG2093. Excluded GEOG2013.

Additional quantitative research techniques normally taken by Honours students in their third year. Research organization; computer analysis; collection and organization of data; statistical description; hypothesis testing and sampling; simple and multiple association analysis; nonparametric methods. **(Old No. 27.884)**

GEOG3333 Special Topic   S1 or S2 L4

Prerequisite: Nil.

Admission by permission to suitable students with good Passes in at least four subjects at Level III. Course of individually supervised reading and assignments as an approved topic in Geography not otherwise offered. **(Old No. 27.883)**

GEOG4032 Honours Geography　　　　　F

Prerequisites: Arts students must satisfy Faculty requirements for entry to the Honours Level program and must have obtained at least 54 credit points in Geography subjects, including 12 Level 1 credit points. A minimum cumulative average at Credit level is required for all Upper Level subjects taken which must include GEOG3221

Details of Honours Geography for science students are available from the School of Geography office.

Students are required: **1.** To undertake an original piece of work extending throughout the year and to submit a thesis based upon it. **2.** To participate in seminars and fieldwork as notified by the School of Geography. **(Old No. 27.844)**

Applied Geology

Field tutorials are an essential part of these subjects, and are held during weekends and/or recesses. Dates and costs are available during the first week of the subject. Attendance is compulsory.

GEOL1101 Geological Processes　　　　S1 L3 T3

Stream 1

Constitution of the Earth. The Earth and Solar System. The interior of the Earth: the crust and its chemical composition, gravity and isostasy. Minerals and rocks, economic mineral deposits. *Geological 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. Metamorphosism and metamorphic rocks. Structural geology, classification and origin of faults and folds. Quaternary stratigraphic sequences, neotectonics. Field work of up to two days is a compulsory part of the subject.

OR

Stream 2

Available only with permission of the Head of School.

A program of projects and independent study of selected aspects of geology. Assessment includes practical and theory examinations. **(Old No. 25.110)**

GEOL1201 Geological Environments　　　L3 T3

Prerequisites:	HSC Exam Score Range Required
2 unit Mathematics* or	*55-100*
3 unit Mathematics or	*1-50*
4 unit Mathematics	*1-100*
and	
2 unit Science (Physics) or	*53-100*
2 unit Science (Chemistry) or	*53-100*
2 unit Science (Geology) or	*53-100*
2 unit Science (Biology) or	*53-100*
4 unit Science	*1-50*
3 unit Science	*90-150*
and	
GEOL1101.	

*This refers to the 2 Unit Mathematics subject. It does not refer to the subject 2 Unit Mathematics (Mathematics in Society).

Geological 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. *Geological Dynamics:* The evolution of ocean basins; sea-floor spreading and sea-level changes. Climates of the past. Geophysical methods of exploration; seismology and earthquake prediction. Plate tectonics and continental drift. *Field work* of up to four days is a compulsory part of the subject. **(Old No. 25.120)**

GEOL2111 Earth Materials 1　　　　S1 L2 T4

Prerequisite: GEOL1201.

Mineralogy: Principles of optical crystallography and the use of the polarizing microscope. Chemical and physical properties of rock forming minerals. Mineral identification. Igneous Petrology: Occurrence, classification and origin of igneous rocks. Fractional crystallization and differentiation. Partial melting. Simple binary melting diagrams. *Igneous petrology* relating to plate tectonics. *Practical:* Macroscopic and microscopic examination of rock forming and ore minerals and igneous rocks in the field and the laboratory. *Field work* of five days is a compulsory part of the subject. **(Old No. 25.211)**

GEOL2121 Earth Environments 1　　　　S1 L3 T3

Prerequisite: GEOL1201.

Sedimentology: Flow regimes and bedding forms, sedimentary structures. Modern and ancient sedimentary environments of deposition: alluvial, nearshore, shelf and deep sea, in both terrigenous clastic and carbonate evaporite domains. The facies concept: lateral and vertical relationships between depositiona environments and associated lithofacies within developing sediment wedges, *Palaeontology:* Morphology and stratigraphic distribution of invertebrates, including Foraminifera, Brachiopoda, Mollusca, Arthropoda, Protochordata and Echinodermata. Introductory palaeobotany. Palaeoecology. Biogeography. Trace fossils. Reef building organisms and the evolution of reefs. *Field work* of up to five days is a compulsory part of the subject. **(Old No. 25.212)**

GEOL2211 Earth Materials 2　　　　S2 L3 T3

Prerequisite: GEOL2111.

Sedimentary Petrology: The influence of transportation, deposition and diagenesis on the composition, texture and structure of detrital sedimentary rocks. The non-clastic sedimentary rocks including phosphates, evaporites, ferruginous and silceous deposits. *Metamorphic* Petrology: Origin and classification of metamorphic rocks as an aid in understanding common mineral assemblages. Petrographic studies of common metamorphic rocks. Field studies. *Structural Geology:* Origin, classification and description of 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 four days is a compulsory part of the subject. **(Old No. 25.221)**

GEOL2230   Mathematical Geology 1   S2 L2 T1
Prerequisite: GEOL1201.

Geological Statistics: Measurement scales in geology. Probability distributions and their properties; sampling and test of significance. Application of these techniques using geological data. *Geological Computing:* FORTRAN programming; text editing; control language for VAX and CYBER. **(Old No. 25.2261)**

GEOL2231   Earth Physics   S2 L2 T4
Prerequisite: GEOL1101.

Global Geophysics: principles of gravity, geomagnetism, palaeomagnetism, geothermy and seismology and their relation to shape, internal constitution, dynamic processes and major tectonic features of the earth. *Photogeology:* the use of air photos for geological mapping and geomorphological evaluation of land. Techniques and principles of photo-interpretation and multi-band photography. Photo-interpretation of folds, faults, joints, bedding, limestone, intrusive igneous volcanic rocks, alluvial fans, terraces, slopes, landslides, coastal and tropical landforms. Relationships between geology, drainage, soil and vegetation, orebody expression gossans, colouration halos. An introduction to remote sensing. *Geological Surveying:* Levels, tachometers and theodolites. Field techniques. Precision of angular measurements. Stadia surveying. Levelling. Field computations. Closed and open traverses. Coordinates and their computation. *Field work* of two days is a compulsory part of the subject. **(Old No. 25.223)**

GEOL3111   Earth Materials 3   S1 L2 T4
Prerequisite: GEOL2211.

Mineralogy: Principles of X-ray powder diffractometry and the use of X-ray powder cameras and diffractometers. Elementary stereology. Laboratory methods of mineral separation. Mineral characterization. *Geochemistry:* Accuracy, precision and quality of geochemical data. Graphical display of analyses. Norms. The distribution of elements in terrestrial rocks. Nature and origin of meteorites and tektites. *Aqueous Geochemistry:* Redox potentials in nature. Oxidation reduction and sediment formation. Solubilities, metal transport and ore deposition. The growth of minerals from solution and the development of mineral textures. Particular aqueous geochemical systems. **(Old No. 25.311)**

GEOL3121   Earth Environments 2   S1 L3 T3
Prerequisite: GEOL2121 note: it is desirable that students taking this unit have also taken GEOL2231.

Stratigraphy: Stratigraphic classification. Biological and physical methods of correlation. Introduction to radiogenic methods of age determination: 14C, K Ar, Rb Sr, Nd Sm, U Th Pb and fission track methods. Definition of international stratigraphic boundaries, stratotypes and reference points. Types of sedimentary basins and continental margins. The development of the Precambrian craton of Australia. The geological evolution of eastern Australia, particularly the late Palaeozoic and Mesozoic history of the Tasman Mobile Belt. Intracratonic basins of western and southern Australia and the effects of the dispersal of Gondwanaland. Geological evolution of the northern margin of the Australian plate, particularly the Mesozoic to Recent of Papua-New Guinea. *Palaeontology:* Theories of biological classification. Processes and theories of evolution. The origin and early history of life. Functional morphology. Practical application of palaeontology.

Field Mapping: Geological mapping in a complicated geological terrain. Geological report writing and cartography. *Field work* of up to seven days is a compulsory part of the subject. **(Old No. 25.312)**

GEOL3130   Mathematical Geology 2   S1 L2 T1
Prerequisite: GEOL2230.

Application of the mathematical techniques listed below to geological data processing and analysis. Analysis of variance. Introduction to matrix algebra. Regression analysis; trend surface analysis; time series analysis; Markov chain analysis. Introduction to nonparametric statistics. Introduction to multivariate statistics. *Practical work* based on the use of SPSS, BMDP and other library programs. **(Old No. 25.3162)**

GEOL3141   Mineral and Energy   S1 L3 T3
Resources 1
Co-requisite: GEOL2211 or GEOL3111.

Metallic Resources: Classification and origin of the ore deposits, geochemical processes, research methods. Orthomagmatic, hydrothermal, porphyry, volcanic-sedimentary, Mississippi Valley type, chromium, iron, manganese ores, residual and mechanical ores. Introduction to mineral exploration. Laboratory study of hand specimens, thin sections and polished sections of various ore types; study of selected mining areas representing various genetic types of ore. *Economic Mineralogy:* Nature of reflected light. Ore textures and their interpretation. Phase relations and paragenesis of ore minerals. Practical work in optical properties of ore minerals, hardness and reflectivity measurements: study of selected ores and ore minerals under the microscope including textural studies. *Field work* of up to three days is a compulsory part of the subject. **(Old No. 25.314)**

GEOL3211   Earth Materials 4   S2 L3 T3
Prerequisite: GEOL2211.

Clay Mineralogy: The structure and properties of the clay mineral groups including the kaolinites, illites, smectites, chlorites, mixed layered and fibrous clay minerals. Techniques for the identification of the clay minerals. Clay-water systems and ion exchange. Chemical weathering and the origin of the clay minerals. Industrial uses of clays and bauxite. *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 deformations and recrystallization. Metamorphic petrology of Australia. Practical macroscopic and microscopic study of metamorphic rocks. *Field Work* of up to six days is a compulsory part of the subject. **(Old No. 25.321)**

GEOL3241   Mineral and Energy   S2 L3 T3
Resources 2
Prerequisite: GEOL2121 or GEOL8220.

Coal Geology: Nature and properties of coal. Methods of testing and analysis. Introduction to coal petrology. Origin of coal seams and coal-bearing sequences. Coalfield exploration and coal mining geology. Geological factors in

coal preparation and use. Geology of oil shale. *Petroleum Geology:* Geological factors critical to the occurrence of oil and natural gas. Geochemistry of hydrocarbons and formation fluids; techniques of petroleum exploration. Assessment and development of reserves. Typical petroleum occurrences in Australia and overseas. *Non-metallic Minerals:* Occurrence and economic use of non-metallic and industrial minerals including limestone, silica, asbestos and construction materials. *Sedimentary Basin Analysis:* Techniques of analysis and data presentation using information from outcrops, boreholes (including geophysical logs) and seismic sections. Construction and interpretation of structural, isopachous and lithofacies maps. Seismic stratigraphy. Styles of sedimentation within and structural development of basins in different tectonic regimes. Evolution of sedimentary basins. *Field work* of four days is a compulsory part of the subject. **(Old No. 25.324)**

GEOL3251   Engineering and Environmental   S2 L4 T2
Geology

Prerequisite: Nil.

Environmental Geology: Hydrodynamics of pollutants and water quality principles. Domestic, industrial and radioactive waste disposal, deep well injections. Geological hazards and urban planning. Environmental impacts of dams, mineral exploration, mining and impact statement techniques. Water resources law and pollution. Land use conflicts. *Hydrogeology:* The hydrological cycle; confined and unconfined groundwater. Hydrological characteristics of rocks and their measurement. Pump tests. Aquifer boundaries. Exploration for groundwater development and monitoring of groundwater resources. Groundwater flow tests. Case studies from the Great Artesian Basin and the Murrumbidgee area. *Geomechanics: Rock* and soil masses and their engineering behaviour influence of composition and fabric. Discontinuities in rocks and soils and their analysis for engineering purposes. Mechanical properties and their measurement. Stress strain theory. *Coastal Geology:* Properties of sedimentary populations. Sampling practices. Measurements of grain size, grain shape and packing; analyses of measured data. Geological significance of sediment parameters. The shoreline processes Littoral and longshore drifts and net sand movement. Coastal engineering works. The estuarine environment. *Field work* of up to three days is a compulsory part of the subject. **(Old No. 25.325)**

GEOL3271   Structural Geology   S2 L1 T1
Prerequisite: GEOL2211.

Advanced Structural Geology: Analysis of structural elements at the microscopic, mesoscopic and macroscopic scales. Detailed studies of the analysis of metamorphic terrains, eg Cooma Complex, Broken Hill. *Field work* of up to four days is a compulsory part of the subject. **(Old No. 25.3271)**

GEOL3281   Exploration Geochemistry   S2 L1 T1
Prerequisites: GEOL3111 and GEOL3141.

Principles and techniques of soil, drainage and rock geochemistry as applied to mineral exploration. **(Old No. 25.3281)**

GEOL3331   Exploration Geophysics S1 L3 and S2 L1 T1
Prerequisite: GEOL1201.

Physical properties of rocks and soils. Introduction to seismic, gravity, magnetic, electrical, electromagnetic and radiometric methods of geophysical exploration. Application of these methods in the search for mineral deposits, petroleum, coal and groundwater and in civil and mining engineering projects. Interpretation of geophysical data. *Field work* of up to three days is a compulsory part of the subject. **(Old No. 25.333)**

GEOL4303   Geology Honours

Students with a double major in geology will follow the program set for Year 4 students in the Faculty of Applied Science Course 3000 Applied Geology, which involves in Session 1 a core of advanced geological topics and one strand chosen from mineral resources, sedimentary basin resources, engineering and environmental geology, or geophysics. Session 2 is devoted to a specialized research project.

Students with a single major will follow a course of advanced study that includes geological topics subject to approval of the Head of School. **(Old No. 25.435)**

GEOL6201   Marine Geology 1   F L1 T2
Prerequisites: GEOL1101 and GEOL1201.

Sedimentology: Flow regimes and bedding forms, sedimentary structures. Modern and ancient sedimentary environments of deposition: alluvial, nearshore, shelf and deep sea, in both terrigenous clastic and carbonate evaporite domains. The facies concept: lateral and vertical relationships between depositional environments and associated lithofacies within developing sediment wedges. *Global Geophysics:* Principles of gravity, geomagnetism, palaeomagnetism, geothermy and seismology and their relation to shape, internal constitution, dynamic processes and major tectonic features of the earth. *Mineralogy and Petrology:* Igneous and sedimentary rock types of the ocean floor and their significance.

Field work of five days is a compulsory part of the subject. **(Old No. 25.621)**

GEOL6231   Coastal Monitoring Techniques   FL1T2
Prerequisite: Nil

General principles of surveying. Optical and electronic methods of distance and elevation measuring. Coastal position fixing. Co-ordinates systems and their application to coastal mapping. Map projections. Long and short term monitoring of coastal changes. Tides, their measurement and determination of tidal planes. Soundings and bathymetric surveys. Shallow water investigations for seabed and bedrock morphologies. Through its intensive practical approach, the course is designed to give each student an understanding of coastal surveying applicable to a large variety of small scale investigations, from beach to esturine monitoring. **(Old No. 25.622)**

GEOL6310   Marine Mineral Deposits and   S1 L1 T1
Oceanic Minerals

Oceanic minerals and mineral deposits: 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. **(Old No. 25.6341)**

GEOL6311 Marine Geology 2   F L1 T2
Prerequisite: GEOL6201.

Clay Mineralogy: Structure and properties of the clay mineral groups including the kaolinites, illites, smectites, chlorites, mixed layered and fibrous clay minerals. Techniques for identification of the clay minerals. Clay-water systems and ion exchange. Chemical weathering and the origin of the clay minerals. *Sedimentary Basin Analysis:* Technique of analysis and data presentation using information from outcrops, boreholes (including wireline logs) and seismic sections. Construction and interpretation of structural, isopachous and lithofacies maps. Seismic stratigraphy. Styles of sedimentation within and structuring of basins in tensional, compressive and strike-slip tectonic regimes. Basin evolution. *Stratigraphy:* Ocean basin stratigraphy and the environmental and chronological utility of the principal groups of index fossils. Stratigraphical history and correlation of sediment rocks in the deep ocean basins and on continental shelves. Changes of sea level. The Quaternary history of the oceans. Reefs and carbonate sedimentation. Deep sea consolidated sediments. *Field work* not exceeding two days is a compulsory part of the subject. **(Old No. 25.631)**

GEOL6321 Coastal Environmental Assessment   FL1T2
Prerequisite: Nil

The physical nature of the various coastal environments: their morphology and the relationship between water masses and the sedimentary and benthic characteristics of the bottom. Sampling techniques, analytical methodology and statistical data evaluation. Environmental assessment of Australia and overseas areas. An important aspect of the course is its practical approach: from data gathering, data evaluation and environmental assessment report writing. Practical work in the course involves each student as an active member of a project team. **(Old No. 25.630)**

GEOL6330 Exploration and Seismic Methods   S2 L2 T1
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. **(Old No. 25.6342)**

GEOL7221 Surficial Materials and Processes   S2 L3 T3
Prerequisite: GEOL2111.

Clay Mineralogy: The structure and properties of the clay mineral groups including the kaolinites, illites, smectites, chlorites, mixed layered and fibrous clay minerals. Techniques for the identification of the clay minerals. Clay-water systems and ion exchange. Chemical weathering and the origin of the clay minerals. Indisutrial uses of clays and bauxite. *Sedimentary Petrology.* The influence of transportation, deposition and diagenesis on the composition, texture and structure of detrital sedimentary rocks. The non-clastic sedimentary rocks including phosphates, evaporites, ferruginous and siliceous deposits. *Hydrogeology.* The

hydrological cycle, confined and unconfined groundwater. Hydrological characteristics of rocks and their measurement. Pump tests Aquifer boundaries. Exploration for groundwater development and minitoring of groundwater resources. Groundwater flow tests. Case studies from the Great Artesian Basin and the Murrumbidgee area. **(Old No. 25.511)**

GEOL8220 Sedimentology   S1 L1 T1
Prerequisite: GEOL3121. Excluded GEOL1201.

As for *Sedimentology* in GEOL3121 *Earth Environments 1.* **(Old No. 25.5212)**

GEOL8310 Stratigraphy   S1 L2
Prerequisite: GEOL8220. Excluded GEOL3121.

As for *Stratigraphy,* in GEOL3121 Earth Environments 2. **(Old No. 25.5313)**

GEOL8320 Gravity and Magnetic Methods   S1 L2 T1
Prerequisites: PHYS1002 and MATH1032. It is desirable that students taking this unit have a background to geology.

Fundamental principles. Field procedures and instruments. Reduction of field data. Regionals and residuals. Effects of sources of simple geometrical shapes and generalized two and three-dimensional distributions. Applications. Field work of one day is a compulsory part of the subject. **(Old No. 25.9311)**

GEOL8330 Seismic Methods   S1 L2 T1
Prerequisites: PHYS1002 and MATH1032. It is desirable that students taking this unit have a background in geology.

Seismic waves. Physical/engineering properties of geological materials. Ray theory is seismic refraction and reflection methods. Instrumentation. Data acquisition and processing. Depth and velocity analysis. Geophysical and geological interpretation. Case history studies. *Field work* of one day is a compulsory part of the subject. **(Old No. 25.9312)**

GEOL8340 Electrical Methods   S1 L2 T1
Prerequisites: PHYS1002 and MATH1032. It is desirable that students taking this unit have a background in geology.

Introductory theory and field practice of resistivity, self-potential, induced polarization and airborne and ground electromagnetic methods. Geological interpretation of field data. Geophysical logging. Field work of one day is a compulsory part of the subject. **(Old No. 25.9313)**

GEOL8350 Geological Applications   S1 L1 T1
Prerequisite: GEOL1201.

A subject of ten weeks' duration. Structural Geology: Elements of structural geology, stereographic projection and fracture analysis. *Geology of Fuels:* Origin of coal, oil and natural gas; stratigraphic and structural consideration of oil and coalfields. *Hydrogeology:* Principles of hydrogeology; transmission of groundwater in rocks and soils. *Field work* of one day is a compulsory part of the subject. **(Old No. 25.9314)**

**GEOL8360 Geophysical and Geological   S2 L1 T2
Applications**

Prerequisite: GEOL1201. Excluded GEOL6330.

Geological Interpretation of Geophysical data: Seismic stratigraphy. Coal-seam geometry from high resolution seismic and inseam data. *Geology of Ore* Deposits: Mineralogy of industrially important metallic and non-metallic minerals. Theories of ore formation including secondary enrichment processes. Available only in program 2503. **(Old No. 25.9321)**

Information Systems

**INFS1602   Computer Information   S1 or S2 L2 T1
Systems 1**

Prerequisite: Nil

An understanding of the content of Information Systems, the types of Information Systems and the position of Information Systems in Society; Information Systems at an organisational level, typical commercial applications, the systems lifecycle, design concepts, data analysis and models and an introduction to data communications. (Old No.19.602)

INFS2603   Computer Information Systems 2   S2 L2 T1

Prerequisite: INFS1602. Excluded INFS3606.

System analysis and design: requirements analysis and specification, logical and physical design of business systems, specification and updating of files, man-machine dialogue procedures. Comparison of design methodologies. **(Old No. 19.603)**

**INFS2609   Computer Information   S1 L2 T1
Systems Technology**

Prerequisites: INFS1602 or approved studies in Computer Science.

Programming in the commercial environment; COBOL; Hardware and operating systems concepts and their impact on the commercial computing environment. Introduction to computer networks and distributed systems. Introduction to object-oriented programming. **(Old No.19.609)**

INFS2691   Industrial Training 1   S1 1CCH

Prerequisite: INFS1602

Available only to students enrolled in Course 3971.

A practical treatment of the characteristics of commercial information systems. The topics covered include: analysis of an existing information system; development of overview documentation of the system; evaluation of the interface design; consideration of the role of security and control mechanisms. (Old No. 19.691)

**INFS3605 · Computer Systems   S1 L2 T1
Implementation**

Prerequisite: INFS2609
For students who first enrolled before 1989
Prerequisite: INFS2603

Supervised implementation of an Information Systems project in a commercial programming language. Advanced programming techniques: sub-programs, inter-active programming, inter-active file access.

Life cycle physical design, debugging, maintenance, version control, testing, user documentation, management of human resources in an implementation environment, project estimating and control, CASE Technologies, comparison of a range of programming languages. **(Old No.19.605)**

**INFS3607   Distributed Computer   S1 or S2 L2 T1
Systems**

Prerequisite: INFS2603 and INFS2609.

Advanced data communication concepts, computer networks, reference to international standards and common industry communications software packages; transaction processing software and interface with data management systems; local networks; interaction between text processing and data processing; a case involving the design of a telecommunications based commercial system. **(Old No. 19.607)**

INFS3608   Database Systems   S1 L2 T1

Prerequisite: INFS2603 or INFS2606

Advanced data analysis and modelling techniques; database management system architectures including hierarchical, network and relational approaches; database reliability, security and integrity issues; data description and manipulation languages. **(Old No.19.608)**

**INFS3611   Information Systems   S1 L2 T1
Development**

Prerequisite: INFS2603 and approval by the Head of the School of Information Systems.

A systems analysis design case study where students are required to produce: Statement of requirements, feasibility/evaluation study, logical design, physical design, presentation of proposals to users.

User requirements elicitation techniques and approaches, project management, alternative design methodologies, information systems life cycle, practical use of CASE tools. **(Old No.19.611)**

**INFS3616   Commercial Programming   S2 L2 T1
Principles**

Prerequisite: INFS3605. Co-requisite:INFS3692.

Available only to students enrolled in Course 3971.

An advanced treatment of the practice of implementing commercial systems. Topics include: the use of library code, program design for performance, the use of code generators, project control and reporting practice. **(Old No. 19.616)**

INFS3692   Industrial Training 2   S2 1CCH

Prerequisite: INFS3605. Co-requisite: INFS3616.

Available only to students enrolled in Course 3971.

An in-depth practical exposure to Information Systems Development. The topics covered include: the structure and management of the implementation teams; the roles of users and information staff in implementation; scheduling and control during implementation, **(Old No. 19.692)**

INFS3693 Industrial Training 3   **S1 1CCH**

Co-requisite: INFS3611.

Available only to students enrolled in Course 3971.

In-depth practical work in Information Systems Analysis and Design. The topics covered include: the structure and management of analysis and design teams; the roles of users and I S staff in analysis and design; scheduling and control during analysis and design. **(Old No. 19.693)**

INFS4853 Advanced Systems Management   **L3**

Prerequisite: Admission to BCom degree course at Honours level.

As for INFS5953. See Graduate Study: Subject Descriptions. **(Old No. 19.853)**

INFS4857 Operations Research for Management 1 L3

Entry approval by Head of Department of Information Systems.

As for INFS5957. See Graduate Study: Subject Descriptions. **(Old No. 19.857)**

INFS4886 Research Topics in   **L3**
           Information Systems 1

Entry approval by Head of Department of Information Systems.

As for INFS5986. See Graduate Study: Subject Descriptions. **(Old No. 19.886)**

INFS4887 Research Topics in   **L3**
           Information Systems 2

Entry approved by Head of Department of Information Systems.

As for INFS5987. See Graduate Study: Subject Descriptions. **(Old No. 19.887)**

INFS4891 Decision Support Systems   **L3**

Prerequisite: INFS2603.

As for INFS5991. See Graduate Study: Subject Descriptions. **(Old No. 19.891)**

Japanese

JAPN1000 Japanese 1A (Core)   **S1 L1 T4**

Prerequisite: Nil. Excluded: 28.809

Introduction to modern Japanese speaking, listening, reading and writing using communicative methods. Hiragana, Katakana and 100 Kanji are introduced and developed through progressive practice. **(Old No.28.809)**

JAPN1001 Japanese 1B (Core)   **S2 L1 T4**

Prerequisite: JAPN1000 or equivalent. Excluded: 28.810.

Further acquisition of communication skills in basic Japanese, regarding everyday non-technical topics. A further 100 Kanji are introduced and developed through progressive practice. **(Old No.28.810)**

JAPN1100 Japanese 1A (Intermediate)   **S1 L1 T4**

Prerequisite: 70% + 2-unit NSW HSC Japanese; 80% + in 2-unit Z NSW HSC Japanese, or equivalent (subject to placement test). Excluded: 28.809.

This course develops students' fundamental knowledge of spoken/written Japanese. Students are introduced to authentic Japanese through tapes and readings in order to refine communication skills. 150 Kanji are progressively introduced.

JAPN1101 Japanese 1B (Intermediate)   **S2 L1 T4**

Prerequisite: JAPN1100 or equivalent. Excluded: 28.810.

This course further develops students' communication skills in modern Japanese. Students use Japanese in a wider context, thereby increasing vocabulary and grammatical structures. A further 150 Kanji are progressively introduced.

JAPN1200 Japanese 1A (Advanced)   **S1 L1 T4**

Prerequisite: 35150 + in 3-unit NSW HSC Japanese. Those students who have acquired competence in Japanese by being exchange students in Japan or by some other means (both subject to placement test). Excluded: 28.809.

This course builds upon students' knowledge of Japanese language. Skills are improved through communicative (both written and spoken) activities. 150 Kanji are introduced progressively.

JAPN1201 Japanese 1B (Advanced)   **S2 L1 T4**

Prerequisite: JAPN1200 or equivalent (subject to a placement test). Excluded: 28.810.

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

Legal Studies and Taxation

LEGT7711 Legal Environment of   **S1 or S2 L2 T1**
           Commerce

Prerequisite:	*HSC minimum mark required*
2 unit English (General) or	60
2 unit English or	53
3 unit English	1

The Australian legal system and areas of substantive law relevant to commerce including contract, business organization, employment, commercial arbitration, advertising, trade regulation, civil compensation, discrimination. **(Old No. 99.774)**

LEGT7721 Legal Transactions in   **S1 or S2 L2 T1**
           Commerce

Prerequisite: LEGT7711.

General principles of law of contract and specialized commercial transactions including banking and negotiable instruments, insurance, agency, sale of goods, bailment, suretyship. **(Old No. 99.775)**

LEGT7731   Legal Regulations   S1 or S2 L2 T1
of Commerce

Prerequisite: LEGT7711.

The regulation of restrictive trade practices and sales promotion. The legal framework of marketing strategy with special reference to anti-competitive practices (including collusive activity, exclusive dealing, price discrimination, resale price maintenance, mergers and monopolization) and consumer protection law (including misleading and deceptive advertising and other unfair practices). Consumer credit; product liability; protection of intellectual property. **(Old No. 99.776)**

LEGT7741   Legal Organization of   S2 L3 T1
Commerce

Prerequisites: LEGT7721 or LEGT7731.

The law relating to corporations including company takeovers and the securities industry, partnerships, joint ventures and trusts, with special reference to their comparative utility. (Old No. 99.777)

LEGT7751   Taxation Law   S1 L3 T1

Prerequisite: LEGT7721 or LEGT7731.

The law and practice of the taxation of income under the Income Tax Assessment Act 1936 (Commonwealth) including the concepts of income and allowable deductions; alienation of income; taxation of partnership, trusts and corporation; tax avoidance and evasion. Taxes. Introduction to stamp duties, payroll tax, land tax and sales tax. Tax policy. **(Old No. 99.783)**

Mathematics

Note: When a subject is listed as a prerequisite or co-requisite, the appropriate higher subject may be substituted.

Many subjects in the School of Mathematics are offered at two levels. The higher level caters for students with superior mathematical ability. Where both levels are offered grades higher than Distinction are only awarded in the ordinary level in exceptional circumstances.

Students should note that some of the Mathematics honours programs require them to take some of their Mathematics subjects at higher level. However, students should not think that the higher level subjects are intended only for those in honours programs. Any student with the ability to undertake higher subjects benefits from so doing.

First Year Mathematics

MATH1032 Mathematics 1. This is the standard subject and is generally selected by the majority of students in the Faculties of Science, Biological and Behavioural Sciences, Engineering and Applied Science who intend to pursue further studies in mathematics, computer science, physics, chemistry or engineering.

MATH1042 Higher Mathematics 1. This subject has the same purpose as MATH1032, but is aimed at the more mathematically able students, including those who may wish to take an honours degree in mathematics. It covers all the material in MATH1032, plus other topics, at greater depth and sophistication. It is intended for students who have obtained high marks in the 3 or 4 unit mathematics courses of the Higher School Certificate.

General Mathematics

This is a combination of the single session subjects MATH1011 and MATH1021 and provides for students who do not intend studying mathematics beyond first year but whose other studies require some knowledge of basic mathematical ideas and techniques. It is particularly designed to meet the needs of such students in Biological and Behavioural Sciences, Optometry, Psychology and Wool Science. However, students who select this subject should weigh seriously the implications of their choice because no further mathematical subjects are normally available. A student with meritorious performance in MATH1021 may be permitted to proceed to a certain limited number of second year subjects intended for biologists and chemical engineers. The single subject MATH1011 is also available to students seeking a prerequisite for MATH1032.

Mathematics as a Subsidiary Subject

The School also provides the sequence of two subjects MATH2021 and MATH3021 at the second and third levels respectively, for students in the Science and Mathematics Course and the Faculty of Science who are mainly interested in the chemical and biological sciences. These courses offer an introduction to mathematical techniques for scientists and engineers.

There is also the Level II subject in Statistics. MATH2841, which provides an introduction to statistical procedures commonly used in Science, and which also leads to the Level III subjects MATH3870 Regression Analysis and Experimental Design, and MATH3880 Applied Stochastic Processes.

For both the above Level II subjects the entry qualification is a pass in MATH1032 Mathematics 1, but in appropriate cases students who have passed in MATH1021 General Mathematics 1C at a satisfactory level may be given permission to enrol.

MATH1011   General Mathematics 1B   S1 L4 T2

Prerequisite:	*HSC Exam Score Range Required*
2 unit Mathematics* or	*60-100*
2 and 3 unit Mathematics or	*1-150*
3 and 4 unit Mathematics	*1-200*

Excluded MATH1042, MATH1032

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. **(Old No. 10.021B)**

* the required score may vary slightly from year to year

MATH1021   General Mathematics 1C   S2 L4 T2

Prerequisite: MATH1011. Excluded MATH1032, MATH1042.

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. **(Old No. 10.021C)**

MATH1032   Mathematics 1   F L4 T2

Prerequisite:	*HSC Exam Score Range Required*
2 unit Mathematics* or	*67-100*
2 and 3 unit Mathematics or	*100-150*
3 and 4 unit Mathematics or	*100-200*
MATH1011	

Excluded MATH1042, MATH1011, MATH1021

Calculus, analysis, analytic geometry, linear algebra, an introduction to abstract algebra, elementary computing. **(Old No. 10.001)**

MATH1042   Higher Mathematics 1   F L4 T2

Prerequisite:	*HSC Exam Score Range Required*
3 unit Mathematics	*145†150*
or	
4 unit Mathematics	*186-200*

Excluded MATH1032, MATH1011, MATH1021

As for MATH1032 Mathematics 1, but in greater depth. **(Old No. 10.011)**

†These numbers may vary from year to year.
* This refers to the 2 unit Mathematics subject which is related to the 3 unit Mathematics subject. It does not refer to the subject Mathematics in Society.

MATH1061   Introductory Applied Computing   S2 L3 T3

Prerequisite: As for MATH1011 Co-requisite: MATH1021 or MATH1032 Excluded: 10.061 any any subjects taught by the Department of Computer Science.

The major components of a computer, software vs hardware. The role of computers, history, range of available hardware and software, computing issues and standards. The operating systems DOS and UNIX, files and text editors, networks and communications. An overview of spreadsheets, databases, graphics and other software packages Structured programming in the high level language C, covering a variety of date types, efficiency, language standards, and libraries of functions and subprograms. Mathematical applications from a wide variety of areas. **(Old No. 10.061)**

MATH1081   Discrete Mathematics   S1 L4 T2

Co-requisite: MATH1032 or MATH1042

Role of proof in mathematics, logical reasoning and implication, different types of proofs. Sets, algebras of sets, operations on sets. Mathematical logic, truth tables, syntax, induction. Graphs and directed graphs, basic graph algorithms. Counting, combinatorial identities, binomial and multinomial theorems. Binary operations and their properties, groups and semigroups, ordered structures. Recursion relations. Application to network theory, assignment problems and population growth. **(Old No. 10.081)**

MATH2021   Mathematics   F L1 T1

Prerequisite: MATH1032 or MATH1042 or MATH1021 CR

Note A: A unit, together with MATH3021 which is available to Faculty of Science students as one of a sequence of two units constituting a terminating service course in mathematics. As such it is mutually exclusive to any other Level II or Level III unit in Pure and or Applied Mathematics except that MATH3261 may be taken with MATH2021 and MATH3021.

Note B: Mathematics MATH2021 is included for students desiring to attempt only one Level II Mathematics unit. If other Level II units in Pure Mathematics or Applied Mathematics are taken, MATH2021 Mathematics will not be counted.

Differential equations, use of Laplace transforms, solutions by series; partial differential equations and their solution for selected physical problems, use of Fourier series; multiple integrals, matrices and their application to theory of linear equations, eigenvalues; introduction to numerical methods. **(Old No. 10.031)**

MATH3021   Mathematics   F L1 T1

Prerequisite: MATH2021.

Note A: As for Note A in MATH2021 Mathematics.

Note B: Mathematics MATH3021 is included for students desiring to attempt only one Level III Mathematics unit. If other Level III units in Pure Mathematics or Applied Mathematics are taken, MATH3021 Mathematics will not be counted.

Vector calculus; special functions; convolution theorem and applications; complex variable theory; Fourier integrals; Laplace transforms with application to ordinary and partial differential equations. **(Old No. 10.032)**

MATH4003   Mathematics and Computer Science Honours
(Old No. 10.623)

Pure Mathematics

Level II Subjects

MATH2400   Pure Mathematics 2   S1 L1.5 T.5
Finite Mathematics

Prerequisite: MATH1032 or MATH1042**

Positional number systems, floating-point arithmetic, rational arithmetic, congruences. Euclid's algorithm, continued fractions, Chinese remainder theorem, Fermat's theorem, applications to computer arithmetic. Polynomial arithmetic, division algorithm, factorization, interpolation, finite field. Codes, errorcorrecting codes, public-key cryptography. **(Old No. 10.1115)**

MATH2410   Pure Mathematics 2   S2 L1.5 T.5
Automata and Algorithms

Prerequisite: MATH1032 or MATH1042**

Finite automata, regular languages and Kleene's theorem. Analysis of fast algorithms for matrix, integer and polynomial manipulation, sorting, etc. Discrete and Fast Fourier Transform and applications. **(Old No. 10.1116)**

MATH2501   Pure Mathematics 2   F L1.5 T1 or
**   Linear Algebra   S1 or S2 L3 T2**

Prerequisite: MATH1032 or MATH1042. Excluded MATH2601.

