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## A MESSAGE TO NEW SCIENCE STUDENTS

You'll hear the word 'welcome' many times during the next few weeks. It will be meant sincerely and I hope that your experience will be a good one while you become familiar with what UNSW can offer you.

UNSW is a big place and at first it can be quite confusing. You will have to select courses to study, go through the enrolment process, find out where lectures, laboratories and tutorials are held, and so on. You may occasionally feel 'lost' and want advice on your programs or other matters - if this happens please come to the Science Student Centre for help. The Centre is located on Level 1 at the eastern end of the Robert Webster Building, room 128. Alternatively, you can contact us by phone (02) 9385-6125 or email [sso@unsw.edu.au](mailto:sso@unsw.edu.au).

I strongly recommend a new optional course (SCIF1101) that we have introduced this year to develop the skills and insights that will help you to excel at university and in your future employment. You will also explore and develop critical thinking and the philosophy of science, that is, what makes scientific thinking so uniquely effective in problem solving.

I wish you every success over the next few years as you work towards the completion of your degree.

Scott Mooney  
Associate Dean (Undergraduate Programs)  
Faculty of Science

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## This brochure provides the following information:

I The structure of programs offered by the faculty of Science

II Study plans/Majors/discipline areas

III Level I Science courses available at Stage 1 (first year) of all undergraduate Science programs.

After you have accepted your offer to a Science program at UNSW, you must enrol in appropriate Stage 1 courses (subjects) for that program.

You enrol online at [www.my.unsw.edu.au](http://www.my.unsw.edu.au). Enrolment can be a complex process, so please carefully read this booklet and others from the university before you begin. You can find further information at the above website.

### Checklist:

Before enrolling:

- In programs that require it, select a **Major or Study Plan** (i.e. a major area of interest. You are not permanently locked into this choice.)
- Note the **compulsory/core** courses within your chosen major/study plan or program
- Select any **elective** courses, so that the total of your compulsory plus elective courses is 24 UoC for each semester.

The University timetable is online to assist you in planning your workload. You can find it at <http://www.timetable.unsw.edu.au>

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## HOW TO ENROL@UNSW

All new Science students enrol online; you do not need to come to UNSW to enrol. For information on how to enrol at UNSW please refer to the following website: [www.my.unsw.edu.au](http://www.my.unsw.edu.au). Online enrolment opens at **9am on Thursday 18 January 2007 and closes 5pm Friday 23 February 2007**. You will not be permitted to enrol after Friday 23 February. Further information on enrolment for new students is contained in the brochure Enrolment For New Undergraduate Students 2007 that was sent to you with your UNSW offer letter.

You can make the process easier for yourself (and less time-consuming) if you do some preparation before enrolling online.

- Make sure you know which program you are enrolling in. If the program has a majors/study plans, choose the one that you are most interested in (the 3-year Bachelor of Science program has a choice of more than 30 majors!). You won't be committing yourself to this, but it helps if you start with some idea of what you want to specialise in.
- Identify the first year (Level I) courses that are required in your program. This information is in the first year enrolment templates listed later in this booklet.
- Make a note of courses that you might take as electives.

This booklet has a section describing first year Science courses, but for more detailed information consult the UNSW Undergraduate Online Handbook 2007. The most up-to-date version of the handbook is online at [www.handbook.unsw.edu.au](http://www.handbook.unsw.edu.au).

**Note:** Details in the Undergraduate Online Handbook may vary from year to year. Students are required to fulfil all of the requirements of their particular major or study plan, as specified in the handbook for the year in which they first enrolled.

## ACADEMIC ADVISING SESSION

UNSW Science programs require you to make important course choices at enrolment and this booklet will help you do that - but you may still have questions or may be unsure of some aspects of the choices you can make. To assist you, the Faculty is holding an Academic Advising Session on the Kensington campus on **Monday 29 January 2007**. A separate information leaflet in this mailout gives you details of the event, and you are **strongly** urged to attend before completing your online enrolment. Academic advisers from all Schools and Departments of the Faculty of Science will be present to offer guidance on programs and program options.

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## TERMINOLOGY

### **Course**

The basic unit of study (previously known as a “subject”). Each course has a specified number of **units of credit** (UoC) which indicate the workload required for that course. Most courses are 6 UoC.

### **Program**

The approved sequence of courses that lead to a degree. Each program is identified by a number and a name, eg 3970 - Bachelor of Science.

### **Major**

A sequence of related courses (usually from the same School) making up a primary area of specialisation within a program. In the BSc, for example, a major requires at least 42 UoC of Level II and III courses in the second and third years excluding an Honours year.

### **Minor**

A sequence of related courses making up a secondary area of specialisation (24 UoC from Level II and III courses, in second and third years).

### **Study plan**

Some programs (especially in Advanced Science) specify a sequence of compulsory courses to be taken in a particular order.

### **Full time Load**

If a student studies 18 UoC or more per session they are considered to be a full-time student; however, a normal full-time load is 24 UoC per session and is strongly recommended for new students.

### **Prerequisite**

A course that must be completed prior to enrolment in the course for which it is prescribed.

### **Compulsory or Core Course**

A course that is an essential part of a program, study plan, major or minor.

### **Elective Course**

A course chosen by the student. This may be from a suggested list. Elective courses available to students enrolled in Science programs are those offered as a part of any major or minor within the Science program.

