

# Faculty of Science

## Introduction to the Faculty of Science

The Faculty of Science comprises the Schools of Botany, Chemistry, Earth Sciences, and Physics, and the Departments of Genetics, Information Systems, Mathematics and Statistics, Optometry and Vision Sciences, and Zoology. These schools and departments undertake most of the faculty's teaching and research. A number of other departments also make significant teaching contributions to the faculty. These departments include Anatomy and Cell Biology, Biochemistry and Molecular Biology, Computer Science and Software Engineering, Anthropology, Geography and Environmental Studies, History and Philosophy of Science, Microbiology and Immunology, Pathology, Pharmacology, Physiology, and the School of Behavioural Science.

The Faculty of Science offers a range of courses at all levels. It offers professional degrees in optometry and information systems, as well as the more generalist Bachelor of Science and Bachelor of Biomedical Science. These programs are designed to provide graduates with a range of skills sought after by employers in many professions, and with the essential skills required for a career in scientific research.

As a student in the Faculty of Science you study in a stimulating and exciting environment with access to highly trained academic staff, first rate research equipment and programs of international standing.

## Objectives of the faculty

The faculty's objectives are to provide an educational framework which enables:

- graduates to contribute to many areas of society;
- graduates to provide leadership to the science-technology base of the Australian economy and culture;
- students to enter applied science and technology, and professional science-based career paths; and
- scientists to enter the international community of advanced science and technology through postgraduate research studies.

## Faculty courses

### Undergraduate

- Bachelor of Science (page 4)
- Bachelor of Science (Extended) (page 26)
- Bachelor of Science combined courses:
  - Bachelor of Arts and Bachelor of Science (page 4)
  - Bachelor of Commerce and Bachelor of Science (page 5)
  - Bachelor of Engineering (Mechanical and Manufacturing, Civil, Environmental, Chemical) and Bachelor of Science (page 5)
  - Bachelor of Geomatic Engineering and Bachelor of Science (page 7)
  - Bachelor of Laws and Bachelor of Science (page 1)
  - Bachelor of Science and Bachelor of Information Systems (page 23)
  - Bachelor of Science and Bachelor of Engineering (Electrical, Computer and Software) (page 6)
  - Bachelor of Forestry and Bachelor of Science (page 8)
  - Bachelor of Science and Bachelor of Forest Science (page 16). *No first year entry into this course from 2001 onwards.*
- Bachelor of Arts and Sciences (page 5)
- Bachelor of Biomedical Science (page 16)
- Bachelor of Information Systems (page 20)
- Bachelor of Information Systems combined courses:
  - Bachelor of Commerce and Bachelor of Information Systems (page 22)
  - Bachelor of Geomatic Engineering and Bachelor of Information Systems (page 7)
  - Bachelor of Science and Bachelor of Information Systems (page 23)
- Bachelor of Optometry (page 25)
- Diploma in Information Systems (page 24)

### Honours programs

- Bachelor of Science (Honours)
- Bachelor of Information Systems (Honours)

Both programs may be taken separately, or as part of a combined course. Information about the honours programs may be found in *Bachelor of Science (Honours)* and *Bachelor of Information Systems (Honours)* (p.1).

### Graduate and postgraduate

Further information about graduate and postgraduate courses offered by the Faculty of Science may be obtained from the Faculty of Science office or the School of Graduate Studies, Tel. +61 3 8344 8599.

### Coursework

- Graduate Certificate in Environmental Science
- Graduate Diploma in Environmental Science
- Master of Environmental Science
- Graduate Diploma in Information Systems
- Postgraduate Certificate in Information Systems
- Postgraduate Diploma in Information Systems
- Master of Information Systems
- Graduate Diploma in Operations Research
- Postgraduate Diploma in Science
- Postgraduate Certificate in Ocular Therapeutics
- Postgraduate Diploma in Advanced Clinical Optometry
- Master of Science (Mathematics and Statistics)
- Master of Science (Applied Statistics)

### Research

- Master of Information Systems<sup>1</sup>
- Master of Optometry<sup>1</sup>
- Master of Science (Research)<sup>1</sup>
- Doctor of Philosophy<sup>1</sup>
- Doctor of Science

## The Faculty of Science office

The Faculty of Science office coordinates the formal requirements of a student's course. In the reception area of the faculty of Science office you will find:

- enquiries officers;
- publications providing further information about the undergraduate and postgraduate courses offered by the Faculty;
- free multimedia information kiosks that provide information ranging from key dates to careers in science.