Vector spaces, linear transformations and matrices, change of basis. Eigenvalues and eigenvectors, generalized eigenvectors. Functions of matrices. Linear systems of differential equations including the use of Laplace transform. Inner products, orthogonalization, projections. Unitary and self-adjoint transformations. Quadratic and Hermitian forms. **(Old No. 10.111A)**

MATH2510   Pure Mathematics 2   S1 or S2 L1.5 T1
**   Real Analysis**

Prerequisite: MATH1032 or MATH1042. Excluded MATH2610.

Multiple integrals, partial differentiation. Analysis of real valued functions of one and several variables. **(Old No. 10.1113)**

MATH2520   Pure Mathematics 2   S1 or S2 L1.5 T1
**   Complex Analysis**

Prerequisite: MATH1032 or MATH1042 or Excluded MATH2620.

Analytic functions, Taylor and Laurent series, integrals. Cauchy's theorem, residues, evaluation of certain real integrals. **(Old No. 10.1114)**

MATH2601   Higher Pure Mathematics 2   S2 L4 T.5
**   Algebra**

Prerequisite: MATH1042 or MATH1032 CR.   Excluded MATH2501, MATH3500.

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. **(Old No. 10.121A)**

MATH2610   Higher Pure Mathematics 2   S1 L2 T.5
**   Real Analysis**

Prerequisite: MATH1042 or MATH1032 CR.   Excluded MATH2510.

As for MATH2510 Pure Mathematics 2 Real Analysis but in greater depth. **(Old No. 10.1213)**

MATH2620   Higher Pure Mathematics 2   S1 L2 T.5
**   Complex Analysis**

Prerequisite: MATH1042 or MATH1032 CR. Excluded MATH2520.

As for MATH2520 Pure Mathematics 2 Complex Analysis, but in greater depth. **(Old No. 10.1214)**

Level III Subjects

MATH3400   Pure Mathematics 3   SS L1.5 T.5
**   Logic and Computability**

*Prerequisites: ***.*

The propositional calculus its completeness and consistency: Turing machines; unsolvable problems; computability and Church's thesis; Godel's incompleteness theorems. **(Old No. 10.1123)**

MATH3410   Pure Mathematics 3   SS L1.5 T.5
**   Combinatorial Structures**
**   and Applications**

*Prerequisites: ***.*

Theory of combinatorial designs (including Bruck-Ryser-Chowla theorem), Latin squares, projective and affine planes, application to the design of experiments. **(Old No. 10.1521)**

MATH3420   Pure Mathematics 3   SS L1.5 T.5
**   Communication, Codes and Ciphers**

*Prerequisites: ***.*

Introduction to discrete information theory (including Shannon's theorems), error-correcting codes and cryptography. **(Old No. 10.1524)**

MATH3500   Pure Mathematics 3   S1 L1.5 T.5
**   Group Theory**

*Prerequisites: ***. Excluded MATH2601*

Mathematical systems, groups, determination of small groups, homomorphisms and normal subgroups. **(Old No. 10.1111)**

MATH3510   Pure Mathematics 3 - Geometry S2 L1.5 T.5

*Prerequisites: ***. Excluded MATH3610.*

Elementary concepts of Euclidean, affine and projective geometries. **(Old No. 10.1112)**

MATH3520   Pure Mathematics 3   SS L1.5 T.5
**   Number Theory**

*Prerequisites: ***. Excluded MATH3610.*

Introduction to algebraic structures. Euclidean domains, prime and irreducibles, factorization. Diophantine equations, polynomial congruences, arithmetic functions, Primitive roots, quadratic residues, quadratic reciprocity, sums of squares. **(Old No. 10.1121)**

MATH3530   Pure Mathematics 3   SS L1.5 T.5
**   Combinatorial Topology**

*Prerequisites: ***.*

Elementary combinatorial topology of surfaces. **(Old No. 10.1124)**

MATH3540   Pure Mathematics 3   S1 L1.5 T.5
**   Ordinary Differential Equations**

Prerequisite: MATH2501 Excluded MATH3650.

Systems of ordinary differential equations: variations of constants formula; stability; Poincare space; Lyapunov's direct method. **(Old No. 10.1125)**

MATH3550   Pure Mathematics 3   S2 L1.5 T.5
**   Partial Differential Equations**

Prerequisites: MATH2510, MATH2520. Co-requisite: MATH3540 Excluded: MATH3660.

System of partial differential equations characteristic surfaces; classifications. Cauchy problem. Dirichlet and Neumann problems; the maximum principle. Poisson's formula: conformal mapping. **(Old No. 10.1126)**

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MATH3560   Pure Mathematics 3   SS L1 T1
History of Mathematics

*Prerequisites:***.*

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. **(Old No. 10.1127)**

MATH3570   Pure Mathematics 3   SS L1.5 T.5
Foundations of Calculus

*Prerequisites: ***. Excluded MATH3601.*

Properties of the real numbers. Convergence of sequences and series. Properties of continuous and differentiable functions of a real variable. **(Old No. 10.1128)**

MATH3580   Pure Mathematics 3   SS L1.5 T.5
Differential Geometry

*Prerequisites: MATH2510, ***. Excluded: MATH3750.*

Curves and surfaces in space. Gaussian curvature, Gauss theorem. Gauss Bonnet theorem. **(Old No. 10.1522)**

MATH3601   Higher Pure Mathematics 3   F L1.5 T.5
Real Analysis and Functional
Analysis

Prerequisites: MATH2601 or MATH2501 CR, MATH2610 or MATH2510 CR, Excluded MATH3570, 10.1523.

The limit processes of analysis; introduction to Lebesgue integration; introduction to metric spaces. Hilbert spaces; linear operators; Fourier series. **(Old No. 10.122B)**

MATH3610   Higher Pure Mathematics 3 -   S1‡‡ L1.5 T.5
Number Theory

Prerequisite:.††† Excluded: MATH3520.

Prime numbers; number theoretic functions; Dirichlet series; partitions. Continued fractions, diophantine approximation; p-adic numbers. **(Old No. 10.1421)**

MATH3620   Higher Pure Mathematics 3 -   S2‡‡ L1.5 T.5
Groups and Representations

Prerequisites: MATH2601 or MATH2501 CR, and MATH3500 CR †††

Abelian groups, composition series; nilpotent groups; soluble groups. Representations and characters of finite groups; induced representations. **(Old No. 10.1422)**

MATH3630   Higher Pure Mathematics 3 -   S1‡‡ L1.5 T.5
Complex Analysis

Prerequisites: MATH2620 or MATH2520 CR††† . Co-requisite: MATH3601 strongly recommended.

Topics in advanced complex function theory chosen from the following: Conformal mapping. Analytic continuation. Entire and meromorphic functions. Elliptic functions. Asymptotic methods. Integral formulae. Harmonic functions. **(Old No. 10.1323)**

MATH3640   Higher Pure Mathematics 3 -   S2‡‡ L1.5 T.5
Geometry

Prerequisites: MATH2601 or both MATH2501 CR and MATH3500 CR†††. Excluded: MATH3510.

Axioms for a geometry; affine geometry, Desargues' theorem; projective geometry. **(Old No. 10.1424)**

MATH3650   Higher Pure Mathematics 3 -   S1‡‡ L1.5 T.5
Ordinary Differential Equations

Prerequisites: MATH2601 or MATH2501 CR, MATH2610 or MATH2510 CR†††. Co-requisites: MATH3601 strongly recommended. Excluded: MATH3540.

Existence and uniqueness theorems. Linearization. Qualitative theory of autonomous systems. **(Old No. 10.1425)**

MATH3660   Higher Pure Mathematics 3 -   S2‡‡ L1.5 T.5
Partial Differential Equations

Prerequisites:†††. Co-requisite: MATH3650 Excluded: MATH3550.

Classification, characteristics. Cauchy problem; Dirichlet and Neumann problems. Distributions. **(Old No. 10.1426)**

MATH3710   Higher Pure Mathematics 3 -   S1‡ L1.5 T.5
Rings and Fields

Prerequisite: MATH2601 or MATH2501 CR†††.

Rings; integral domains; factorization theory; Fields; algebraic and transcendental extensions. Introduction to algebraic number theory, quadratic reciprocity. **(Old No. 10.1321)**

MATH3720   Higher Pure Mathematics 3 -   S2‡ L1.5 T.5
Galois Theory

Prerequisites:†††. Co-requisite: MATH3710.

Galois fields. Galois groups. Solution of equations by radicals. Further algebraic number theory. **(Old No. 10.1322)**

MATH3730   Higher Pure Mathematics 3 -   S1‡‡ L1.5 T.5
Topology

Prerequisite: MATH2610 or MATH2510 CR†††.

Naive set theory, the axiom of choice Metric and topological spaces, compactness. **(Old No. 10.1423)**

MATH3740   Higher Pure Mathematics 3 -   S2‡ L1.5 T.5
Integration and Fourier Analysis

Prerequisites:†††. Co-requisite: MATH3601.

Lebesgue integration; measure theory. Fourier transforms. **(Old No. 10.1324)**

MATH3750   Higher Pure Mathematics 3 -   S1‡ L1.5 T.5
Differential Geometry

Prerequisites: MATH2601 or MATH2501 CR, MATH2610 or MATH2510 CR†††. Excluded: MATH3580.

Curves and surfaces in space; classification of surfaces. Curvature; geodesics. **(Old No. 10.1325)**

MATH3760   Higher Pure Mathematics 3 -   S2‡ L1.5 T.5
Calculus on Manifolds

Prerequisites:†††. Co-requisite: MATH3750.

Manifolds; vector fields; flows. Introduction to Morse theory. Differential forms; Stokes' theorem; the Gauss-Bonnet theorem. **(Old No. 10.1326)**

Level IV Subject

MATH4603/MATH4604   Pure Mathematics 4 (Honours)

An honours program consisting of the preparation of an undergraduate thesis together with advanced lectures 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.

** MATH1081 is strongly recommended
*** Normal prerequisites for attempting Level III Pure Mathematics units are at least two level II Mathematics units, including any course prerequisites. For any listed prerequisite or co-requisite unit, an appropriate higher unit may be substituted.
‡ These subjects are offered in odd-numbered years.
‡‡ These subjects are offered in even-numbered years.
††† Students wishing to enrol in Level III Higher Pure Mathematics units should consult with the Department before enrolling. Normal prerequisites for attempting Level III Higher Pure Mathematics units are at least two Level II Mathematics units, including any course prerequisites, at an average of distinction level or their higher equivalents. Subject to the approval of the Head of the Department, these may be relaxed.

Applied Mathematics

Level II Subjects

MATH2100   Applied Mathematics 2   S1 or S2 L1.5 T.5
Vector Calculus
Prerequisite: MATH1032 Excluded: MATH2110.

Properties of vectors and vector fields; divergence, gradient, curl of a vector; line, surface, and volume integrals. Gauss and Stokes' theorems. Curvilinear co-ordinates. **(Old No. 10.2111)**

MATH2110   Higher Applied Mathematics 2   S1 L2 T.5
Vector Analysis
Prerequisite: MATH1042 or MATH1032 CR. Excluded: MATH.2100.

As for MATH2100 but in greater depth. **(Old No. 10.2211)**

MATH2120   Applied Mathematics 2 -   S1 or S2 L1.5 T.5
Mathematical Methods
for Differential Equations
Prerequisite: MATH1032. Excluded: MATH2130.

Mathematical methods for ordinary and partial differential equations. Series solutions, numerical methods, separation of variables. Fourier series. Bessel functions. **(Old No. 10.2112)**

MATH2130   Higher Applied Mathematics 2 -   S2 L2 T.5
Mathematical Methods for
Differential Equations
Prerequisite: MATH1042 or MATH1032 CR. Excluded: MATH2120.

As for MATH2120 but in greater depth. **(Old No. 10.2212)**

MATH2160   Applied Mathematics 2 -   S1 L1.5 T.5
Linear Programming
Prerequisite: MATH1032. Co-requisite: MATH2501. Excluded: 10.2213

A first course in mathematical modelling and solution techniques for problems. The revised simplex and dual simplex methods, theory and application of sensitivity analysis, duality theory. Networks, transportation and assignment problems. Examples, applications and computing methods are prominent features. **(Old No. 10.2113)**

MATH2180   Applied Mathematics 2   S2 L1.5 T.5
- Operations Research
Prerequisite: MATH2160

Modelling and solution techniques for optimization problems of interest to business and industry. Topics will be selected from linear programming, integer programming, (discrete) dynamic programming, project scheduling, game theory, queueing theory, inventory theory and simulation. Software packages will be used to solve realistic problems.

MATH2200   Applied Mathematics 2 -   S2 L1.5 T.5
Discrete-Dynamical Systems
Prerequisite: MATH1032. Co-requisite: MATH2501, Excluded: 10.2215.

The study of dynamical systems whose states change at discrete points in time. Difference equations, general properties. Linear systems, stability, oscillations, z-transforms. Nonlinear systems, critical points, periodic cycles, chaotic behaviour. Applications selected from engineering, biological, social and economic contexts. **(Old No. 10.2115)**

MATH2220   Applied Mathematics 2 -   S2 L1.5 T.5
Continuous-Dynamical Systems
Prerequisite: MATH1032. Excluded: 10.2216.

The study of continuous dynamical systems. One-dimensional systems, kinematic waves, applications include traffic flow and waves in fluids. An introduction to the modelling of physical, biological and ecological systems, stability, oscillations and resonance. **(Old No. 10.2116)**

MATH2301   Applied Mathematics 2 -   S1 L3 T1
Mathematical Computing A
Prerequisite: MATH1032.

Topics covered are: structured programming in FORTRAN, errors in representing real numbers and their effect on calculations, and mathematical algorithms based on polynomial approximations. **(Old No. 10.261A)**

Level III Subjects

MATH3150   Transform Methods
See under Servicing Subjects

MATH3101   Applied Mathematics 3 -   S1 L3 T1
Numerical Analysis
Prerequisite: At least two level II mathematics units, including any course prerequisites. Excluded: MATH3141, 10.222A

Analysis of some common numerical methods. Iterative methods for solving nonlinear equations; interpolation using polynomials, splines and trigonometric functions; least-squares approximation and orthogonal functions; numerical differentiation and intergration: extrapolation; finite difference methods for initial value problems for ordinary differential equations; iterative techniques for large systems of linear equations. **(Old No. 10.212A)**

**MATH3121 Applied Mathematics 3 -   S1 L3 T1
Mathematical Methods**

*Prerequisites: MATH2120, MATH2501, MATH2510, MATH2520.
Excluded: MATH2280, 10.033, 10.222D, 10.412D, 10.422D, 10.4331,
10.2921.*

*Fundamental methods for solution of problems in applied
mathematics, physics and engineering.* Functions of a complex
variable, contour integration, asymptotic methods. Fourier and
Laplace transforms, complex inversion theorems. Orthogonal
polynomials and functions, Sturm-Liouville theory,
eigenfunction expansions, generalized Fourier series.
Applications to the solution of boundary value problems for
ordinary and partial differential equations is given for all
methods. **(Old No. 10.212D)**

**MATH3161 Applied Mathematics 3 -   S1 L3 T1
Optimization Methods**

*Prerequisites: MATH2501 and MATH2510 or MATH2100. Excluded:
10.222L.*

*Development, analysis and application of methods for
optimization problems.* Theory of multivariable optimization;
including necessary and sufficient optimality conditons,
stationary points, Lagrange multipliers, Kuhn-Tucker
conditions, convexity and duality. Numerical methods for one
dimensional minimization, uncostrained multivariable
minimization (including steepest descent, Newton,
quasi-Newton and conjugate gradient methods) and
constrained multi-variable minimization (including linear
programming and quadratic programming). **(Old No. 10.212L)**

**MATH3181 Applied Mathematics 3 -   S2 L3 T1
Optimal Control**

*Prerequisites: A total of 2 level II mathematics units which must include
either MATH2100 or MATH2510. Excluded: 10.222M.*

An introduction to the optimal control of dynamical systems.
Mathematical descriptions of dynamical systems. Stability,
controlability, and observability. Optimal control. Calculus of
variations. Dynamic programming.

Examples and applications are selected from biological,
economical and physical systems. **(Old No. 10.212M)**

**MATH3201 Applied Mathematics 3 -   S2 L3 T1
Dynamical Systems and Chaos**

*Prerequisites: MATH2501, MATH2120, MATH3540. Excluded:
10.222N.*

Regular and irregular behaviour of nonlinear dynamical
systems. A selection from topics developing the theory of
nonlinear differential and difference equations, with
applications to physical, biological and ecological systems.
Topics will be selected from stability and bifurcation theory,
Floquet theory, perturbation methods, Hamilitonian dynamics,
resonant oscillations; chaotic systems, Lyapunov exponents,
Poincaré maps, homoclinic tangles. **(Old No. 10.212N)**

**MATH3241 Higher Applied Mathematics 3 -   S1 L3 T1
Fluid Dynamics**

Prerequisites: MATH2100, MATH2120. Excluded: 10.222B, 10.422A.

*The mathematical modelling and theory of problems arising in
the flow of fluids.* Cartesian tensors, kinematics, mass
conservation, vorticity, Navier-Stokes equation. Topics from
inviscid and viscous fluid flow, gas dynamics, sound waves,
water waves. **(Old No. 10.212B)**

**MATH3261 Applied Mathematics 3 -   S2 L3 T1
Oceanography**

*Prerequisites: MATH2120 or MATH2021, PHYS1022. Excluded:
10.412A.*

*Review of basic physical features and mathematical
description of oceans.* Physical properties of sea water.
Elementary hydrodynamics. An elementary discussion of
turbulence. Geostrophy, dynamic heights and the inference of
heights from hydrographic measurement. Ekman layers.
Wind-driven ocean circulation, western boundary currents.
Surface and internal waves, tides. Thermohaline process:
mixing, entrainment, double-diffusive phenomena, mixed
layers and gravity currents. **(Old No. 10.292A)**

**MATH3301 Applied Mathematics 3 -   S2 L3 T1
Mathematical Computing B**

Prerequisites: MATH2501, MATH2120, MATH2301. Excluded: 10.612.

*The design and use of computer programs to solve practical
mathematical problems.* Matrix computations and use of
existing mathematical software packages, plus case studies
from applications involving numerical integration, differential
equations, symbolic algebra, and vector and parallel
computers. **(Old No. 10.262A)**

Level IV Subjects

MATH4103/MATH4101 Applied Mathematics 4 (Honours)

An honours program consisting of the preparation of an
undergraduate thesis together with advanced lecture courses.
Lecture topics include selections from: advanced
mathematical methods for applied mathematics, advanced
optimization, numerical analysis, theory of linear and non-linear
dynamical systems, optimal control, operations research,
functional analysis and applications, mathematics of economic
models and of economic prediction, fluid mechanics,
oceanography, microhydrodynamics, and analytical and
numerical solution of partial differential equations. With
permission of the Head of Department, the subject may also
include advanced lecture courses given by other Departments
or Schools. **(Old No. 10.223)**

MATH4123 Applied Mathematics 4 (Short Course)

6 units consisting of the preparation of an undergraduate thesis
together with advanced lecture courses. Lecture topics include
selections from: topics listed in MATH4103. With permission of
the Head of Department, the subject may also include
advanced lecture courses given by other Departments or
Schools. **(Old No. 10.233)**

Statistics

Level II Subjects

MATH2801 TS2 - Probability and Random Variables   S1 L3 T1

Prerequisite: MATH1032 or MATH1042 or MATH1021 (CR). Excluded: MATH2901, MATH2819, MATH2841, BIO2041

Probability, random variables, standard discrete and continuous distributions, multivariate distributions, transformations, random sampling, sampling distributions, limit theorems. **(Old No. 10.311A)**

MATH2810 TS2 - Statistical Computing and   S1 L1.5 T.5 Simulation

Prerequisite: MATH1032 or MATH1042 or MATH1021(CR). Co-requisite:MATH2801.

Introduction to APL, random variables, univariate transformation, simulation of random variables, APL programming, integer value random variables, random walks theory and simulation, introduction to Markov chains. **(Old No. 10.3111)**

MATH2821 TS2 - Basic Inference   S2 L3 T1

Prerequisite: MATH2801. Excluded: MATH2921, MATH2819, MATH2841, BIO2041.

Point estimation: general theory, estimation by moments, maximum likelihood, interval estimation with general theory and application, hypothesis testing using Neyman Pearson theory, linear regression and prediction, analysis of variance. **(Old No. 10.311B)**

MATH2830 TS2 - Nonparametric Statistical   S2 L1.5 T.5 Inference

Prerequisite: MATH2801. Co-requisite: MATH2821.

Order statistics, exact and approximate distributions, multinomial distributions, goodness of fit, contingency tables, one-sample and two-sample estimation and inference problems. **(Old No. 10.3112)**

MATH2841 Statistics SS   F L1.5 T.5

Prerequisite: MATH1032 or MATH1021(CR). Excluded: MATH2801, MATH2821, MATH2901, MATH2921, MATH2819, BIOS2041.

An introduction to the theory of probability, with finite, discrete and continuous sample spaces. The standard elementary univariate distributions: binomial, Poisson and normal, an introduction to multivariate distributions. Standard sampling distributions, including those of chi+, 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. **(Old No. 10.331)**

MATH2901 HTS2 - Probability and   S1 L3 T1 Random Variables

Prerequisite: MATH1032 or MATH1042. Excluded: MATH2801, MATH2819, MATH2841, BIOS2041.

As for MATH2801 but in greater depth. **(Old No. 10.321A)**

MATH2910 HTS2 - Statistical Computing and   S1 L1.5 T.5 Simulation

Prerequisite: MATH1032 or MATH1042. Co-requisite: MATH2901.

As for MATH2810 but in greater depth. **(Old No. 10.3211)**

MATH2921 HTS2 - Basic Inference   S2 L3 T1

Prerequisite: MATH2901. Excluded: MATH2821, MATH2819, MATH2841, BIOS2041

As for MATH2821 but in greater depth. **(Old No. 10.321B)**

MATH2930 HTS2 - Nonparametric Statistical   S2 L1.5 T.5 Inference

Prerequisite: MATH2901. Co-requisite: MATH2921.

As for MATH2830 but in greater depth. **(Old No. 10.3212)**

Level III Subjects

MATH3801 TS3 - Stochastic Processes   S1 L3 T1

Prerequisites: MATH2801, MATH2501, MATH2510. Excluded: MATH3901, MATH3880.

Probability spaces, generating functions, convolutions. Poisson process, renewal processes. Branching processes. Recurrent events, Markov chains. Birth-and-death processes, queueing models. Inference for stochastic processes. **(Old No. 10.312A)**

MATH3811 TS3 - Linear Models   S1 L3 T1

Prerequisites: MATH2821, MATH2501, MATH2510. Excluded: MATH3911, MATH3870.

Matrix theory. Multivariate normal distribution. Quadratic forms (distributions and independence). The general linear hypothesis, Gauss-Markov theorem. Hypothesis testing. Selection of variables. Analysis of residuals. Analysis of variance. **(Old No. 10.312C)**

MATH3820 TS3 - Sample Survey Theory   S1 L1.5 T.5

Prerequisite: MATH2821. Excluded: MATH3920.

Finite population sampling theory illustrated by mean estimation; simple random, stratified, cluster, systematic, mutistage and ratio sampling, sampling proportional to size. **(Old No. 10.3121)**

MATH3830 TS3 - Design and Analysis   S2 L1.5 T.5 of Experiments

Prerequisites: MATH2821, MATH3811. Excluded: MATH3930, MATH3870.

Principles of good experimental design. Completely randomized experiment, randomized complete block design. Latin square design. Contrasts and multiple comparisons. Analysis of factorial experiments. Random effects models. **(Old No. 10.3122)**

MATH3840   TS3 - Statistical Inference   **S2 L1.5 T.5**

Prerequisite: MATH2821. Excluded: MATH3940.

Uniformly minimum variance unbiased estimation. Cramer-Rao inequality, Lehman-Scheffe theorem. Monotone likelihood ratio distributions and uniformly most powerful unbiased tests. Generalized likelihood ratio test, exact test and large samples tests. Bayesian point estimation, interval estimation and hypothesis testing. **(Old No. 10.3123)**

MATH3850   TS3 - Nonparametric Methods   **S2 L1.5 T.5**

Prerequisite: MATH2821, MATH2830. Excluded: MATH3950.

One sample and two sample problems. Tests for association. Contingency tables. Nonparametric analysis of variance and regression. **(Old No. 10.3124)**

MATH3861   TS3 - Statistical Computation   **S2 L2 T2**

Prerequisites: MATH2821 or MATH2921, MATH2810 or MATH2910.

Array and sequential processing in APL. Standard statistical operations and their efficient coding. Simulation of random variables and stochastic processes. Efficient coding of survey data. Modular package construction, and the use of packages (eg STATAPL, IDAP, INS&TAPAK, SPSS, GLIM, GENS&TAT, MINITAB, SAS, BMD). A project, to construct a small package consistent with general specifications and with safeguards against common errors. **(Old No. 10.312F)**

MATH3870   Regression Analysis and   **S1 L1.5 T.5**
            Experimental Design

Prerequisite: MATH2841 or MATH2821 or approved equivalent. Excluded: MATH3830, MATH3930, MATH3811, MATH3911.

A revision of linear regression with extension to multiple and stepwise linear regression. Analysis of block designs, Latin squares, factorial designs, variance component and mixed model analyses. Bioassay, logit models. Contingency tables. **(Old No. 10.3321)**

MATH3880   Applied Stochastic Processes   **S2 L1.5 T.5**

Prerequisite: MATH2841 or MATH2801 or MATH2901, or approved equivalent. Excluded: MATH3801, MATH3901.

An introduction to processes in discrete and continuous time Markov chains and Markov processes, branching processes, time series with moving average models. **(Old No. 10.3322)**

MATH3901   HTS3 - Stochastic Processes   **S1 L3 T1**

Prerequisites: MATH2901, MATH2501, MATH2510. Excluded: MATH3801, MATH3880.

As for MATH3801 but in greater depth. **(Old No. 10.322A)**

MATH3911   HTS3 - Linear Models   **S1 L3 T1**

Prerequisites: MATH2921, MATH2501, MATH2510. Excluded: MATH3811, MATH3870.

As for MATH3811 but in greater depth. **(Old No. 10.322C)**

MATH3920   HTS3 - Sample Survey Theory   **S1 L1.5 T.5**

Prerequisite: MATH2921. Excluded: MATH3820.

As for MATH3820 but in greater depth. **(Old No. 10.3221)**

MATH3930   HTS3 - Design and Analysis   **S2 L1.5 T.5**
            of Experiments

Prerequisites: MATH2921, MATH3911. Excluded: MATH3830, MATH3870.

As for MATH3830 but in greater depth. **(Old No. 10.3222)**

MATH3940   HTS3 - Statistical Inference   **S2 L1.5 T.5**

Prerequisite: MATH2921. Excluded: MATH3840.

As for MATH3840 but in greater depth. **(Old No. 10.3223)**

MATH3950   HTS3 - Nonparametric Methods   **S2 L1.5 T.5**

Prerequisites: MATH2921, MATH2930. Excluded: MATH3850.

As for MATH3850 but in greater depth. **(Old No. 10.3224)**

MATH3971   HTS3 - Probability Theory

Prerequisites: MATH2901, MATH2501, MATH2510.

Not offered in 1991.

Probability spaces, generating functions. Weak convergence, convergence in probability, weak law of large numbers, central limit theorem. Extreme value distributions. Borel-Cantelli lemma, almost sure convergence, strong law of large numbers. Stable and infinitely divisible distributions.

MATH3980   HTS3 - Statistic Project   **F**

Prerequisites: MATH2901, MATH2921. Co-requisites: At least four units from MATH3901, MATH3911, MATH3920, MATH3930, MATH3940, MATH3950, MATH3971, MATH3861.

(Old No. 10.3225)

Level IV Subject

MATH4903/MATH4904   Theory of Statistics 4 (Honours)

Specialized study, from the topics set out, for students attempting honours in the Science and Mathematics or Arts courses with a major in Statistics. Mathematical basis. Experimental design; response surfaces. Stochastic processes. Theories of inference. Sequential analysis. Non-parametric methods. Multivariate analysis. Mathematical programming. Information theory. Discrete distributions. Project. **(Old No. 10.323)**

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subjects see the Faculty of Applied Science and Engineering Handbooks.

MATH1051   Mathematics 1F   **S1 L4 T2**

Prerequisite: 3 unit HSC Mathematics. Excluded: MATH1011, MATH1021, MATH1032, MATH1042.

For students in Course 3950 only.

Complex numbers, vectors and vector geometry, matices and matrix algebra. Functions, continuity and differentiability,

integration, introduction to differential equations and series of functions.

MATH2001 Engineering Mathematics 2   F L2 T2

Prerequisite: MATH1032.

Differential equations, use of Laplace transforms, solutions by series; partial differential equations and thier solution for selected physical problems, use of Fourier series; introduction to numerical methods; matrices and their application to theory of linear equations, eigenvalues and thier numerical evaluation; vector algebra and solid geometry; multiple integrals; introduction to vector field theory. **(Old No. 10.022)**

MATH2819 Statistics SA   F L1.5 T.5

Prerequisite: MATH1032 or MATH1021. Excluded: MATH2841, MATH2801, MATH2821, MATH2901, MATH2921, BIOS2041.

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. **(Old No. 10.301)**

MATH2829 Statistics SU   S1 L2.5 T.5

Prerequisite: MATH1032 or MATH1042.

For students in the School of Surveying.

Introduction to probability theory, random variables and distribution functions, sampling distributions, including those of t, chi^2 and F. Estimation procedures, including confidence interval estimation with an emphasis on least squares and surveying problems, and computer based exercises. **(Old No. 10.341)**

MATH2839 Statistics SM   F L1.5 T.5

Prerequisite: MATH1032 or MATH1042.

For students in Aeronautical, Industrial and Mechanical Engineering and Naval Architecture.

Introduction to probability theory, with finite, discrete and continuous sample spaces. Random variables: the standard elementary distributions including the binomial, Poisson and normal distributions. Sampling distributions: with emphasis on those derived from the normal distribution: t, chi^2 and F. Estimation of parameters: the methods of moments and maximum likelihood and confidence interval estimation. The standard test of statistical hypotheses, and, where appropriate, the powers of such tests. An introduction to regression and the bivariate normal distribution. **(Old No. 10.351)**

MATH2849 Statistics SE1   S1 or S2 L1.5 T.5

Prerequisite: MATH1032 or MATH1042. Excluded: 10.361.

For students in the School of Electrical Engineering.

Introduction to probability theory, random variables and distribution functions; the binomial, Poisson and normal distributions in particular. Standard sampling distributions including those of chi-square and t. **(Old No. 10.3611)**

MATH2859 Statistics SE2   S1 or S2 L1.5 T.5

Prerequisite: MATH2849. Excluded: 10.361.

For students in the School of Electrical Engineering.

Estimation by moments and maximum likelihood; confidence interval estimation. The standard tests of significance with a discussion of power where appropriate.

An introduction to linear regression, auto-regression. Probability limit, law of large numbers and central limit theorem. Multivariate normal distribution. Stochastic processes in discrete and continuous time; Poisson and Gaussian processes. **(Old No. 10.3612)**

MATH2869 Statistics SC   S1 or S2 L1.5 T.5

For students in the School of Civil Engineering.

Introduction to probability. Random variables. Elementary distribution. Statistical inference. Point estimation. Confidence intervals. **(Old No. 10.381)**

MATH3141 Electrical Engineering   S2 L2.5 T1 Mathematics 3 Numerical and Mathematical Methods

Prerequisites: MATH2501, MATH2510, MATH2100. Excluded: MATH2120, MATH2130, MATH3101, 10.222A.

Numerical and Mathematical Methods for Electrical Engineering. Numerical Methods: Solution of linear and non-linear algebraic equations, interpolation and extrapolation, numerical quadrature, solution of ordinary differential equations, computational methods for matrix eigenvalues and eigenvectors. Mathematical Methods for Partial Differential Equations: Separation of variables methods, generalized Fourier series, Bessel functions, Legendre polynomials. **(Old No. 10.033A)**

MATH3150 Electrical Engineering   S2 L1.5 T.5 Mathematics 3 Transform Methods

Prerequisites: MATH2100, MATH2520. Excluded: 10.033, 10.2921.

The mathatics of signals and linear systems. General Fourier series. Fourier, Laplace and related transforms. Delta-distributions and others and their transforms. Discrete Fourier and Z-transforms. Applications to spectral analysis, autocorrelation, uncertainty and sampling, linear analog and digital filters, partial differential equations. **(Old No. 10.0331)**

Materials Science and Engineering

MATS1042 X-Ray Diffraction and Electron   S1 L2 T2 Microscopy

Prerequisite: MATS8193.

X-ray diffraction, electron optics, and analysis. Production, absorption and diffraction of X-rays. Powder and single crystal X-ray methods. Stereographic projections and crystal geometry. Applications of diffraction methods to solid solutions and solubility limit, thermal analysis, stress measurement, chemical analysis. X-ray fluourescence spectroscopy and analysis, on-stream analysis. Electron

optics and analysis, transmission and scanning electron microscopy. Energy-loss spectrometers, microanalysis. **(Old No. 4.713)**

MATS1072   Physics of Materials   S1 L2 T1
Pre-requisite: PHYS1002 or PHYS1919.

Interatomic bonding in solid materials. Types of interatomic bonds, metallic, covalent, ionic. Introductory quantum mechanics in one dimension, free electron theory, effects of periodic potential, density of states curves. Effect of electron to atom ratio on conductivity and crystal structure; semiconductors; instrinsic, extrinstic. Exchange energy; ferromagnetism, antiferromagnetism. Elementary perturbation theory, covalent bond; crystal structures, properties. Ionic bond, crystal structures, force models, properties. **(Old No. 4.742)**

MATS1083   Non Ferrous Alloys   S2 L1 T2
Pre or Co- requisite: MATS8193.

Metallography of non-ferrous alloys. Structure/property relationships in non-ferrous alloys. Hardening mechanisms. Metallography and properties of copper, aluminium, nickel, magnesium, lead, tin and titanium base alloys. **(Old No. 4.413)**

MATS1253   Ferrous Alloys   S2 L1 T2
Prerequisite: MATS8193.

Ferrous alloys. Iron-carbon phase equilibrium. Microstructure and properties of plain carbon steels. Austenite decomposition under equilibrium and non-equilibrium conditions. Dilatometry. Heat treatment of steels. Surface hardening treatments. Microstructure and properties of ordinary cast irons, including grey, white, mottled, malleable and ductile irons. **(Old No. 4.432)**

MATS1263   Alloy Steels   S2 L1 T1
Pre or Co-requisite: MATS1253.

Alloy steels. Ternary equilibria involving iron and carbon. Metallography and properties of alloys steels. Effect of alloying elements on austenite formation and decomposition under equilibrium and non-equilibrium conditions. Heat treatment of alloy steels. Metallography and properties of alloy cast irons. **(Old No. 4.453)**

MATS4053   Metallographic Techniques   S1 L1 T1

Metallographic techniques. Principles of optical microscopy. Quantitative microscopy and stereology. **(Old No. 4.422B)**

MATS4363   Origins of Microstructure   S1 L1 T1
Unit 1: Phase Equilibra
Co-requisite: CHEM1011, MATS1062 or 5.4221

Phase rule. Two-component system: free energy-composition and temperature composition diagrams, solubility limits, compound formation, invariants. Three-component systems:isothermal sections and liquidus projections. solidification and crystallization; cooling curves, crystallization paths.

Unit 2: Diffusion   S1 L1 T1

Fick's first and second laws. Solutions for short and long times by analytical and numerical methods. Boundary conditions for solid-fluid and solid-solid interfaces. Diffusion couples. Atomic level diffusion theory.

Unit 3: Metallography and
phase equilibrium laboratory   S1 T3

Determination of equilibrium phase diagrams. Solidification processes in moulds. Metallography of non-ferrous alloys.

Unit 4: Phase transformations   S2 L2 T1

Solidification: single phase, eutectic and near-eutectic, peritectic. Diffusional transormations: precititation repening, cooperative transformation, TTT and CCT curves. Diffusionless transformation: crystallography, nucleation and growth modes. **(Old No. 4.503)**

MATS4223   Mechanical Behaviour of Materials   S L T
Prerequisites: MATS8193.

Unit 1: Deformation   S1 L2

Atomic and molecular description of deformation. Introduction to dislocation theory and its application to mechanical properties. Chain dynamics under stress.

Unit 2: Fractographic analysis   S2 L1 T1

Classification of macroscopic and microscopic fracture mechanisms. Initiation and propagation of ductile, brittle, fatigue, creep, stress corrosion, and corrosion fatigue fractures. Effect of material defects, design deficiencies and incorrect processing on the origin and cause of fracture. Analysis of various modes of fracture using fractographic techniques involving optical microscopy and scanning and transmission electron microscopy.

Unit 3: Deformation and
strengthening mechanisms   S2 L1 T1

Strengthening mechanisms, creep, fracture, grain size dependence of strength. Introduction to generation of deformation and recrystallization textures. Measurements of age-hardening, activation energy of strain ageing.