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## PROGRAMS, STUDY PLANS AND MAJORS AVAILABLE IN SCIENCE

The UNSW program codes corresponding to UAC codes are as follows:

UAC Code	UNSW Program
429000	3970 Bachelor of Science
429001	3930 Bachelor of Science/ Bachelor of Arts 3935 Bachelor of Science/ Bachelor of Social Science
429002	4075 Bachelor of Science/ Bachelor of Education
429003	3993 Bachelor of Science (Communications)
429004	3994 Bachelor of Science (Media and Communications)
429007	3991 Bachelor of Science (Medical Science)
429008	3988 Bachelor of Environmental Science
429011	3617 Bachelor of Science (Nanotechnology)
429013	3972 Bachelor of Science (Advanced Science)
429025	3952 Bachelor of Optometry/Bachelor of Science
429026	3432 Bachelor of Psychology

The table below provides UAC codes (right column) for all undergraduate programs offered by the faculty of Science at UNSW. Check the Online Handbook for more information on the structure and scope of each program.

The left column lists:

- All choices of major/area of specialisation for the programs that require a major/area of specialisation (3930, 3935, 3972, 3986, 3988, 3993, 3994), and
- The more specialist and structured programs - 3980, 3981, 3052, 3991, 3617, 3952, 3432 - some of which may **not** have formal majors/areas of specialisation.

The middle column indicates the UNSW program code.

	Available in Program(s)	UAC Entry Code(s)
ADVANCED MATHEMATICS (by invitation only)	3972	429013
ANATOMY	3970, 3972	429000, 429013
APPLIED MATHEMATICS	3972	429013
BIOCHEMISTRY	3970, 3972	429000, 429013
BIOLOGICAL ANTHROPOLOGY	3970	429000
BIOLOGICAL SCIENCE	3970, 3972	429000, 429013
BIOTECHNOLOGY	3970, 3972	429000, 429013
	3052	429018
CHEMISTRY	3970, 3972	429000, 429013
ECOLOGY	3970, 3972	429000, 429013

<b>Subject Area</b>	<b>Available in UAC Program(s)</b>	<b>Entry Code(s)</b>
ENVIRONMENTAL SCIENCES		
Biology	3988	429008
Marine	3988	429008
Microbiology	3988	429008
Chemistry	3988	429008
Earth Science	3988	429008
Geography	3988	429008
Oceanography	3988	429008
ENVIRONMENTAL EARTH SCIENCE	3970	429000
FOOD SCIENCE	3970, 3972	429000, 429013
GENETICS	3970, 3972	429000, 429013
GEOGRAPHY	3970	429000
GEOLOGY	3970	429000
GEOSCIENCE	3972	429013
HISTORY AND PHILOSOPHY OF SCIENCE	3970	429000
MARINE SCIENCE	3970	429000
MARINE AND COASTAL STUDIES	3972	429013
MATERIALS SCIENCE	3970, 3972 3135, 3138 3136	429000, 429013 425001 424000
MATHEMATICS	3970	429000
MATHEMATICS AND FINANCE	3986	429013
MATHEMATICS AND COMPUTER SCIENCE	3972	429013
MEDICAL CHEMISTRY	3972	429013
MEDICAL MICROBIOLOGY AND IMMUNOLOGY	3970, 3972	429000, 429013
MEDICAL SCIENCE	3991	429007
MICROBIOLOGY	3970, 3972	429000, 429013
MOLECULAR BIOLOGY	3970, 3972	429000, 429013
NANOTECHNOLOGY	3617	429011
NEUROSCIENCE	3972	429013
PHARMACOLOGY	3970, 3972	429000, 429013
PHILOSOPHY	3970	429000
PHYSICAL OCEANOGRAPHY	3970, 3972	429000, 429013
PHYSICS	3970, 3972	429000, 429013
PHYSICS AND ASTRONOMY	3972	429013
PHYSICS WITH COMPUTER SCIENCE	3972	429013
PHYSIOLOGY	3970, 3972	429000, 429013
PSYCHOLOGY	3970, 3972 3432	429000, 429013 429026
PURE MATHEMATICS	3972	429013
QUANTITATIVE RISK (See ADVANCED MATHMATICS)	3972	429013
SAFETY SCIENCE	3970	429000

<b>Subject Area</b>	<b>Available in UAC Program(s) Entry Code(s)</b>	
SCIENCE COMMUNICATIONS	3993	429003
SCIENCE MEDIA AND COMMUNICATIONS	3994	429004
SPATIAL INFORMATION SYSTEMS	3970	429000
STATISTICS	3970, 3972	429000, 429013
TOXICOLOGY	3970	429000
VISION SCIENCE	3970	429000

**Note:**

Most of the majors listed above are also appropriate for combined programs **3930** (Science/Arts), **3931** (Advanced Science/Arts), **3529** (Science/Commerce), **4075** (Science/Education), **4770** (Science/Law). Students in these programs should consult their program advisor for details.

In **first year**, students should enrol in Level I courses **totalling 48 UoC** and covering at least **three** different disciplines. **At least 24 UoC from level I must be Science courses.** These will be the courses compulsory or strongly recommended for your major or study plan. 24 UoC of elective courses bring the total to 48 UoC.

Elective courses allow you to pursue study in areas outside your chosen specialisation. If these elective courses lead to new interests which you then wish to follow, you can change your major or study plan or incorporate them into a minor sequence. Most study plans allow elective courses from other faculties such as Arts and Social Sciences or Commerce and Economics. Careful selection of courses in first year allows the final choice of the major or study plan to be postponed until second year or even later.