You should visit the Faculty of Science office if you need advice about:

- course requirements
- changing your address
- credit or prerequisite evaluation of previous studies
- changes to course enrolment (deferment, leave of absence, discontinuation)
- adding subjects or withdrawing from subjects
- re-enrolment
- selection
- special consideration
- study skills workshops

For more in-depth information, students can make an appointment with a student adviser. Information is also provided at the Faculty of Science home page at <<http://www.science.unimelb.edu.au/>>.

### Departments and schools

Departments and schools are the teaching and research centres of the University. Students should visit them for information regarding:

- the teaching of subjects
- the assessment requirements of subjects
- practical classes
- detailed syllabus information

1. Administered by the School of Graduate Studies

- academic advice about course planning
- honours requirements

### Contacting the Faculty of Science office

The Faculty of Science office is located on the ground floor of the Old Geology Building (Masson Road) on the Parkville campus of the University.

The various contact points for the Faculty of Science office are:

Faculty of Science Office  
Old Geology Building  
The University of Melbourne  
Victoria 3010  
Australia  
Tel: + 61 3 8344 6404  
Fax: + 61 3 8344 5803  
Email: science-queries@unimelb.edu.au  
Web: <http://www.science.unimelb.edu.au/>

## General information for all undergraduate students

### What do I need to read in this Handbook?

Students are expected to read:

- the general information section at the start of the Handbook;
- the Faculty of Science introduction;
- the department entries that follow this introduction. Department entries provide listings of suggested subjects, subject descriptions and other information that is invaluable for course planning. Department entries appear in alphabetical order.

### Accelerated Entry Program

The Accelerated Entry Program enables students who have undertaken appropriate additional work while completing their Year 12 studies to gain exemption from some first year subjects.

Exemption tests equivalent to first year BSc standard are conducted in between enrolment and the commencement of Semester 1. Students who pass an exemption test will be granted credit for the relevant first year subject. Students may receive credit for more than one subject. Students who receive such credit may be able to complete the course in less than the normal duration.

Application forms for accelerated entry will be available at the time of enrolment.

### Credit and prerequisite evaluations for previous studies

Credit towards a Faculty of Science course is available for tertiary studies undertaken in the 10 years prior to enrolment in that course. The amount and type of credit granted is determined by the basis of the content, standard, workload and relevance of previous studies to the course into which the student has been admitted. Students are expected to provide appropriate documentation for the credit assessment, including their academic transcript and detailed course and subject descriptions.

Students should refer to the Faculty of Science Credit and Prerequisite Evaluation Policy for Undergraduate Courses before applying for credit. A copy of this policy is available from the Faculty of Science office.

### Prerequisites

Entry into many subjects requires the prior completion of prerequisite subjects or concurrent enrolment in corequisite subjects. Students must not enrol in subjects for which they lack the prerequisites without a written waiver of the prerequisite from the Head of Department.

It is the responsibility of students to ensure that they have completed the necessary prerequisites before enrolling in subjects. Students are advised that enrolment in subjects for which they lack the prerequisites, or waivers, may be cancelled. If a student remains in a subject for which they lack the appropriate prerequisites, even with a waiver, the lack of the prerequisite is not deemed grounds for special consideration or other concessions should the student fail to complete the subject successfully.

### Workloads

All Faculty of Science courses, except for the Bachelor of Optometry and some honours programs, are available on a full-time or a part-time basis. Bachelor of Optometry students require permission from the head of optometry to enrol part-time.

Refer to *Overloads in Semester 1 and 2 (p.6)* for Faculty guidelines on approving overloads.

Combined course students in the Bachelor of Engineering or Bachelor of Geomatic Engineering would also need approval from their Engineering Department and/or Faculty of Engineering to enrol in 62.5 points per semester.

*Youth Allowance workload requirements (p.5)* in the general information section of this Handbook explains how a student's HECS load (i.e. workload) determines if they are a full-time or part-time student.

### Subject levels

Subjects normally taken in first year are referred to as 100-level subjects. Subjects normally taken in second and third year are referred to as 200-level and 300-level subjects respectively. The year level of a science subject is normally indicated by the fourth digit of its six-digit subject code. For example, 610-280 is a 200-level subject.

Students may combine 100-level, 200-level and/or 300-level subjects in any year of their course, providing they have the necessary prerequisites and avoid timetable clashes.

### Subject changes

Students must use a subject change form, available at the Faculty of Science office, to advise the faculty of changes to their enrolment. BASc and combined course students should notify the office of the faculty which administers the affected course component (e.g. Engineering for engineering subjects in the combined BE/BSc; Arts for arts subjects in the BASc or BA/BSc). Students wishing to change the information systems subjects of their BIS or the BIS component of their combined course should notify the Department of Information Systems. Students enrolled in the Diploma of Information Systems should notify the Faculty of Science. The critical dates relating to subject changes are detailed in *Course and subject changes (p.6)* in the general information section of this Handbook.