Unit 4: Metal forming processes   S2 L1 T1

Metal forming. Introduction to metal forming operations. Factors affecting deformation and workability. Hot working, cold working and recrystallization. Processes: forging, rolling, extrusion and wire drawing. Die materials and geometry. Deformation parameters and processing defects. Plant visits. **(Old No. 4.523)**

MATS8193   Origins of Microstructures

Unit 1   Phase equilibria   S1 L1 T1

Phase rule. Two-component systems: free energy-composition and temperature-composition diagrams, solubility limits, compound formation, invariants. Three-component systems: isothermal sections and liquidus projections. Solidification and crystallisation; cooling curves, crystallisation paths.

**Unit 3   Metallography and phase
          equilibrium laboratory   S1 T3**

Determination of equilibrium phase diagrams. Solidification processes in moulds. Metallography of non-ferrous alloys. (Old No. 4.503)

MATS9193   Origin of Microstructure

Unit 2   Diffusion   S1 L1 T1

Fick's first and second laws. Solutions for short and long times be analytical and numerical methods. Boundary conditions for solid-fluid and solid-solid interfaces. Diffusion couples. Atomic level diffusion theory.

Unit 4   Phase transformations   S2 L2 T1

Solidification: single phase, eutectic and near-eutectic, peritectic. Diffusional transformations: precipitation, ripening, cooperative transformations, TTT and CCT curves. Diffusionless transformations: crystallography, nucleation and growth modes. (Old No. 4.503)

**MATS9323   Mechanical Behaviour of Materials
            (Units 1,2,3)**

Unit 1   Deformation   S1 L2

Atomic and molecular description of deformation. Introduction to dislocation theory and its application to mechanical properties. Chain dynamics under stress.

Unit 2   Fractographic analysis   S2 L1 T1

Classification of macroscopic and microscopic fracture mechanisms. Initiation and propagation of ductile, brittle, fatigue, creep, stress corrosion, and corrosion fatigue fractures. Effect of material defects, design deficiencies and incorrect processing on the origin and cause of fracture. Analysis of various modes of fracture using fractographic techniques involving optical microscopy and scanning and transmission electron microscopy.

**Unit 3   Deformation and strengthening
            mechanisms   S2 L1 T1**

Strengthening mechanisms, creep, fracture, grain size dependence of strength. Introduction to generation of deformation and recrystallization textures. Measurements of age-hardening, activation energy of strain ageing. (Old No. 4.523)

MATS9520   Engineering Materials   S1 L2 T1

Prerequisites: PHYS1919, CHEM1807. Excluded: 5.4222.

Microstructure and structure-property relationships of the main types of engineering materials (metals, polymers, ceramics and composites). Micromechanisms of elastic and plastic deformation. Fracture mechanisms for ductile, brittle, creep, fatigue modes of failure in service; corrosion. Metal forming by casting and wrought processes. Phase equilibria of alloys; microstructural control by thermo-mechanical processing and application to commercial engineering materials. Laboratory and tutorial work includes experiments on cast and recrystallized structures, ferrous and non-ferrous microstructures and fracture and failure analysis.

Medicine

**MDCN8001 Principles of Medicine for   F L1
           Optometry Students**

Prerequisite: Nil. Students normally take the subject in Year 4 of course 3950.

An overview of all aspects of current clinical medical practice. Included are historical, epidemiological, pathophysiological, diagnostic, therapeutic and public health aspects of disease in man and the various clinical categories of practice. (Old No. 71.001)

Mechanical and Manufacturing Engineering

MECH1100 Mechanical Engineering Design 1   S2 L/T3

Co-requisite: MECH1000.

Introduction to hardware. Studies of a range of engineering components, considering: what they do, how they do it, how they were made, the range of possible forms for each item, why each item has its particular form. Design philosophy. Design as the formulation and implementation of practical ways of fulfilling needs, including: recognising the need, generalising the question, considering a range of solutions, selecting a short-list, analysing the selected range, making a final choice. Commercial philosophy. Impetus for design, market competition, significance of innovation, intellectual property, financing, manufacturing, marketing, etc. (Old No. 5.1010)

MECH1400 Mechanics of Solids 1   S1 or S2 L2 T1

Co-requisite: MECH1300.

Stress and strain. Bars under axial loading. Stresses and deformation due to bending. Strain energy. Flexibility and stiffness. Stress and deformation due to torsion. Helical springs. (Old No. 5.421)

MECH1500 Computing 1M   S2 L/T3

Introduction: history, applications, hardware, software, a model of a computer system, editors, operating systems. Program design and development: programming objectives, data structures, algorithms, symbolic names, translation of algorithms, steps in programming, programming style, syntax charts, errors and debugging. Data: data types, declarations, input, output, file control. Programming constructs: arithmetic expressions, assignment, relational and logical expressions, selection, iteration, intrinsic functions, statement functions, subprograms, common communication. Applicants using existing programs: sorting, word processing, graphics and plotting, simultaneous linear algebraic equations. (Old No. 5.5010)

MECH2300   Engineering Mechanics 2A   S1 or S2 L2 T1

Prerequisites: PHYS1002 or PHYS1919, MECH1300, MATH1032 or MATH1042.

Kinetics of systems of particles; plane steady mass flow. Plane kinematics and kinetics of rigid bodies: moment of inertia; motion relative to translating and rotating frames of reference, equations of motion; work and energy, impulse and momentum. Virtual work for static and dynamic systems. Kinematics and kinetics of simple mechanisms. (Old No. 5.3021)

MECH2310   Engineering Mechanics 2B   S1 or S2 L/T2

Co-requisite: MECH2300.

Differential equations of motion. Transverse vibrations of beams. Whirling of shafts. Single degree-of-freedom systems; free, forced, undamped and damped vibrations. Transmissibility. (Old No. 5.3022)

MECH2400   Mechanics of Solids 2   F L1.5 T2

Prerequisites: MECH1400, MATH1032, MATH1042.

Mechanical properties of materials: tensile and compressive behaviour; hardness; testing machines. Analysis of stress and strain at a point (2D, 3D, Mohr's Circles); generalized Hooke's Law; modulus of rigidity; bulk modulus; interdependence of elastic moduli; strain energy (total, volumetric and distortion); yeild criteria; combined loads in beams; fatigue, stress concentrations, Miner's Rule; membrane stresses; bending of composite beams; bending and unsymetrical beams; direct shear stresses in beams, shear centre; elastic and inelastic buckling of columns. (Old No. 5.4221)

MECH2600   Fluid Mechanics 1   F L1 T1

Prerequisites: PHYS1002 or 1.951, MECH1300, MATH1042 or MATH1042. Co-requisite: MECH2300.

Units. Fluid properties; fluid statics. Flow fields; unsteady and compressible flow. Bernoulli's equation. Momentum equations. Ideal flow. Flow measurement. Dimensional analysis: similitude; dimensionless numbers; methods of analysis. Steady one dimensional flow in ducts: laminar and turbulent; pressure loss; friction factor; losses in bends and fittings. Elementary boundary layer flow; skin friction and drag. Pups and turbines. (Old No. 5.620)

MECH2700   Thermodynamics 1   F L1 T1

Prerequisites: PHYS1002 or 1.951, MECH1300, MATH1032 or MATH1042.

Work, energy, power. Units. Systems, states and processes. Control mass and volume. Fluid properties: extensive; intensive. Equation of state. Tables of properties. First law of themodynamics. Non-flow processes: reversible; irreversible. Flow processes: energy equation; enthalpy. Ideal processes and cycles. Reversibility. The second law of thermodynamics. Entropy. Isentropic processes. Cycles for engines and heat pumps. Energy conversion efficiency. Reciprocating pumps; compressors; engines. Energy analysis; P-V diagrams. Heat transfer. (Old No. 5.626)

Microbiology and Immunology

Level II Subjects

MICR2201   Introductory Microbiology   S1 L2 T4
Prerequisites: Nil.

An optional unit for students enrolled in courses of the Faculties of Applied Science, Arts, Engineering, Law and Science. It is not available for those who wish to major in any of the science programs offered by the Schools of Biochemistry, Biological Science or Microbiology and Immunology; nor for students enrolled in the Food Technology courses in the Faculty of Applied Science. It is an introduction to the science of Microbiology and does not require any previous knowledge of biology; bridging instruction is given in the first week of the course for students in this category.

The general nature, occurrence and importance of microorganisms; a systematic review of the eukaryotic protista (microalgae, protozoa and fungi), prokaryotic protista (bacteria) and viruses. Relationships between micro organisms and their environment; their impact on man through medical, industrial and environmental applications. Methods for handling bacteria and other micro-organisms; initial training in scientific method through designing and reporting experiments. (Old No. 44.101)

MICR2011   Microbiology 1   S2 L2 T4
Prerequisite: BIOS2011. Co-requisites: BIOC2312 and BIOS2021. Excluded: MICR2201.

This subject is mandatory for students wishing to major in program 4400 Microbiology and Immunology, it is also offered as a single unit elective. Material presented in the prerequsite unit is taken as "assumed knowledge". An essential component of this course is training in scientific methods, particularly designing and reporting experiments and use of the scientific literature.

The general nature, occurrence and structure of bacteria, fungi, viruses, micro-algae and protozoa; methods for laboratory study of these organisms. Principles and applications of modern bacterial taxonomic techniques, characteristics and behaviour of selected groups of bacteria. Bacterial growth in batch and continuous culture; biosynthetic and bioenergetic mechanisms of bacteria and eukaryotic protista. Interactions of micro-organisms with their environments. (Old No. 44.121)

Level III Subjects

MICR3011   Microbiology 2   S1 L2 T4
Prerequisites: BIOS2011, BIOS2021, BIOC2312, MICR2011.

This unit is suitable for students majoring in Microbiology, Biochemistry or Biotechnology; it extends material covered in the Microbiology I unit with particular emphasis on bacterial physiology and groups of medically and environmentally significant micro-organisms. Major topics include structure and function of bacterial cell envelopes, membrane transport and secretion mechanisms, bacterial motility, chemotaxis and

adhesion, antibacterial agents and resistance, environmental effects on bacterial behaviour, continuous culture growth, viruses and bacterial plasmids. **(Old No. 44.102)**

MICR3021   Microbial Genetics   S1 L2 T4

Prerequisites: BIOS2011, BIOS2021, BIOC2312 and MICR2011. Excluded: BIOT3031.

This unit is suitable for students majoring in Microbiology, Biochemistry, Biotechnology or Genetics. It is presented conjointly by the School of Microbiology and Immunology and the Department of Biotechnology and covers a wide range of topics in microbial genetics including plasmids and transposable genetic elements, gene transfer, mutagenesis and DNA repair, bacterial mutants, bacteriophage genetics, gene cloning, recombinant DNA techniques (genetic engineering) and genetics of nitrogen fixation. It also includes an introduction to the genetics of eucaryotic micro-organisms. **(Old No. 44.152)**

MICR3031   Applied Mycology   S1 L2 T4

Prerequisites: MICR2201 or MICR2011 or MICR2218.

The balanced structure of this unit makes it suitable for students majoring in Microbiology, Botany or Biotechnology. It is also suitable for students who wish to broaden their knowledge and skills in mycology beyond those obtained in second level introductory Microbiology courses or equivalent units at other institutions. The course is also appropriate as an elective for Food Technology students in third level.

The course is essentially an introduction to the applications and economic importance of fungi to people and the environment. It includes details of the growth and ecology of fungi, the use of fungi as food and fodder, in food and beverage fermentations and in the production of useful chemical products. The medical uses of fungal products including drugs, antibiotics and hallucinogens are discussed. Some aspects of the poisonous and mycotoxigenic fungi, fungi as superficial and systemic animal pathogens, fungal biodeterioration and biodegradation of organic matter and interaction of fungi with other organisms are covered. Means of controlling fungal growth by chemicals are also included in the discussions. **(Old No. 44.172)**

MICR3041   Immunology I   S1 L2 T4

Prerequisites: BIOC2312.

This course covers basic immunology and immunological techniques. The interdisciplinary nature of the subject makes this unit suitable for students taking any major program in biological science who require a background training in immunology. The course includes innate and adaptive immunity, development of the immune system, induction and expression of the immune response, structure and function of antibodies, *in vitro* and *in vivo* antigen-antibody reactions, the major histocompatibility complex and aspects of immunology in disease. **(Old No. 44.122)**

MICR3051   Immunology 2   S2 L2 T4

Prerequisite: MICR3041.

This course considers the discipline of immunology at a more advanced level and will emphasize the mechanisms of immune reactivity. The unit is appropriate for students in all areas of biological and biomedical science who wish to gain a working knowledge of modern immunology.

The immune system is covered under the following headings; antigen epitope analysis, processing and presentation, lymphocyte biology, immunogenetics of the molecules of recognition, cytokines, immune regulation, the mucosal immune system, immunity to infectious diseases, vaccine development and clinical immunology. Tutorial sessions will include discussions of the immunological literature and laboratory classes will involve an experimental project.

MICR3061   Animal Virology   S2 L2 T4

Prerequisites: MICR2011.

This unit concerns viruses which are important to man and other animals. It is suitable for students with special interests in medical microbiology who require a grounding in human virology. It is also of value to students wishing to broaden their knowledge of the important role which viruses play in human society.

The course covers virus structure and classification and provides some experience of the biological and physical techniques employed in virology laboratories. The methods used by viruses for replication are discussed, with particular emphasis on their behaviour at the cellular level. A number of human diseases caused by viruses are discussed in the contexts of the mechanisms used to produce diseases and the associated virus-host interactions of various types, the persistence, transfer and control of virus infections in communities and aspects of laboratory diagnosis of virus diseases. The course also discusses new trends in virology with emphasis on research aspects. **(Old No. 44.132)**

MICR3071   Environmental Microbiology   S2 L2 T4

Prerequisites: MICR2201 or MICR2011.

This unit is suitable for students majoring in Microbiology, Ecology and Marine Science (Biological Oceanography) together with other students wishing to broaden their knowledge of the important role played by micro-organisms in environmental processes.

The course covers the complexity of natural habitats and recognition of organisms in these habitats, interactions of micro-organisms with their environment at the level of individuals and populations along with evolution and adaptation. Methods for environmental monitoring in aquatic and soil habitats are discussed. Manipulation of microbial populations in natural habitats, including problems associated with the release of genetically engineered micro-organisms are considered in some detail. **(Old No. 44.142)**

MICR3081   Medical Bacteriology   S2 L2 T4

Prerequisites: MICR2011, MICR3011.

The aim of this course is to provide an appreciation of the mechanisms whereby bacteria cause disease. Selected groups of bacteria will be studied in detail emphasising strategies which the micro-organisms have adopted to overcome host defence mechanisms. Special emphasis will be given to the processes of research that have led to the understanding of microbial pathogenesis and the means of intervention, ie. immunisation, treatment and epidemiology. The focus of the practical classes will be to further develop the

student's skills in handling bacteria and in identification methods used in a routine diagnostic laboratory. **(Old No. 44.162)**

Level IV Subjects

MICR4013/MICR4023   Microbiology 4 (Honours)

Advanced training in selected areas of microbiology and immunology, **1.** a formal component consisting of seminars, tutorials, introductory electron microscopy and written assignments, **2.** a supervised research program in a specific area of microbiology or immunology. **(Old No. 44.103)**

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subjects see the Faculty of Medicine and Faculty of Applied Science Handbooks.

MICR2218   Microbiology

This course is solely for students enrolled in the Food Technology BSc courses 3060 and 3070 in the Faculty of Applied Sciences. **(Old No. 44.141)**

MICR3228   Microbiology for Medical Students (Old No. 44.211)

Optometry

OPTM9012   Physical and Geometrical Optics   S2 L4 T2
Prerequisite: Nil.

Physical Optics: History of Optics, wave nature. The nature of light, interference, diffraction, polarisation. Geometrical Optics: Reflection, refraction, thin lenses, lens systems, thick lenses, optical instruments.

OPTM9013   Visual Optics   S2 L2 T2
Prerequisite: Nil.

Optical systems of the eye: schematic eye, reduced eye, emmetropia, spherical ametropia, astigmatic ametropia, correction of ametropia, elementary magnification effects, aphakia. Accommodation, presbyopia, correction of presbyopia. Accommodation and convergence. Aberrations of the eye, phorias, measurement of phorias. Modulation transfer function Gradient index optics.

OPTM9014   Measurement of Light and Colour   S2 L1 T1
Prerequisites: Nil.

Sources of radiant energy, detection and measurement of radiant energy. Distribution temperature. Colour temperature. The eye as a photoreceptor. Luminous energy. Relative luminous efficacy. Photometric measures and units. Reflection and transmission of light. Spectrophotometry. Colour mixture.

Colorimetric equations. Grassman's Laws. Geometrical representation of colour. Transformation of primaries. CIE System. CIE Standard Observers. Uniform colour space. Colour differences. Colour rendering. Correlated colour temperature. Colour order systems.

OPTM9015   Clinical Optometry 1   S2 L2 T4
Prerequisites: Nil.

Lectures and practical assignments in visual acuity, keratometry, auto-refraction, visual fields, tonometry and colour vision, frame selection, facial fitting, insertion and removal of contact lenses.

OPTM9016   Dispensing   S2 T2
Prerequisite: Nil.

Mechanical optics and opical dispensing. Practical assignments in spectacle frame measurements, frame materials, basic focimetry, basic lens layout, lens glazing, frame adjustments.

OPTM9021   Anatomy and   S1 L4 T2 S2 L5 T2
                Physiology of
                Eye and Visual System
Prerequisites: BIOS1011, BIOS1021. Co-requisite: 73.011, PHPH2011.

Histology, anatomy and embryology of the eye and associated structures: Fibrous, vascular and neural tunics of the eye. The eyelids and lacrimal apparatus. Blood supply and innervation of these tissues. Visual pathways and gross anatomy of the brain. Functional architecture of the visual pathways. Pathways involved in ocular motility. Elementary embryology of the eye and associated structures. Developmental abnormalities of the eye. Internal and external examination of the eye using clinical techniques. *Vegetative physiology of the eye:* Corneal function: Transparency and thickness related to hydration. Ionic bases of corneal hydration; corneal metabolism and biochemistry. Epithelial electrophysiology. Control of intraocular pressure. Mechanisms of production and drainage of aqueous humour. Physiology of the crystalline lens. Electropotentials. Lens biochemistry and the basis of cataract formation. Autonomic reflexes: Pupil size and retinal illumination. Accommodation and the synkinetic near response. Blinking. Physiology of the lacrimal apparatus. Introduction to clinical techniques for evaluation of ocular function *Physiology of vision:* Photochemistry, Pigment bleaching and regeneration in rods and cones. Psychophysics and physiology of adaptation. Physiology, psychophysics and perception of colour. Visual eletrophysiology. Theories of parallel and hierarchical processing of visual information. Perception of spatial and temporal modulation of retinal illuminance. Ocular motility. Binocular vision, fusion and stereopsis. Introduction of issues of interest in current visual science. Visual perception: Perception of form. Space perception. Visual illusions. **(Old No. 31.821)**

OPTM9041   Clinical Optometry   F L1 T1.5
Prerequisites: OPTM9031, OPTM9032, OPTM9033, OPTM9064.

Students are required to examine patients in the Optometry Clinic, to diagnose their problems and to prescribe optical aids, orthoptic treatment or other management or referral as required. They also work in special clinics, including orthoptics, colour vision, low vision, children's vision and contact lenses, and participate in patient review clinics. **(Old No. 31.841)**

OPTM9023 Optics   S1 L4 T4 S2 L1 T3

Prerequisites: PHYS1002 or PHYS1022, MATH1032 or MATH1011 and MATH1021 or MATH1042.

Physical optics: extension of Physics I content on the nature of light, interference, diffraction, polarisation. Geometrical optics: reflection, refraction, thin lenses, lens systems, thick lenses, optical instruments. *Mechanical optics and optical dispensing:* manufacture and properties of spectacle lens materials. 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. **(Old No. 31.851)**

OPTM9023 Visual Optics   S1 L1 T1 S2 L2 T1

Prerequisites: PHYS1002 or PHYS1022, MATH1032 or MATH1011 and MATH1021 or MATH1042.

Optical systems of the eye: schematic eye, reduced eye, emmetropia, spherical ametropia, astigmatic ametropia, correction of ametropia, elementary magnification effects, aphakia. Accommodation, presbyopia, correction of presbyopia. Accommodation and convergence. Aberrations of the eye phorias, measurement of phorias. Modulation transfer function Gradient Index optics. **(Old No. 31.852)**

OPTM9024 Measurement of Light and Colour   S2 L1 T1

Prerequisite: Nil.

Sources of radiant energy, detection and measurement of radiant energy. Distribution temperature. Colour temperature. The eye as a photoreceptor. Luminous energy. Relative luminous efficacy. Photometric measures and units. Reflection and transmission of light. Spectrophotometry. Colour mixture. Colorimetric equations. Grassman's Laws. Geometrical representation of colour. Transformation of primaries. CIE System. CIE Standard Observers. Uniform colour space. Colour differences. Colour rendering. Correlated colour temperature. Colour order systems. **(Old No. 31.853)**

OPTM9031 Optometry A   F L5.5 T0.5

Prerequisites: OPTM9021, OPTM9022, OPTM9023, OPTM9024.

Refraction: theory and practice of keratometry, measurement of vision and visual acuity, aetiology and treatment of ametropia, objective and subjective refraction, prescribing special visual aids. Binocular vision; sensory and motor fusion; retinal correspondence; the horopter; stereopsis. *Orthoptics* convergence/accommodation anomalies, strabismus, amblyopia. *Contact lenses:* corneal anatomy and physiology, contact lens design and manufacture, fitting techniques, care and maintenance. Low vision: examination of the low vision patient, selection of aids. **(Old No. 31.861)**

OPTM9032 Diagnosis and Management   F L5 T
of Ocular Disease

Prerequisite: OPTM9021.

Microbiology: cell structure, genetics, metabolism and classification of microbes. Special environments. Host-parasite relations. Introductory chemotherapy and immunology. Pathogenic micro-organisms and parasites. Viruses. *Pathology:* acute inflammation, chronic inflammation, repair, regeneration, haemorrhage, thrombosis, embolism, ischaemia, infraction, hyperplasia, hypertophy, atrophy, metaplasia, neoplasia, carcinogenesis. *Diseases of the eye:*

aetiology, pathology, diagnosis, prognosis and management of diseases of the eyelids, cornea, conjunctiva, iris, ciliary body, choroid, retina, optic nerve, lacrimal apparatus, sclera, orbit, lens and vitreous. Glaucoma. Lesions of the visual pathways. Ocular manifestations of systemic disease. *Diagnostic examination:* history taking and symptomatology, internal and external examination, ophthalmoscopy, slit-lamp biomicroscopy, tonometry, gonioscopy, visual field examination, colour vision tests. **(Old No. 31.862)**

OPTM9033 Theory of Spectacle Lenses   F L1
and Optical Instruments

Prerequisite: OPTM9022, OPTM9023.

Advanced geometrical optics and spectacle lens design. Aberrations and their control. The elements of telescopes, microscopes and other optical systems used especially in clinical practice. **(Old No. 31.863)**

OPTM9034 Clinical Methods   F T5

Prerequisites: OPTM9021, OPTM9022, OPTM9023, OPTM9024. Co-requisites: OPTM9031, OPTM9032.

Practical assignments in ophthalmoloscopy, biomicroscopy, tonometry, gonioscopy, visual fields, colour vision tests, refraction, assessment of binocular vision, strabismus, contact lens fitting. **(Old No. 31.864)**

OPTM9042 Optometry B   F L6

Prerequisites: OPTM9031, OPTM9032, OPTM9033, OPTM9034.

Public health optometry: visual task analysis, visual standards vision screening. Industrial hazards; identification assessment and prescription of protective measures. Ergonomics and visual ergonomics. Illuminating engineering. Fatigue and visual fatigue. Epidemiology. *Contact lenses:* materials. Fitting. Residual astigmatism. Care, maintainance and solutions. Continuing patient care. Extended wear and special applications. *Pharmacology and drugs used in refraction:* classification. Pharmaceutical aspects: administration, absorption, elimination, accumulation, sterilisation. Preservatives. Chemotherapy. Toxicity. Ocular drugs and complications. Mydriatics, Miotics, Cyclopiegics, Anaesthetics. Staining agents and contact lens solutions. *Paediatric optometry:* visual and perceptual maturation. Juvenile ocular pathology. Clinical procedures. Vision screening. *Colour vision:* normal and abnormal. Features and mechanisms. Genetics. Advanced *Physiological optics and optometry:* current issues and research. *History of optometry:* development of optics, optometry and ophthalmology. *Legal aspects of optometry.* Projects. **(Old No. 31.871)**

Pathology

PATH3201 Basic and Applied Pathology   F L2 T1

Prerequisites: ANAT2211, ANAT2111, PHPH2112 or equivalent.

Lectures and practical class demonstrations. Includes exposition of the basic classification of pathological processes, study of the processes of cell and tissue degeneration, acute and chronic inflammation, vascular disease, including thrombosis, embolism, ischaemia and infarction. Coverage of

the processes of healing and regeneration with specific reference to healing of skin wounds and the healing of fractures. Aberrations of cell growth used to introduce the subject of neoplasia and carcinogenesis. Exposure to examples of specific disease entities of general practical importance exemplifying the basic or fundamental processes such as appendicitis, pneumonia, arthritis, pulmonary and myocardial infarction as well as lung, alimentary and cerebral tumours. Correlation of pathological processes with development of specific clinical syndromes. **(Old No. 72.301)**

Philosophy

Philosophy is a wide-ranging discipline, catering for a great diversity of interests, for instance, in science, reasoning, persons, and social issues, and encouraging critical and imaginative thought about the foundations of other subjects. Apart from providing considerable choices for students majoring in Philosophy, the diversity of Upper Level subjects makes it possible for students majoring in other disciplines to select subjects complementing their main interest.

First Enrolment in Philosophy

There are two Level I subjects:
PHIL1006   Introductory Philosophy A (Session 1)
PHIL1007   Introductory Philosophy B (Session 2)

Each of these has 1-unit value. They can be taken separately, and a student can gain Upper Level status in Philosophy quality to enrol in Upper Level subjects by passing in only one. However, students enrolling in one will normally enrol in both, and students wishing to major in Philosophy must do so.

Value of Upper Level Subjects in Philosophy

All upper level subjects are full units.

Specialization in Philosophy

Students majoring in Philosophy must complete, in addition to PHIL1006 and PHIL1007 (Introductory Philosophy A and Introductory Philosophy B), the equivalent of six full-point Upper Level (II/III) units. Of these, at least four units must be chosen from List A, which includes subjects in Logic, Philosophy of Mind, Philosophy of Science, and areas of History of Philosophy relevant to those subject areas. Students normally take the equivalent of two Level II/III units in Year 2, and the equivalent of four Level II/III units in Year 3. **(Old No. 48.403)**

List A

PHIL2106	Logic
PHIL2216	Human Nature and Human Understanding: the Empiricist Approach
PHIL2206	Contemporary Philosophy of Mind
PHIL2207	Issues in the Philosophy of Psychology
PHIL2108	Ways of Reasoning
PHIL2308	Reason and the Passions: Descartes, Spinoza and Hume
PHIL2218	Philosophical Foundations of Artificial Intelligence

PHIL2217	Personal Identity
PHIL2107	Advanced Philosophy of Science
PHIL3106	Pre-Honours Seminar

The remaining two units are to be chosen from other Upper Level Philosophy subjects in Table 1 or EURO2400 in Table CHEM

Level II/III

Some Upper Level subjects deal with particular philosophical topics; others can be taken in sequence to give more sustained treatments of larger areas. Students may select freely among these, subject to stipulations regarding prerequisites. They are welcome to seek advice and further information from the School.

In certain circumstances the prerequisites specified for 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.

Honours Entry Requirements

Students intending to proceed to an Honours degree in Philosophy complete years 1-3 of Programs 5200 or 5262 with an overall credit record and some indication of Distinction ability in the philosophy units included in those programs; plus PHIL3106 (Pre-Honours Seminar).

Socratic Society

The Socratic Society is a student-run society associated with the School of Philosophy which meets regularly to promote discussion on topics of philosophical interest.

PHIL1006   Introductory Philosophy A   S1 L2 T1 C6
Stephen Cohen, Phillip Staines, Philip Cam.
Prerequisite: Nil.

An introduction to philosophical thought and issues. Topic areas: the nature of argument; Philosophy of mind; ethics and political philosophy. **(Old No. 52.103)**

PHIL1007   Introductory Philosophy B   S2 L2 T1 C6
Neil Harpley, San MacColl, Stephen Hetherington.
Pre-requisities: Nil.

A further introduction to philosophy through a study of traditional and contemporary discussions of three topic areas: epistimology; perception; science and religion; ideas of utopia. **(Old No. 52.104)**

PHIL2106   Logic   S1 3CCH C6
Prerequisite: Any Level 1 subject.
Excluded: 52.2030 and 52.2031.

This subject is about deductive logic (in particular, propositional logic and predicate logic). The aim will be to constuct - and to understand - a precise, unami=biguous, formal language. Many important parts of English will be translatable into it, hence many arguments of English will be translated into it too. It will be a language with which we can better understand the concept of deductive proof. **(Old No. 52.220)**

**PHIL2107   Advanced Philosophy of   S1 3CCH C6
             Science**

Prerequisite: PHIL2106 either HPST2001.

A seminar subject, to which several members of staff from the schools of Philosophy and Science and Technology Studies contribute. Topics include: the role of experiment in science; the cognitive status of theories; explanation; confirmation; intertheoretical reduction; reductionism; models and metaphors; the logic of theory generation; the revival of realism; problems of classification; theories of measurement; order and entrophy; current issues in the philosophy of the physical sciences. **(Old No. 52.304)**

PHIL2108   Ways of Reasoning   S2 3CCH C6

Prerequisite: Any Level 1 subject. Excluded: 52.233.

The material for this subject will be drawn from everyday sources, such as newspapers, books and advertisements, and including television. It will deal with the nature of argument, fallacies, reasoning and the role of reasoning. From studying the structure of arguments students will be able to improve their critical skills and the presentation of their own arguments. **(Old No. 52.2010)**

**PHIL2206   Contemporary Philosophy   S1 3CCH C6
             of Mind**

Philip Cam

Prerequisite: Upper Level status in Philosophy. Excluded: 52.2002.

The subject is an introduction to some major issues in the field. There are four topics with lectures and tutorials as follows: (1) On relating the Mental to the Physical: The Theory of Intentional Systems (6 lectures, 3 tutorials); (2) Alternative Approaches to the Psychology of Belief and Desire (6 lectures and 3 tutorials); (3) The Psychology of Experience and Consciousness (8 lectures, 4 tutorials); and (4) Mechanism, Freedom and Responsibility (4 lectures, 2 tutorials). **(Old No. 52.250)**

**PHIL2207   Issues in the Philosophy   S2 3CCH C6
             of Psychology**

Philip Cam

Prerequisite: Either PHIL2206, 52.250 or PSYC1002. Excluded: 52.2003.

Philosophical issues in theoretical psychology, drawn from philosophical and psychological writings on personal identity, consciousness, intentionality, perception, mental imagery, psychology and the brain sciences, psychology and artificial intelligence. **(Old No. 52.251)**

PHIL2208   Epistemology (Scepticism)   S1 3CCH C6

Stephen Hetherington

Prerequisite: Upper Level status in Philosophy.

All of us acknowledge that there are things we do not know. But such humility can turn into perplexity when we encounter epistemological sceptics. A sceptic typically denies us either vast amounts of knowledge or justification of some select, but extremely everyday, sorts of apparent knowledge or justification. In short, sceptics argue for surprising denials of knowledge or justification. This subject examines some prominent sceptical arguments - one of less, and ones of more, recent vintage. They will attack knowledge of, or justified belief in, such areas as these: the external world, the unobserved, linguistic meaning, everything.

**PHIL2209   Epistomology: Belief and   3CCH C6
             Knowledge**

Prerequisite: Upper Level status in Philosophy.

Not offered in 1991.

**PHIL2216   Human Nature and Human   S1 3CCH C6
             Understanding:
             The Empiricist Approach**

*Prerequisite: Upper Level status in Philosophy.
Excluded: 52.2130, 52.2170.*

Neil Harpley

Not offered in 1991.

The traditional empiricists Locke, Berkeley, and Hume developed a substantial framework for theories concerning human nature and particularly for the consideration of issues arising in the attempt to explain our perception and knowledge of the world. The empiricist approach to these matters was revivified and became dominant in the first half of this century. Notable figures in recent empiricism include Russell and Quine and the leaders of the Logical Positivist movement. The course will involve a study of the major concerns of traditional and modern empiricists.

Assessment: Exercises and essays or examination. **(Old No. 52.231)**

**PHIL2218   Philosphical   S1 3CCH C6
             Foundations of Artificial
             Intelligence**

Phillip Staines

Prerequiste: Upper Level status in Philosophy. Excluded: 52.2026.

An examination of the assumptions, achievements and prospects for artificial intelligence through consideration of problems in understanding and designing natural and artificial minds. Some of the design requirements for building intelligent systems are discussed, as is the nature and scope of computation and its role in artificial intelligence. Some work on artificial intelligence has been described as 'philosophical explication turned into computer programs'. The idea that it can make a direct contribution to philosophy will be explored. **(Old No. 52.2026)**

**PHIL2308   Reason and the Passions: S2 3CCH C6
             Descartes, Spinoza and Hume**

Genevieve Lloyd

Prerequisite: Upper Level status in Philosophy. Excluded: 52.2021, 52.2024.

Not offered in 1991.

Philosophical distinctions between reason and the passions, and the role that philosophers have given or denied reason in understanding and controlling the passions. The reason-passion distinction will be discussed in relation to other distinctions between mind and body, theoretical and practical reason, interests and passions, male and female; and also in relation to contemporary attitudes to rationality.

Assessment: To be decided in consultation with students. (Old No. 52.215)

PHIL2309   The Heritage of Hegel   S1 3CCH C6
Lisabeth During

Prerequisite: Upper Level status in Philosophy.

Not offered in 1991.

Many of the ruling ideas of contemporary European philosophy were first given form by Hegel. These include: the constitution of subjectivity; the problem of reflection; the possibility of a dialectical reasoning; the role of negativity; and the relationship of philosophy to history. Beginning with a close reading of the Preface and Introduction to the *Phenomenology of Spirit*, we will examine responses to Hegel in theorists ranging from Gadamer to Derrida. **(Old No. 52.221)**

PHIL2407   Culture and Critique: S1 3CCH C6
Trends in Contemporary
European Philosphy
Lisabeth During

Prerequisite: Upper Level status in Philosophy. Excluded: 60.014.

Not offered in 1991.

A study of influential texts of 20th century European philosophy, which finds its rationale in a project which is common to contemporary French and German theory: rethinking philosophy as Cultural Criticism. Authors to be discussed include Freud, Nietzsche, Benjamin, Adorno. Horkheimer, Marcuse, Blich, Mauss, Bataille, Artaud, Foucault, Deleuze, Dristeva and Derrida. **(Old No. 60.014)**

PHIL2409   Speaking through the   S1 3CCH C6
Body: Feminism,
Psychoanalysis, Literature
Lisabeth During

Prerequisite: Upper Level status in Philosophy.

Explores the metaphorical relation between femininity and language in recent French philosopy. Topics discussed include; femininity, transgression and jouissance; transvestitism and gender ambivalence; Woman versus Truth; and Kristeva's treatment of the 'maternal' and the 'hysteric' woman. Readings will be taken from the work of Freud, Lacan, Marguerite Duras, Irigaray, Deleuze and Guattari, Djuna, Barnes, Nietzsche, Virginia Woolf and Kristeva.

PHIL2506   Classical Political Philosophy   S1 3CCH C6
Stephen Cohen

Prerequisite: Upper Level status in Philosophy. Excluded: 52.2050, 52.203, 52.213.

Examination of the work of some central figures in the history of political philosophy, with regard to the basis of political society, its various functions, and its relation to the individuals in it. Topics include the idea of a state of nature, theory of a social contract, the establishment of political rights and obligations, and the relation of moral and political concerns within a political society.

Assessment: Essays and an examination. **(Old No. 52.240)**

PHIL2507   The Ethics of Plato and   S1 3CCH C6
Aristotle
Stephen Cohen

Prerequisite: Upper Level status in Philosophy. Excluded: 52.523, 52. 2220, 52.5231.

Not offered in 1991.

A Systematic investigation of the moral theories of Plato and Aristotle, and some discussion of the difference between the appracches, concerns, and general aims of classical Greek ethics compared with more modern moral theorising. Beginning with the apparently immoral and subsequent amoral position of Thrasymachus and his question in Book 1 of the 'The Republic', "Why should I be just?", the subject investigates 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 solutions to these problems, and their positive moral theories. **(Old No. 52.242)**

PHIL2508   Theories in Moral Philosophy   S2 3CCH C6
Stephen Cohen

Prerequisite: Upper Level status in Philosophy. Excluded: 52.2230, 52.523, 52.5232.