**Note:** Details in the Undergraduate Online Handbook may vary from year to year. Students are required to fulfil all of the requirements of their particular major or study plan, as specified in the handbook for the year in which they first enrolled.

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## GENERAL EDUCATION REQUIREMENTS

The University requires all students to complete a selection of General Education courses, identified by a GEN prefix. The General Education Program is an integral part of all UNSW undergraduate programs and gives students the opportunity to address some of the key questions they will face as individuals, citizens and professionals. Although First year students cannot enroll in General Education (except for students in the Advanced Science and Medical Science degrees) it is important to be familiar with the rules governing General Education so that there is no confusion when enrolling for the later years.

Students in Science programs must complete General Education courses totaling 12 UoC plus an additional 56 hours of study which fosters acceptance of professional and ethical action and social responsibility.

Mainstream courses may be substituted for General Education with the prior approval of the Associate Dean (Student Affairs). Only 6 UoC from mainstream courses may be substituted for General Education. Students may also only count a maximum of 6 UoC of General Education courses from a single Faculty and a maximum of 3 UoC from the Faculty of Science (GENS)

Students enrolled in combined degrees are normally exempt from the General Education requirement.

For full details of the General Education requirements, please consult the Online Handbook – <http://www.handbook.unsw.edu.au/generaleducation/2007/generaleducation.html>

## FIRST YEAR ENROLMENT TEMPLATES

### 3972, 3986 BACHELOR OF SCIENCE - Advanced Science

Study plan		Courses specified in first year of study plan			
Advanced Mathematics	S1 S2	MATH1141 MATH1241	MATH1081		MATH1000
Anatomy	S1 S2	BABS1201 BIOS1101	CHEM1011 CHEM1021	MATH* MATH*	SCIF1021
Applied Mathematics	S1 S2	MATH1141 MATH1241	MATH1081		MATH1000/GE
Biochemistry	S1 S2	BABS1201 BIOS1101	CHEM1011 CHEM1021	MATH1031** MATH1041**	SCIF1021
Biological Science	S1 S2	BABS1201 BIOS1101	CHEM1011	BIOS1301 MATH1041**	SCIF1021
Biotechnology	S1 S2	BABS1201 BIOS1101	CHEM1011 CHEM1021	MATH1031** or MATH1041**	SCIF1021
Chemistry	S1 S2	MATH * MATH *	CHEM1031 CHEM1041	PHYS(any)	CHEM1000/GE
Ecology	S1 S2	BABS1201 BIOS1101	CHEM1011	BIOS1301 MATH1041**	SCIF1021
Food Science and Technology	S1 S2	BABS1201 BIOS1101	CHEM1031 CHEM1041	MATH** MATH**	PHYS1111 SCIF1021
Genetics	S1 S2	BABS1201 BIOS1101	CHEM1011 CHEM1021	MATH1031** and/or MATH1041**	SCIF1021
Geoscience	S1 S2	PHYS1111 MATH1041	GEOS1701 GEOS1111	GEOS1211	CHEM1011 SCIF1021
Marine and Coastal studies	S1 S2	BIOS1301 BIOS1101	GEOS1111 GEOS1211	MATH1041**	LIFE1001/GE
Mathematics and Computer Science	S1 S2	MATH1141 MATH1241	MATH1081 MATH2400	COMP1911 COMP1921	MATH1000/GE
Mathematics and Finance	S1 S2	MATH1151 MATH1251	ECON1101 ECON1102	ACCT1501 FINS1612	COMP1911 MATH1000/GE
Medical Chemistry	S1 S2	MATH * MATH *	CHEM1031 CHEM1041	BABS1201 BIOS1101	CHEM1000/GE
Medical Microbiology and Immunology	S1 S2	BABS1201 BIOS1101	CHEM1011 CHEM1021	MATH1031** MATH1041**	SCIF1021
Microbiology	S1 S2	BABS1201 BIOS1101	CHEM1011 CHEM1021	MATH1031** MATH1041**	SCIF1021
Molecular Biology	S1 S2	BABS1201 BIOS1101	CHEM1011 CHEM1021	MATH1031** MATH1041**	SCIF1021

Study plan		Courses specified in first year of study plan			
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Neuroscience	S1 S2	BABS1201 BIOS1101	CHEM1011 CHEM1021	PSYC1001 PSYC1011	MATH* SCIF1021
Pharmacology	S1 S2	BABS1201 or BIOS1101	CHEM1011 CHEM1021	1 x MATH1	SCIF1021
Physical Oceanography	S1 S2	MATH1141  MATH1241	MATH1081	PHYS1121 or PHYS1131 PHYS1221 or PHYS1231	MATH1000/GE
Physics	S1 S2	MATH # MATH #	PHYS1131 PHYS1231		PHYS1000/GE
Physics and Astronomy	S1 S2	MATH # MATH #	PHYS1131 PHYS1231		PHYS1000/GE
Physics with Computer Science	S1 S2	MATH # MATH #	PHYS1131 PHYS1231	COMP1911 COMP1921	PHYS1000/GE
Physiology	S1 S2	BABS1201 or BIOS1101	CHEM1011 CHEM1021	1 x MATH1	SCIF1021
Psychology	S1 S2	PSYC1001 PSYC1011			SCIF1021
Pure Mathematics	S1 S2	MATH1141 MATH1241	MATH1081		MATH1000/GE
Quantitative Risk	S1 S2	ACCT1501	ECON1101	FINS1613 SCIF1021	MATH1151 MATH1251
Statistics	S1 S2	MATH1141 MATH1241	MATH1081		MATH1000/GE

**NOTES:**

MATH\* Choose either MATH1131, MATH1141 or MATH1031 and either MATH1231, MATH1241 or MATH1041

MATH\*\* The higher level Maths courses may be substituted.