Subject changes may alter a student's enrolment category from full-time to part-time (or vice versa). Students are encouraged to read *Youth Allowance workload requirements (p.5)*.

### Timetable clashes

While every effort is made to avoid timetable clashes, the number of subjects offered by the Faculty of Science makes it impossible to accommodate every possible subject combination.

If a subject combination results in lecture or practical class time clashes, students are advised to consider changing subjects. Timetable clashes inevitably affect student performance, and are not grounds for special consideration. Attendance is expected at all scheduled lectures, practical classes, excursions and tutorials.

### Special consideration

For information about special consideration, see *Special consideration (p.4)*.

### Study difficulties

The faculty organises several study skills seminars throughout the year. These seminars are advertised on faculty and department noticeboards, and discuss both general and discipline-specific study skills. See *Study skills (p.4)* for more information.

### Students at risk

Many first year students experience academic difficulties, particularly during their first semester of university study. Students who fail two or more of the subjects attempted in their first semester, or those who feel that their performance was well below expectations, are invited to discuss any problems and ways of improving their performance. Interviews, with an academic staff member or a student adviser, will be held as soon as possible after the first semester results have been finalised by departments.

### Unsatisfactory progress guidelines

At the end of each semester, the Faculty of Science reviews the academic progress of all students enrolled in Faculty of Science courses.

Students enrolled in any Faculty of Science course who:

- pass 75 per cent or more of the points attempted in any semester will be deemed to have made satisfactory progress in that semester;
- pass 50 per cent or more but less than 75% of the points attempted in any semester will be required to gain faculty approval before being allowed to continue in their course;
- pass less than 50 per cent of the points attempted in any semester, or pass less than 75 per cent of the points in any semester for the second time, will be required to make a case to the Faculty of Science Unsatisfactory Progress Committee;
- fail a core subject for the second or subsequent time will be required to make a case to the Faculty of Science Unsatisfactory Progress Committee.

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Students are given an opportunity to make a written submission or to appear before the committee or to do both. In considering a student's progress, the committee will normally consider the student's results, attendance at lectures, practical classes and tutorials, and any extenuating circumstances, such as personal difficulties, financial hardship and study problems.

The committee will determine the best course of action for the student's academic future and make one of three decisions:

- take no action (i.e. the student is able to continue in the course with no restrictions);
- restrict the student's enrolment for the following semester or year;
- recommend to the Academic Board that the student be suspended from the course, or from one component of a combined course. Students recommended for suspension have the right to appeal to the Academic Board before a final decision is made.

At the very least, unsatisfactory progress will:

- increase the length of time required to complete the degree (with a corresponding increase in fees and HECS liability);
- make selection into quota subjects or other courses more difficult as selection is usually based on academic merit.

Students suspended from their course can apply for re-admission. Generally, re-admission is only possible if the student has demonstrated that there is a reasonable chance that they would successfully complete their course if re-admitted. Relevant studies completed at another tertiary institution, or through the University of Melbourne Community Access Program, can be used to show that a student is now capable of completing their course.

### Community Access Program

The Community Access Program (CAP) enables students to undertake individual subjects on a fee-paying basis. Students wishing to resume their studies after being suspended may apply to enrol through CAP to show academic rehabilitation.

Students currently enrolled in Faculty of Science courses who wish to take subjects for which they will not receive credit in their course should enrol in such subjects through CAP. See *Community Access Program (for enrolled students)* (p.2).

### Taking time off from study

Applications for deferment, leave of absence, or discontinuation are made by completing a cancellation of enrolment form at the Faculty of Science office. The Faculty of Science allows students to take one year of leave from their course, under the conditions set out in *Taking time from study* (p.4).

### International exchange program

Going on exchange to another university with which we have an exchange agreement can enhance your degree. You may apply to go on exchange in your second, third or fourth year. Students intending to participate in the University's exchange program need to discuss their options with the faculty and have their proposed course plan approved both by the department and faculty to ensure they receive full credit for their studies abroad.

See *Studying at an overseas university as part of an exchange program* (p.3) in the general information section of this Handbook.

### Concurrent diplomas

The Faculty of Science allows eligible students to enrol in the Diploma in Modern Languages, the Diploma in Music (Practical), the Diploma in Arts, the Diploma in Creative Arts or the Diploma in Information Systems, concurrently with their degree studies. Enrolling in a concurrent diploma adds an extra year to the duration of the course. See *Additional general studies of importance* (p.2) for more information.

### Faculty awards

#### Dean's Prize

The Dean's Prize is determined by academic merit and is awarded to the highest achieving commencing students in the faculty each year. These prizes are presented by the Dean of the Faculty of Science at a ceremony in the presence of heads of departments, invited alumni and parents.