Examination of three moral theories central in the history and development of moral philosophy. Hume, Kant, and Mill offer different kinds of moral theories, differing approaches to arriving at a moral theory, and specific theories which are markedly different from each other. Each moral theory is investigated in itself and in comparison with the other two.

Assessment: Essays and an examination. **(Old No. 52.243)**

PHIL2509   Philosophy of Law   S2 3CCH C6
Stephen Cohen

Prerequisite: Upper Level status in Philosophy. Excluded 52.2150, 52.105.

Selected conceptual and normative issues in the philosophy of law, centring around the broad areas of law eg, its nature, validity, bindingness, and relation to morality, liberty, justice, responsibility (including strict, vicarious and collective liability), and punishment.

Assessment: Essays, and an examination. **(Old No. 52.241)**

PHIL2516   Philosophical Foundations of   S2 L3 C6
Marx's Thought

Prerequisite: Upper Level status in Philosophy. Excluded 52.373.

May not be offered in 1991.

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

Assessment: Exercises and essays. **(Old No. 52.219)**

PHIL2606   Aesthetics   S1 3CCH C6

Prerequisite: Upper Level status in Philosophy. Excluded: 52.273.

In this subject, emphasis will be placed on the visual arts, although it will also deal with leterature and film. Topics will include: subjectivity and objectivity in aesthetics; with special reference to Kant; concepts of tradition and genre; concepts of representation and 'expression'. The subject will also address issues of the modern and post-modern. It will include a case study, discussing the history of the female nude in European painting.

Assessment: Exercises or essay and examination. **(Old No. 52.2260)**

PHIL2607   Philosophy and Literature   S2 3CCH C6

Prerequiste: Upper Level status in Philosophy.

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

PHIL2706   Seminar A   S1 3CCH C6

Admission by permission, based on a student's performance in Upper Level subjects. Topics vary and are influenced by student requests.

Assessment: Essay. **(Old No. 52.2980)**

PHIL2707   Seminar B   S2 3CCH C6

As for PHIL2706 Seminar A. **(Old No. 52.3010)**

PHIL2708   Reading Option   S1 or S2 3CCH C6

Students wishing to do work in an area not covered by an existing subject or seminar may apply to the School to take a reading option. Not more than one such subject may be counted towards a degree. Approval of a program for a reading option depends on its suitability and on the availability of a member of staff to undertake supervision. **(Old No. 52.2990)**

PHIL3106   Pre-Honours Seminar   S2 3CCH C6

Prerequisites: 30 credit points in Philosophy with overall standard of Credit or higher.

A subject for students intending to take Honours in Philosophy; designed to form skills in philosophical research and writing through seminar discussion of readings illustrating a range of philosophical approaches, styles and techniques. **(Old No. 52.395)**

PHIL4000   Philosophy Honours (Research)   F T4

Prerequisite: In addition to general Faculty requirements, admission is subject to completion of a qualifying program containing at least 54 credit points in Philosophy, consisting of 6 or 12 credit points at Level 1 and the remaining points at Upper Level, including PHIL3106 (Pre-Honours Seminar), completed with a good overall credit record and with indication of ability at Distinction level or better. Students who will have completed only 52 credit points are encouraged to seek the approval of the School for admission.

The Honours Year consists of writing a research thesis under supervision and two seminar courses. **(Old No. 52.4000)**

Physiology and Pharmacology

**PHPH2111   Principles of Physiology   F L2 T4
(Optometry)**

Prerequisites: As for Physiology 1, except that CHEM1113 may be accepted as a co-requisite. Excluded: PHPH2112.

Covers the same general areas of physiology as Physiology 1 but in less detail and with less intensive practical courses. Principles of Physiology is taken only by students in the Optom degree course. **(Old No. 73.011)**

PHPH2112   Physiology 1   F L2 T4

Prerequisites: BIOS1011 & BIOS1021; CHEM1002 or CHEM1101 or CHEM1201; MATH1032 or MATH1042 or MATH1011 and MATH1021. Excluded: PHPH2122. Co-requisite: BIOC2312.

Introduction to fundamental physiological principles, dealing first with basic cellular function in terms of chemical and physical principles, and, second, with the operation of the various specialized systems in the body, for example, the cardiovascular system, whose function it is to transport materials to and from the tissues of the body; the respiratory system which must maintain the exchange of oxygen and carbon dioxide between the atmosphere and the blood; the gastrointestinal system which enables food materials to be modified by digestion and absorbed into the circulation; the kidney which is involved in the regulation of body fluid and electrolyte balance and with the excretion of the waste products of metabolism; the endocrine system which releases chemical messengers, called hormones, that are carried in the blood stream to regulate a great variety of body functions, eg metabolism and reproductive activity; the nervous system which by means of very rapidly propagated electrical impulses is responsible for all our movements, sensations, memories, emotions and consciousness itself. A substantial series of practical class experiments on these different areas of physiology is included in the course. This subject is taken by students enrolled in any of the Physiology program. **(Old No. 73.111)**

PHPH3114   Physiology 2   F L4 T8

Prerequisites: PHPH2112, BIOC2312.

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. **(Old No. 73.012)**

PHPH3121   Membrane Biology   S1 L2 T4

For entry consult Head of School of Physiology and Pharmacology.

The properties of cell membranes including permeation of ions, solutes and water across membranes, generation of

electrical signals in nerve and muscle cells produced by ion movements, and transmission of information between cells. Stress on modern research techniques and on a critical examination of appropriate classical papers. **(Old No. 73.012A)**

PHPH3131   Neurophysiology   S1 L2 T4

For entry consult Head of School of Physiology and Pharmacology.

A detailed study in two broad areas, neural mechanisms in sensation and the control of posture and movement. Includes the regulation of visceral and other autonomic effector structures and the neural substrates and correlates of certain higher functions such as speech, memory and consiousness. Directed towards the experimental analysis of nervous system function, to introduce the techniques and approaches used in neurophysiological research. Sensation: an integrated lecture and experimental course is given on somatic, visual and auditory sensory mechanisms. Laboratory work: students conduct psychophysical experiments to evaluate subjective sensory capabilities. The neural mechanisms underlying these subjective abilities are examined in animals in electrophysiological experiments which involve recording the impulse patterns from individual neurones within the sensory systems. Students are required to analyze the mechanisms employed by the nervous system to code information about specific parameters of sensory stimuli.

Lectures and experiments on motor function are directed towards an understanding of the various reflex and voluntary mechanisms controlling posture and movement. The section dealing with nervous control of visceral function is concerned mainly with regulation of cardiorespiratory activity. **(Old No. 73.012B)**

PHPH3142   Organ Physiology   S2 L4 T8

Prerequisite: Normally as for PHPH3114.

For entry consult Head of School of Physiology and Pharmacology.

An advanced study dealing with major physiological systems of the body and usually includes detailed segments from: the cardiovascular and respiratory systems; endocrines, kidney, fetal physiology, gastrointestinal physiology and exercise physiology. Emphasis on the functions of individual organs as well as the overall operations of particular body systems including their neural control mechanisms. Emphasis on the approaches and techniques involved in physiological research. Students are therefore required to carry out an extensive series of experiments which usually employ mammalian (including human) preparations. **(Old No. 73.012C)**

PHPH3152   Pharmacology   F L2 T4

Prerequisite: PHPH2112 or PHPH3114. Co-requisites: PHPH3114 or BIOC3121 or BIOC3271 or two Level III Chemistry units.

Includes a study of the absorption, distribution and metabolism of drugs, as well as a study of the pharmacology of the autonomic nervous system, the cardiovascular system, the central nervous system, the kidney, the endocrine system and also a study of pharmacokinetics. A practical class program complements the lecture program by demonstrating a variety of basic pharmacological techniques. **(Old No. 73.022)**

Physics

Physics Level I Subjects

PHYS1002   Physics 1   F L3 T3

Prerequisites:	*HSC Exam Score Range Required*
2 unit Mathematics* or	*67-100*
3 unit Mathematics or	*1-50*
4 unit Mathematics	*1-100 or*
and	*(for PHYS.1002 only) 10.021B*
2 unit Science (Physics) or	*57-100*
2 unit Science (Chemistry) or	*60-100*
3 unit Science or	*90-150*
4 unit Science or	*1-50*
PHYS1022	

Co-requisite: MATH1021 or MATH1032

*This refers to the 2 Unit Mathematics subject which is related to the 3 Unit Mathematics subject. It does not refer to the subject 2 Unit Mathematics (Mathematics in Society).

Aims and nature of physics and the study of motion of particles under the influence of mechanical, electrical, magnetic and gravitational forces. Concepts of force, inertial mass, energy, momentum, charge, potential, fields. Application of the conservation principles to solution of problems involving charge, veenergy and momentum. Electrical circuit theory, application of Kirchoff's laws to AC and DC circuits. Uniform circular motion, Kepler's laws and rotational mechanics. Properties of matter: solids, liquids, gases. The wave theories of physics, transfer of energy by waves, properties of waves. Application of wave theories to optical and acoustical phenomena such as interference, diffraction and polarization. **(Old No. 1.001)**

PHYS1002   Physics 1, S2   Elective Syllabus

Those students enrolled in a physics program in the Science Course, and who have achieved a satisfactory performance in Session 1, may elect to take the following option for Session 2.

QUANTUM AND LASER PHYSICS

Waves in elastic media; sound waves; early quantum physics; the laser, operation and applications, interference, diffraction and polarisation.

A.C.CIRCUIT THEORY

Addition of alternating quantities; series circuits, impedance, power, resonance, parallel circuits; ideal transformer.

SOLAR SYSTEM ASTROPHYSICS

Celestial dynamics: Orbits; shape and rotation of planets, planetary rings; tests of relativity; black holes.

The formation of the Sun and Solar System; the structure of the Sun.

Planetary atmospheres. The composition and vertical structure of the atmospheres of Venus, Earth, Mars and the Jovian planets. The greenhouse effect, the ionosphere and magnetosphere.

PHYS1022   Introductory Physics 1   F L3 T3
(For Health and Life Scientists)

Prerequisites: Nil. Co-requisite: MATH1011 and MATH1021 or MATH1032

Principally for students majoring in the life and health sciences disciplines. Topics at an introductory level.

The methods of physics, describing motion, the dynamics of a particle, conservation of energy, kinetic theory of gases, properties of liquids, vibrations and waves, electricity and conduction in solids, ions and ionic conduction, magnetism and electromagnetic induction, alternating current, atomic nature of matter, X-rays, the nucleus and radio-activity, geometrical optics, optical instruments, wave optics, microscopes and their uses. **(Old No. 1.021)**

PHYS1601   Computer Applications in   S1 or S2 L2 T4
Experimental Science 1

Co-requisites: PHYS1002   or   PHYS1022,   MATH1032   or MATH1042 Excluded PHYS1611

Overview of the use of computers in Science for computation and instrumentation; the important role of the microcomputer in instrumentation and its special role in contemporary experimental science.

Integrated lectures and laboratory exercises on binary logic, digital electronic logic. Arithmetic as logic operations on binary variables. Communications on a party-line bus, master and slave elements, the bus structure of a computer. Instruction and instructions sets, machine level operation. Interfaces to the outside world, input/output structures. Interaction schemes between the computer and the outside world. Control and measurement of outside world variables by the computer, analog/digital conversions. **(Old No. 1.061)**

Physics Level II Subjects

PHYS2001   Mechanics, and   S1 L3T1
Computational Physics

Prerequisites: PHYS1002 and MATH1032 or MATH1042 Co-requisite: MATH2100
Excluded PHYS2999.

Harmonic motion, systems of particles, central force problems, Lagrange's equations, coupled oscillations, travelling waves, pulses, energy and momentum transfer, computer operating systems, introduction to FORTRAN, libraries and software packages, use of computers to solve problems in physics. **(Old No. 1.002)**

PHYS2011   Electromagnetism and   S2 L3 T1
Thermal Physics

Prerequisites: PHYS1002, MATH21032. Co-requisite: MATH2100
Excluded ELEC2013, PHYS2999.

Electric field strength and potential, Gauss' law, Poisson's and Laplace's equations, capacitance, dielectrics and polarization, magnetism, electro-magnetic induction, Maxwell's equations, electromagnetic waves. Laws of thermodynamics, kinetic theory, microscopic processes, entropy, solid state defects, Helmholtz and Gibbs functions, Maxwell's relations, phase diagrams, chemical and electrochemical potential. **(Old No. 1.012)**

PHYS2021   Quantum Physics and Relativity   F L1.5 T.5

Prerequisites: PHYS1002, MATH1032.
Excluded PHYS2989.

Special theory of relativity: time dilation, length contraction, simultaneity, Lorentz transformations, energy and mass. Photon properties, de Broglie relations, Uncertainty principle, operators in quantum mechanics, postulates of quantum mechanics, potential wells, steps and barriers, harmonic oscillator, H atom, angular momentum, magnetic moment, electron spin, nuclear spin. Atomic and molecular spectra, lasers, quantum statistics, free electron model of a metal, band theory; nuclear size, density, mass; nuclear models, fission and fusion, nuclear forces. **(Old No. 1.022)**

PHYS2031   Laboratory   F T3

Prerequisites: PHYS1002, MATH1032. Excluded PHYS2920.

Alternating current circuits, complex impedance, resonance, mutual inductance, introductory electronics, diode and characteristics and circuits, power supplies, transistor characteristics, single stage and coupled amplifiers, experiments using AC circuits. Experimental investigations in a choice of areas including radioactivity, spectroscopy, properties of materials, Hall effect, nuclear magnetic resonance, photography, vacuum systems. **(Old No. 1.032)**

PHYS2601   Computer Applications in   S1 L2 T3
Experimental Science 2

Prerequisite: PHYS1601.

Review of microcomputer architecture and operation. Digital logic devices for busses. Analog and digital data collection and signal processing, laboratory interface architecture. Data transfer with implicit and explicit handshakes and protocols, communications. Interaction schemes, programmed, interrupt and direct access. Priority structures. Multi-master systems, arbitration concepts. Peripheral devices and peripheral systems. Microcomputer system concepts and user access, hardware and software aspects. The speed and capacity limitations of computer systems, peripheral techniques and systems that enhance the capacity of the microcomputer peripheral system as a control measurement instrument well beyond the limitations of a computer.

Laboratory exercises and project work. **(Old No. 1.062)**

PHYS2630   Electronics   S2L1T2

Prerequisites: PHYS1002 or PHYS1022 Excluded PHYS2920

Review of AC theory. Transistors, basic circuits, transistor amplifiers, Feedback, Operational amplifiers, basic circuits, intergrators, differentiators, compensation, Power supplies, voltage and current regulators, switching power supplies.

PHYS2920   Electronics   S1 L1 T2

Prerequisites: PHYS1002 or PHYS1022.   Excluded PHYS2031, PHYS2630.

The application of electronics to other disciplines. Includes: principles of circuit theory; amplifiers, their specification and application, transducers; electronic instrumentation; industrial data acquisition. **(Old No. 1.9222)**

PHYS2940 Introduction to Physics of   **S1 L1.5 T1.5**
Measurement

Prerequisite: PHYS1002.

Resolution: accuracy and sensitivity of instruments, errors of observation; experimental design; transducers; thermometry; electrical noise; servo systems, mechanical design of apparatus; optical instruments optical fibres; photometry; calorimetry; analogue to digital conversion and digital instruments; measurement of very large and very small quantities. **(Old No. 1.9422)**

Physics Level III Subjects

PHYS3010 Quantum Mechanics   **S1 L1.5 T.5**

Prerequisites: PHYS2021, MATH2120.

Revision of basic concepts, harmonic oscillator systems, spherically symmetric systems, angular momentum, H atom, first-order perturbation theory, identical particles, Exclusion Principle, atomic structure, spin-orbit coupling, Helium atom, introductory quantum theory of molecules. **(Old No. 1.0133)**

PHYS3021 Statistical Mechanics and   **S1 L3 T1**
Solid State Physics

Prerequisites: PHYS2011, PHYS2021, MATH2120.

Canonical distribution, paramagnetism, Einstein solid, ideal gas, equipartition, grand canonical ensemble, chemical potential, phase equilibria, Fermi and Bose statistics, Bose condensation, blackbody radiation. Crystal structure, bonding, lattice dynamics, phonons, free-electron models of metals, band theory, point defects, dislocations. **(Old No. 1.023)**

PHYS3030 Electromagnetism   **S1 L1.5 T.5**

Prerequisites: PHYS2011, MATH2100, MATH2120.

Electromagnetic fields; Maxwell's equations, Poynting theorem, electromagnetic potentials, electromagnetic waves. Reflection and transmission, Fresnel equations, waveguides, radiation fields, dipoles and antenna theory. **(Old No. 1.0333)**

PHYS3041 Experimental Physics A   **F T4**

Prerequisite: PHYS2031.

Basic experimental techniques and analysis of results in the following areas: electricity, magnetism, diffraction optics including X-ray and electron diffraction, solid state physics, nuclear physics, atomic physics and spectroscopy, vacuum systems. **(Old No. 1.043)**

PHYS3050 Nuclear Physics   **S2 L1.5 T.5**

Co-requisite: PHYS3010.

Nuclear shell model; theory of beta decay; the deuteron, nucleon-nucleon scattering; theories of nuclear reactions, resonances; mesons and strange particles, elementary particle properties and interactions; symmetries and quark models; strong and weak interactions. **(Old No. 1.0143)**

PHYS3060 Advanced Optics   **S2 L1.5 T.5**

Co-requisite: PHYS2001.

Fresnel and Fraunhofer diffraction, Fourier transforms, filtering, coherence length and time, stellar interferometers, laser theory, non-linear optics. **(Old No. 1.0343)**

PHYS3110 Experimental Physics B1   **S1 T4**

Prerequisite: PHYS2031.

Selected experiments and projects. Advanced experimental techniques and open ended projects in the areas covered in PHYS3041 Experimental Physics A together with projects involving electron and nuclear magnetic resonances, low temperature physics and super-conductivity. Fourier optics, holography. **(Old No. 1.0533)**

PHYS3120 Experimental Physics B2   **S2 T4**

Prerequisite: PHYS2031.

As for PHYS3110 Experimental Physics B1. **(Old No. 1.0543)**

PHYS3150 Marine Acoustics   **S2 L1.5 T.5**

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. **(Old No. 1.3533)**

PHYS3160 Astrophysics   **S2 L1.5 T.5**

Prerequisite: PHYS2021.

Stellar radiation, spectra classification. Hertzsprung-Russell diagrams, determination of stellar masses and radii. Equations of stellar structure, energy sources in stars, nuclear reaction cycles energy transport, equations of state, degeneracy, opacity. Properties of main sequence stars, stellar evolution, structure of red giants and white dwarfs. The solar atmosphere. **(Old No. 1.1633)**

PHYS3180 Atmospheric Physics   **S2 L1.5 T.5**

Prerequisites: PHYS1002, PHYS2011 or CHEM2011.

Atmospheric thermodynamics, radiation, dynamics; energy balance, greenhouse effect, climate models and climate change, upper atmosphere physics. **(Old No. 1.1833)**

PHYS3310 Physics of Solid State Devices   **S2 L1.5 T.5**

Prerequisite: PHYS3021.

Review of electronic structure in semiconductors; p-n junctions; bipolar and field effect transistors including formation, characteristics and electrical breakdown. Optical devices including light emitting diodes and junction lasers. Integrated circuit structures. **(Old No. 1.3133)**

PHYS3320 Topics in Condensed Matter   **S2 L1.5 T.5**
Physics

Prerequisite: PHYS3021.

Superconductivity, Meissner-Ochsenfeld effect, entropy, thermodynamics and relevant theories, Josephson junctions. Amorphous materials, preparation, magnetic properties, bandgaps, dangling bonds and ESR, mobility edge, solar cells. Polymers, structure, bonding, relaxation phenomena, electrical breakdown, liquid crystals. **(Old No. 1.3143)**

PHYS3410   Biophysics   S2 L2 T1

Prerequisites: PHYS2011, PHYS2021.

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.   (Old No. 1.1433)

**PHYS3510   Advanced Mechanics, Fields   S1 L1.5 T.5
                    and Chaos**

Prerequisites: PHYS2001, MATH2510, MATH2100.

Lagrange's equations and applications, variational principles, dissipative systems, Hamiltonian formulation, canonical transformations, Poisson brackets, Hamilton-Jacobi equation, continuous systems and fields, stability and chaos.

PHYS3520   Relativistic Electrodynamics   S2 L1.5 T.5

*Prerequisites: PHYS2021, MATH2510, MATH2100, MATH2120.
Co-requisite: PHYS3030.*

Special relativity, covariant formulation of electrodynamics, stress tensor, radiation from moving charges, Lienard-Wiechert potentials, synchrotron radiation, bremsstrahlung, electro-magnetic mass, radiative damping, multipole expansion for fields, scattering. (Old No. 1.5233)

PHYS3530   Advanced Quantum Mechanics   S2 L1.5 T.5

Co-requisite: PHYS3010.

Formal structure, matrix formalism, relativistic quantum mechanics, spin, scattering theory, Born approximation, phase shifts, many particle systems, occupation number formalism. (Old No. 1.1133)

PHYS3550   General Relativity   S2 L1.5 T.5

Prerequisites: PHYS2021, MATH2100, MATH2510.

Relativistic kinematics and dynamics, tensors and tensor operations, Christoffel symbols, formulation of general relativity, curvature of space, geodesics, gravitational field equations, Schwarzschild solution, tests of the theory, astrophysical and cosmological implications.   (Old No. 1.5533)

**PHYS3601   Computer Applications
                    in Instrumentation   S1T5**

Prerequisite: PHYS2601

Review of interface/interaction schemes used between a computer and the outside world. Standard and specialised communication protocols; purpose designed peripheral structures. Special purpose bus architectures. Transducers, instruments and systems.

The procedure for the analysis, design and development of a peripheral system starting from its functional specifications. The preparation and presentation of documentation that defines a system and its operation comprehensively and efficiently.

**PHYS3620   Computer Based Signal   S2L1.5T1.5
                    Processing**

Prerequisites: PHYS2031, MATH2120.Exclusion 6.042

Measurement and Sampling; noise power spectra; signal-to-noise improvement using digital techniques: digital filters, auto- and cross- correlation, methods based on Fourier transformation; system response including transfer functions, convolution, image enhancement.

PHYS3631   Electronics   S1 L2 T4

Prerequisite: PHYS2920 or PHYS2031.

Review of AC theory. Transistors. Operational amplifiers. Voltage regulators, constant current sources, switching power supplies. Field effect transistors, noise and drift. Digital electronics. Frequency dependent networks, active and passive filters, digital filters, oscillators. Communication and storage of information. Analogue-digital conversion. Transducers. (Old No. 1.133)

PHYS3710   Lasers and Applications   S1 L1.5 T.5

Interaction between light and matter, fundamental properties of laser amplifiers and oscillators, giant pulse generation, mode locking and Q switching, specific laser systems including gas lasers and semiconductor lasers, applications of lasers.   (Old No. 1.7113)

**PHYS3760   Laser and Optoelectronics   S2 T4
                    Laboratory**

Prerequisite: PHYS2031.

Aims to make students conversant with the techniques employed in advanced laser technology and to become familiar with the various components used in such applications. Includes: a study of advanced optical techniques including the construction, operation and characterisation of various types of laser; preparation and investigation of optical, electrooptical and other related devices in terms of their basic behaviour and with respect to applications in complex optical systems; safety aspects. (Old No. 1.7613)

Physics Level IV

All Physics honours subjects consist of lecture topics and project work. Some of the lecture topics of which quantum mechanics, statistical mechanics and solid state physics are examples, are taken by all students. Other topics which are considered particularly relevant to the type of honours chosen are also prescribed. The actual list of topics in this second category varies from time to time and is partly influenced by student numbers and interest. Examples of such topics are given below under each honours subject heading. The project work forms a very significant part of each subject. Usually two projects are undertaken during the year of study.

Students whose academic records are satisfactory are invited to enrol in the honours year. Full details of lecture topics and projects are then supplied. The approval of the Head of School is required for each program of study.

PHYS4103/PHYS4113   Physics 4 (Honours)

Examples of specific lecture topics which may be offered include: astronomy, additional topics in solid state physics, lasers, biophysics. (Old No. 1.104)

PHYS4303/PHYS4313 Applied Physics 4 (Honours)

Examples of specific lecture topics which may be offered include: physical principles of instrumentation, applied solid state physics, physics of materials. (Old No. 1.304)

PHYS4403/PHYS4413 Biophysics 4 (Honours)

Biophysics, statistical mechanics and solid state physics are examples of prescribed topics. Additional lecture topics may be selected from those on offer in other Physics honours subjects and from Biochemistry and Physiology. (Old No. 1.604)

PHYS4503/PHYS4513 Theoretical Physics 4 Honours

Examples of specific lecture topics which may be offered include: quantum theory of solids, plasma theory, quantum electrodynamics. (Old No. 1.504)

Servicing Subjects

These are mainly subjects taught within courses offered by other faculties.

For further information regarding the following subjects see the relevant Faculty Handbooks.

PHYS1909 Astronomy S1 or S2 L2 T2

Involves an overview of Astronomy, from the solar system to the galaxies. Includes an exploration of the solar system, to indicate the advances that have been made, particularly and most recently with space probes, in our understanding of planetary systems. The characteristics of stars discussed along with their use in establishing an understanding of stellar evolution. The treatment of galaxies includes consideration of the nature of our galaxy and its relation to other external systems, concluding with a brief discussion of aspects of observational cosmology. Discussion of such recent topics as black holes, pulsars, quasars. (Old No. 1.901)

PHYS1919 Physics 1 (Mechanical Engineering) F L2 T2

Prerequisites: As for PHYS1002 Physics 1.

For students in the School of Mechanical and Industrial Engineering.

Rotational mechanics. Mechanics of intermolecular systems. Atomic structure of solids; forces and defects. Plasticity of solids. Fracture of solids. Thermal properties of solids, liquids and gases. Wave motion, including acoustics. Optics: geometrical optics, optical instruments, interference and diffraction, polarisation, laser light. Electromagnetism: magnetic forces and fields, electromagnetic induction. Electric fields and currents: electrostatics, direct-current circuits. Elementary circuit theory. Introduction to electronics and electronic devices. Boolean algebra and basic number systems. Introduction to instrumentation. (Old No. 1.911)

PHYS1929 Physics 1 (Surveying) F L2 T2

Prerequisites: As for PHYS1002 Physics 1.

Aims and nature of physics and the study of motion of particles under influence of mechanical, electrical, magnetic and gravitational forces. Concepts of force, mass, energy, momentum, charge, potential fields. Application of the conservation principles to the solution of problems involving charge, energy and momentum. Electrical circuit theory,

applications of Kirchoff's laws to d.c. and a.c. circuits. Uniform circular motion, Kepler's laws and rotational mechanics. Geometrical optics, optical instruments. Wave theories of physics, transfer of energy by waves, properties of waves. Application of wave theory to interference, diffraction and polarisation. (Old No. 1.921)

PHYS1939 Physics 1 (Building) S2 LT4

Prerequisites: Nil

Energy transfer: conduction, convection, radiation, emittance, absorptance; Joules equivalent; thermometry; heat transfer through materials; thermal storage; thermal resistance; insulation; water vapour, condensation and vapour barriers. Refrigeration theory, properties and characteristics of refrigerants. Electrostatics and electromagnetism: DC circuits; Coulomb's law; electric field; electric potential; capacitance; conductors; resistivity; Atomic view of conduction; EMF; Kirchoff's laws; magnetic induction; torque on a coil in a magnetic field; moving coil meter; Wheatstone bridge; potentiometer; Faraday's law; transient circuits. AC power and circuit theory. Sound: longitudinal waves; overtones; intensity levels; decibels; quality of sound; assessment of noise annoyance; airborne sound transmission; sound attenuation; transmission loss; adsorption coefficients; partitions; recommended acoustic criteria; introduction to auditorium acoustics. (Old No. 1.931)

PHYS1969 Physics 1 (Electrical Engineering) F L3 T3

Prerequisites: As for PHYS1002 Physics 1.

For students in the School of Electrical Engineering.

Electrostatics in vacuum, electrostatics in dielectrics, steady state currents, magnetostatics in vacuum, ferromagnetism, electromagnetic induction, transient currents. Vectors motion in one dimension, motion in a plane, particle dynamics, work and energy, the conservation of energy, conservation of linear momentum, collisions, rotational kinematics, rotational dynamics, simple harmonic motion, gravitation. Temperature, heat and the first law of thermodynamics, kinetic theory of gases. Waves in elastic media, sound waves, geometrical optics, interference, diffraction, gratings and spectra, polarization. (Old No. 1.961)

PHYS1989 Physics 1 (Civil Engineering) S1 L2 T2 and S2 L2 T1

Prerequisites: As for PHYS1002 Physics 1.

For students in the School of Civil Engineering.

Aims of physics and its relation to civil engineering. Mechanical concepts, properties of matter, atomic structure, elasticity, plasticity, fracture of solids; surface tension and viscosity of fluids, electrical and magnetic forces, electromagnetism, DC and AC circuits, digital electronics. Simple harmonic motion and its relation to wave motion. Acoustic and mechanical waves, attenuation, velocity of propagation. Elastic moduli. Non-destructive testing, instrumentation, techniques and theory. Emphasis on the physics involved in non-destructive testing and the aspects of vibration important to civil engineering. (Old No. 1.981)

PHYS1999 Physics 1 (Optometry) S1 L3 T3

Prerequisites: Nil

Vectors, Linear mechanics, Newton's Laws of Motion. Rotational mechanics, electric forces, fields and potential. Magnetic forces and fields. Ampere's Law, Faraday's Law. Electric circuit theory, - a.c., d.c. and transient circuits. Fluid mechanics - Bernoulli's equation - viscosity - Stoke's Law. Nuclear Physics - radioactivity, half-life, nuclear forces, binding energies, fission and fusion.

PHYS2969 Physics of Measurement (Surveying) S1 L1 T2

Prerequisite: PHYS1929.

For students in the School of Surveying.

Resolution, accuracy and sensitivity of instruments. Errors of observation and their treatment. Experimental design. Displacement transducers. Transducers for other mechanical quantities. Thermometry. Electrical noise. Dynamic response of measuring systems. Servo-systems. Mechanical design of apparatus. Microscopes, telescopes and other optical instruments. Lenses, optical fibres and other optical components. Photometry. Colorimetry. Measurements under adverse ambient conditions. Analogue-to-digital conversion. Digital instruments. Measurements of very large and very small quantities. **(Old No. 1.962)**

PHYS2989 Solid State Physics (Electrical Engineering) S1 L2.5 T2

Prerequisites: PHYS1969 or PHYS1002, MATH1032 Co-requisites: MATH2100. Excluded: PHY2021.

The concepts of waves and particles, introductory quantum mechanics, atomic structure, optical spectra and atomic structure, structural properties of solids, band theory and its applications, uniform electronic semiconductors in equilibrium, excess carriers in semiconductors. **(Old No. 1.982)**

PHYS2999 Mechanics and Thermal Physics (Electrical Engineering) F L1.5 T.5

Prerequisites: PHYS1969, MATH1032. Co-requisite: MATH2100. Excluded PHYS2001, PHYS2011.

Particle mechanics, harmonic motion, central force problems, systems of particles, Lagrange's equations with applications, coupled oscillations, wave equation. Thermodynamic laws, entropy, kinetic theory, M-B distribution, microscopic processes, Maxwell's relations, chemical potential, phase diagrams, multicomponent systems, electrochemical potential, statistics of defects in solids. **(Old No. 1.992)**

Chemical Engineering and Industrial Chemistry

POLY3010 Polymer Science F L2 T1

Prerequisites: CHEM2011, CHEM2021, MATH2021, MATH2819. Co-or prerequisites: INDC3090.

Polymerization chemistry and processes. Step and radical chain polymerization. Ionic (including stereoregular) polymerization. Methods including bulk, suspension, emulsion, solution and gas phase polymerization. Industrially important polymers and their manufacture. Principles of analysis. Molecular weight distribution. Thermodynamics of polymer solutions. Polymer chain conformation. Viscoelasticity. Mechanical behaviour. Polymermorphology. Thermal behaviour and analysis. Chemistry and physics of elastomers. Elememts of polymer compounding and fabrication. New polymers. **(Old No 48.403)**

Psychiatry

PSCY2201 Human Behaviour F L2 T1

Prerequisites: No formal prerequisites. Students may take the subject in Year 2 or Year 3 of Course 3820.

As for PSCY2101. See Undergraduate Study: 3820 Combined Science and Medicine Course, earlier in this handbook. **(Old No. 80.014)**

Psychology

Psychology Level I Subject

PSYC1002 Psychology 1 F L3 T2

Excluded: GENS4620 and GENS5050

An introduction to the content and methods of psychology as a basic science, with emphasis on the biological and social bases of behaviour, relationship to the environment, and individual differences. Training in the methods of psychological enquiry, and in the use of elementary statistical procedures. **(Old No. 12.100)**

Psychology Level II Subjects

PSYC2001 Research Methods 2 S1 L2 T2

Prerequisite: PSYC1002.

General introduction to the analysis of data by means of inferential statistics (z, t and chi square). Consideration of issues in the use of statistics (power, robustness, multiple tests). General features of research methodology. Laboratory

and statistical traditions affecting design and control procedures. The implications of the use of inferential statistics for research methodology generally. **(Old No. 12.206)**

PSYC2011   Psychological Assessment   S2 L2 T1
Prerequisite: PSYC2001.

Principles and techniqes of psychological measurement. Types of tests and issues relevant to their construction, administration and interpretation in decisions about selection and classification. **(Old No. 12.207)**

PSYC2021   Attention, Memory and Thought   S1 L2 T2
Prerequisite: PSYC1002.

Introduction to the fundamental principles of human cognition underlying pattern recognition, selective attention, memory storage and retrieval, and reasoning and problem-solving. Applications are considered. **(Old No. 12.208)**

PSYC2031   Personality and Social Psychology S2 L2 T2
Prerequisite: PSYC1002.

This course consists of two components. One focuses on models of personality and their method of study, personality development and links with social behaviour. The other deals with social behaviour and the processes of verbal and nonverbal communication, person perception and interpersonal relationships in particular. **(Old No. 12.209)**

PSYC2042   Psychology 2A   F L2 T2
Prerequisite: PSYC1002. Co-requisites: PSYC2001, PSYC2011, PSYC2021 and PSYC2031. Excluded: PSYC3091.

Available to Course 3431 students only.

Introduction to several areas of professional practice in psychology and the roles of psychologists in these areas eg Developmental Disabilities, and Psychology and the law. Principles and techniques of interviewing and counselling in a variety of contexts. **(Old No. 12.203)**

PSYC2051   Human Development   S1 L2 T2
Prerequisite: PSYC1002. Excluded: PSYC3111.

The physical, perceptual, cognitive, and psychosocial development of the human from genetic and pre-natal influences through to old age. **(Old No. 12.210)**

Psychology Level III Subjects

PSYC3001   Research Methods 3A   S1 L2 T2
Prerequisite: PSYC2001.

Analysis of variance for single factor and multifactor designs. Test procedures for planned and post-hoc contrasts defined on parameters of fixed and mixed models. General principles of experimental design. **(Old No. 12.300)**

PSCY3011   Research Methods 3B   S2 L2 T2
Prerequisite: PSYC3001.

Multivariate statistics and computing. Data analysis using the SPSS and PSY computer programs; their statistical basis. **(Old No. 12.301)**

PSYC3021   Perception   S2 L2 T2
Prerequisites: PSYC2001 and either PSYC2021 or PSYC2031.

The study of the sensory basis of perception; the study of perception as an adaptive process by which individuals are able to correctly apprehend the external environment and localise themselves within it; the study of perceptual development in infants and young children. **(Old No. 12.341)**

PSYC3031   Behavioural Neuroscience   S1 or S2 L2 T2
Prerequisites: PSYC2001 and either PSYC2021 or PSYC2031.

An examination of brain-behaviour relationships with emphasis on contemporary models of the neural bases of learning, memory and motivation. Topics may include classical and operant conditioning, neuropharmacology, the neural basis of feeding and its disorders, invertebrate and vertebrate models of learning, amnesias and theories of normal memory.

(Old No. 12.342)

PSYC3041   Learning   S1 L2 T2
Prerequisite: PSYC3031.

The conditions which promote learning, the contents of learning and the mechanisms by which learning is deployed in action. The course emphasises the distinction between specialised and general-purpose learning abilities. **(Old No. 12.348)**

PSYC3051   Physiological Psychology   S2 L2 T2
Prerequisite: PSYC3031.

An examination of the neural control of behaviour with special emphasis on cerebral localisation of function in humans. Clinical conditions will be considered to the extent that they illuminate mechanisms of brain control or they relate to theorising about brain function. **(Old No. 12.349)**

PSYC3061   Perceptual Theory
Prerequisite: PSYC3021.