SCIF1021 Students in these study plans **must** enrol in SCIF1021 in Session 2.

CHEM Students with 75 or more in HSC Chemistry are strongly encouraged to consider CHEM1031 & CHEM1041 in place of CHEM1011 & CHEM1021.

**3970 BACHELOR OF SCIENCE - Compulsory and recommended courses in Science majors**

Major		Courses recommended in first year of major			
Anatomy	S1 S2	BABS1201 BIOS1101		CHEM1011	MATH1031 MATH1041
Biochemistry	S1 S2	BABS1201 BIOS1101		CHEM1011* CHEM1021*	MATH1031 MATH1041
Biological Anthropology	S1 S2	BABS1201 BIOS1101			
Biological Science	S1 S2	BABS1201	BIOS1301 BIOS1101	CHEM1011	MATH1041
Biotechnology	S1 S2	BABS1201	BIOS1101 or BIOT1011	CHEM1011* CHEM1021*	MATH1031 MATH1041
Chemistry	S1 S2	CHEM1011 or CHEM1031 CHEM1021 or CHEM1041			MATH1031 MATH1041
Ecology	S1 S2	BABS1201	BIOS1101 BIOS1301	GEOS1701	MATH1041
Environmental Earth Science	S1 S2	BIOS1301 BIOS1101	GEOS1701 GEOS1111	GEOS1211	MATH1041
Food Science and Nutrition	S1 S2	BABS1201	CHEM1011 CHEM1021	FOOD1120 FOOD1130	MATH1041
Genetics	S1 S2	BABS1201 BIOS1101		CHEM1011 CHEM1021	MATH1031 MATH1041
Geography	S1 S2	BIOS1301	GEOS1701 GEOS1601	MATH1041 or SLSP1001	
Geology	S1 S2	GEOS1111	GEOS1211	MATH1041	
History and Philosophy of Science	S1 S2	12 UoC from: HPSC1100 or HPSC1200 or HPSC1400 or HPSC1500			MATH1041
Marine Science (Marine Biology)	S1 S2	BABS1201	BIOS1301 BIOS1101		MATH1041
Marine Science (Physical Oceanography)	S1 S2	MATH1131 MATH1231	PHYS1121 PHYS1221		
Marine Science (Marine Geology)	S1 S2	GEOS1111	GEOS1211		MATH1041
Materials Science	S1 S2	MATH1131 MATH1231	PHYS1121 PHYS1221		
Mathematics	S1 S2	MATH# MATH#	MATH1081		
Medical Microbiology and Immunology	S1 S2	BABS1201 BIOS1101		CHEM1011 CHEM1021	MATH1031 MATH1041

Major		Courses recommended in first year of major			
Microbiology	S1 S2	BABS1201 BIOS1101		CHEM1011 CHEM1021	MATH1031 MATH1041
Molecular Biology	S1 S2	BABS1201 BIOS1101		CHEM1011 CHEM1021	MATH1031 MATH1041
Physical Oceanography	S1 S2	MATH# MATH#	MATH1081	PHYS1121 PHYS1221	
Pharmacology	S1 S2	BABS1201 other BIOS1	CHEM1011 CHEM1021	1 x MATH1	
Philosophy	S1 S2	12 UoC from Level 1 Philosophy			MATH1041
Physics	S1 S2	MATH# MATH#	PHYS1121/PHYS1131 PHYS1221/PHYS1231		
Physiology	S1 S2	BABS1201 or BIOS1101	CHEM1011		MATH1041
Psychology	S1 S2	PSYC1001 PSYC1011			MATH1031 MATH1041
Safety Science	S1 S2	MATH* MATH*	SESC1001		
Spatial Information Systems	S1 S2	BIOS1301 BIOS1101	GEOS1701 GEOS1211		MATH1041
Statistics	S1 S2	MATH# MATH#	MATH1081		
Toxicology	S1 S2	BABS1201 BIOS1101	CHEM1011 CHEM1021	MATH1031 MATH1041	SESC1001
Vision Science ^	S1 S2	BABS1201 BIOS1101 or PSYC1011	CHEM1031 CHEM1829	PHYS1121 VISN1211	MATH1131 VISN1231

**NOTES:**

CHEM\* Students with 75 or more in HSC Chemistry are encouraged to consider CHEM1031 & CHEM1042 in place of CHEM1011 & CHEM1021.

MATH\* Choose either MATH1131, MATH1141 or MATH1031 and either MATH1231, MATH1241 or MATH1041

MATH# Choose either MATH1131 or MATH1141 (Session 1) and MATH1231 or MATH1241 (Session 2)

^ Students intending to apply for transfer to 3952 Bachelor of Optometry Bachelor of Science in Stage 2 need to discuss this with the School of Optometry and Vision Science.