Not offered in 1991.

Some of the major theoretical influences in perception, beginning with a histroical view and then considering the different perspectives represented by Helmholtz, Gestalt psychology, and Gibson, and finally the influence of computer vision (especially Marr) and the modern revolution in knowledge of the physiology of the visual system. **(Old No. 12.350)**

PSYC3071   Abnormal Psychology   S1 L2 T2
Prerequisite: PSYC2001.

Descriptive psychopathology; symptomatology and diagnostic features of schizophrenia, organic brain syndromes, affective disorders, neurotic disorders, psychopathy, sexual aberrations, and addictions. **(Old No. 12.322)**

PSYC3081   Experimental Psychopathology   S2 L2 T2

Prerequisite:PSYC3071.

An examination of the aetiology and mechanisms of behavioural disorders in the light of experimental research and theory construction. Major topics include: aetiology and mechanisms of schizophrenia, affective disorders; psychophysiological disorders, anxiety, depression, addictive behaviours and amnesia. **(Old No. 12.324)**

PSYC3091   Counselling and Evaluation   S1 L2 T2

Prerequisites: PSYC2001 and PSYC2011. Excluded: PSYC2042.

Theory and practice of counselling in a variety of contexts. Emphasis will be placed on major theoretical orientations, counselling skills development and the evaluation of counselling effectiveness through behavioural and other assessments. **(Old No. 12.343)**

PSYC3101   Individual Differences   S1 L2 T2

Prerequisites: PSYC2011 and PSYC2031.

Measurement and assessment of intelligence, psychometric assessment of personality, cognitive and affective aspects of personality, the authoritarian personality, achievement motivation, socio-biological models and critique. **(Old No. 12.344)**

PSYC3111   Development Psychology   S2 L2 T2

Prerequisites: PSYC2001 and either PSYC2021 or PSYC2031 Excluded:PSYC2051.

Issues, methods, and theories in developmental psychology; the development of infants, toddlers, school children, and adolescents with reference to significant cognitive and social events in each of these periods. **(Old No. 12.321)**

PSYC3121   Social Psychology   S1 L2 T2

Prerequisites: PSYC2001 and PSYC2031. Excluded: PSYC3131 and PSYC3141.

Human sociability, affiliation and attraction, the development of interpersonal relationships, social influence processes, conformity, obedience, leadership, interaction in groups, affective influences on social cognition and behaviour. **(Old No. 12.320)**

PSYC3131   Cross-Cultural Social Behaviour

Prerequisites: PSYC2001 and PSYC2031. Excluded: PSYC3121 and PSYC3141.

Not offered in 1991.

The social psychology of intergroup relations or contact between culturally diverse individuals and groups. Particular aspects to be covered will include intercultural communication, inter-group conflict and its resolution, culture learning and orientation program, and cross-cultural social skills training. These processes will be illustrated with studies of overseas students, migrants, international business persons, and other individuals exposed to second-culture influences. **(Old No. 12.353)**

PSYC3141   Behaviour in Organizations   S2 L2 T2

Prerequisites: PSYC2001 and PSYC2031. Excluded: PSYC3121 and PSYC3131.

Industrial and organisational psychology, job analysis, selection, motivation, management strategies, job design and a systems analytic approach to organisations, training, selection, work satisfaction and organisational climate. **(Old No. 12.334)**

PSYC3151   Cognition and Skill   S2 L2 T2

Prerequisites: PSYC2001 and PSYC2021. Excluded: PSYC3161.

An examination of the cognitive processes underlying skilled behaviour. Topics include detection and discrimination, the representation of knowledge, artificial intelligence, and the basis of expertise in skilled performance. **(Old No. 12.345)**

PSYC3161   Language and its Development   S1 L2 T2

Prerequisites: PSYC2001 and PSYC2021. Excluded: PSYC3151.

How language is acquired and used in reading, writing, speech comprehension and speech production. Language dysfunction and bilingualism will also be considered.

(Old No. 12.346)

PSYC3171   Recent Developments in Experimental Psychology

Prerequisites: PSYC2001 and PSYC2021.

Not offered in 1991.

An occasional elective dealing with recent developments in experimental psychology. **(Old No. 12.351)**

PSYC3181   Issues in Applied Psychology

Prerequisites: PSYC2001 and PSYC2011.

An occasional elective dealing with issues in applied psychology. Topics may include psychology and law, career choice and development stress, forensic psychology and field versus laboratory research. **(Old No. 12.352)**

PSYC3191   Computer Science and Psychology

Prerequisites: COMP2011, COMP3411, PSYC2001 and PSYC2021.

Not offered in 1991.

A course designed to investigate the burgeoning relationships between cognitive psychology and computer science. Topics to be covered include parallel distributed processing models of learning, memory and perception; processes of reasoning, logic and decision making; human expertise and expert systems.

Psychology Level IV Subjects

PSYC4003   Psychology 4 (Thesis Course 3431)   F

Prerequisite: All requirements for Years 1-3 of the course.

Psychology 4 in the BSc(Psychol) degree course. A supervised research thesis and course work to be determined in consultation with the Head of School. **(Old No. 12.400)**

PSYC4013   Psychology 4 (Course 3431)   F

Prerequisite: All requirements for Years 1-3 of the course.

Psychology 4 in the BSc(Psychol) degree course. Course work and a supervised group research project to be determined in consultation with the Head of School. **(Old No. 12.401)**

PSYC4023   Psychology 4 (Thesis) Honours   F

Prerequisites: PSYC1002, PSYC2001, PSYC2011, PSYC2021 PSYC2031 and 8 Psychology Level III units, including PSYC3001, PSYC3011, PSYC3021 and PSYC3031, with an average of at least 68 % and at the discretion of the Head of School.

Psychology 4 in the Arts, and Science and Mathematics degree courses. A supervised research thesis and course work to be determined in consultation with the Head of School. **(Old No. 12.403)**

PSYC4033   Psychology 4 (Honours)   F

Prerequisites: PSYC1002, PSYC2001, PSYC2011, PSYC2021, PSYC2031 and 8 Psychology Level III units, including PSYC3001, PSYC3021 and PSYC3031 with an average of at least 68 % and at the discretion of the Head of School.

(Old No. 12.404)

PSYC4043   Computer Science and Psychology 4   F
(Honours)

Prerequisites : Refer to Program 1206.

Combined Honours in Computer Science and Pyschology.

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subject see the Faculty of Commerce Handbook.

PSYC2106   Psychology (Industrial Relations)

Prerequisite: Nil.

Not offered in 1991.

Problems and limitations affecting social research in industry. Critical review of American research from Hawthorne to Herzberg and of British research from Tavistock and Trist to Emery in Australia. Conflict and organic theories of organisation and related theories of motivation and morale. The use of library resources. Practice in the skills and discipline required to obtain and evaluate empirical evidence in this field. Recent developments under the heading of 'participation' and democracy in industry. **(Old No. 12.651)**

For further information regarding the following subject see the Faculty of Science section of this handbook.

PSYC4106   Psychology (Optometry)   F L2

Prerequisite: PSYC1002.

Visual perception: The nature and characteristics of visual perception. Topics to be discussed include: psychophysics, the organization of visual perception, the influence of context, and the effects of learning and motivation on perception. Throughout the course emphasis will be placed on an examination of relevant experimental data. *Abnormal psychology:* The concepts of normality and abnormality, and an examination of the principal psychodynamic processes. Causes and symptoms of various mental disorders are introduced with some emphasis on the importance of these symptoms in optometrical practice. **(Old No. 12.741)**

Science and Technology Studies

Students undertaking subjects in Science and Technology Studies are required to supplement the class contact hours by study in the Library.

Level I

HPST1106   Myth, Megalith and Cosmos   S1 L2 T1 C6

Prerequisite: Nil. Excluded: 62.111.

Only 2 Level I units may be counted towards Course 3970.

The first of a two part study of *Humanity and the Cosmos* constituting a general introduction to the history and philosophy of science. Provides a background to HPST1107 *From the Closed World to the Infinite Universe* but is a self-contained subject in its own right presupposing no prior knowledge of science or mathematics. Examines the evidence for scientific knowledge in prehistoric cultures (with special reference to the Western European megalithic cultures), the astronomy and cosmology of the ancient Near Eastern civilizations, and the development in earlier Greek geometry, astronomy, cosmology and method which provided the foundations for medieval and modern Western science. Topics: naked-eye astronomy; archaeoastronomy; ley lines and "fringe" archaeology; dating and the development of archaeological theory; Pacific Islands' navigation; Australian Aboriginal cosmology and astronomy; the interpretation of mythology; the astronomy and cosmology of Mesopotamia and Egypt; an assessment of astrology; Aristotle's cosmology; the origins and development of geometry to Euclid; patterns of reasoning and the foundations of scientific method; and the mystery of the Dogons and the Von Daniken phenomenon.

Assessment: 2 short essays, 2 tests, tutorials. **(Old No. 62.102I)**

HPST1107   From the Closed World   S2 L2 T1 C6
To the Infinite Universe

Prerequisite: Nil. Excluded: 62.211.

Only 2 Level I units may be counted towards Course 3970.

The second of a two part study of *Humanity and the Cosmos* which aims to provide a general introduction to the history and philosophy of science. Follows on from *HPST1106 Myth, Megalith and Cosmos,* but constitutes a self-contained subject in its own right without prerequisites. Examines the momentous transition from the ancient/medieval model of a closed world to

modern cosmological theory. Topics: the ancient tradition and the medieval conception of the cosmos; the labyrinth and the *mappa mundi*: the Ptolemaic system; cultural and cognitive change during the Renaissance; *Terra Australis* and the expansion of the known world; Copernicus and the Copernical Revolution; the development of scientific methodology; the astronomy and cosmology of Kepler, Galileo and Descartes; Newton and the clockwork universe; the Scientific Revolution and the Church; humanity as microcosm; the telescope and the microscope; the plurality of worlds; galaxies and nebulae; Relativity theory, big bangs and black holes; "fringe" and "New Age" cosmologies; science fiction and little green men.

Assessment: 2 short essays; 2 tests; tutorials. **(Old No. 62.104I)**

HPST1108   Science: Good, Bad   S2 L2 T1 C6
and Bogus. An Introduction
to the Philosophy of Science

Prerequisite: Nil.

Only 2 Level I units may be counted towards Course 3970.

What is science? What are its distinctive characteristics as a form of inquiry? Why are astrology and 'creationism' widely considered to be pseudosciences? A critical consideration of the claims of astrology, psychoanalysis, parapsychology and creation-science provides a vehicle for raising central questions concerning the nature of science, involving issues such as the nature of observation and evidence, theories and laws, explanation and prediction, etc. Central concerns throughout the history of philosophy have been the nature of knowledge and justified belief, and the demarcation between science and pseudoscience. These questions are placed in an historical context: from the Pre-Socratics, to Hume, Kant and the twentieth-century philosophers Wittgenstein, Popper and the 'Logical Positivists'.

Assessment: Essay; tutorials; class tests. **(Old No. 62.115I)**

SCTS1106   Science, Technology and   S1 L2 T1 C6
Social Change

Prerequisite: Nil. Excluded: 62.110.
Only 2 Level I units may be counted towards Course 3970.

Relations between Science, Technology and Society as they have evolved in the 20th Century. Theories on the nature of technological design and change. An examination of controversies in areas including: pollution and environmental protection; nuclear energy and alternative energy sources; information/communications technologies; genetic engineering. The control of technology, technology assessment and the nature of public involvement in decisions about scientific and technological development.

Assessment: Essay (40 percent); tutorials (30 percent); class tests (30 percent). **(Old No. 62.101I)**

SCTS1107   Understanding   S2 L1 T2 C6
Technological Controversy

Prerequisite: SCTS1106 or 62.101I.
Only 2 Level I units may be counted towards Course 3970.

The lecture series examines themes relevant to the analysis of scientific and technical controversies in general; how they arise, how they are conducted, the nature of evidence, the uses of expert authority, how and why disputes are resolved or remain unresolved. The tutorials are devoted to intensive supervised group work on particular issues of concern to students in the general areas of environment; energy resources

and technologies; reproductive technologies and genetic engineering; information and communication technologies.

Assessment: Essay; test; tutorials. **(Old No. 62.103I)**

Level II/ III

HPST2106   The Scientific Theory   S2 L2 T1 C6

Prerequisite: Completion of at least 4 Level 1 units from Table 1.
Excluded: 62.032, 62.505.

A critical examination of the scientific theory its origins, nature and nurture. With particular reference to selected historical examples chosen from both the physical and biological sciences, a number of philosophically interesting problems relating to scientific theories are subjected to analysis. Topics include: the principles of theory construction; perception and observation; the structure of scientific revolutions; scientific explanation; the status of laws and theoretical terms; the 'existence' of theoretical entities; relationships between theory and observation; the functions of models; the principles of theory establishment and rejection.

Assessment: One essay; tests; tutorials. **(Old No. 62.202U)**

HPST2107   The Darwinian Revolution   S1 L1 T1 C6

Prerequisite: As for HPST2106. Excluded: 62.104.

Scientific, philosophical, and social antecedents and consequences of Darwin's theory of evolution. The prevailing ideas in biology before Darwin in the context of the general climate of ideas in the 18th and early 19th centuries. Darwin's life and work in some detail, followed by a consideration of the work of Mendel and the establishment of the 'synthetic' theory of evolution. The impact of evolutionary ideas in such diverse fields of thought as religion, literature, music, political theory, epistemology, ethics, and the social and behavioural sciences.

Assessment: Examination; tutorial exercises; essay. **(Old No. 62.208U)**

HPST2108   History of Medicine   S1 L2 T1 C6

Prerequisite: As for HPST2106. Excluded: 62.109, 62.273, 62.309, 26.568, 26.2506.

Development of theory and practice in Western medicine from the time of Hippocrates to the 20th century. Material covered in four sections: 1. 'bedside' medicine from antiquity to the French Revolution; 2. 'Hospital' medicine in the early 19th century; 3. 'laboratory' medicine in the late 19th century; and 4. 'technological' medicine in the 20th century, with particular emphasis on the social role of modern medicine. **(Old No. 62.210U)**

HPST2109   Computers, Brains and Minds: S2 L2 T1 C6
Foundations of Cognitive
Science

Prerequisite: As for HPST2106. Excluded: 62.554.

Introduction to contemporary discussions of the mind, thought, intelligence and consciousness. Focus on the issues which arise in connection with the so-called 'cognitive sciences' the disciplines which include such fields as computer science, the various neuro-sciences, cognitive psychology, linguistics and the philosophy of mind. Stress on the recent revolutionary developments in the computer

simulation of thought or 'artificial intelligence' and linguistics, since both these areas shed new light on traditional questions concerning the mind. Questions are: 'Can computers think?' and 'Is the brain a machine?' Exploration of the theories, methods and philosophical issues which arise from the 'computational' or 'information processing approach' to the mind.

Assessment: Essay; tests; tutorials. **(Old No. 62.217U)**

HPST2116   History of the Philosophy   S1 L2 T1 C6
and Methodology of Science

Prerequisites: As for HPST2106. Excluded: 62.543, 62.551, 62.561, 62.215U, 62.216U.

A survey of the history of ideas about the nature and method of science, considering such issues as Aristotelianism, Galileo's mathematization of nature, rationalism and empiricism, Kantianism, positivism, pragmatism, conventionalism, logicism, falsificationism, the realist/ instrumentalist debate, and 'sociologism'.

Assessment: Essays; tutorials. **(Old No. 62.224U)**

HPST2117   Technology and Society   S2 L2 T1 C6
Prerequisite: As for HPST2106. Excluded: 26.251, 62.022.

Not offered in 1991.

The history of technology in its social and cultural context with special emphasis on the Industrial Revolution. This Revolution, which has been described as the most significant event in human history since the Agricultural Revolution of the New Stone Age, is examined in some detail, and concentrates on technology and its effects on human beings. Considers the professionalization of engineering, the spread of industrialization in Britain, in Europe and the USA, and examines the Second Industrial Revolution. Emphasis on the social and economic effects of the interactions of technology and society.

Assessment: Tutorial paper; performance in class; examination. **(Old No.62.201U)**

HPST2118   Body, Mind and Soul: S1 L2 T1 C6
The History and Philosophy
of Psychology

Prerequisite: As for HPST2106. Excluded: 62.106.

The development of scientific ideas concerning the nature of life, mind and behaviour. While the subject includes both a brief treatment of early ideas and references to issues in contemporary biological and behavioural sciences, the main focus is on the period from the Proto-Scientific Revolution of the 16th century to the advent of the general purpose computer. Topics include: Vesalius and the School of Padua; the biological thought of William Harvey; machines and the mechanical philosophy; Cartesianism and the mechanization of biology; classical theories of the relationship between mind and body; neurophysiology from the 18th to the early 20th century; the mechanist-vitalist disputes; Wundt, Fechner and the rise of experimental psychology; the Freudian revolution; Pavlov and the conditioned reflex; behaviourism and its critics; mind, brain, life and the computer.

Assessment: Essay; tutorial assessment; tests. **(Old No.62.209U).**

HPST3106   The Discovery of Time   S2 L2 T1 C6
Prerequisite: As for HPST2106. Excluded: 62.103.

The history of time, from the Ancient World through the Twentieth Century. The principal strands studied are: clocks and other instruments for the measurement of time, civil and religious calendars, concepts of time, philosophy and theology of time, conceptions of history and of progress, the cognition of time, the age of the Earth and the antiquity of humanity, time and the development of modern science. Throughout, attention will be paid to the historical context within which specific episodes and developments occurred and to cultural consequences of changes in the cognition of time.

Assessment: Essay; tutorials; 2 class tests. **(Old No. 62.207U)**

HPST3107   Relations Between Science and S1 L2 T1 C6
the Arts

Prerequisite: As for HPST2106. Excluded: 62.241.

Not offered in 1991.

The relationships between science, technology and the visual arts in the history of western culture. 'Art' and 'science' in the ancient world. Pythagoreanism and its cultural influences. Science, painting and architecture in the Renaissance and the discovery of the principles of perspective. Optical theories of Newton, Goethe, Young, Helmholtz, etc., and their influence on painting. Photography and art. Impressionism, neo-impressionism, cubism, futurism, etc., and the emergence of abstract art in relation to science, technology and art. Psychology and art. Magritte's philosophizing. New visual experiences as material for artistic expression. Nature of the relationship between science and art.

Assessment: Tutorial exercises; essay; examination. **(Old No. 62.211U)**

HPST3108   Man, Woman and Deity   S2 L2 T1 C6
Prerequisite: As for HPST2106. Excluded: 62.285.

Conceptions of deity, from earliest times to the present, in relation to changing notions of sexuality and generation; the place of human beings in relation to their environment and the cosmos; the roles of the sexes within different cultures. Topics: archaelogical evidence for early ideas concerning generation and for the relations of man to the cosmos; the Earth Mother Goddess; biology, religion and mythology; feng-shui and geomancy; the symbolism of city, temple and dwelling; religion, sexuality and generation in ancient civilizations and primitive societies, with special reference to the Australian Aborigines; the Medieval and Renaissance world views; the tyranny of the machine; conservation and stewardship in the Middle Ages; the *cultus* of the Virgin Mary in relation to scientific and social change; theories of biological generation; concepts of Deity and Nature in relation to science and the environmentalist movement; the Gaia hypothesis.

Assessment: 1 essay; 2 tests; tutorials. **(Old No. 62.214U)**

**HPST3109   Issues in the   S1 L2 C4
              Philosophy of Science**

Prerequisite: Completion of at least 2 HPST subjects. Excluded: 62.3005.

Not offered in 1991.

Selected topics in contemporary philosophy of science chosen from among the following: Scientific Laws, Theories and Explanations, Observation, Evidence, Confirmation, Induction, Models and Metaphors, Realism and Instrumentalism, Verification and Falsification, Scientific Discovery and Scientific Revolutions, Theoretical Reduction, Methodological Problems of Social Sciences, Teleological and Purposive Explanation, Rationality and Scientific Method, Science and Pseudo-Science Demarcation. **(Old No. 62.305U)**

**HPST3116   Language and Mind: S1 L2 T1 C6
              The Impact of Chomsky's
              Revolution**

Prerequisite: As for HPST2106. Excluded: 62.570.

Not offered in 1991.

Chomsky's theories of language and mind which have revolutionised linguistics, psychology and philosophy. History of linguistics and psychology, especially the Behaviourist approach of Skinner. Chomsky's impact on traditional philosophical debate between Rationalists and Empiricists concerning innate ideas. **(Old No. 62.218U)**

**HPST3117   Philosophical Problems in   S2 L2 C4
              Evolutionary Biology**

Co-requisite: HPST2106 or HPST2107.

Current controversies in evolutionary theory, with consideration of topics such as essentialism and population thinking, falsifiability of the principle of natural selection, the group selection controversy, sociobiology, problems in classification and cladism, the neutral theory of evolution and the role of chance, punctuated equilibrium theory, the origin of life, creation 'science'. **(Old No. 62.301U)**

**SCTS2106   Scientific Knowledge and   S1 L2 T1 C6
              Political Power**

Prerequisite: As for HPST2106. Excluded: 62.052.

An introduction to the political dimensions of 20th century science. Topics include: growth of expenditure on science in the 20th century; attempts to define the social function of science in the inter-war years; the radical scientists' movement of the 1930s the freedom *versus* planning debate; science and politics in the Second World War; government patronage and political expectations in the post-war period; science and economic growth; the science-technology relationship; the rejection of *laissez-faire* in the 1960s; approaches to science policy; critiques of the role of science in contemporary society; scientists as experts; the question of social responsibility in science.

Assessment: Essays; tutorials. **(Old No. 62.203U)**

**SCTS2107   The Sociology of Science   S2 L2 T1 C6
              and Technology**

Prerequisite: As for HPST2106. Excluded: 62.062.

An examination of the communal nature of scientific and technological activities which will include: an historical survey of the development of scientific and engineering sub-cultures and professions; theories on the internal workings of scientific communities scientific communication, norms, the reward system, fraud, disciplines and specialties in science and engineering; a critical examination of the notion of 'communities' and their relation with the wider social order; the 'constructivist' re-unification of social systems and knowledge systems and consequences for the sociology of expertise.

Assessment: Essays; tutorials. **(Old No. 62.204U)**

**SCTS2108   Information Technology,   S1 L2 T1 C6
              Politics and Policies**

Prerequisite: SCTS1106 or completion of at least 4 Level 1 Science units.

Not offered in 1991.

Key issues for an 'info-tech' society including: social policies and the future of work and education; mass media and telecommunications in the electronic age; commercialisation and shifting patterns of trade in the world economy; de-regulation and the role of 'info-tech' in global restructuring.

Assessment: Essay and tutorial participation. **(Old No. 62.221U)**

**SCTS2109   The New Biotechnologies and   S2 L2 T1 C6
              Their Social Context**

Prerequisite: SCTS1106 or by permission of the Head of school for 3rd and 4th year students in the Biological Sciences. Excluded: 62.245.

Not offered in 1991.

The social implications of the new biotechnologies, including recombinant DNA techniques, genetic manipulation of animals and test tube babies. The present achievements and likely future developments of the new genetic and reproductive technologies, together with detailed discussions of the social, ethical and political implications of these developments. Topics include: the debate on the safety of genetic engineering; in vitro fertilization and related reproductive technologies; the ethics of human genetic engineering; university-industry interactions in biotechnology; the release into the environment of engineered organisms; mechanisms for public participation in the control of biotechnology. **(Old No. 62.212U)**

**SCTS3106   Science, Technology and   S2 L2 T1 C6
              Developing Countries**

Prerequisite: As for HPST2106. Excluded: 62.082.

The disparities between the scientific and technical capabilities of industrialized and developing societies. The reasons for these disparities and their economic and social consequences. Aspects include: the problems of dependency; the product cycle and its impact on location of production; concepts of the 'learning curve'; aspects of technology choice; bargaining processes; transnational corporations and the 'truncation' of the industrial sector; efforts to define 'appropriate' technologies; modes of technology transfer; alternate models and policies for scientific and technological development; the role of traditional technology; the impact of modern technology on international relations. Issues: the consequences of modern science and technology for the role of the military in developing countries; food and population problems; energy use; environmental impacts; class structure, etc. The social role and function of scientific communities in less developed countries and the process of

diffusion of science from the centre to the periphery and the evolution of national scientific communities and institutions are addressed through the use of case studies.

Assessment: Essay; tutorials. **(Old No. 62.206U)**

SCTS3108 Technological Development in S2 L2 T1 C6
20th Century Australia

Prerequisite: SCTS1106. Excluded: 62.246.

Not offered in 1991.

The historical development of technology in Australia during the 20th century, with an analytic focus on three key dimensions: linkages between scientific research, industrial development and economic growth, technological change and its impact on Australian society; the distinctive features of Australia's geopolitical situation. Topics include: the origin, expansion and transformation of the CSIRO, the maturation and professionalization of the Australian research community; the politicization of science and the post-war legacy; the failure of Australian research to serve an industrialized economy; science policy and technological change in the 1970s and 1980s; comparison with the Canadian situation and the experience of newly industrializing countries. **(Old No. 62.213U)**

SCTS3109 Technology, Environment S2 L2 T1 C6
and Risk

Prerequisite: SCTS1106 or completion of at least 4 Level 1 Science units.

The growth of concern in advanced industrial societies over the risks associated with the development of resource-based and other technological and environmental degradation. The relationships between perceived risk and social trust and institutional arrangements. The basis of much of the present concern in anxieties over social control and in changing perceptions of the relationships between ethics and politics. Case studies examine nuclear energy, hazardous wastes and information technology.

Assessment: Essays and tutorial participation. **(Old No. 62.220U)**

SCTS3116 The Politics of Energy S2 L2 T1 C6
Prerequisite: As for SCTS3109.

The fundamentals of energy, force, work construction of energy use; resources and reserves; the 'energy crisis'; the nuclear energy process; solar and alternative sources; political economy of energy use coal, oil, nuclear; institutional power; market arrangements and the role of the State; energy in the 1980s and 1990s. Case studies include N.S.W. and Victorian power inquiries; coal vs oil vs gas; the nuclear industry today; the future of solar power.

Assessment: Essay, tutorial participation and class tests. **(Old No. 62.222U)**

SCTS3117 Technology, Globalisation and the S2 L2 T1
Role of the State

Prerequisite: Completion of at least 2 SCTS subjects. Excluded: 62.3003.

Not offered in 1991.

An analysis of the interaction between technology, economic growth and the internationalism of industry; the growing

pressure on the State to adopt an increasingly interventionist role. **(Old No. 62.303U)**

Level IV Honours Program

SCTS4106 Science and Technology Studies (Honours)

Prerequisite: Completion of Years 1-3 of Program 6200, with marks that result in an average of credit or better in eight HPST and/or SCTS units included in that program.

In the Honours Program, candidates are required to present a thesis and to complete course work as approved by the Head of School.

Wool and Animal Science

WOOL3803 Genetics 1 S2 L3 T3

Mendelian inheritance. Chromosomes, linkage and the physical basis of heredity. Gene action in physiology and development. Elements of molecular genetics. Principles of quantitative genetics, strength of inheritance and relationships. Selection and crossbreeding. Genetics applied to animal and plant improvement. Applications of genetics in sheep and wool production. **(Old No. 9.801)**

WOOL3901 Biostatistics 1 S1 L2 T2

Design and analysis of comparative experiments, for continuous and discrete random variables. Analysis of variance for fixed, mixed and random models. Linear regression and correlation. Multiple comparison methods. **(Old No. 9.811)**

WOOL4813 Genetics 2 F L2 T2

Prerequisite: WOOL3803.

Genetic structure of populations. Forces causing genetic change. Partition of genetic and phenotyic variation. Resemblance between relatives and estimation of genetic parameters. Direct and correlated selection responses. Aids to selection and selection indexes. Inbreeding and genetic drift. Genetic homeostasis, Genotype environment interaction. Heterosis and its utilization. Interaction of natural and artificial selection. Limits of selective progress. **(Old No. 9.802)**

Graduate Study:
Faculty of Biological and
Behavioural Sciences,
Faculty of Science

Introduction

Faculty of Biological and Behavioural Sciences

The Schools of the Faculty of Biological and Behavioural Sciences offer facilities for students to proceed to the award of a Graduate Diploma, the award of a master degree by research and the award of the degree of Doctor of Philosophy; and the award of a master degree by course work in Psychology (8251 and 8252) and in Biotechnology (8042).

Students requiring advice about graduate studies should check details later in this handbook and also enquire from the Head of the appropriate School. Schools of the Faculty also contribute to programs to the Science and Mathematics Course 3970.

Faculty of Science

The Schools of the Faculty of Science supervise the graduate diploma courses Food and Drug Analysis (5510) and Physical Oceanography (5530). The Schools of the Faculty also offer facilities for students to proceed to masters degrees in Chemistry (8770), Mathematics (8740), Optometry (8760), Physics (8730) and Statistics (8750), to the award of masters degrees by research and to the award of the degree of Doctor of Philosophy.

Students requiring information about the graduate studies which are available should seek advice from:

Graduate Diploma in Food and Drug Analysis Professor G. Crank

or

in the case of masters and doctors degrees from:

School of Chemistry Associate Professor H.A. Goodwin

School of Mathematics Associate Professor C.E. Sutherland

School of Optometry Professor H.B. Collin

School of Physics Associate Professor D. Miller

Schools of the Faculty also contribute programs to the Science and Mathematics Course 3970.

Graduate Study:
Faculty of Biological and Behavioural Sciences
Faculty of Science

Faculty of Biological and Behavioural Sciences and Faculty of Science Enrolment Procedures

All students re-enrolling in 1991 or enrolling in graduate courses should contact the Postgraduate Section for enrolment details.

Faculty of Biological and Behavioural Sciences

Facilities are available in each of the Schools for research leading to the degrees of Master of Science, Doctor of Philosophy and Graduate Diploma. The Department of Biotechnology offers, a Graduate Diploma in Biotechnology and a Master's course in Biotechnology by formal study, and the School of Psychology offers Master of Psychology (Clinical) and Master of Psychology (Applied) degree courses.

Higher Degree Qualifying Program

Students without a BSc Honours degree wishing to register as higher degree candidates must usually complete a qualifying program, admission to which is subject to the approval of the Faculty Higher Degree Committee.

Applicants must normally have a degree or diploma in an appropriate field of study from an approved university or institution, and in the case of a diploma, appropriate professional experience.

Undergraduates of this University may be admitted to the full-time or part-time Honours undergraduate course. Other applicants may be admitted to a full-time, part-time or external qualifying program. The duration of the qualifying program is a minimum of one year for full-time and two years for part-time or external students.

Content of Qualifying Program

The qualifying program consists of the whole of the usual program for the final Honours year of the undergraduate course, the following being the prescribed Level IV subjects:

BIOC4618	Biochemistry Honours
BIOS4013	Biological Science Honours (Full-time)
BIOS4019 ·	Biological Science Honours (Part-time)
BIOT4073	Biotechnology Honours
BIOT4083	Biotechnology Honours (Part-time)
BIOS4023	Botany Honours
BIOS4029	Botany Honours (Part-time)

MICR4013	Microbiology Honours
MICR4023	Psychology 4 (Thesis)
PSYC4033	Psychology 4
BIOS4033	Zoology Honours
BIOS4039	Zoology Honours (Part-time)

The qualifying program is graded in the usual way, and in appropriate cases the results are expressed as a grading equivalent to Honours.

Alternative Qualifying Program

Applicants who cannot attend the University regularly for the above programs may be admitted as external qualifying students to a program similar to a standard Honours year. The following are the alternative qualifying subjects:

BIOC6308	Biochemistry
BIOS9917	Biological Science
BIOT6013	Biotechnology
BIOS9943	Botany
MICR6043	Microbiology
PSYC6000	Psychology
BIOS9945	Zoology

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

Fees

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

Graduate Diploma
GradDip

The Graduate Diploma is designed as a one year full-time period of study and research. It is intended primarily as an advanced training programme for graduates from overseas universities who wish to obtain specialized training in particular areas of biological and behavioural science. The expectation is that for suitably qualified students, the course would allow entrance to a higher degree programme (MSc or PhD) provided suitable supervision and facilities were available. The course is also available to graduates of Australian universities who have not done an Honours course and who wish to pursue postgraduate study in a discipline other than that in which they obtained their first degree.

At the successful conclusion of the course the students would be provided with a Diploma Certificate showing their Higher Degree Qualifying status by the University and a statement of their proficiency from the relevant School.

Entrance for students for whom English is the second language would be dependent on achieving an adequate standard of written and spoken English.

The academic year for the University of New South Wales consists of two sessions, commencing in late February - early March and mid-July, respectively. It is preferred that new students arrive 2-3 weeks prior to the beginning of the Session, so that they can be orientated prior to the commencement of formal teaching.

Brief descriptions of the courses currently offered within the Schools of the Faculty are as follows:

School of Biochemistry

The Course is tailored according to the background and requirements of the individual student. In most cases it would include advanced formal undergraduate training, including lectures in general and medical biochemistry, training in the use of modern biochemical techniques, eg scintillation counting, gas-liquid chromatography (GLC), high performance liquid chromatography (HPLC), molecular biology, spectrophotometry, nuclear magnetic resonance (NMR) spectroscopy, and animal and plant cell culture. The student would also carry out a research project (or projects) in the laboratory of an academic member of staff and write a report on the project.

The School of Biochemistry has a wide range of interests and can offer research projects in most areas of biochemistry. Specialized areas of research are molecular biology, marine biochemistry, parasite biochemistry, plant biochemistry and the study of naturally occurring toxins.

School of Biological Science

The course is designed to meet the needs and objectives of individual students building on that students' competence and experience. It includes a formal coursework component and a research project which is carried out under the supervision of a member of the academic staff. Students receive advanced formal training to provide them with background information relevant to their research project.

The School has a wide range of interests and training and research are offered in both plant and animal sciences. Areas of biology in which facilities and appropriate supervision are available include:-

ecology, taxonomy, environmental physiology, marine and fisheries biology, genetics and evolution, mycology, ultrastructure, comparative physiology, mammalian studies.

School of Microbiology and Immunology

The structure of the course would be decided after discussions with each student, taking into account their particular background, interest and career goals. Usually students would attend one or more of the advanced third year courses in either general microbiology, microbial genetics, environmental microbiology, immunology, mycology, plant/microbe interactions, medical bacteriology or animal virology. The rest of the year would be spent carrying out a research project supervised by a member of academic staff.

The School of Microbiology and Immunology has a number of research teams working on a range of well funded projects in microbiology, molecular biology and immunology. Specialized areas of research include microbial ecology, environmental microbiology, marine microbiology, nitrogen fixation, the pathogenesis of intestinal infection, the immunology of the intestinal tract and arbovirus research.

School of Psychology

This one year course is adapted to suit the needs and objectives of each student, taking into account the areas of psychology in which they have already demonstrated competence. The expectation is that students who achieve an appropriate standard in the course will then be admitted to a

higher degree program, provided suitable supervision and facilities are available.

The course comprises formal teaching in an approved set of subjects drawn from the following areas: research methods and statistics, perception, learning, cognitive psychology, psycholinguistics, social psychology, clinical psychology and applied psychology. Both lectures and practical work will be given.

Students will normally also carry out a research project under the supervision of a member of the academic staff of the School. Active research programs exist in experimental psychology, social psychology, clinical psychology, behavioural neuroscience and industrial/occupational psychology. Particular attention within each of these programs if paid to the inter-relationship between scientific theory and the practical application of psychological knowledge.

		Hours per week	
		S1	S2
Obligatory Subjects			
BIOT3011	Biotechnology A	6	0
BIOT3021	Biotechnology B	0	6
BIOT5013	Practical Biotechnology	6	6
Elective Subjects			
BIOT3031	Microbial Genetics	6	0
BIOT8010	Graduate Seminars	2	2
BIOT7100	Biological Principles	3	0
BIOT7110	Bioengineering Principles	0	6

Other suitable electives from the Department of Food Science and Technology and/or other Schools.

Biotechnology

5015
Biotechnology Graduate Diploma Course

Graduate Diploma
GradDip

The graduate diploma course provides the opportunity for graduates with no previous tuition in biotechnology to undertake training in this discipline.

A degree in a science-based course is required for admission. If the degree course has not included a biology component, the candidate is required to undertake some basic biology training as a prerequisite or co-requisite.

Under normal circumstances, students whose previous training has included a substantial component of biotechnology will not be admitted to the course.

The course comprises study of undergraduate and graduate formal subjects, plus extensive laboratory training in biotechnology.

The diploma is awarded after one year's full-time study, consisting of an average of 18 hours per week, or two years part-time study, consisting of an average of 9 hours per week. The program includes the listed obligatory subjects plus sufficient of the listed elective subjects to meet the hours of study required. The electives include subjects necessary for students without previous tuition in biochemistry and or microbiology, as well as alternatives for those with previous tuition in these disciplines. The choice of electives in each individual case is subject to approval by the Head of School.

Master of Applied Science
(Biotechnology)

The Department also offers a formal graduate course at the master's level (Master of Applied Science (Biotechnology). The course includes advanced treatments of all areas of biotechnology. It is open to graduates with a four-year degree in biotechnology or a related discipline, or who have, in the opinion of the Higher Degree Committee, acquired equivalent qualifications or experience. Intending students are referred to Conditions for the Award of Graduate Degrees set out later in this handbook.

The course consists of lectures, tutorials, practical sessions, case history studies and a supervised project. The minimum period of registration before the award of the degree is two sessions for full-time students and four sessions for part-time students.

To qualify for the degree students must satisfy the examiners in the prescribed examinations, which include the submission and assessment of a report on the specified project.

8042
Master of Applied Science (Biotechnology)
Graduate
Course

Master of Applied Science (Biotechnology)
MAppSc(Biotech)

See Applied Science Handbook.

Psychology

8252
Applied Psychology Graduate Course
Full-time

Head of School
Professor B. J. Gillam

Administrative Officer
Mr T. J. Clulow

The School offers courses leading to the award of the degrees of Master of Psychology (Clinical) and Master of Psychology (Applied).

Master of Psychology (Applied)

The Master of Psychology (Applied) degree course is aimed at providing psychology graduates with a postgraduate qualification which will equip them to make a distinctive contribution in work and other organizations. The emphasis of the program will be on developing applied research skills that integrate theory and practice. When combined with their undergraduate training and the required work experience, this program will equip psychologists with an understanding of organizational, social and cultural influences on behaviour. They will be able to apply this understanding to many problems through a critical, empirical orientation based on experimental methods, measurement and statistics. Areas of specialization include Ergonomics, Organizational and Vocational Psychology, and psychological aspects of Occupational Health.

The normal entrance requirement is completion of an honours Class 1 or Class 2 degree in Psychology from the University of New South Wales or a qualification considered equivalent.

Applicants who do not satisfy the above entrance requirements may be admitted to the program. Such admissions will be based on an assessment of the applicant's knowledge, experience and occupation. Some additional qualifying subjects may be required of those who are admitted under this provision.

The minimum period of registration before the award of the degree is four sessions for full-time students and six sessions for part-time students. Students with advanced standing may have the minimum period reduced by up to one half of the program (ie a reduction of one session if a student has completed a PhD in an approved area of Psychology and one session if a student has completed part of the course work program).

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

The course consists of 1. a 22 hour core program, 2. a thesis, 3. a 10 hour elective program, and 4. Professional Practice component.

Subjects from other graduate degrees, including the Master of Psychology (Clinical) degree, may be included in the elective program with the permission of the School concerned and the Head of the School of Psychology.

Master of Psychology (Applied)
MPsychol(App)

Core Program

Year 1		Hours per week	
		S1	S2
PSYC7000	Research and Evaluation Methods	2	-
PSYC7001	Psychological Assessment 1	3	-
PSYC7002	Psychological Assessment 2	-	2
PSYC7100	Industrial and Organisational Psychology 1	2	-
PSYC7101	Industrial and Organisational Psychology 2	-	2
PSYC7102	Psychological Principles of Training	-	2
either			
PSYC7103	Applied Experimental Psychology	2	-
or			
PSYC7104	Applied Cognitive Psychology	-	2
PSYC7105	Professional Practice (Applied): 340 hours		
PSYC7106	Graduate Colloquium (Applied)	1	1
PSYC7109	Principles of Ergonomics	3	-

Core Program
Year 2			
PSYC7105	Professional Practice (Applied): 350 hours		
PSYC7107	Seminars in Applied Psychology	2	-
PSYC7108	Research Thesis (Applied)	6	6

Elective program
Year 2			
PSYC7103	Applied Experimental Psychology	2	-
PSYC7104	Applied Cognitive Psychology	-	2
PSYC7110	Advanced Ergonomics	3	-
PSYC7111	Cross-cultural Perspectives in Applied Psychology	-	2
PSYC7112	Vocational Psychology	3	-
PSYC7113	Special Topic	-	2
PSYC7114	Graduate and Applied Seminars	1 or	1
PSYC7208	Behavioural Health Management	2	2
PSYC7209	Developmental Disabilities and Disorders	-	3
PSYC7210	Human Neuropsychology	-	3
SAFE9232	Introduction to Occupational Health and Safety Law	3	-
SAFE9424	Applied Ergonomics	-	3

		S1	S2
ANAT5151	Introductory Functional Anatomy	3	-
CMED9701	Occupational Disease	-	3

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

Master of Psychology (Clinical)

This course is designed to provide professional training at an advanced level for honours graduates in psychology.

The normal entrance requirements are:

1. a degree of Bachelor, with Honours Class 1 or Class 2 in Psychology;

2. completion of a research thesis or research project in the Honours fourth year;

and

3. completion of approved courses in learning, perception and cognition, physiological psychology, psychological statistics, psychometrics and abnormal psychology, or in such other fields as may be prescribed by the Head of the School.

Selection of students is based on academic qualifications and suitability for the course. It may be necessary to limit the number of new enrolments in any year.

The minimum period of registration before the award of the degree is four sessions for full-time students and six sessions for part-time students. Students with advanced standing may have the minimum period reduced by up to one half of the program ie a reduction of one session if a student has completed a PhD in an approved area of Psychology and one session if a student has completed part of the course work program.

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

The course consists of lectures, seminars, demonstrations and practical work, 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 680 hours of supervised clinical practice must be completed.

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

It should be noted that the course extends over two calendar years and not just four academic sessions with vacation breaks.

8251
Clinical Psychology Graduate Course – Full-time

Master of Psychology (Clinical)
MPsychol (Clin)

Year 1		Hours per week	
		S1	S2
PSYC7000	Research and Evaluation Methods	2	-
PSYC7001	Psychological Assessment 1	3	-
PSYC7002	Psychological Assessment 2	-	2
PSYC7003	Graduate Colloquium	1	1
PSYC7200	Experimental Clinical Psychology	4	4
PSYC7202	Pharmacotherapy and other Physical Treatments	2	-
PSYC7203	Theory and Research in Psychopathology	-	2
PSYC7204	Child Clinical Psychology	2	-
PSYC7205	Professional Practice (Clinical): 380 hours		
PSYC7208	Behavoural Health Management	2	2
PSYC7209	Developmental Disabilities and Disorders	-	3
PSYC7210	Human Neuropsychology	-	3
Year 2			
PSYC7003	Graduate Colloquium	1	1
PSYC7201	Family Based Therapies	2	-
PSYC7205	Professional Practice (Clinical): 380 hours		
*PSYC7206	Research Thesis (Clinical)		
PSYC7207	Ethical Issues and Special Topics	2	-

Select one elective subject from -

a. Neuroanatomy for Neuropsychologist

b. a subject from the Master of Psychology (Applied) degree course, or

c. with the approval of the Head of School of Psychology one other subject.

*Contributes approximately 25 per cent to the overall grading for the degree.
Note: Part-time students normally are expected to take half the full-time program in any one session.

Faculty of Science

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

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

Faculty of Science
School of Optometry
School of Chemistry

School of Mathematics

School of Physics

Graduate Diploma in Physical Oceanography
Master of Optometry
Master of Chemistry
Graduate Diploma in Food and Drug Analysis
Master of Mathematics
Master of Statistics
Master of Physics

For admission to registration for all degrees of Master (except Master of Statistics), candidates must have completed one of the following:

1. An approved degree of Bachelor with Honours.

2. An approved three year course leading to the degree of Bachelor plus an approved qualifying program. Suitable professional and or research experience may be accepted in lieu of the qualifying program.

3. An approved four year course leading to the degree of Bachelor.

Applicants for registration for the degree of Master of Statistics shall have been admitted to the degree of Bachelor with major studies in the field of statistics in the University of New South Wales or other approved university.

The manner of presentation and examination of reports of projects undertaken as part of formal courses shall be determined by the Head of the School.

The conditions governing these awards are set out later in this handbook.

5530
Physical Oceanography Graduate Diploma Course

Graduate Diploma in Physical Oceanography
GradDip

This graduate diploma is intended to train graduates in the physical sciences or engineering in the basic techniques of physical oceanography.

It is intended to develop student skills in planning and execution of oceanographic experiments, in the theory of oceanographic fluid mechanics, the applications and limitations of oceanographic equipment and of commonly used data analysis techniques.

Recent rapid developments in marine science coupled with the relative scarcity of persons able to take up support positions demonstrate the need for skilled persons who will be able to assist oceanographic research with minimum training. This program is aimed at providing such skilled graduates.

Intending students are referred to the conditions for the award of graduate diplomas set out elsewhere in this handbook. Basic entry qualifications for this program are a degree in Engineering or in Science with major studies in mathematics or physics.

The program, requiring 28 credits for completion, consists of a major project OCE5115 worth 50% of the total accreditation for the program, the remaining 50 being comprised as indicated below.

1 Compulsory Subjects

OCEA5115	Experimental Project	14 credits
OCEA5125	Geophysical Fluid Dynamics	4 credits
OCEA5135	Instrumentation	1 credit
OCEA5145	Applied Data Analysis	2 credits

2 Elective Subjects

REMO9580	Image Analysis in Remote Sensing	3 credits
REMO9581	Microwave Remote Sensing	3 credits
CIVL9835	Coastal Engineering 1	3 credits
CIVL9836	Coastal Engineering 2	3 credits
CIVL9863	Estuarine Hydraulics	3 credits
GEOG9150	Remote Sensing Applications	3 credits
OCEA5155	Theoretical Project	7 credits
	Appropriate existing subjects within mathematics, physics or engineering chosen on the basis of individual background	

Here 1 credit is defined as being 1 hour per week for one session The course may be taken over one year full-time or two years (part-time).

Chemistry

Head of School
Professor I. G. Dance

Chairman of Graduate Studies
Associate Professor H. A. Goodwin
(contactable via Chemistry Academic Office)

8770
Master of Chemistry Graduate Course

Master of Chemistry
MChem

Three programs are available, emphasizing different areas of chemistry. Each program consists of a number of lecture courses each separately examinable, laboratory instruction and visits to laboratories. In addition each student undertakes a short research project, with a research report assessed by two examiners. The student may also be required to undergo an oral examination.

Program 2.581G Advanced Analytical Chemistry and 2.583G Analytical Science Chemistry are available only on a full-time basis.

Program 2.582G Food and Drug Chemistry may be taken either full-time or part-time.

Details of the programs are:

2.581G Advanced Analytical Chemistry

This program should be of interest to chemistry graduates who are involved in the practice or teaching of analytical chemistry.

1 *Lecture Courses*

Students are required to take all of the following nine core courses of lectures:

(1) Analytical flame spectroscopy;
(2) Advanced electrochemical analysis;
(3) Chromatography;
(4) Analytical chemistry of pollutants;
(5) Emission, IR, Mass and XRF spectroscopy;
(6) Calculations and statistics in analytical chemistry;
(7) Chemical analysis of organic and biological materials;
(8) Operations and applications of minicomputers in chemistry;
(9) Chemical microscopy.

The lecture time for the whole course is a minimum of 140 hours.

2 *Laboratory Instruction and Visits to Laboratories*

An additional minimum of 150 hours is spent by students in selected areas of laboratory practice, instruction and visits to laboratories.

3 *Research Project*

A short research project (with report) of approximately 4 months' duration full-time (400 hours) laboratory work is selected in relation to the combined interests of the student and the supervisor.

2.582G Food and Drug Chemistry

This program involves an advanced study of the chemistry, stability, mode of action where applicable and analysis of food constituents, food additives and selected drugs. Entry to this program is excluded in the case of applicants who have completed the Graduate Diploma in Food and Drug Analysis (course 5510)

1 *Lecture/Laboratory Courses*

(1) Food and Drugs 1
(2) Treatment of Analytical Data
(3) Instrumental Techniques in Food and Drug Analysis
(4) Food and Drugs 2
(5) Toxicology, Occupational and Public Health
(6) Introductory Microbiology

The lecture time for the whole course is 160 hours. An additional 392 hours is spent by students in formal laboratory work. Students who have not previously taken an approved course in microbiology are required to complete subject MICR2201 Introductory Microbiology (84 hours) in addition to the above program.

2 *Research project*

A short research project with report of approximately 4 months' duration full-time 400 hours laboratory work is selected in relation to the combined interests of the student and the supervisor.

2.583G Analytical Science (Chemistry)

This program provides a more broadly based training in methods of chemical analysis than 2.581G.

1 *Formal course work*

Students are required to complete all of the following courses of lectures and associated laboratory work.

(1) Classical methods of chemical analysis
(2) Instrumental analysis

(3) Toxicology, occupational and public health
(4) Special instrumental analysis methods

The lecture time for the whole course is 98 hours. An additional 196 hours is spent in formal laboratory sessions.

2 *Project*

A short project with report requiring 400 hours of laboratory work, which may be either original research work or development work. The field of work will be selected considering the combined interests of the student and supervisor.

5510
Food and Drug Analysis Graduate Diploma Course

Diploma in Food and Drug Analysis
DipFDA

According to demand the course may be available on a full-time basis over one year or on a part-time basis over two years.

The course in food and drug analysis is designed to provide systematic training at an advanced level for chemists who wish to extend their acquaintance with analytical techniques, and thus is suitable for those who may wish to practice as public analysts. It is also suitable for those who wish to work in the food or pharmaceutical industry. The prime aim is to present discussions of the principles and design of analytical methods which are therefore presented on a comparative basis.

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

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

Year 1

Part-time**		Hours per week
CHEM7125	Food and Drugs 1	4
CHEM7115	Treatment of Analytical Data	1
CHEM7425	Instrumental Techniques in Food and Drug Analysis	4
		9

Year 2

CHEM7225	Food and Drugs 2	4
CHEM7325	Toxicology, Occupational and Public Health	4
MICR2201	Introductory Microbiology	3*
		11

* Offered in Session 1 only, at 6 hpw.
**Full-time students take Years 1 and 2 in the one year.

Mathematics

Head of School
Professor I.H. Sloan

The School offers graduate courses leading to the award of the degrees of Master of Mathematics (MMath) and Master of Statistics (MStats). (The School also offers the pass degree of MA For further details see the Faculty of Arts Handbook).

8740
Master of Mathematics Graduate Course

Master of Mathematics
MMath

The Master of Mathematics Course is intended for honours graduates in pure or applied mathematics, but others may be admitted after completing a qualifying course. The course may be completed in one year of full-time or two years of part-time study. The course may be taken as a preliminary step towards the award of a PhD in mathematics. It also provides advanced training for persons specializing in the teaching of mathematics in tertiary institutions. In addition an appropriate program may provide training for those employed or seeking employment in the area of industrial mathematics.

The program consists of seven lecture courses from 10194G, the duration of each being two hours per week for one session. With the approval of the Head of the School of Mathematics a student may substitute for one or more of these lecture courses a reading course supervised by a member of staff. Again with this approval a student may substitute for at most two of these courses graduate courses offered either within or outside the School of Mathematics. Students are also required to participate in relevant departmental seminars. In addition, students are required to undertake a project supervised by a staff member, consisting of either a critical review of the literature in a specific field of mathematics, or a short research project. It is anticipated that students will spend three hours per week for two sessions on their project. Each candidate's proposed program of study requires the approval of the Head of the School of Mathematics.

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

8750
Master of Statistics Graduate Course

Master of Statistics
MStats

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

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

The academic requirement for the degree is 24 credits.

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

Compulsory Subjects		Credits
MATH5815	Experimental Design 1	2
MATH5835	Stochastic Processes	2
MATH5855	Multivariate Analysis 1	2
MATH5905	Statistical Inference	2
MATH5925	Project	2

Elective Subjects		
MATH5825	Experimental Design 2	2
MATH5845	Time Series	2
MATH5865	Multivariate Analysis 2	2
MATH5875	Sample Survey Design	2
MATH5885	Sequential Analysis	2
MATH5895	Non-Parametric Methods	2
MATH5915	Special Topic* A	2
MATH5935	Special Topic* B	2
MATH5945	Discrete Distributions	2
MATH3181	Optimal Control Theory	

Up to 6 credits may be taken in graduate subjects offered by other Departments or Schools within the University, subject to the approval of the Head of School Such subjects include:

CIVL9403	Theory of Land Use/Transport Interaction	2
CIVL9405	Urban Transport Planning Practice	2
CIVL9417	Transport and Traffic Flow Theory	4
MATH3161	Optimization Methods or	3
ECON3204	Econometrics B	2
MANF9330	Simulation in Operations Research	2

*To be arranged: eg biological statistics, further work on order statistics, population statistics, non-linear programming

Optometry

Head of School
Professor H. B. Collin

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

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

8760
Master of Optometry Graduate Course

Master of Optometry
MOptom

Not offered in 1991.

		Hours per week
OPTM8001	Advanced Clinical Optometry	4
	Three elective graduate subjects chosen from the list below (each 4 hours)	12
OPTM8008	Project	8
		24

Elective Graduate Subjects

OPTM8002	Advanced Physiological Optics	4
OPTM8003	Pleorthoptics and Binocular Vision	4
OPTM8004	Advanced Contact Lens Studies	4
OPTM8005	Advanced Contact Lens Practice	4
OPTM8006	Occupational Optometry	4
OPTM8007	Clinical Photography	4

The six elective graduate subjects offered are quite independent, and any three of them are suitable for a student seeking advanced professional training of a general nature. If clinical specialization is aimed at, the student would be advised to elect the graduate subjects shown below:

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

Physics

Head of School
Professor J. W. V. Storey

Executive Assistant to Head of School
Dr K. R. Vost

Administrative Officer
Mr S. Lo

8730
Master of Physics Graduate Course

Master of Physics
MPhysics

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

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

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

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

PHYS8015	Energy Alternatives
PHYS8025	Astrophysics
PHYS8035	Acoustics
PHYS8045	Biophysics
PHYS8055	Applied Physics

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

Undergraduate Study

Subject Descriptions

Identification of Subjects

A subject is defined by the Academic Board as 'a unit of instruction approved by the University as being a discrete part of the requirements for a course offered by the University'.

In 1991 a new system of subject identification is introduced. Each approved subject of the University is identified by a sequence of eight characters, consisting of a four character alphabetical prefix which identifies the organizational unit responsible for administering the subject, and a four digit numeric suffix identifies the subject.

Subject identifiers are approved by the Registrar and the system of allocation is based on the following guidelines:

1. The authority offering the subject, normally a School of the University, is indicated by the four character alphabetical prefix.

2. Each subject identifier is unique and is not used for more than one subject title.

3. Subject numbers which have previously been used are not used for new subject titles.

Subjects taught are listed in full in the handbook of the faculty or board of studies responsible for the particular course within which the subjects are taken. Subject descriptions are contained in the appropriate section in the handbooks.

Appropriate subjects for each school appear at the end of each school section.

The identifying alphabetical prefixes for each organizational unit are set out on the following pages.

Servicing Subjects are those taught by a school or department outside its own faculty. Their subject descriptions are published in the handbook of the faculty which originates the subject and are also published in the handbook of the faculty in which the subject is taught. The following pages contain descriptions for most of the subjects offered for the courses described in this book, the exception being General Education subjects. For General Education subjects see the General Education Handbook which is available free of charge.

HSC Exam Prerequisites

Subjects which require prerequisites for enrolment in terms of the HSC Examination percentile range, refer to the 1978 and subsequent Examinations.

Candidates for enrolment who obtained the HSC in previous years or hold other high school matriculation should check with the appropriate school on what matriculation status is required for admission to a subject.

Information Key
The following is the key to the information which may be supplied about each subject:

S1 Session 1, **S2** Session 2

F Session 1 *plus* Session 2, ie full year

S1 or S2 Session 1 or Session 2, ie choice of either session

SS single session, but which session taught is not known at time of publication

CCH class contact hours

L Lecture, followed by hours per week

T Laboratory/Tutorial, followed by hours per week

P/T part-time

hpw hours per week

wks weeks of duration

C Credit point value

CR Credit

DN Distinction

HD High Distinction

X External

Sciences

Prefix	Organizational unit	Faculty
ABIO	School of Applied Bioscience	Applied Science
ACCT	School of Accounting	Commerce & Economics
ACHM	Department of Chemistry	University College
ACMA	Department of Civil Engineering	University College
ACSC	Department of Computer Science	University College
AECM	Department of Economics & Management	University College
AELE	Department of Electrical Engineering	University College
AENG	Department of English	University College
AERO	Aeronautical Engineering	Engineering
AGOC	Department of Geography & Oceanography	University College
AHIS	Department of History	University College
AINT	University College (Interdisciplinary)	University College
AMAT	Department of Mathematics	University College
AMEC	Department of Mechanical Engineering	University College
ANAT	School of Anatomy	Medicine
APHY	Department of Physics	University College
APOL	Department of Politics	University College
APSE	Faculty of Applied Science	Applied Science
ARCH	School of Architecture	Architecture
ARTS	Faculty of Arts	Arts
ASIA	Asian Studies	Arts
AUST	Australian Studies	Arts
BIOC	School of Biochemistry	Biological & Behavioural Sciences
BIOM	Centre for Biomedical Engineering	Engineering
BIOS	School of Biological Science	Biological & Behavioural Sciences
BIOT	Department of Biotechnology	Applied Science
BLDG	School of Building	Architecture
BSSM	Board of Studies in Science & Mathematics	
CEIC	School of Chemical Engineering & Industrial Chemistry	Applied Science
CHEM	School of Chemistry	Science
CHEN	Department of Chemical Engineering	Applied Science
CHIN	Chinese	Arts
CIVL	School of Civil Engineering	Engineering
CMED	School of Community Medicine	Medicine
COFA	College of Fine Arts	
COMM	Faculty of Commerce	Commerce & Economics
COMP	Computer Science	Engineering
ECOH	Department of Economic History	Commerce & Economics
ECON	School of Economics, and Departments of Econometrics and Economics	Commerce & Economics

Prefix	Organizational unit	Faculty
EDST	School of Education Studies	Professional Studies
ELEC	School of Electrical Engineering & Computer Science	Engineering
ENGL	School of English Studies	Arts
EURO	European Studies	Arts
EXPA	School of Arts and Music Education	Professional Studies
FIBR	School of Fibre Science & Technology	Applied Science
FINS	School of Banking & Finance	Commerce & Economics
FOOD	Department of Food Science and Technology	Applied Science
FREN	School of French	Arts
FUEL	Department of Fuel Technology	Applied Science
GENS	Centre for Liberal & General Studies	
GEOG	School of Geography	Applied Science
GEOL	Department of Applied Geology	Applied Science
GERS	School of German Studies	Arts
GREK	Modern Greek	Arts
GSBE	Graduate School of the Built Environment	Architecture
HEAL	School of Health Services Management	Professional Studies
HIST	School of History	Arts
HOSP	Asian Studies Unit	Commerce & Economics
IDES	Department of Industrial Design	Architecture
INDC	Department of Industrial Chemistry	Applied Science
INDO	Indonesian	Arts
INFS	School of Information Systems	Commerce & Economics
INTD	Interdisciplinary Studies	Arts
IROB	School of Industrial Relations & Organ. Behaviour	Commerce & Economics
JAPN	Asian Studies Unit	Commerce & Economics
KCME	Key Centre for Mines	Applied Science
LAND	School of Landscape Architecture	Architecture
LAWS	School of Law	Law
LEGT	Department of Legal Studies & Taxation	Commerce & Economics
LIBS	School of Librarianship	Professional Studies
MANF	Manufacturing Management	Engineering
MARK	School of Marketing	Commerce & Economics
MATH	School of Mathematics	Science
MATS	School of Materials Science and Engineering	Applied Science
MDCN	School of Medicine	Medicine
MDSG	Med/Surg.Clinical Studies	Medicine
MECH	School of Mechanical Eng. & Manufacturing Eng.	Engineering
MEED	School of Medical Education	Medicine
MFAC	Medical Faculty (Admin)	Medicine

Prefix	Organizational unit	Faculty
MICR	School of Microbiology and Immunology	Biological & Behavioural Sciences
MINE	Department of Mining Engineering	Applied Science
MNGT	Australian Graduate School of Management	
MSCI	Centre for Marine Sciences	
MUSI	Department of Music	Arts
NAVL	Naval Architecture	Engineering
OBST	School of Obstetrics & Gynaecology	Medicine
OPTM	School of Optometry	Science
PAED	School of Paediatrics	Medicine
PATH	School of Pathology	Medicine
PHIL	School of Philosophy	Arts
PHPH	School of Physiology & Pharmacology	Medicine
PHYS	School of Physics	Science
PLAN	School of Town Planning	Architecture
POLS	School of Political Science	Arts
POLY	Department of Polymer Science	Applied Science
PSCY	School of Psychiatry	Medicine
PSYC	School of Psychology	Biological & Behavioural Sciences
PTRL	Department of Petroleum Engineering Studies	Applied Science
REMO	Centre for Remote Sensing	Engineering
RUSS	Department of Russian Studies	Arts
SAFE	Centre for Safety Science	Engineering
SCTS HPST	School of Science & Technology Studies	Arts
SLSP	Department of Social Science & Policy	Arts
SLST	School of Sport & Leisure Studies	Professional Studies
SOCI	School of Sociology	Arts
SOCW	School of Social Work	Professional Studies
SPAN	Spanish & Latin American Studies	Arts
SURG	School of Surgery	Medicine
SURV	School of Surveying	Engineering
TEDG	School of Teacher Education (grad)	Professional Studies
TEED	School of Teacher Education (undergrad)	Professional Studies
TESL	TESOL	Arts
TEXT	Department of Textile Technology	Applied Science
THST	Department of Theatre Studies	Arts
USOM	School of Mines	Applied Science
WOMS	Women Studies	Arts
WOOL	Department of Wool & Animal Science	Applied Science

Anatomy

ANAT5151   Introductory Functional Anatomy

An overview of basic human anatomy and physiology with an emphasis on structures and systems such as the eye, ear and skin, which are most vulnerable to chemical and physical trauma under industrial conditions. Other systems studied include the musculo skeletal system, central and peripheral nervous systems, circulatory, respiratory, gastrointestinal, endocrine and urogenital systems. **(Old No. 70.201G)**

ANAT6411   Neuroanatomy

This subject is identical in content as ANAT3411 Neuroanatomy 1 and is offered jointly with that subject. **(Old No. 70.012G)**

Biochemistry

BIOC6308   Alternative Higher Degree Qualifying Program

Similar in content and standard to BIOC4318 Biochemistry Honours but designed specifically for students who cannot regularly attend the University. **(Old No. 41.999G)**

Biological Science

BIOS3014   Ecological Studies in Arid   S2 L2 T4
Lands Management

Prerequisite: Degree with background in bioscience or equivalent.

Techniques in ecological studies of animal communities. Adaptations to an arid environment environmental and social determinants. Behaviour, diet and condition of native and feral animals. Competition between native and introduced herbivores. Strategies in the management of arid zone wildlife. Concurrent studies in relevant units in the School of Biological Science are prescribed to cover aspects of vegetation description and plant environment interactions. **(Old No. 45.900G)**

BIOS9917   Alternative Higher Degree Qualifying Program

Similar in content and standard to BIOS4013 Biological Science Honours but designed specifically for students who cannot regularly attend the University. **(Old No. 17.999G)**

BIOS9943   Alternative Higher Degree Qualifying Program

Similar in content and standard to BIOS4023 Botany Honours but designed specifically for students who cannot regularly attend the University. **(Old No. 43.999G)**

BIOS9945 Alternative Higher Degree Qualifying Program

Similar in content and standard to BIOS4033 Zoology Honours but designed specifically for students who cannot regularly attend the University. **(Old No. 45.999G)**

Biotechnology

BIOT5013   Practical Biotechnology   F T6

Illustration, demonstration and operation of laboratory-scale and pilot-scale equipment. Visits to appropriate industries. Experimental project or critical review. **(Old No. 42.215G)**

BIOT6013   Alternative Higher Degree Qualifying
Program

Training similar in content and standard to BIOT4073 Biotechnology Honours, but designed specifically for students who cannot regularly attend the University. **(Old No. 42.999G)**

BIOT7010   Reading List in Biotechnology (Microbiology)
(Old No. 42.111G)

BIOT7020   Reading List in Biotechnology (Biochemistry)
(Old No. 42.112G)

BIOT7030   Biotechnology   SS L2 T1

The selection, maintenance and genetics of industrial organisms; metabolic control of microbial synthesis; fermentation kinetics and models of growth; batch and continuous culture; problems of scale-up and fermenter design; control of the microbial environment; computer fermentor interactions. Industrial examples will be selected from: antibiotic and enzyme production, alcoholic beverages, single cell protein SCP, microbial waste disposal and bacterial leaching. Tutorial practical sessions include: problem solving, instrumentation, continuous culture techniques, and mathematical modelling and simulation of industrial processes. **(Old No. 42.214G)**

BIOT7100   Biological Principles   S1 L3

Characteristics of living systems. Biological molecules: carbohydrates, lipids, proteins and nucleic acids. Cell structure and function: prokaryotic and eukaryotic cells. Basic biochemistry: thermodynamics and catalysis of metabolism; catabolic and anabolic processes; properties of enzymes; DNA replication; protein synthesis. Comparative metabolism of viruses, bacteria, fungi, plants and animals. Metabolic regulation. Modes of nutrition and nutrient cycles. Reproduction and genetics: eukaryotic and prokaryotic systems; sexual and asexual reproduction; bacterial genetics; recombinant DNA technology. Micro-organisms of commercial significance. Biodeterioration and diodegradation. Pathogenic micro-organisms; aetiology and epidemiology of infection; host defence mechanisms; chemotherapy; mechanisms of drug action; drug resistance. **(Old No. 42.407G)**

BIOT7110   Bioengineering Principles   S1 L3

Steady state and differential balances as a basis for quantification of complex real systems. Concepts in rate processes and kinetic analysis with application to biological systems. Experimental determination of rate data. Correlation of simple lumped rate processes and simultaneous distributed processes and the concepts involved in dimensionless numbers.

Lamina and turbulent flow. The structure of homogeneous and boundary layer turbulence flow in pipes and channels. Mixing theory. Process vessel (reactor) models.

Fluid viscosity, Newtonian and non-Newtonian fluids, convective and molecular transport processes. Heat and mass transport, film coefficients. Film, boundary layer, penetration and surface renewal theories (descriptive only). .

Quantification of complex systems. Empirical and mechanistic models in biological systems. **(Old No. 42.408G)**

BIOT8010   Graduate Seminars
(Old No. 42.104G)

Chemistry

CHEM7115   Treatment of Analytical Data   F L1

Errors of measurement, the treatment, interpretation and comparison of sets of measurements, associated data and problems involving analysis of variance. Topics: Description of sets of measurements, tests of significance, associated data, linear regression analysis; analysis of variance; biologicval assays, bacteriological counts, sampling problems. **(Old No. 2.371G)**

CHEM7125   Food and Drugs 1   F L1 T3
and
CHEM7225   Food and Drugs 2   F L1 T3

These two units contain common subject material but are subdivided to enable them to be taken over one or 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. **(Old No. 2.231G)**

CHEM7325   Toxicology, Occupational and   F L1 T3
Public Health

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. **(Old No. 2.251G)**

CHEM7425   Instrumental Techniques in   F L1 T3
Food and Drug Analysis

Principles involved in modern instrumental techniques; detailed application and interpretation of results. UV, IR, NMR, and ESR, emission and atomic adsorption spectroscopy, polarography, Xray methods, fluorescence spectroscopy and gas chromatciated data and problems involving analysis of variance. Topics: Description of sets of measurements, graphical representations, calculation of measures of location and spread; probability and random errors, binomial, normal and Poisson distributions; comparisons of sets of measurements, tests of significance; associated data, linear regression analysis; analysis of variance; biological assays, bacteriological counts, sampling problems. **(Old No. 2.281G)**

Civil Engineering

CIVL9403   Theory of Land Use Transport   S1 C3
Interaction

Theoretical aspects of land use transport planning. Basic concepts, data collection methods, systems models and equation of state function behavioural, optimizing. Introduction to land use-transport modelling land use, generation, distribution, modal assignment, network assignment, evaluation. Planning methodologies short-, medium-, long-term; action planning, strategic planning; local, urban, regional national. **(Old No. 8.403G)**

CIVL9405   Urban Transport Planning Practice   SS C3

Analytical techniques for urban land use transport planning practice. Planning methodology: traffic generation, trip distribution, modal-choice, traffic assignment, evaluation. Land use forecasting; calibration and verification of behavioural models, application of mathematical programming models, case studies, public transport problems. **(Old No. 8.405G)**

CIVL9417　Transport and Traffic Flow Theory

Analysis of deterministic and stochastic models of the traffic stream. Topics covered include the following. Definition and measurement of traffic stream parameters. Space and time distribution of speed. Overtaking models and the moving-observer method. Fundamental diagram of traffic. Car-following theory. Headway and counting distributions. Introduction to queueing theory. Simulation techniques. Signalized and unsignalized intersections. **(Old No. 8.417G)**

CIVL9835　Coastal Engineering 1　　　　S1 C3

Theory of periodic waves as applied to tides and wind generated waves in water of varying depths. Wave and tide prediction. **(Old No. 8.835G)**

CIVL9836　Coastal Engineering 2　　　　S1 C3

Wave forces on structures, shore processes and beach erosion. Estuarine hydraulics, wave and tide models. **(Old No. 8.836G)**

CIVL9863　Estuarine Hydraulics　　　　SS C3

Classification of estuary types and their characteristics. Tides, their origin, prediction and effect on estuarine circulation. Entrainment and mixing process in estuaries. Salinity intrusion, tidal flushing, dispersion of pollutants. Sediment transport, channel stability. **(Old No. 8.863G)**

Medicine, Faculty of

CMED9701　Occupational Disease　　　　S2 L3 C3
Prerequisite: ANAT5151 or equivalent.

Physical environment and disease; Musculoskeletal system, physical trauma; heat and cold, burns, electric shock; rediation, pressure, vibration, noise hearing. *Chemical environment and disease:* Metallic poisons, carcinogens, allergens, *Microbial environment and disease. Systems approach:* gastrointestinal tract; renal system; central and peripheral nervous systems; visual system, respiratory system, airborne particulates; skin. **(Old No. 80.701G)**

Economics

ECON3204　Econometrics B　　　　S2 L2 T1
Prerequisite: ECON3203.

Identification, specification and estimation of simultaneous equation models including forecasting, policy analysis and simulation. The estimation techniques include: two-stage least squares, three-stage least squares, limited information maximum likelihood and reduced form estimation.

Students build their own models using standard computer packages. **(Old No. 15.304M)**

ECON5114　Economics A　　　　S1 L2 T1
Prerequisite: Nil.

Microeconomic theory and applications including consumer behaviour and the theory of demand; costs, production and the theory of the firm price determination under competition, monopolistic and oligopolistic markets; investment and technology; wages, and the distribution of income; welfare, economic efficiency and public policy. **(Old No. 15.114G)**

ECON5125　Economics B　　　　S2 L2 T1
Prerequisite: ECON5114.

Overview of the macroeconomy; determination of aggregate income, interest rate and employment in closed and open economies; theories of inflation; inflation and unemployment policy; monetarist and Keynesian controversies. **(Old No. 15.125G)**

Geography

GEOG9150　Remote Sensing Applications

The application of remotely-sensed data and information in the description, classification and assessment of earth resources and environmental conditions. Different types of remote sensing data and imagery, their attributes, acquisition and uses. Relevance of remote-sensing data and imagery to a range of applications, including assessment of conditions of terrain, soils and surface materials, multitemporal monitoring and inventory of rangelands, croplands and forests; rural and urban land use assessment; surveillance of surface water resources and sedimentation; appraisal of changes in coastal zone. Use of remote sensing in environmental management and in environmental impact assessment. **(Old No. 27.043G)**

Engineering, Faculty of

MANF9330　Simulation in Operations Research　　C3
Excluded MANF3609, 6.646.

The relationship of simulation to other methods of comparing alternative solutions to industrial problems. Computer simulation languages. Process generation. Variance reduction techniques. Analysis of simulation generated time series. Formulation and construction of models for simulation. Problems of simulation. Design of simulation experiments. Optimization through simulation. Examples of the use of simulation. Heuristics. **(Old No. 18.761G)**

REMO9580　Image Analysis in Remote Sensing　　C3
Prerequisite: 10.361 or similar.

Techniques for extracting information from remotely sensed data with particular emphasis on satellite imagery. Topics taken from: nature and characteristics of earth resources and related satellites; satellite sensors and data formats; image

enhancement techniques; image classification; image classification methodologies; new horizons in remote sensing image analysis. (Old No. 97.580G)

REMO9581 Microwave Remote Sensing   C3

Use of passive and active radar microwave techniques in remote sensing of earth resources. Topics include; real and synthetic aperture radar systems; passive microwave radiometry; energy-surface interactions; interpretation of microwave image data: applications in agriculture, geology, oceanography and hydrology; issues in signal and image processing; characteristics of airborne and spaceborne microwave sensors. (Old No. 97.581G)

Mathematics

MATH3161   Applied Mathematics 3   S1 L3 T1
            Optimization Methods

Prerequisites: MATH2501 and MATH2510 or MATH2100. Excluded: 10.222L.