**3988 ENVIRONMENTAL SCIENCE**

S1	ENVS1011	GEOS1701	CHEM1011	Specialisation and electives
S2	BIOS1101	GEOS1211	MATH1041	

### 3991 MEDICAL SCIENCE

S1	BABS1201	CHEM1011 or 1031	MATH1031 or 1131 or 1141	
S2	BIOS1101	CHEM1021 or 1041	MATH1041 or 1231 or 1241	SCIF1110 and 3 units GE

### 3994 SCIENCE MEDIA AND COMMUNICATION

S1	MDCM1000	24 units from two Science Schools	12 units electives (Science)
S2	MDCM1001		

### 3993 SCIENCE COMMUNICATION

S1	SCOM1011	24 units from two Science Schools	12 units electives
S2	SCOM2014		

For all **COMBINED DEGREES** (eg BSc/BA, BSc/BEd) see Advisors from the Science Student Centre.

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## FIRST YEAR SCIENCE COURSES

### BIOLOGY

These courses are compulsory for programs in biological sciences but are also appropriate for students wishing to broaden their degree and gain a better understanding of the world in which we live. BIOS1101 and BIOS1301 are taught on the basis that students have little background in biology, but it is assumed that students have either 2 unit Science (Physics) 53-100, OR 2 unit Science (Chemistry) 53-100.

**BIOS1101 Evolutionary and Functional Biology** is a 6 UoC course taught in Session 2. It is for anyone with an interest in the natural world – plants and animals in all their forms, including their origin, development, functioning, evolution, and how they interrelate.

**BABS1201 Molecules, Cells and Genes** is a 6 UoC course taught in Session 1. The course aims to introduce you to the concepts of modern Biology and to develop skills in scientific thinking and analysis. It is concerned with the basic characteristics of all life: its chemistry, the way in which the genetic code controls its chemical processes, cell biology and genetics.

**BIOS1301 Ecology, Sustainability and Environmental Science** is a 6 UoC course taught in Session 1. This course will give you a great background in the full range of environmental issues and their effects on biodiversity and sustainability.

## CHEMISTRY

Chemistry is the science of the structure, properties and transformations of matter. It is not only a fundamental science, but it is also a core science in such interdisciplinary fields as biochemistry, nanotechnology, food science, industrial chemistry, medical science, pharmacology and environmental and marine science.

**CHEM1000 Chemistry at the Cutting Edge** is a course offered to Advanced Science students only. It is designed to give students an early introduction to the investigative aspects of contemporary issues and challenges facing chemists today. It is recommended that students have successfully completed HSC 2U Chemistry or equivalent.

**CHEM1011 Fundamentals of Chemistry 1A** is the entry course to studies in chemistry. It may be taken as a stand-alone introduction to chemistry or coupled with CHEM1021 to provide a broad general first year of chemistry. Enrolment in this course assumes that you have a basic knowledge of chemistry (this is taken as NSW year 11 Chemistry or equivalent). If you do not meet this level it is strongly recommended that you enrol in a bridging course in chemistry.

**CHEM1021 Fundamentals of Chemistry 1B** builds on CHEM1011 to complete a first level of chemistry. The prerequisite for CHEM1021 is a pass in CHEM1011.

**CHEM1031 Higher Chemistry 1C** is a course for students who have a very good background in chemistry and who wish to pursue studies which require a strong chemistry background. Entry to this course is limited to students who have a very good standard in high school chemistry (HSC 2U Chemistry (75-100) or equivalent).

**CHEM1041 Higher Chemistry 1D** builds on CHEM1031 to complete a first year of chemistry. The prerequisite for CHEM1041 is a pass in CHEM1031. CHEM1041 includes experimental project work,

## COMPUTING

*Although computing is not available as a major to science students, it is available as a minor; computing courses may be chosen as electives within science.* Computer Science is the study of the processes underlying the design of software and hardware computer systems. Students may study computing through four patterns, depending on their background and intended specialisations. They are

- (A) Higher Computing 1 COMP1917/Higher Data Structures and Algorithms COMP1927 for highly qualified students in Advanced Science (UAI 97 or greater) who intend to complete a combined major between computer science and either Mathematics or Physics.
- (B) Computing 1 COMP1911/Data Structures and Algorithms COMP1921 for other students in Advanced Science who intend to complete combined majors.
- (C) A single first year course COMP1911 for students who have had some prior programming experience (such as a Band 5 or 6 result in the HSC course *Software Design and Development*) or a high UAI (95 or greater).
- (D) The pair of first-year courses ENGG1811/COMP1911 for all other students. ENGG1811 may also be taken as a single course in either session.

The course titles and availability to Science students are:

Course	Title	Prereq.	Sess 1	Sess 2
COMP1917	Higher Computing 1	High UAI	Yes	No
COMP1927	Higher Data Structures and Algorithms	COMP191 7	No	Yes
COMP1911	Computing 1	None	Yes	Yes
COMP1921	Data Structures and Algorithms	COMP191 1	No	Yes
ENGG1811	Computing for Engineers	none	Yes	Yes

Students who have gained direct entry to a Computing Science major (UAC code 425010) take pattern A or B.

## GEOGRAPHY

Geography concerns the physical and human environment, why it varies from place to place, and how and why it changes. With the combination of specialist skills and the general understanding of the relationship between various branches of the physical and social sciences which geography provides, it would be appropriate to include geography in the first year of a science degree. The 6 UoC courses offered in first year have no prerequisites.

**GEOS1601 Australian and Global Geographies** is a 6 UoC course taught in Session 2. Topics covered include the geography of indigenous and invasion Australia; patterns and consequences of economic and cultural diffusion and change; socio-economic impacts of industrial change; emergence of global information economies, and more.

**GEOS1701 Environmental Systems and Processes** is a 6 UoC course taught in Session 1. Topics covered include earth, atmosphere and biosphere systems, weather and climate, water resources, soils and land degradation, fluvial and coastal processes and landforms, biodiversity and Australian biotic patterns.

## GEOLOGY

Geology is concerned with the evolution of the planet Earth, its biosphere and atmosphere, and it includes the study of the chemistry, physics and biology of geological processes. It is therefore an appropriate course to include in the first year of a science degree.

**GEOS1111 Fundamentals of Geology** is a 6 UoC course taught in Session 1. It provides a sound basis in geology for potential geologists, mining and petroleum engineers and environmental earth scientists, and covers mineral and rock properties and formation, geological history, and methods for analysis, description and definition.

**GEOS1211 Environmental Earth Science** is a 6 UoC course taught in Session 2. The course examines the nature and evolution of Earth, from crystal structure and fossils to the forces that drive earthquakes and volcanoes.

## HISTORY AND PHILOSOPHY OF SCIENCE

History and Philosophy of Science (HPS) is the subject area that deals with the nature, history social shaping and social impacts of science, technology and medicine. It includes not only its core fields of history of science and philosophy of science, but also environmental studies, the social shaping and social impacts of technology, as well as the history and politics of medicine and health. For science students HPS provides the opportunity to stand back from 'doing' science and reflect on the nature of science and the dynamics of scientific change; to place science within its wider socio-cultural context and historical development; and to consider the ethical, political and economic issues raised by modern science and technology. Courses in this area are therefore appropriate at first year, even if these studies are not taken further. Of the following four courses available in first year science, a maximum of two may be taken in a science degree.

**HPSC1100 Cosmos and Culture** (Session 1)

**HPSC1200 Science, Good, Bad and Bogus** (Session 2)

**HPSC1400 Science, Technology, Society and Environment** (Session 1)

**HPSC1500 Understanding Environmental Controversy** (session 2)

## MATHEMATICS

Mathematics provides an essential base for all the sciences. The growth in computer technology has increased dramatically the demand for mathematical and statistical expertise in the community. Consequently at least one session of Level I Mathematics is strongly recommended for all students in Science programs.

**MATH1000 Modelling Real-World Phenomena** is a course offered to Advanced Science students only. It is designed to give students an early introduction to contemporary issues and challenges in Mathematics today. Assumed knowledge: HSC Mathematics Extension 1 or equivalent.

**MATH1011 General Mathematics 1B** is single-session course worth 6 UoC. It is intended for students who will not be doing any Mathematics courses after first year, or who need to do MATH1131 but do not have the assumed knowledge. Such students typically do MATH1011 in first session, MATH1131 in second session, and MATH1231 in the following summer session. Only a limited number of Mathematics courses are available to students who have done General Mathematics. This course assumes a level of knowledge equivalent to a mark of at least 60 in HSC Mathematics. Students who did not reach this mark or who did HSC General Mathematics should seek advice from the School of Mathematics.

**MATH1031 Mathematics for Life Sciences** and **MATH1041 Statistics for Life and Social Sciences** are single session courses each worth 6 UoC. They are designed to provide the basic mathematics and statistics needed for students in the Life Sciences. Only a limited number of second year mathematics courses are available to students who take MATH1031. MATH1041 is also available to students studying MATH1131 and MATH1231 or MATH1141 and MATH1241. However it cannot be taken together with MATH1081 due to limitations on the number of courses that can be taken in the one discipline. The assumed knowledge for MATH1031 and MATH1041 is the same as for MATH1011.

**MATH1131 Mathematics 1A** and **MATH1231 Mathematics 1B** are single session courses each worth 6 UoC. They provide a wider coverage of Mathematics than the General Mathematics courses. Students required (or intending) to do any Mathematics (and some other courses like Physics) after first year must do either these courses or the corresponding Higher Mathematics 1 courses (described below).

This course assumes a level of knowledge equivalent to a combined mark of at least 100 in HSC Mathematics and Mathematics Extension 1, although students whose marks are in the range 100-115 should seek advice from the School of Mathematics. Students who are required to do MATH1131 and MATH1231 and do not have the assumed knowledge can either attend a Mathematics Bridging course (22<sup>nd</sup> Jan to 16<sup>th</sup> Feb. 2007, for details see <http://www.unsw.edu.au/futureStudents/nonAward/sad/bridgeprog.html>) or take MATH1011 General Mathematics 1B in Session 1, then MATH1131 in Session 2 and MATH1231 in the following Summer Session. These alternatives are also strongly recommended for students who did not study HSC Mathematics Extension 1.

**MATH1141 Higher Mathematics 1A** and **MATH1241 Higher Mathematics 1B** are single session courses each worth 6 UoC. Their coverage is similar to MATH1131 and MATH1231 but in greater depth. They are intended for students who obtained a good mark (at least 175) in HSC Mathematics Extension 1 and Extension 2 or a very good mark (at least 140) in HSC Mathematics and Mathematics Extension 1. Students who are considering enrolling in these courses should consult a Mathematics adviser at enrolment.

**MATH1081 Discrete Mathematics** is a course worth 6 UoC which can be taken in conjunction with Mathematics 1A and 1B (MATH1131 and MATH1231) or Higher Mathematics 1A and 1B (MATH1141 and MATH1241). MATH1081 is highly recommended for Science students taking a Mathematics major and is compulsory in most Advanced Science Mathematics Study Plans.