Development, analysis and application of methods for optimization problems. Theory of multivariable optimization; including necessary and sufficient optimality conditons, stationary points, Lagrange multipliers, Kuhn-Tucker conditions, convexity and duality. Numerical methods for one dimensional minimization, uncostrained multivariable minimization (including steepest descent, Newton, quasi-Newton and conjugate gradient methods) and constrained multi-variable minimization (including linear programming and quadratic programming). (Old No. 10.212L)

MATH5005   Advanced Mathematics Lecture Courses

Each year a selection of courses is offered in the following areas:

Algebraic geometry; algebraic topology; categorical and homological algebra: commutative algebra: group theory; Lie groups and algebras; representation theory; group theory and its physical applications; advanced quantum mechanics; differential geometry; differential equations; optimal control theory; functional analysis: applied functional analysis; operator theory; harmonic analysis; advances numerical analysis; theory of functions; finite mathematics: number theory; logic; theoretical astrophysics: history of mathematics; recent advances in mathematics; mathematical economics; optimization and control. (Old No. 10.194G)

MATH5815   Experimental Design 1

Modified designs for fixed effects models. Incomplete and balanced incomplete block designs. Confounding and fractional replication. Randomization theory. Multiple comparisons. (Old No. 10.381G)

MATH5825   Experimental Design 2

Extensive treatment of random and mixed models. Combinatorial structure of designs, cross-over and lattice designs, response surfaces. (Old No. 10.382G)

MATH5835   Stochastic Processes

Discrete parameter, continuous time Markov processes. Brief survey of birth-and-death, immigration, epidemic and predatorprey processes. Introduction to dam and storage problems. Queueing processes. Diffusion approximations. (Old No. 10.383G)

MATH5845   Time Series

Spectral estimates, discrete and continuous spectra. Periodogram analysis. Probability theory, special processes. Ergodicity, harmonic analysis and linear filters. Estimation and hypothesis testing. (Old No. 10.384G)

MATH5855   Multivariate Analysis 1

Likelihood ratio tests for means, variances and structure. Discriminant, principal component, canonical and factor analysis. (Old No. 10.385G)

MATH5865   Multivariate Analysis 2

The general linear hypothesis and analysis of dispersion. Tests based on roots, distribution theory. (Old No. 10.386G)

MATH5875   Sample Survey Design

Simple, stratified and systematic random sampling. Estimation of proportions, ratios, and sample sizes. Multi-stage sampling. (Old No. 10.387G)

MATH5885   Sequential Analysis

The sequential probability ratio test OC and ASN functions. General theory of sequential tests. Sequential estimation. (Old No. 10.388G)

MATH5895   Non-Parametric Methods

Sign test, run tests, goodness-of-fit tests. Order statistics and range. Rank-order statistics. Wilcox and signed-rank tests, oneand two-way rank analyses of variance. Rank correlation. Randomization theory and permutation tests. Paired comparisons. Censoring and truncation. (Old No. 10.389G)

MATH5905   Statistical Inference

Decision theory. General theory of estimation and hypothesis testing. (Old No. 10.390G)

MATH5915   Special Topic A

To be arranged, eg biological statistics, further work on order statistics, population statistics, non-linear programming, discrete distribution theory. (Old No. 10.391G)

MATH5925   Project (Old No. 10.392G)

MATH5935   Special Topic B

To be arranged, eg biological statistics, further work on order statistics, population statistics, non-linear programming, and other topics. (Old No. 10.393G)

MATH5945   Discrete Distributions

Discrete and lattice distributions their general properties mostly via generating functions. The structures of contagious clustered distributions, with a study of specific examples such as the negative binomial. Neyman and Poisson-Pascal

families, together with estimation and fitting procedures. (Old No. 10.394G)

MATH5950 Regression Analysis and   **S1 L1.5 T.5**
Experimental Design

Prerequisite: First course in Statistics or equivalent.

A revision of linear regression with extension to multiple and stepwise linear regression. Analysis of block designs, Latin squares, factorial designs, variance component and mixed model analyses. Bioassay, logic models. Contingency tables. (Old No. 10.302G)

MATH5960 Applied Stochastic Processes   **S2 L1.5 T.5**

Prerequisite: First course in Statistics or equivalent.

An introduction to processes in discrete and continuous time. Markov chains and Markov processes, branching processes, time series with moving average models. (Old No. 10.303G)

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subjects see the Faculty of Engineering Handbook.

MATH5045 Advanced Mathematics for   **C3**
Electrical Engineers

Boundary value problems in partial differential equations. Selected topics from complex variable analysis, integral transforms, and orthogonal functions and polynomials. (Old No. 10.061G)

BIOM9012 Biomedical Statistics   **S2 L2.5 T1.5 C4**

Probability and distributions. Estimation and hypothesis testing. Associations between disease and risk factors. Linear models; analysis of variance, simple and multiple regression, discriminant analysis. Distribution-free methods. Analysis of survival data. Experiment design. (Old No. 32.012G)

Microbiology and Immunology

MICR6043 Alternative Higher Degree Qualifying
Program

Similar in standard to MICR4013 Microbiology Honours, but designed for students who cannot regularly attend the University. (Old No. 44.999G)

Science, Faculty of

*OCEA5115 Experimental Project in   **F L9**
Physical Oceanography

A report of an experimental project, including recording, preparation, analysis and interpretation of field or laboratory data. (Old No. 67.001G)

*OCEA5125 Geophysical Fluid Dynamics   **F L2**

Aspects of the physical features of the oceans. Includes ocean waves rotational and gravitational, tides, large scale wind driven ocean circulation, coastal dynamics, thermohaline circulations and mixing processes. (Old No. 67.002G)

*OCEA5135 Instrumentation   **S1 L1**

Laboratory, moored, shipborne, airborne and space instrumentation commonly used in oceanographic experiments; their applications and limitations. (Old No. 67.003G)

*OCEA5145 Applied Time Series Analysis   **S1 L1.5 T.5**

Classification of random processes, sampling for discrete analysis, Fourier analysis, spectra, filtering. Cross-spectra, estimation and hypothesis testing, confidence limits, application to experiment planning. Emphasis on computer analysis of actual data. (Old No. 67.004G)

*OCEA5155 Theoretical Project in Physical
Oceanography

A theoretical project aimed at developing the prediction of oceanographical phenomena, tailored to meet individual student background but taken only by those students with a strong theoretical background. (Old No. 67.005G)

*These subjects are administered by the School of Mathematics

Optometry

OPTM8001 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; geriatic and pediatric optometry; the clinical application of electrophysiological techniques. The assessment of new instruments, methods and treatment. (Old No. 31.701G)

OPTM8002 Advanced Physiological Optics   **F L2 T2**

Advanced studies in a number of areas of physiological optics. Refractive state of the eye: physiological basis of ocular refraction, advanced study of the schematic eye, modern concepts of ocular image formation, resolution of the ocular image. Scatter,

absorption and reflection of light within the eye, illumination of the retina, receptor density and the retina image, image-forming properties of the rods and cones. Ultrasonic, X-ray and optical techniques for defining the parameters of the refractive state. Aetiology of the refractive state. Perceptual organization of the retinal image: neural networks in the retina and their mathematical analogs, visual transfer functions. Mach bands, retinal inhibition, spatial and temporal resolution of the retina, static and dynamic visual acuity. Stabilization of the retinal image. Periodic stimulation processes. Electrophysiology of vision: electrical fields of the eye, monitoring the ocular potential. Electro-oculography, electro-retinogram, electro-myogram, electro-encephalogram. Electro-pathology of vision. Autonomic servo-mechanisms of the eyes: pupillometry. Accommodation. Colour vision: basic mechanics of colour vision; visual pigments, fundus reflectometry, Stiles' increment threshold technique. Derivation of fundamental response curves. Differential and incremental colour thresholds. Temporal and spatial effects. Defective colour vision. Parafoveal colorimetry. Colour scales and colour spaces. **(Old No. 31.702G)**

OPTM8003 Pleorthoptics and Binocular Vision   F L2

An integrated subject, in which binocular vision and pleorthoptics are studies from theoretical and clinical viewpoints. Clinical experience is provided by selected patients. Includes: the nature and control of eye movements and role in maintaining the perception of a stable visual world. Binocular and monocular subjective visual directions. The neurophysiological substrate of binocular vision and its phenomena. Stereopsis and its measurement. Accommodation, convergence, and oculo-motor imbalance. Laboratory and clinical methods of measuring eye position and visual directions. The aetiologies, measurements and treatment of strabismus, anomalous correspondence, eccentric fixation amblyopia. **(Old No. 31.703G)**

OPTM8004 Advanced Contact Lens Studies   F L1 T3

Contact lens materials: polymer chemistry, physical and chemical properties of soft and hard lens materials. *Contact lens design:* the relationship of theoretical contact lens design and corneal topography. Clinical evaluation of current and new soft and hard lens designs. *Contact lens care and maintenance:* theory and performance of various soft and hard lens care and maintenance systems. Soft and hard lens parametric variations. *Contact lens patients:* systems and techniques for evaluating contact lens patients; new techniques for patient instruction and management. Evaluation of patient responses to lenses. **(Old No. 31.704G)**

OPTM8005 Advanced Contact Lens Practice   F L1 T3

The examination, evaluation and aftercare of contact lens patients. **(Old No. 31.705G)**

OPTM8006 Occupational Optometry   F L2 T2

Visual job analysis, human aspects of people-machine systems. Information theory, channel capacity. Visual aspects of peoplemachine 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. **(Old No. 31.706G)**

OPTM8007 Clinical Photography   F L2 T2

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. **(Old No. 31.707G)**

OPTM8008 Project
(Old No. 31.799G)

OPTM9003 Pleorthoptics and Binocular Vision   F L2 T2

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. **(Old No. 31.703G)**

Physics

Not all graduate subjects are necessarily offered in any one year.

PHYS8015 Energy Alternatives

For MPhysics degree course students.

Details are determined during the year preceding that in which it is offered. **(Old No. 1.801G)**

PHYS8035 Acoustics

As for PHYS8015 Energy Alternatives
(Old No. 1.803G)

PHYS8025 Astrophysics

As for PHYS8015 Energy Alternatives
(Old No. 1.802G)

PHYS8045 Biophysics

As for PHYS8015 Energy Alternatives
(Old No. 1.804G)

PHYS8055   Applied Physics

As for PHYS8015 Energy Alternatives
(Old No. 1.805G)

PHYS9183   Methods of Theoretical Physics

For PhD degree, MSc and MPhysics degree course students.

Response functions and Green's functions. Symmetry and group theory. Many particle systems. Tensor calculus and variational techniques. **(Old No. 1.118G)**

PHYS9283   Methods of Experimental Physics

For PhD degree, MSc and MPhysics degree course students.

Signal processing and retrieval. Resonance spectroscopy techniques. Diffraction and scattering techniques. Electron microscopy. **(Old No. 1.128G)**

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subject see the Faculty of Architecture handbook.

PHYS7159   Acoustic Theory   L1.5 T.5

2 credit points.

Sources of acoustic radiation; simple, dipole, quadrupole, plane, impulsive source, random source, aerodynamic sources. Free field propagation in fluids, interference and diffraction, absorption, shock waves. Boundary effects: reflection and transmission at fluid fluid and fluid solid interfaces, fluid waveguides, solid waveguides. Reception and analysis; transducers. Fourier analysis, statistical methods, impulse measurement. **(Old No. 1.927G)**

Psychology

PSYC6000   Alternative Higher Degree Qualifying Program

Refer to the School of Psychology for details. **(Old No. 12.999G)**

PSYC7000   Research and Evaluation Methods

Problems of experimental design in applied fields; measurement and scaling; analysis of change, including sequential analysis, and the application of the experimental methods to the individual cases. Design and evaluation of programs. **(Old No. 12.239G)**

PSYC7001   Psychological Assessment 1

A theoretical basis, background information and practical skills in methods of assessment typically used in clinical and industrial psychology. Theory and research on interviewing, introduction to DSM III-R, assessment interviewing, assessment of intellectual functioning, test access and use and computerised testing, neuropsychological and organicity assessment, personality assessment and its use, assessment

and goal attainment scaling, and ethical, legal and professional issues. **(Old No. 12.250G)**

PSYC7002   Psychological Assessment 2

Prerequisite: PSYC7001

The application of the principles of experimental psychology to problems of behavioural assessment in a wide variety of situations, eg organisational behaviour; lifestyle change; the management of behavioural disorders; institutional behavioural programs. Assessment procedures studied include: psychological tests, behavioural analysis and case history taking, psychophysiological and other objective measures. **(Old No. 12.244G)**

PSYC7003   Graduate Colloquium

Participation in the staff-graduate student colloquium. **(Old No. 12.241G)**

PSYC7100   Industrial and Organisational Psychology 1

General framework for understanding organisational settings and how social structures and procedures affect work motivation, job satisfaction, performance and health. Emphasis will be placed on the particular contribution which psychologists can make to areas such as job analysis and design, selection, and performance appraisal, interpersonal and intergroup relations, the socio-technical analysis of production systems, social influence, leadership style, job enrichment, and communication patterns.

PSYC7101   Industrial and Organisational Psychology 2

Prerequisite PSYC7100

An advanced examination of some topics covered in PSYC7100 Industrial and Organisational Psychology 1 with a particular emphasis on the application of sound measurement and research principles to selection, job evaluation and work motivation. Special attention will be given to the application of social psychological principles to the work setting.

PSYC7102   Psychological Principles of Training

Relevant principles from learning theory and cognitive psychology applied to training in industry and retraining for new technology. Training for adaptability and transfer; the important role of automaticity and attitudes in training. Development of work related cognitive, motor and social skills, and the use of computerised packages. Research on the effectiveness of different methods of training. **(Old No. 12.352G)**

PSYC7103   Applied Experimental Psychology

A discussion of the perceptual and attentional mechanisms that limit our ability to obtain information, and the implications for such practical areas as ergonomics and selection. Topics include psychophysics and signal detection performance on vigilance tasks.

PSYC7104   Applied Cognitive Psychology

A discussion of the cognitive factors that limit our ability to process information, methods used to cope with these limitations, and the implications for such practical areas as training and artificial intelligence. Topics include memory,

reasoning and problem-solving, and performance on motor tasks.

PSYC7105   Professional Practice (Applied)

The application of theoretical aspects covered in the course to a variety of situations. There will be supervised work experience in a variety of settings together with a weekly meeting to allow systematic discussion of relevant professional, ethical and legal issues. (Old No. 12.356G)

PSYC7106   Graduate Colloquium (Applied)

Participation in the staff-graduate student colloquium.

PSYC7107   Seminars in Applied Psychology

A series of seminars on topics of particular relevance to the practice of applied psychology eg the organisation and regulation of psychology as a profession; ethical standards in relation to clients, members of other professions and the public; legal aspects of psychological practice. Additional topics dealing with contemporary issues in applied psychology will be chosen in consultation with students undertaking the seminars. (Old No. 12.357G)

PSYC7108   Research Thesis

A research thesis involving an investigation into some aspect of applied psychology. (Old No. 12.358G)

PSYC7109   Principles of Ergonomics

Selected topics within the area of ergonomics drawn from: anthropometrics and biomechanics; the design of displays and controls, including visual display units, keyboards, and workstations; work physiology and energy expenditure, fatigue and its measurement; the sources and control of stress at the workplace; social and equipment-related workplace design problems; the effects on human performance of environmental stressors such as noise, heat, cold and sleep loss (including shiftwork). (Old No. 12.354G)

PSYC7110   Advanced Ergonomics

Prerequisite:PSYC7109.

The application of ergonomic principles and methods to the design and analysis of work tasks involving a high cognitive component, such as those involving human-computer interaction. (Old No. 12.355G)

PSYC7111   Cross-cultural Perspectives in Applied Psychology

General issues in cross-cultural psychology; problems of conducting research in more than one cultural setting. Cross-cultural organisational psychology including a comparative analysis of production systems. Culture training and orientation including programs aimed at preparing managers to become culturally mediating persons will be given special attention. (Old No. 12.359G)

PSYC7112   Vocational Psychology

Individual career counselling, decision-making and work adjustment throughout life, traditional and computerised approaches to occupational information and psychological testing; staff development; relationships between work, leisure, retirement and unemployment. Vocational problems

of groups such as minorities and those with disabilities. (Old No. 12.360G)

PSYC7113   Special Topic

An occasional elective dealing with applications of some special field of psychology. (Old No. 12.361G)

PSYC7114   Graduate and Applied Seminars

A weekly seminar during which academic staff, graduat students and visitors from other institutions make presentations about the work they are doing.

PSYC7200   Experimental Clinical Psychology 1

Excluded: 12.243G.

The theoretical basis of clinical practice in individual, group, institutional, and community settings. The application of the principles of experimental psychology to the analysis of both adaptive and maladaptive patterns of behaviour. The study of a wide range of techniques of behavioural intervention. (Old No. 12.252G)

PSYC7201   Family Based Therapies

Prerequisite PSYC7200

An assessment of marital and family problems and a critical examination of the most influential and most effective intervention strategies.

PSYC7202   Pharmacotherapy and Other Physical Treatments

Major biological treatments, especially pharmacotherapy currently used in the management of psychological disorders and dysfunctional behaviour. Familiarisation with the range of physical treatments and their use in clinical practice especially in relation to clinical psychology. The light which the modes of action of these treatments throws on the biological substrates of psychological disorders will be a special focus.

PSYC7203   Theory and Research in Psychopathology

An illustration of theoretical principles and experimental strategies in research investigating the processes and mechanisms underlying psychological disturbance. Major topics include the relationship between genetic and environmental factors in aetiology, the integration of laboratory and clinical evidence, and the status of biological, behavioural and cognitive theories of dysfunction.

PSYC7204   Child Clinical Psychology

Description, assessment and treatment of child psychopathology. Role of environmental factors in maintenance of maladaptive behaviour, practical implications for assessment and treatment. Theoretical bases of behavioural, cognitive, medical and family treatment approaches. (Old No. 12.249G)

PSYC7205   Professional Practice (Clinical)

Supervised work with clients in the School's clinic, and in approved institutions. (Old No. 12.231G)

PSYC7206   Research Thesis (Clinical)

A research thesis involving an investigation into some aspect of clinical or community psychology. **(Old No. 12.242G)**

PSYC7207 Ethical Issues and Special Topics

An examination of the ethical codes and legal requirements that clinical psychologists are expected to adhere to, and their applications to specific problems that confront practitioners, when dealing with social or cultural "problems", making differential diagnoses, and interacting with their colleagues.

PSYC7208   Behavioural Health Management

Lectures, practical classes and supervized clinical experience concerned with the theoretical and practical issues associated with the design, implementation and evaluation of behavioural programs for the promotion of positive mental and physical health. **(Old No. 12.245G)**

PSYC7209   Developmental Disabilities and Disorders

An essentially practical course focusing on childhood disorders, such as mental retardation, infantile autism, physical and sensory handicaps, specific learning difficulties, and hyperactivity. Methods of assessment to be studied include standardized tests of child development, behavioural checklists and interviews, and observation of present behaviour. Behavioural change procedures that may be effective in the treatment and management of the behavioural problems in question. **(Old No. 12.230G)**

PSYC7210   Human Neuropsychology

Neural bases of human behaviour, with particular emphasis on clinical applications. Issues in assessment and rehabilitation, functional analysis of each cerebral lobe, and particular disorders such as the dementias and aphasias. **(Old No. 12.251G)**

Servicing Subjects

These are subjects taught within courses offered by other faculties.

For further information regarding the following subjects see the Faculty of Arts Handbook.

PSYC7300   Experimental Psychology in Cognitive Science

Theory of experimental psychology pertinent to cognitive science. Learning, memory, decision making, problem solving, perception, and language comprehension. **(Old No. 12.710G)**

PSYC7301   Behavioural Neuroscience

The neurophysiological substrates of learning, memory, perception and cognition. Introduction to the basic structure and physiology of the nervous system. **(Old No. 12.711G)**

PSYC7302   Human Information Processing

Human information processing: advanced topics in cognitive psychology with particular reference to temporal dynamics of attention, organisation, integration and retrieval processes for sensory and linguistic information. **(Old No. 12.712G)**

PSYC7303   Neuroscience: Human Neuropsychology

Advanced topics in the neurophysiology of human cognitive functioning, including consideration of the influence of brain disease and brain damage. **(Old No. 12.713G)**

Safety Science

SAFE9232   Introduction to Occupational Health   C3
and Safety Law

The concept of law; the creation and interpretation of statutes; the judicial and court systems; locus stand; common law and equity; basic principles of legal liability of the Crown; the common law of employment; statutory regulation of employment; compulsory arbitration of industrial disputes. Outline of occupational health, safety and compensation legislation of the Australian States. Actions under the common law. **(Old No. 47.090G)**

SAFE9424   Applied Ergonomics

Prerequisite: SAFE9224 at credit level or equivalent.

Cognitive ergonomics. Decision making, vigilance, effects of workload and stress, applications to screen-based equipment. Work systems: the systems approach, practical evaluation and re-design of work systems. Experimental methodology: experimental design in ergonomics, critical evaluation of the literature. **(Old No. 47.062G)**

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 **Faculty (Undergraduate Study)** in the Calendar.

First Degrees

The following is the list of higher degrees and graduate diplomas of the University, together with Higher Degrees 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 **Table of Courses (by faculty): Graduate Study** in the Calendar.

For the statements **Preparation and Submission of Project Reports and Theses for Higher Degrees** and **Policy with respect to the Use of Higher Degree Theses** see later in this section.

Higher Degrees

Title	Abbreviation	Calendar/Handbook
Doctor of Science	DSc	Calendar
Doctor of Letters	DLitt	Calendar
Doctor of Laws	LLD	Calendar
Doctor of Medicine	MD	Calendar Medicine
Doctor of Philosophy	PhD	Calendar and all handbooks
Master of Applied Science	MAppSc	Applied Science
Master of Architectural Design	MArchDes	Architecture
Master of Architecture	MArch	Architecture
Master of Archives Administration	MArchivAdmin	Professional Studies
Master of Arts	MA	Arts University College
Master of Biomedical Engineering	MBiomedE	Engineering
Master of Building	MBuild	Architecture
Master of the Built Environment	MBEnv	Architecture

Higher Degrees

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	Title	Abbreviation	Calender/Handbook
Higher Degrees (continued)	Master of the Built Environment (Building Conservation)	MBEnv	Architecture
	Master of Business Administration	MBA	AGSM
	Master of Chemistry	**MChem**	**Sciences***
	Master of Cognitive Science	MCogSc	Arts
	Master of Commerce (Honours)	MCom(Hons)	Commerce
	Master of Commerce	MCom	Commerce
	Master of Community Health	MCH	Medicine
	Master of Construction Management	MConstMgt	Architecture
	Master of Education	MEd	Professional Studies
	Master of Educational Administration	MEdAdmin	Professional Studies
	Master of Engineering	ME	Applied Science Engineering University College
	Master of Engineering *without supervision*	ME	Applied Science Engineering
	Master of Engineering Science	MEngSc	Engineering Applied Science University College
	Master of Environmental Studies	MEnvStudies	Applied Science
	Master of Health Administration	MHA	Professional Studies
	Master of Health Personnel Education	MHPEd	Medicine
	Master of Health Planning	MHP	Professional Studies
	Master of Industrial Design	MID	Architecture
	Master of Landscape Architecture	MLArch	Architecture
	Master of Landscape Planning	MLP	Architecture
	Master of Laws	LLM	Law
	Master of Librarianship	MLib	Professional Studies
	Master of Management Economics	MMgtEc	University College
	Master of Mathematics	**MMath**	**Sciences***
	Master of Music	MMus	Arts
	Master of Nursing Administration	MNA	Professional Studies
	Master of Optometry	**MOptom**	**Sciences***
	Master of Paediatrics	MPaed	Medicine
	Master of Physics	**MPhysics**	**Sciences***
	Master of Project Management	MPM	Architecture
	Master of Public Health	MPH	Medicine Professional Studies
	Master of Psychology (Applied)	**MPsychol**	**Sciences §**
	Master of Psychology (Clinical)	**MPsychol**	**Science§**
	Master of Psychotherapy	MPsychotherapy	Medicine
	Master of Safety Science	MSafetySc	Engineering
	Master of Science	MSc	Applied Science Architecture Engineering Medicine Sciences*§ University College
	Master of Science without supervision	MSc	Applied Science Architecture

Title	Abbreviation	Calender/Handbook	Higher Degrees (continued)
Master of Science without supervision (continued)	MSc	Engineering Medicine Sciences*§ University College	
Master of Science (Acoustics)	MSc(Acoustics)	Architecture	
Master of Science (Industrial Design)	MSc(IndDes)	Architecture	
Master of Science and Society	MScSoc	Arts	
Master of Social Work	MSW	Professional Studies	
Master of Statistics	MStats	Sciences*	
Master of Surgery	MS	Medicine	
Master of Surveying	MSurv	Engineering	
Master of Surveying *without supervision*	MSurv	Engineering	
Master of Surveying Science	MSurvSc	Engineering	
Master of Town Planning	MTP	Architecture	
Master of Welfare Policy	MWP	Professional Studies	
Graduate Diploma	GradDip	Applied Science Architecture Engineering Sciences*§	Graduate Diploma
	DipPaed	Medicine	
	DipEd	Professional Studies	
	DipIM-ArchivAdmin DipIM-Lib DipFDA	Sciences*	

*Faculty of Science.
§Faculty of Biological and Behavioural Sciences.

1. The degree of Doctor of Philosophy may be awarded by the Council on the recommendation of the Higher Degree Committee of the appropriate faculty or board (hereinafter referred to as the Committee) to a candidate who has made an original and significant contribution to knowledge.

Doctor of Philosophy (PhD)

2.(1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor with Honours from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Committee.

Qualifications

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out work as the Committee may prescribe, before permitting enrolment as a candidate for the degree.

3.(1) An application to enrol as a candidate for the degree shall be lodged with the Registrar at least one month prior to the date at which enrolment is to begin.

Enrolment

(2) In every case before making the offer of a place the Committee shall be satisfied that agreement has been reached between the School and the applicant on the topic area, supervision arrangements, provision of adequate facilities and any coursework to be prescribed and that these are in accordance with the provisions of the Bill of Rights for postgraduate research students.

(3) The candidate shall be enrolled either as a full-time or a part-time student.

(4) A full-time candidate will present the thesis for examination no earlier than three years and no later than five years from the date of enrolment and a part-time candidate will present the thesis for examination no earlier than four years and no later than six years from the date of enrolment, except with the approval of the Committee.

(5) The candidate may undertake the research as an internal student i.e. at a campus, teaching hospital, or other research facility with which the University is associated, or as an external student not in attendance at the University except for periods as may be prescribed by the Committee.

(6) An internal candidate will normally carry out the research on a campus or at a teaching or research facility of the University except that the Committee may permit a candidate to spend a period in the field, within another institution or elsewhere away from the University provided that the work can be supervised in a manner satisfactory to the Committee. In such instances the Committee shall be satisfied that the location and period of time away from the University are necessary to the research program.

(7) The research shall be supervised by a supervisor or supervisors or under other appropriate supervision arrangements approved by the Committee. Normally an external candidate within another organisation or institution will have a co-supervisor at that institution.

Progression   4. The progress of the candidate shall be considered by the Committee following report from the School in accordance with the procedures established within the School and previously noted by the Committee.

(i) The research proposal will be reviewed as soon as feasible after enrolment. For a full-time student this will normally be during the first year of study, or immediately following a period of prescribed coursework. This review will focus on the viability of the research proposal.

(ii) Progress in the course will be reviewed within twelve months of the first review. As a result of either review the Committee may cancel enrolment or take such other action as it considers appropriate. Thereafter, the progress of the candidate will be reviewed annually.

Thesis   5.(1) On completing the program of study a candidate shall submit a thesis embodying the results of the investigation.

(2) The candidate shall give in writing to the Registrar two months notice of intention to submit the thesis.

(3) The thesis shall comply with the following requirements:

(a) it must be an original and significant contribution to knowledge of the subject;

(b) the greater proportion of the work described must have been completed subsequent to enrolment for the degree;

(c) it must be written in English except that a candidate in the Faculty of Arts may be required by the Committee to write a thesis in an appropriate foreign language;

(d) it must reach a satisfactory standard of expression and presentation;

(e) it must consist of an account of the candidate's own research but in special cases work done conjointly with other persons may be accepted provided the Committee is satisfied about the extent of the candidate's part in the joint research.

(4) The candidate may not submit as the main content of the thesis any work or material which has previously been submitted for a university degree or other similar award but may submit any work previously published whether or not such work is related to the thesis.

(5) Four copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of theses for higher degrees.

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

Examination   6.(1) There shall be not fewer than three examiners of the thesis, appointed by the Committee, at least two of whom shall be external to the University.

(2) At the conclusion of the examination each examiner shall submit to the Committee a concise report on the thesis and shall recommend to the Committee that:

(a) The thesis merits the award of the degree.

(b) The thesis merits the award of the degree subject to minor corrections as listed being made to the satisfaction of the head of school.

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*Or department where a department is not within a school or schools or departments where the research is being undertaken in more than one school or department.

(c) The thesis requires further work on matters detailed in my report. Should performance in this further work be to the satisfaction of the higher degree Committee, the thesis would merit the award of the degree.

(d) The thesis does not merit the award of the degree in its present form and further work as described in my report is required. The revised thesis should be subject to re-examination.

(e) The thesis does not merit the award of the degree and does not demonstrate that resubmission would be likely to achieve that merit.

(3) If the performance at the further work recommended under (2)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to re-present the same thesis and submit to further examination as determined by the Committee within a period specified by it but not exceeding eighteen months.

(4) The Committee shall, after consideration of the examiners' reports and the results of any further work, recommend whether or not the candidate may be awarded the degree. If it is decided that the candidate be not awarded the degree the Committee shall determine whether or not the candidate be permitted to resubmit the thesis after a further period of study and/or research.

7. A candidate shall pay such fees as may be determined from time to time by the Council.

Fees

1. The degree of Master of Chemistry or Master of Mathematics or Master of Optometry or Master of Physics by formal course work may be awarded by the Council to a candidate who has satisfactorily completed a program or advanced study.

Master of Chemistry(MChem), Master ofMathematics (MMath),Master of Optometry(MOptom) and Master ofPhysics (MPhysics)

2.(1) A candidate for the degree shall have been awarded an appropriate four-year degree of Bachelor from The University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the Faculty of Science (hereinafter referred to as the Committee).

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may prescribe, before permitting enrolment.

Qualifications

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Registrar two calendar months before the commencement of the session in which enrolment is to begin.

(2) A candidate for the degree shall be required to undertake such formal subjects and pass such assessment as prescribed.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the degree until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of a candidate shall be four academic sessions from the date of enrolment for a full-time candidate and eight sessions for a part-time candidate. In special cases an extension of this time may be granted by the Committee.

Enrolment and Progression

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Fees

*Or department where a department is not within a school or schools or departments where the research is being undertaken in more than one school or department.

Master of Engineering (ME) and Master of Science (MSc)

1. The degree of Master of Engineering or Master of Science by research may be awarded by the Council on the recommendation of the Higher Degree Committee of the appropriate faculty (hereinafter referred to as the Committee) to a candidate who has demonstrated ability to undertake research by the submission of a thesis embodying the results of an original investigation.

Qualifications

2. (1) A candidate for the degree shall have been awarded an appropriate degree of Bachelor from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Committee.

(2) An applicant who submits evidence of such other academic or professional attainments as may be approved by the Committee may be permitted to enrol for the degree.

(3) When the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant, before being permitted to enrol, to undergo such examination or carry out such work as the Committee may prescribe.

Enrolment and Progression

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least one calendar month before the commencement of the session in which enrolment is to begin.

(2) In every case, before permitting a candidate to enrol, the head of the school* in which the candidate intends to enrol shall be satisfied that adequate supervision and facilities are available.

(3) An approved candidate shall be enrolled in one of the following categories.

(a) full-time attendance at the University;

(b) part-time attendance at the University;

(c) external - not in regular attendance at the University and using research facilities external to the University.

(4) A candidate shall be required to undertake an original investigation on an approved topic. The candidate may also be required to undergo such examination and perform such other work as may be prescribed by the Committee.

(5) The work shall be carried out under the direction of a supervisor appointed from the full-time members of the University staff.

(6) The progress of a candidate shall be reviewed annually by the Committee following a report by the candidate, the supervisor and the head of the school* in which the candidate is enrolled and as a result of such review the Committee may cancel enrolment or take such other action as it considers appropriate.

(7) No candidate shall be granted the degree until the lapse of three academic sessions in the case of a full-time candidate or four academic sessions in the case of a part-time or external candidate from the date of enrolment. In the case of a candidate who has been awarded the degree of Bachelor with Honours or who has had previous research experience the Committee may approve remission of up to one session for a full-time candidate and two sessions for a part-time or external candidate.

(8) A full-time candidate for the degree shall present for examination not later than six academic sessions from the date of enrolment. A part-time or external candidate for the degree shall present for examination not later than ten academic sessions from the date of enrolment. In special cases an extension of these times may be granted by the Committee.

Thesis

4. (1) On completing the program of study a candidate shall submit a thesis embodying the results of the original investigation.

(2) The candidate shall give in writing two months notice of intention to submit the thesis.

(3) The thesis shall present an account of the candidate's own research. In special cases work done conjointly with other persons may be accepted, provided the Committee is satisfied about the extent of the candidate's part in the joint research.

(4) The candidate may also submit any work previously published whether or not such work is related to the thesis.

*Or department where a department is not within a school or schools or departments where the research is being undertaken in more than one school or department.

(5) Three copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of higher degree theses.

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

5. (1) There shall be not fewer than two examiners of the thesis, appointed by the Academic Board on the recommendation of the Committee, at least one of whom shall be external to the University unless the Committee is satisfied that this is not practicable.

Examination

(2) At the conclusion of the examination each examiner shall submit to the Committee a concise report on the merits of the thesis and shall recommend to the Committee that:

(a) the candidate be awarded the degree without further examination; or

(b) the candidate be awarded the degree without further examination subject to minor corrections as listed being made to the satisfaction of the head of the school*; or

(c) the candidate be awarded the degree subject to a further examination on questions posed in the report, performance in this further examination being to the satisfaction of the Committee; or

(d) the candidate be not awarded the degree but be permitted to resubmit the thesis in a revised form after a further period of study and/or research; or

(e) the candidate be not awarded the degree and be not permitted to resubmit the thesis.

(3) If the performance at the further examination recommended under (2)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to re-present the same thesis and submit to a further oral, practical or written examination within a period specified by it but not exceeding eighteen months.

(4) The Committee shall, after consideration of the examiners' reports and the reports of any oral or written or practical examination, recommend whether or not the candidate may be awarded the degree. If it is decided that the candidate be not awarded the degree the Committee shall determine whether or not the candidate may resubmit the thesis after a further period of study and/or research.

6. A candidate shall pay such fees as may be determined from time to time by the Council.

Fees

1. The degree of Master of Engineering or Master of Science or Master of Surveying without supervision may be awarded by the Council on the recommendation of the Higher Degree Committee of the appropriate faculty (hereinafter referred to as the Committee) to a candidate who has demonstrated ability to undertake research by the submission of a thesis embodying the results of an original investigation.

Master of Engineering (ME), Master of Science (MSc) and Master of Surveying (MSurv) *without supervision*

2. A candidate for the degree shall have been awarded an appropriate degree of Bachelor from the University of New South Wales with at least three years relevant standing in the case of Honours graduates and four years relevant standing in the case of Pass graduates, and at a level acceptable to the Committee.

Qualifications

3. An application to enrol as a candidate for the degree without supervision shall be made on the prescribed form which shall be lodged with the Registrar not less than six months before the intended date of submission of the thesis. A graduate who intends to apply in this way should, in his or her own interest, seek at an early stage the advice of the appropriate head of school* with regard to the adequacy of the subject matter and its presentation for the degree. A synopsis of the work should be available.

Enrolment

4. (1) A candidate shall submit a thesis embodying the results of the investigation.

Thesis

(2) The candidate shall give in writing to the Registrar two months notice of intention to submit the thesis.

(3) The thesis shall present an account on the candidate's own research. In special cases work done conjointly with other persons may be accepted, provided the Committee is satisfied about the extent of the candidate's part in the joint research.

*Or department where a department is not within a school or schools or departments where the research is being undertaken in more than one school or department.

(4) The candidate may also submit any work previously published whether or not such work is related to the thesis.

(5) Three copies of the thesis shall be presented in a form which complies with the requirements of the University for the preparation and submission of theses for higher degrees.

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

Examination 5. (1) There shall be not fewer than two examiners of the thesis, appointed by the Academic Board on the recommendation of the Committee, at least one of whom shall be external to the University unless the Committee is satisfied that this is not practicable.