## **MATERIAL SCIENCE**

### **MATS1192 Design and Application of Materials in Science and Engineering**

The design of materials for applications in industry and society includes metallurgical, electronic, medical, packaging and transport. Microstructure and structure-property relationships of the main types of engineering materials (metals, ceramics, polymers and composites); micromechanisms of elastic and plastic deformation; fracture mechanisms for ductile, brittle, creep and fatigue modes of failure in service; corrosion; metal forming by casting and wrought processes; phase equilibria of alloys; microstructural control and application to commercial engineering materials. Information retrieval. Communication skills. Plant visits. Introductory materials laboratories. Application of fundamental learning to problem solving.

## **PHILOSOPHY**

Studying Philosophy provides intellectual skills that can help you to think critically, to better organise your thoughts and to present them logically and persuasively. Philosophy also addresses fundamental questions about the nature of reality, language, meaning, human knowledge and values. It provides a useful complement to studies in many disciplines but especially those in which logical thinking and clear expression are important. The range of Upper Level courses makes it possible for students majoring in other disciplines to select courses complementing their interests. Of the following four courses available in first year science, a maximum of two may be taken in a science

degree.

There are four Level 1 courses available in 2007:

<b>PHIL1007</b>	Knowledge and Reality	S1
<b>PHIL1008</b>	Ethics and Society	S1
<b>PHIL1010</b>	Thinking about Reasoning	S2
<b>PHIL1011</b>	Minds, Bodies and Persons	S2

**PHIL1007** Knowledge and Reality introduces some classical and contemporary philosophical questions, puzzles, and ideas about knowledge and reality. Topics may include: (1) Metaphysics: personal identity, free will, good and evil, universals, essences, meaning of life, death; (2) Epistemology: fallibility, truth, evidence, knowledge, empiricism, causation, rationalism, knowledge of other minds, knowledge of the external world, idealism, moral knowledge.

**PHIL1008** Ethics and Society is an introductory course in moral and political philosophy. When we make decisions in important areas such as euthanasia, reproductive freedom and reproductive technology, the allocation of health resources or the environment, we must balance the rights and duties of the individual with the demands and obligations of society. This team-taught course considers the moral issues raised by such decisions, along with some of the political, philosophical principles that inform our public debate. Also examines the nature and justification of rights, as well as contemporary concepts of justice and equality.

**PHIL1010** Thinking about Reasoning: Thinking clearly, reasoning productively, arguing well. These are skills essential in life in general and at University in particular. Philosophy has a lot to say about these practices, and also about the whole nature of human reason. Also involves practical work on reasoning and argumentative strategies, and an introductory investigation into what good reasoning actually is.

What are we, what are we like? What is a person? Are only humans persons? Are we mind, body or both? These are among the most puzzling and compelling questions that humans can ask. **PHIL1011** Minds, Bodies and Persons introduces some of the many ways philosophers have approached these and related questions. Some philosophical perspectives on the subject have a moral focus, some a psychological, some a computational, some a political. We look at the works of ancient philosophers and of philosophers working today.

Completion of the Philosophy program requires two of these courses in first year.

## **PHYSICS**

Physics is the fundamental natural science dealing with the properties and forms of matter and energy. As such it provides the basic concepts for the development of many other sciences and engineering.

**PHYS1000** Physics Thinking is a course offered to Advanced Science students only. It is designed to give students an early introduction to contemporary issues and challenges facing Physics today. It is recommended that students have successfully completed HSC Physics or equivalent.

**PHYS1111** Fundamentals of Physics is a 6 UoC introductory general Physics course suitable for students with limited Physics or Mathematics background from high school (for example students with a low Physics HSC performance, or students who may not have done any Physics since their Year 10 science studies). The course covers a broad range of introductory Physics topics but in less mathematical detail than the Physics 1A and 1B subjects. It is recommended that appropriate Mathematics courses be taken concurrently.

Since this course is a self-contained university level introduction to Physics, it will be an attractive option for students with an interest in physical science (who possibly could not study the subject at high school) who want a single session of Physics only – it is a course open to students of all disciplines. In particular we would encourage students of the Life Sciences to choose **PHYS1111** as a relevant elective.

The course is also ideal for students intending to study physical sciences, engineering or life sciences but who need an elementary level course in Physics, possibly as a preparation for the Physics 1A courses or PHYS1211 Energy and Environmental Physics.

**PHYS1121** Physics 1A and **PHYS1221** Physics 1B are each single-session 6 units of credit 'companion' courses. They are calculus-based courses giving an in-depth treatment of the fundamental topics of mechanics, thermal physics, electricity and magnetism in Physics 1A, and waves, physical optics, introductory quantum mechanics and an introduction to solid state and semiconductor physics in Physics 1B. The assumed knowledge is Mathematics at HSC level (HSC Mathematics 90-100 or preferably Mathematics Extension 1 1-50; Mathematics Extension 2 1-100) and some Science (preferably HSC Physics 65-100; or 4U Science 1-50 although HSC Chemistry 75-100; or 3U Science 100-150 are acceptable). Mathematics 1A and 1B (MATH1131 and MATH1231) or Higher Mathematics 1A and 1B (MATH1141 and MATH1241) are co-requisites.

**PHYS1131** Higher Physics 1A and **PHYS1231** Higher Physics 1B Students planning on studying a major in physics should enrol in PHYS1131 Higher Physics 1A or PHYS1231 Higher Physics 1B. These courses are each 6 unit of credit single session courses. They are calculus based courses which cover similar topics as PHYS1121 and PHYS1221 but in greater depth.

Students who are required to do **PHYS1121** and **PHYS1221** but do not meet the entry requirements can take **PHYS1111** Fundamentals of Physics in Session 1, and if the theory component is passed, may then undertake the fast track versions of **PHYS1121** and **PHYS1221** which run in Session 2 and in the Summer Session respectively.

**PHYS1211** Energy and Environmental Physics is another 6 UOC course suitable for life Science students, especially those studying Geography, Ecology and the Environmental Sciences. Many of the issues affecting the natural environment such as the ozone hole and global warming and renewable energy sources have their basis in physics. This course gives you the knowledge to quantitatively understand such issues, and will complement studies in many other areas of science. It can be taken as an elective.

## **PSYCHOLOGY**

Psychology, as the scientific study of behaviour and of mental life, provides a useful background for students whether or not they want to pursue psychology as a profession.

Not only does it provide an awareness of the human dimensions of many tasks and situations, but the observational, critical thinking, writing and research skills students will develop are relevant to a wide variety of other areas. Students, with training in the biological or physical sciences and knowledge of such areas of psychology as assessment, organisational psychology, social psychology and cognitive psychology, are very well prepared for entry into the more technological areas of business and industry. Students wishing to become professional psychologists should aim to complete a bachelor degree which includes four years of Psychology such as the BPsychol degree, the BSc (3970, 3972) degree, or degrees combined with the BSc (Science/Arts, Commerce/Science, Engineering/Science, Science/Law and Science/Social Science).

There are two First Year courses: **PSYC1001** Psychology 1A (Session 1) and **PSYC1011** Psychology 1B (Session 2), each worth 6 UoC. **PSYC1001** deals with the social bases of behaviour and it covers the areas of development, personality and individual differences, social, cross-cultural, states of consciousness and health psychology. **PSYC1011** is concerned with the biological bases of behaviour and it covers the areas of physiological, learning, motivation and emotion, perception, memory and cognition and abnormal psychology. The two courses may be taken individually but both are required for progression to Level II courses. Whilst there are no prerequisites a high proficiency in English is deemed necessary to pass all psychology courses.

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## **SCIENCE COMMUNICATION**

Whose discovery hits the headlines? Which invention receives millions of dollars in backing to really make a difference in the world? Why are debates about stem cell research or environmental issues so contentious? Why is it that you find science fascinating, yet your brother or sister turns their nose up at the mere mention of anything scientific? These questions are addressed by the field of science communication. Courses in science communication cover broad concerns about how science is perceived in society as well as development of specific abilities in understanding an audience and tailoring a message to have the impact that you desire.

There are two first-year courses in Science Communication. **SCOM1011** Science, Technology, Society and Environment (Session 1) looks at a range of science-in-society issues and perspectives. Students report that it is an eye opener about how science is perceived. You are eligible to take **SCOM2014** Science Communication (Session 2) once you have earned 24 UoC, that is, you have completed one full session of study. **SCOM2014** is a practical, hands-on course that develops your ability to understand an audience and improve the effectiveness of how you communicate.

The Science Communication unit also coordinates a new subject, **SCIF1101 Science Fundamentals/Science Foundations**, which is offered in session 1. **SCIF1101** develops the skills and insights that you will need to excel at university and be hired by the employers that you prefer. You will also learn about critical thinking and the philosophy of science, that is, what makes scientific thinking so uniquely effective in problem solving. **SCIF1101** is a new course designed to give science students what they need beyond the scientific content of their other subjects.

## **SAFETY SCIENCE**

Safety Science is the application of physical, health and behavioural sciences to the health, safety and well being of people at work and in other activities. Since Safety Science is about both people and technology, it is an ideal choice for those who are interested in science but want a people focused career. Safety is not just about making unsafe things safe; it is about better design, more extensive consideration of how things interact with people and environment, Specialist areas in Safety Science include Toxicology (the study of effects of chemicals on people and the environment), OHS (safety at work) and Biomechanics (the study of the mechanical behaviour of the human body applied to understanding injury and rehabilitation, human movement or sports). Majors offered in the BSc(3970) are Biomechanics, Safety Science, and Toxicology.

There is one First Year course, **SESC1001** Safety, Health and Environment, which is compulsory in the Safety Science and Toxicology majors.

## **VISION SCIENCE**

Vision Science is the study of the scientific basis of how we see. It is based on integrating our understanding of the anatomy and physiology of the eye and visual system, the psychophysics of visual perception, the neuroscience of the visual system and how to measure visual performance in normal and abnormal visual systems.

**VISN1211** Vision Science 1 is a 6 UoC course that provides an understanding of the basic anatomy and physiology of the eye plus an introduction to clinical methods of measuring visual function. This course also introduces the student to important generic skills such library information skills, communication, time management, critical thinking and career choices in vision science. While there are no prerequisites for this course, students are expected to have a high proficiency in written and verbal English.

**VISN1231** Optics 1 is a 6 UoC course that provides an understanding of physical and geometrical optics with an introduction to ocular refractive error. This course covers the Physical Optics inherent in the wave nature of light as well as introducing Geometrical Optics; the description of the basic properties of lenses, optical systems and model eyes. Clinical applications of this theory will be used throughout the course. Students are required to have completed both MATH1131 Maths 1A and PHYS1121 Physics 1A before enrolling in this course.