(2) Before the thesis is submitted to the examiners the head of the school* in which the candidate is enrolled shall certify that it is prima facie worthy of examination.

(3) At the conclusion of the examination each examiner shall submit to the Committee a concise report on the thesis and shall recommend to the Committee that:

(a) the candidate be awarded the degree without further examination; or

(b) the candidate be awarded the degree without further examination subject to minor corrections as listed being made to the satisfaction of the head of the school*; or

(c) the candidate be awarded the degree subject to a further examination on questions posed in the report, performance in this further examination being to the satisfaction of the Committee; or

(d) the candidate be not awarded the degree but be permitted to resubmit the thesis in a revised form after a further period of study and/or research; or

(e) the candidate be not awarded the degree and be not permitted to resubmit the thesis.

(4) If the performance at the further examination recommended under (3)(c) above is not to the satisfaction of the Committee, the Committee may permit the candidate to re-present the same thesis and submit to further examination as determined by the Committee within a period specified by it but not exceeding eighteen months.

(5) The Committee shall, after consideration of the examiners' reports and the results of any further examination, recommend whether or not the candidate may be awarded the degree. If it is decided that the candidate be not awarded the degree the Committee shall determine whether or not the candidate may resubmit the thesis after a further period of study and/or research.

Fees 6. A candidate shall pay such fees as may be determined from time to time by the Council.

Master of Mathematics (MMath) See Master of Chemistry above.

Master of Optometry (MOptom) See Master of Chemistry above.

Master of Physics (MPhysics) See Master of Chemistry above.

Master of Psychology (Applied) (MPsychol(Applied)) and Master of Psychology (Clinical) (MPsychol(Clinical))

1. The degree of Master of Psychology (Applied) or Master of Psychology (Clinical) by formal course work and thesis may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study. The degree shall be awarded at the Pass level or with the grade of Honours Class 1 or with the grade of Honours Class 2 (two divisions).

Qualifications 2. (1) A candidate for the degree shall have been awarded a degree of Bachelor with Honours in psychology from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution, at a level acceptable to the Higher Degree Committee of the Faculty of Biological and Behavioural Sciences (hereinafter referred to as the Committee).

*Or department where a department is not within a school.

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Registrar by 30 November of the year before the year in which enrolment is to begin.

<div style="float:right">Enrolment and Progression</div>

(2) A candidate for the degree shall be required to undertake such formal subjects and, except in exceptional circumstances, pass at the first attempt such assessment as prescribed.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the degree until the lapse of four academic sessions from the date of enrolment in the case of a full-time candidate or six sessions in the case of a part-time candidate. A candidate who has been granted exemptions may have the minimum period reduced by up to one-half. The maximum period of candidature shall be six academic sessions from the date of enrolment for a full-time candidate and ten sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

4. A candidate shall pay such fees as may be determined from time to time by the Council. **Fees**

See Master of Engineering above

Master of Science (MSc)

See Master of Engineering above. **Master of Science (MSc)** *without supervision*

1. The degree of Master of Statistics by formal course work may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

Master of Statistics (MStats)
Qualifications

2. (1) A candidate for the degree shall have been awarded a degree of Bachelor with major studies in statistics from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the Faculty of Science (hereinafter referred to as the Committee).

(2) In exceptional cases an applicant who submits evidence of such other academic and professional qualifications as may be approved by the Committee may be permitted to enrol for the degree.

(3) If the Committee is not satisfied with qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

3. (1) An application to enrol as a candidate for the degree shall be made on the prescribed form which shall be lodged with the Registrar at least two calendar months before the commencement of the session in which enrolment is to begin.

Enrolment and Progression

(2) A candidate for the degree shall be required to undertake such formal subjects and pass such assessment as prescribed.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the degree until the lapse of four academic sessions from the date of enrolment in the case of a full-time candidate or eight sessions in the case of a part-time candidate. In the case of a candidate who has been awarded a degree of Bachelor with Honours in statistics the Committee may approve remissions of up to two sessions for a full-time candidate and four sessions for a part-time candidate. The maximum period of candidature shall be six academic sessions from the date of enrolment for a full-time candidate and ten sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

4. A candidate shall pay such fees as may be determined from time to time by the Council. **Fees**

Graduate Diploma
(GradDip or DipFDA)
Qualifications

1. A Graduate Diploma may be awarded by the Council to a candidate who has satisfactorily completed a program of advanced study.

2. (1) A candidate for the diploma shall have been awarded an appropriate degree of Bachelor from the University of New South Wales or a qualification considered equivalent from another university or tertiary institution at a level acceptable to the Higher Degree Committee of the appropriate faculty (hereinafter referred to as the Committee).

(2) An applicant who submits evidence of such other academic or professional attainments as may be approved by the Committee may be permitted to enrol for the diploma.

(3) If the Committee is not satisfied with the qualifications submitted by an applicant the Committee may require the applicant to undergo such assessment or carry out such work as the Committee may prescribe, before permitting enrolment.

Enrolment and
Progression

3. (1) An application to enrol as a candidate for diploma shall be made on the prescribed form which shall be lodged with the Registrar at least two calendar months before the commencement of the session in which enrolment is to begin.

(2) A candidate for the diploma shall be required to undertake such formal subjects and pass such assessment as prescribed.

(3) The progress of a candidate shall be reviewed at least once annually by the Committee and as a result of its review the Committee may cancel enrolment or take such other action as it considers appropriate.

(4) No candidate shall be awarded the diploma until the lapse of two academic sessions from the date of enrolment in the case of a full-time candidate or four sessions in the case of a part-time candidate. The maximum period of candidature shall be four academic sessions from the date of enrolment for a full-time candidate and six sessions for a part-time candidate. In special cases an extension of these times may be granted by the Committee.

Fees

4. A candidate shall pay such fees as may be determined from time to time by the Council.

Scholarships and Prizes

The scholarships and prizes listed below are available to students whose courses are listed in this handbook. Each faculty handbook contains in its Scholarships and Prizes section the scholarships and prizes available with that faculty. The General Information section of the Calendar contains a comprehensive list of scholarhips and prizes offered throughout the University.

Scholarships

Undergraduate Scholarships

Listed below is an outline only of a number of scholarships available to students. Full information may be obtained from the Student Centre located on the Lower Ground Floor of the Chancellery.

Unless otherwise indicated in footnotes, applications for the following scholarships should be made to the Registrar and Deputy Principal by 14 January each year. Please note that not all of these awards are available every year.

Donor	Value	Year/s of Tenure	Conditions
General			
Bursary Endowment Board*	$200 pa	Minimum period of approved degree/ combined degree course	Merit in HSC and total family income not exceeding $6000
Sam Cracknell Memorial	Up to $3000 pa payable in fortnightly instalments	1 year	Prior completion of at least 2 years of a degree or diploma course and enrolment in a full-time course during the year of application; academic merit; participation in sport both directly and administratively; and financial need.
Girls Realm Guild	Up to $1500 pa	1 year renewable for the duration of the course subject to satisfactory progress and continued demonstration of need	Available only to female students under 35 years of age who are permanent residents of Australia enrolling in any year of a full-time undergraduate course on the basis of academic merit and financial need.

*Apply to The Secretary, Bursary Endowment Board, PO Box 460, North Sydney 2060, immediately after sitting for HSC.

Undergraduate Scholarships (continued)

Donor	Value	Year/s of Tenure	Conditions
General (continued)			
W.S. and L.B. Robinson**	Up to $4200 pa	1 year renewable for the duration of the course subject to satisfactory progress	Available only to students who have completed their schooling in Broken Hill or whose parents reside in Broken Hill; for a course related to the mining industry. Includes courses in mining engineering, geology, electrical and mechanical engineering, metallurgical process engineering, chemical engineering and science.
Alumni Association	Up to $1500 pa	1 year with the possibility of renewal	Available to students enrolled in any year of a full-time course. Candidates must be the children of Alumni of the University of NSW and may be either permanent residents of Australia or overseas students.

**Applications close 30 September each year.

Science

Donor	Value	Year/s of Tenure	Conditions
Faculty of Biological and Behavioural Sciences	Up to $3000 pa	1 year renewable for the duration of the course, subject to satisfactory progress	Permanent residents of Australia. Available to full-time students enrolled in one of the disciplines of the Faculty of Science.
Faculty of Science	Up to $2,000 pa	1 year renewable for the duration of the course, subject to satisfactory progress	Permanent residents of Australia. Available to full-time students enrolled in one of the disciplines of the Faculty of Science.
Chemistry			
John Ragnar Anderson Memorial Bequest	Up to $1500 pa	1 year renewable for the duration of the course subject to satisfactory progress	Permanent residence in Australia and eligibility for admission to a full-time degree course in Chemistry
BSSM			
Esther Louise Buchwald Memorial Scholarship	$500 pa	1 year	Available only to a physically handicapped student enrolled in any year of a course in the Board of Studies in Science and Mathematics

Optometry

Donor	Value	Year/s of Tenure	Conditions
Gibb and Beeman	Up to $1000 pa	1 year renewable for the duration of the course, subject to satisfactory progress	Available to students under 21 years of age who are permanent residents of Australia enrolling in Year 1 of the full-time degree course in Optometry.

The UNSW Co-op Program

The University of New South Wales has industry-linked education scholarship programs to the value of $8000 per annum in the following areas: Business Information Technology, Chemical Engineering, Civil Engineering, Electrical and Computer Engineering, Industrial Chemistry, Mechanical and Industrial Engineering, Mining, Mineral Engineering and Applied Geology. Further information can be obtained by writing to The Co-ordinator, UNSW Co-op Programs Industry-Linked Education Office, C/- Vice-Chancellors Division.

Graduate Scholarships

Application forms and further information are available from the Student Centre, located on the Ground Floor of the Chancellery unless an alternative contact address is provided. Information is also available on additional scholarships which may become available from time to time, mainly from funds provided by organizations sponsoring research projects.

The following publications may also be of assistance: **1.** *Awards for Postgraduate Study in Australia and Awards for Postgraduate Study Overseas,* published by the Graduate Careers Council of Australia. PO Box 28, Parkville, Victoria 3052;* **2.** *Study Abroad,* published by UNESCO;* **3.** *Scholarships Guide for Commonwealth Postgraduate Students, published by the Association of Commonwealth Universities.* *

Details of overseas awards and exchanges administered by the Department of Employment, Education and Training can be obtained from: Awards and Exchanges Section, Department of Employment, Education and Training, PO Box 826, Woden, ACT 2606.

Where possible, the scholarships are listed in order of faculty.

*Available for reference in the University Library.

Donor	Value	Year/s of Tenure	Conditions
General			
University Postgraduate Research Scholarships	Living allowance of $13,504 pa. Other allowances may also be paid. Tax free.	1-2 years for a Masters and 3-4 years for a PhD degree	Applicants must be honours graduates or equivalent. Applications to Dean of relevant Faculty.
Commonwealth Postgraduate Research Awards	$13,504 to $17,427		Applicants must be honours graduates or equivalent or scholars who will graduate with honours in current academic year, and who are domiciled in Australia. Applications to Registrar by 31 October.
Commonwealth Postgraduate Course Awards	Living allowance of $10,903 pa. Other allowances may also be paid. Tax free.	1-2 years; minimum duration of course	Applicants must be graduates or scholars who will graduate in current academic year, and who have not previously held a Commonwealth Post-graduate Award. Applicants must be domiciled in Australia. Preference is given to applicants with employment experience. Applications to the Registrar by 28 September.
Overseas Postgraduate Research Scholarships	Tuition fees only	2 years for a Masters and 3 years for a PhD	Eligibility is confined to postgraduate research studentgs who are citizens of overseas countries excluding citizens of countries which are covered by the Equity and Merit Scholarship Scheme (EMSS). Application to the Registrar by 28 September
IDP-Korea/Taiwan Research Scholarships	Tuition fees and a stipend	2 years for a Masters and 3 years for a PhD	Eligibility is confined to postgraduate research students who are citizens of Korea or Taiwan. Application to the Registrar by 31 July.
Australian American Educational Foundation Fulbright Award	Travel expenses and $A2000 as establishment allowance.	1 year, renewable	Applicants must be graduates who are domiciled in Australia and wish to undertake research or study for a higher degree in America. Applications close 30 September with The Secretary, DEET, AAEF Travel Grants, PO Box 826, Woden ACT 2606.
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

Graduate Scholarships (continued)

Donor	Value	Year/s of Tenure	Conditions
General (continued)			
Commonwealth Scholarship and Fellowship Plan	Varies for each country. Generally covers travel, living, tuition fees, books and equipment, approved medical expenses. Marriage allowance may be payable.	Usually 2 years, sometimes 3	Applicants must be graduates who are Australian citizens and who are not older than 35 years of age. Tenable in Commonwealth countries other than Australia. Applications close with the Registrar in September or October each year.
The English-Speaking Union (NSW Branch)	$7000	1 year	Applicants must be residents of NSW or ACT. Awarded to young graduates to further their studies outside Australia. Applications close mid-April with The Secretary, Ground Floor, Sydney School of Arts, 275c Pitt Street, Sydney NSW 2000.
Frank Knox Memorial Fellowships tenable at Harvard University	Stipend of $US7000 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. Applications close with the Academic Registrar mid October.
Robert Gordon Menzies Scholarship to Harvard	Up to $US 15,000	1 year	Tenable at Harvard University. Applicants must be Australian citizens and graduates of an Australian tertiary institution. Applications close 31 December with the Registrar, A.N.U., GPO Box 4, Canberra ACT 2601
Gowrie Scholarship Trust Fund	$6000 pa. Under. special circumstances this may be increased	2 years	Applicants must be members of the Forces or children of members of the Forces who were on active service during the 1939-45 War. Applications close with the Academic Registrar by 31 October.
Harkness Fellowships of the Commonwealth Fund of New York	Living and travel allowances, tuition and research expenses, health insurance, book and equipment and other allowances for travel and study in the USA	12 to 21 months	Candidates must be Australian citizens and 1. Either members of the Commonwealth or a State Public Service or semi-government Authority. 2. Either staff or graduate students at an Australian university. 3. Individuals recommended for nomination by the Local Correspondents. The candidate will usually have an honours degree or equivalent, or an outstanding record of achievement, and be not more than 36 years of age. Applications close 29 August with the Academic Registrar. Forms available from Mr J Larkin, Bureau of Agriculture and Resource Economics, GPO Box 1563, Canberra ACT 2601.
The Packer, Shell and Barclays Scholarships to Cambridge University	Living and travel allowances, tuition expenses.	1-3 years	Applicants must be Australian citizens who are honours graduates or equivalent, and under 26 years of age. Applications close 15 October with The Secretary, Cambridge Commonwealth Trust, PO Box 252, Cambridge CB2 ITZ, England.
The Rhodes Scholarship to Oxford University	Approximately £4862 stg pa	2 years, may be extended for a third year.	Unmarried Australian citizens aged between 19 and 25 who have an honours degree or equivalent. Applications close in August each year with The Secretary, University of Sydney, NSW 2006.

Graduate Scholarships (continued)

Donor	Value	Year/s of Tenure	Conditions
Biological and Behavioural Sciences			
John Clark Memorial Award in Psychology	$1000	1 year	Applicants must be enrolled in a graduate course in psychology undertaking research in an area concerned with the ongoing problems of the community, particularly the behaviour of the 'whole person' in a social milieu. Applications close 1 July with the Registrar.
National Heart Foundation	See under Medicine		
The National Health and Medical Research Council			
Science			
Australian Telecommunications	$9000 intended as a supplement to other awards	1 year for a Masters and up to 3 years for a PhD degree	Applicants must be first class honours graduates or equivalent or scholars who will graduate with honours in the current academic year, who are Australian citizens or permanent residents and who are aged under 25 years at 1 January. Applications close November 2 with ATERB, PO Box 76, Epping NSW
Australian Institute of Nuclear Science and Engineering Student Scholarships	See under Engineering.		
Contact Lens Society of Australia	$2000 pa		To enable a graduate in optometry, medicine, or other appropriate discipline to undertake the degree of Master of Science or PhD in the School of Optometry. Enquiries to Associate Professor B. Holden, School of Optometry.
Gordon Godfrey Scholarship in Theoretical Physics	$1500 pa	1-3 years	To enable a suitable graduate to undertake a research degree in Theoretical Physics. May be held concurrently with another award. Enquiries to School of Physics.
Lionel Murphy Australian Postgraduate Bicentennial Scholarship	See under Law		
Shell Scholarship in Science or Engineering	Adequate funds for living allowance tuition and travel expenses	2 years, sometimes 3	Applicants must be Australian citizens, under 25 years of age, with at least 5 years' domicile in Australia and who are completing the requirements for an honours degree in Science or Engineering. The successful candidate will attend a British university to pursue a higher degree. Applications close 30 September with Shell Australia, 140 Phillip Street, Sydney NSW 2000.

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.

Information regarding the establishment of new prizes may be obtained from the Examinations Section located on the Ground Floor or the Chancellery.

Donor/Name of Prize	Value $	Awarded for
General		
The Sydney Technical College Union Award	$400.00 and Bronze Medal	Leadership in student affairs combined with marked academic proficiency by a graduand.
The University of New South Wales Alumni Association Prize	Statuette	Achievement for community benefit by a student in the final or graduating year.
School of Chemistry		
The Inglis Hudson Bequest	$15.00	The best performance in CHEM2021 Organic Chemistry
The Jeffery Bequest	$100.00	The best performance in CHEM2021 Organic Chemistry
The June Griffith Memorial Prize	$60.00	The best performance in CHEM1002 Chemistry 1 in the Bachelor of Science course
The Merck Sharp & Dohme (Aust) Pty Ltd Prize	$52.50	The best performance in Level 2 Chemistry subjects in the Board of Studies in Science and Mathematics
The Merck Sharp & Dohme (Aust) Pty Ltd Prize	$52.50	The best performance in Level 3 Chemistry subjects in the Board of Studies in Science and Mathematics
The RACI Analytical Chemistry Group Prize	$150.00	The best performance in CHEM3041 Analytical Chemistry and CHEM3141 Advanced Instrumental Analysis.
The Smith Kline & French Prize	$100.00	The best performance in a subject selected by the Head of School.
The University of New South Wales Chemical Society Parke-Pope Prize	$100.00	The best performance in a subject selected by the Head of School
The University of New South Wales Chemical Society George Wright Prize	$100.00	The best performance in a subject selected by the Head of School
School of Mathematics		
The Applied Mathematics Prize	$50.00	Excellence in level 3 Applied Mathematics subjects in a Bachelor degree or Diploma course
The C.H. Peck Prize	$50.00	The best performance in Year 2 Mathematics by a student proceeding to Year 3 in the School of Mathematics
The Coca-Cola Amatil Limited Prize	$200.00	The best performance in Theory of Statistics or Higher Theory of Statistics 3 subjects in a Bachelor degree
The Head of School's Prize	$50.00	Excellence in four or more mathematics units in Year 2 in a Bachelor degree or Diploma course.
The IBM Prize	$200.00	The best performance in the final year of an honours degree in the School of Mathematics

Undergraduate University Prizes continued)

Donor/Name of Prize	Value $	Awarded for

School of Mathematics (continued)

The ICI Theory of Statistics 4 Prize	$100.00	The best performance in MATH4903 Theory of Statistics in a Bachelor degree
The I.P. Sharp Associates Pty Limited Prize	$100.00	Excellence in Higher Theory of Statistics 2 subjects in a Bachelor degree
The Michael Mihailavitch Erihman Award	$750.00	The best performance by a student enrolled in a Mathematics Program, in examinations conducted by School of Mathematics in any one year.
The Pure Mathematics Prize	$50.00	The best performance in Level 3 Pure Mathematics subjects by a student in a bachelor degree or diploma course
The School of Mathematics Prize	$50.00	The best performance in either MATH1032 Mathematics 1 or MATH1042 Higher Mathematics 1 by a student in a Bachelor degree or Diploma course
The School of Mathematics Prize	$50.00	The best performance in basic Year 2 Higher Mathematics units by a student in a bachelor shared degree or diploma course
The School of Mathematics Prize	$50.00	Excellence in four or more Mathematics units by a student in Year 2 of a bachelor degree or diploma course
The Statistical Society of Australia (NSW Branch) Prize	$100.00	The best performance in Theory of Statistics subjects
The T.P.F & C Fourth Year Prize	$200.00	The best performance in the fourth year project by a student proceeding to the degree of Bachelor of Science (Honours) within the School of Mathematics
The T.P.F & C Third Year Prize	$200.00	The best performance in either MATH3601 Pure Mathematics 3 or MATH3181 Applied Mathematics 3.

School of Optometry

The ACBO/Learning Frontiers Prize In Excellence in Binocular Vision	$150.00	The best performance in the Binocular Vision component of OPTM9042 Optometry B and OPTM9041 Clinical Optometry in the Bachelor of Optometry course.
The Australian Optometrical Association Prize	$200.00	The best performance in a subject selected by the Head of School
The Bausch & Lomb Soflens Prize	Contact Lenses valued at $700.00	The best performance in the contact lens section of OPTM9041 Clinical Optometry in the Bachelor of Optometry course
The Eycon Lens Laboratories Pty Ltd Prize	Trial fitting set of contact lenses	The best essay or project on contact lenses in the Bachelor of Optometry course.
The G Nissell & Company Australia Pty Ltd Prize	Trial fitting set of contact lenses	The best performance in the Contact Lens sections of OPTM9042 Optometry B and OPTM9041 Clinical Optometry in the Bachelor of Optometry course
The Hoya Lens Australia Pty Ltd Prize	$250.00	The best academic record in the Bachelor of Optometry course
The Hydron (Australia) Pty Ltd Prize	$100.00	The best performance in Year 4 of the Bachelor of Optometry course.
The Hydron (Australia) Pty Ltd Prize	$100.00	The best performance in OPTM9042 Optometry B in the Bachelor of Optometry course

Undergraduate University Prizes (continued)

Donor/Name of Prize	Value $	Awarded for
School of Optometry (continued)		
The Martin Wells Pty Ltd Prize	$200.00	The best performance in OPTM9021 Anatomy and Physiology of the Eye and Visual System in the Bachelor of Optometry course.
The Martin Wells Pty Ltd Prize	$200.00	The best performance in OPTM9032 Diagnosis and Management of Ocular Disease in the Bachelor of Optometry course.
The Martin Wells Pty Ltd Prize	$200.00	The best Final Year Essay in the Bachelor of Optometry course.
The Optical Products Ltd Prize	$100.00	The best performance in a subject selected by the Head of School
The Optometric Vision Research Foundation	$200.00	The best research project in the final year of the Prize Bachelor of Optometry course
The Optometrists Association of NSW Prize	$100.00	The best performance in a subject selected by the Head of School
The Optyl (Australia) Pty Ltd Prize	$100.00	The best performance in the practical work of OPTM9034 Clinical Methods in the Bachelor of Optometry course.
The Safilo Australia Prize	$150.00	The best performance in a subject selected by the Head of School
The Theo Kannis Prize for Clinical Optometry	$250.00	The best performance in OPTM9041 Clinical Optometry by a student in the Bachelor of Optometry course
School of Physics		
The Australian Institute of Physics Prize	$100.00 and one years membership of the Institute	The highest aggregate in any 3 units from: PHYS3010 Quantum Mechanics PHYS3050 Nuclear Physics PHYS3021 Statistical Mechanics & Solid State Physics PHYS3030 Electromagnetism PHYS3060 Advanced Optics PHYS3041 Experimental Physics A by a student in the Bachelor of Science course
The Bodal Prize	$100.00	The best performance in a competition based on the use of microcomputers in PHYS1601 Computer Applications
The Bodal Prize	$100.00	The best performance in a project carried out within PHYS2601 Computer Applications.
The ETP-Oxford Prize	$200.00	The best design study of an optical system in PHYS3710 Lasers & Applications or PHYS3720 Optoelectronics
The Gordon and Mabel Godfrey Award In Theoretical Physics 4	$200.00	Excellence in the subject PHYS4503 Theoretical Physics 4 (Honours) in the Bachelor of Science with Honours course.
The Gordon and Mabel Godfrey Prize in Theoretical Physics 3	$200.00	The best performance in a selection of Year 3 Theoretical Physics subjects chosen from: PHYS3510, PHYS3520, PHYS3540, PHYS3550.
The Head of School's Prize in Physics	$50.00	The best Year 4 Honours Thesis in Physics in the Bachelor of Science course.
The Parameters Prize in Electronics	$200.00	Excellence in PHYS3631 Electronics or PHYS3041 Experimental Physics A and PHYS3760 Laser and Optoelectronics Technology Laboratory 1.
The Physics Staff Prize for Physics 1	$100.00	The best performance in PHYS1002 Physics 1

Undergraduate University Prizes (continued)

Donor/Name of Prize	Value $	Awarded for

School of Physics (continued)

Donor/Name of Prize	Value $	Awarded for
The Physics Staff Prize for Physics 2	$150.00	The highest aggregate in PHYS2001 Mechanics & Computational, PHYS 2011 Electromagnetism and Thermal Physics, PHYS2021 Quantum Physics & Relativity, PHYS2031 Laboratory by a student in the Bachelor of Science course
The Physics Staff Prize for Physics Honours	$200.00	The best performance in the Physics Honours Year by a student in the Bachelor of Science course

School of Psychology

Donor/Name of Prize	Value $	Awarded for
The Australian Psychological Society Prize	$100.00	The best performance in a subject selected by the Head of School
The Milon Buneta Prize	$80.00	The best performance in Year 2 of the Bachelor of Science course in Psychology
The Psychology Staff Prize	$80.00	The best performance in Year 2 Psychology by a student in the Bachelor of Science course in Psychology

Graduate University Prizes

The following table summarizes the graduate prizes awarded by the University.

Donor/name of Prize	Value $	Awarded for

School of Mathematics

Donor/name of Prize	Value $	Awarded for
The J.R. Holmes Prize	$75.00	Excellence in at least 4 pass-level pure mathematics level 3 units, taken over no more than two consecutive years by a student in the Science, Arts or Education courses

School of Optometry

Donor/name of Prize	Value $	Awarded for
The Hydron Contact Lens Prize	Trial fitting set of contact lenses	The best performance in OPTM8005 Advanced Contact Lens Theory and Practice in the Master of Optometry course
The Theo Kannis Prize for Advanced Clinical Optometry	$250.00	The best performance in OPTM8001 Advanced Clinical Optometry by a student in the Master of Optometry course

Student's Timetable

Time	Monday		Tuesday		Wednesday		Thursday		Friday	
	Session 1	Session 2	Session 1	Session 2	Session 1	Session 2	Session 1	Session 2	Session 1	Session 2
9-10										
10-11										
11-12										
12-1										
1-2										
2-3										
3-4										
4-5										
5-6										
6-7										
7-8										
8-9										

Student's Timetable

Time	Monday		Tuesday		Wednesday		Thursday		Friday	
	Session 1	Session 2	Session 1	Session 2	Session 1	Session 2	Session 1	Session 2	Session 1	Session 2
9-10										
10-11										
11-12										
12-1										
1-2										
2-3										
3-4										
4-5										
5-6										
6-7										
7-8										
8-9										

The University of New South Wales Kensington Campus

Theatres

Biomedical Theatres   E27
Central Lecture Block   E19
Classroom Block (Western Grounds)   H3
Rex Vowels Theatre   F17
Keith Burrows Theatre   J14
Main Building (Physics) Theatrette   K14
Mathews Theatres   D23
Parade Theatre   E3
Science Theatre   F13
Sir John Clancy Auditorium   C24

Buildings

Affiliated Residential Colleges
New (Anglican)   L6
Shalom (Jewish)   N9
Warrane   M7
Applied Science   F10
Architecture   H14
Arts (Morven Brown)   C20
Banks   F22
Barker Street Gatehouse   N11
Basser College   C18
Biological Sciences   D26
Central Store   B13
Chancellery   C22
Chemistry *(Dalton)*   F12
Robert Heffron   E12
Civil Engineering   H20
Commerce and Economics (John Goodsell)   F20
Dalton (Chemistry)   F12
Electrical Engineering   G17
Geography and Surveying   K17
Goldstein College   D16
Golf House   A27
Gymnasium   B5
House at Pooh Corner   N8
International House   C6
Io Myers Studio   D9
John Goodsell (Commerce and Economics)   F20
Kanga's House   O14
Kensington Colleges   C17 (Office)
Basser   C18
Goldstein   D16
Philip Baxter   D14

Link   B6
Maintenance Workshop   B13
Materials Science and Engineering   E8
Mathews   F23
Mechanical and Industrial Engineering   J17
Medicine (Administration)   B27
Menzies Library   E21
Morven Brown (Arts)   C20
New College (Anglican)   L6
Newton   J12
NIDA   D2
Parking Station   H25
Philip Baxter College   D14
Robert Heffron (Chemistry)   E12
Sam Cracknell Pavilion   H8
Shalom College (Jewish)   N9
Sir Robert Webster (Textile Technology)   G14
   Wool & Animal Sciences   G14
Squash Courts   B7
Swimming Pool   B4
Unisearch House   L5
University Regiment   J2
University Union (Roundhouse) – Stage I   E6
University Union (Blockhouse) – Stage II   G6
University Union (Squarehouse) – Stage III   E4
Wallace Wurth School of Medicine   C27
Warrane College   M7

General .

Accommodation (off-campus)   F15
Academic Staff Office   C22
Accounting   F20
Admissions   C22
Adviser for Prospective Students   C22
Anatomy   C27
Applied Economic Research   G14
Applied Geology   F10
Applied Science (Faculty Office)   F10
Architecture (including Faculty Office)   H14
Arts (Faculty Office)   C20
Audio Visual Unit   F20
Australian Graduate School of Management   G27
Banking and Finance   F20
Biochemistry   D26
Biological and Behavioural Sciences
   (Faculty Office)   D26
Biomedical Engineering   A28
Biomedical Library   F23

Biotechnology   D26
Bookshop   G17
Building   H14
Careers and Employment   F15
Cashier's Office   C22
Chaplains   E15
Chemical Engineering and
   Industrial Chemistry   F10
Chemistry   E12
Child Care Centres   N8, O14
Civil Engineering   H20
Commerce and Economics (Faculty Office)   F20
Community Medicine   D26
Computing Services Department   F21, D26
Counselling and Careers Service   F15
Economics   F20
Education   G2
Education Testing Centre   E15
Electrical Engineering and
   Computer Science   G17
Energy Research, Development and
   Information Centre   F10
Engineering (Faculty Office)   K17
English   C20
Ethics Committees Secretariat   B8
Examinations   C22
Fees Office   C22
Food Science and Technology   F10
French   C20
General Staff Office   C22
Geography   K17
German Studies   C20
Graduate Office and Alumni Centre   E4
Graduate School of the Built Environment   H14
Groundwater Management and
   Hydrogeology   F10
Health Services Management   C22
History   C20
Industrial Arts   H14
Industrial Design   G15
Industrial Relations and Organizational
   Behaviour   F20
Information Systems   F20
International Student Centre   F16
IPACE   F23
Kanga's House   O14
Kindergarten (House at Pooh Corner)   N8
Landscape Architecture   K15
Law (Faculty Office)   F21
Law Library   F21
Legal Studies and Taxation   F20
Liberal and General Studies   C20
Librarianship   F23

Library   E21
Lost Property   C22
Marine Science   D26
Marketing   F20
Materials Science and Engineering   E8
Mathematics   F23
Mechanical and Industrial Engineering   J17
Medical Education   C27
Medicine (Faculty Office)   B27
Microbiology   D26
Mineral Processing and Extractive
   Metallurgy   E8
Mining Engineering   K15
Music   B11
National Institute of Dramatic Art   D2
News Service   C22
Optometry   J12
Pathology   C27
Patrol and Cleaning Services   C22
Petroleum Engineering   D12
Philosophy   C20
Physics   K15
Physiology and Pharmacology   C27
Political Science   C20
Printing Unit   C22
Psychology   F23
Publications Section   C22
Remote Sensing   K17
Russian Studies   C20
Safety Science   J17
Science and Mathematics Course Office   D26
Science and Technology Studies   C20
Social Work   G2
Sociology   C20
Spanish and Latin American Studies   C20
Sport and Recreation Centre   B6
University Health Services   E15
Student Records   C22
Student Services   F15
Students' Union   E4 and C21
Surveying   K17
Professional Development Centre   E15
Textile Technology   G14
Theatre Studies   B10
Town Planning   K15
Union Shop (Upper Campus)   D19
University Archives   E21
University Press   A28
University Union (Blockhouse)   G6
Waste Management   H20
WHO Regional Training Centre   C27
Wool & Animal Sciences   G14
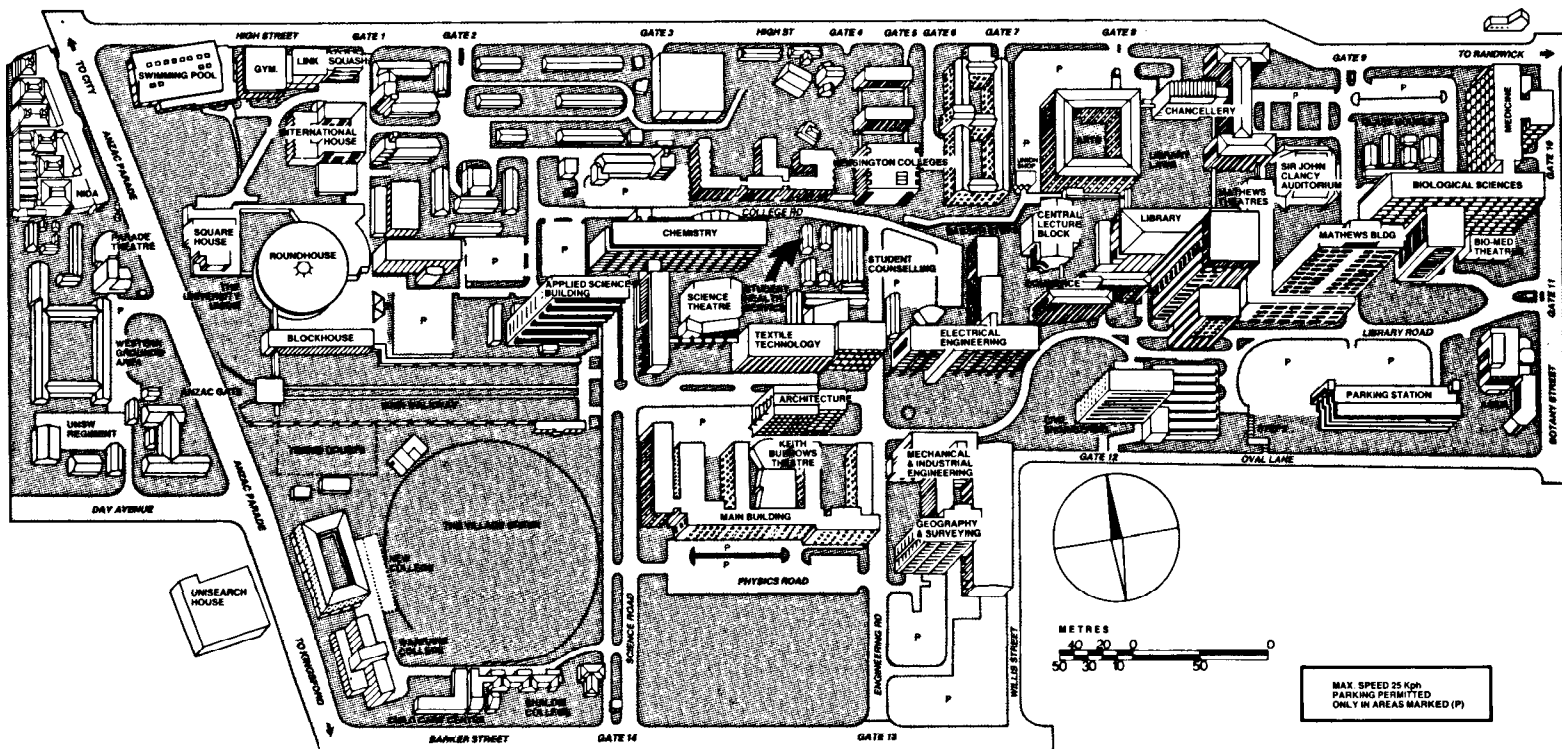
This Handbook has been specifically designed as a source of reference for you and will prove useful for consultation throughout the year.

For fuller details about the University – its organization, staff membership, description of disciplines, scholarships, prizes, and so on, you should consult the Calendar.

The Calendar and Handbooks also contain a summary list of higher degrees as well as the conditions for their award applicable to each volume.

For detailed information about courses, subjects and requirements of a particular faculty you should consult the relevant Faculty Handbook.

Separate Handbooks are published for the Faculties of Applied Science, Architecture, Arts, Commerce and Economics, Engineering, Law, Medicine, Professional Studies, Science (including Biological and Behavioural Sciences and the Board of Studies in Science and Mathematics), and the Australian Graduate School of Management (AGSM).

The Calendar and Handbooks, which vary in cost, are available from the Cashier's Office.