#### Dean's Honour List

The Dean's Honour List recognises high achieving students in the Faculty of Science. Students on the Dean's Honour List receive a certificate from the Dean of the Faculty of Science at an annual presentation ceremony, and their achievement is also recorded on their academic transcript.

To be considered for the Dean's Honour List, students enrolled in the Bachelor of Information Systems, Bachelor of Optometry, Bachelor of Science, Bachelor of Biomedical Science, Bachelor of Arts and Sciences and the combined courses will normally have:

- completed a full year of science study (for combined course students this can be over two years) at the 100, 200 or 300-level;
- passed all subjects;
- obtained an average mark greater than 80 per cent in science subjects.

To be considered for a place on the Dean's Honour List, Bachelor of Science (Honours) students must achieve an overall mark for the BSc (Hons) year that is greater than 85 per cent.

Numerous other prizes, scholarships, awards and bursaries are provided by companies and through bequests. These are available to students enrolled in the undergraduate courses offered by the Faculty of Science and are awarded for academic excellence at each year level and in individual subjects.

Further information on Faculty of Science awards and prizes is available at the following web site at <<http://www.science.unimelb.edu.au/awards>>.

The Student Financial Aid office can provide details of other University awards.

### Career opportunities

One of the major benefits of a degree from the Faculty of Science at the University of Melbourne is that the breadth of the degrees can lead in all sorts of interesting career directions. The faculty has a strong commitment to ensuring that during their studies students develop an understanding of the breadth of the opportunities available to them. In conjunction with the Careers and Employer Liaison Unit the faculty offers the professional development program 'Kick Start Your Career' which focuses on the value of the science degree and the skills obtained as well as methods for successful job-hunting across various industry types.

Our graduates are employed in a wide array of both science-related and non-science-related positions in the business, industry, government, and education sectors. Graduates from the faculty benefit from excellent career opportunities within Australia and internationally, and enjoy competitive salaries.

Many students use the subject material they have learnt through their degree and apply that directly in the scientific industries, becoming research botanists, industrial chemists, geologists, geneticists, forensic scientists, marine ecologists, physicists, biomedical researchers, statisticians, meteorologists, optometrists and vision scientists to name a few.

Alternatively, some graduates use their studies in other, allied industries which require practitioners to have a strong understanding of science, scientific concepts and the practice of science. Such careers include intellectual property law, market research, science journalism, teaching and actuarial roles in the superannuation, finance and insurance industries. Other students take the general skills gained in the courses offered by the faculty, such as numeracy, analytic and logical thinking, information and time management, scientific method and research skills. These graduates enter employment areas which may be completely unrelated to their field of study but which value these skills highly. Examples include management consulting and the actuarial industry.

Students graduating from information systems courses become systems analysts, programmers, database administrators, information systems managers or project managers in a variety of companies. Many of these graduates also take up roles in information technology consulting or management consulting firms.

A significant proportion of science graduates choose to continue their studies and progress into higher degrees. In particular, many students complete an additional honours year in order to focus on a specific discipline area and significantly enhance their career choices and outcomes in the scientific industries.

### Science alumni

The Faculty of Science and the University of Melbourne are dedicated to helping current and past students, staff and other professionals in science build a lifelong relationship with the faculty and the University, and to promoting these contacts at a local, national and international level. For further information please contact the University Development office, Tel. +61 3 8344 7469.

### Veterinary science

Science students who seek entry to the Faculty of Veterinary Science must apply to the Assistant Registrar (Veterinary Science) for lateral transfer to that course. Applications are usually due in early September during the first year of science studies. Contact the Assistant Registrar (Veterinary Science) for details.

The Faculty of Veterinary Science has specified that science students wanting to be considered for a transfer to veterinary science must take 100 points in their first year, including:

- Biology 600-141 and 600-142;
- Chemistry 610-141 and 610-142;

Physics 640-121 and 640-122, or 640-141 and 640-142, or 640-161 and 640-162.

Students who have undertaken physics in their final year of secondary schooling and who study Physics 640-161 and 640-162 will have their marks in that subject debited by 15 per cent when considered for selection into the veterinary science course.

Students enrolled in the Bachelor of Science (Veterinary Science) course should see the *Faculty of Veterinary Science (p.1)* section of this Handbook for further information.

## Bachelor of Science (BSc)

### Course objectives

Bachelor of Science graduates:

- have a broad knowledge of science across a range of disciplines, with a higher level of understanding in one or more of these disciplines;
- when solving scientific problems:
  - are capable of applying appropriate knowledge,
  - are able to access relevant information,
  - understand the principles of project and experimental design,
  - have a capacity to apply practical skills and technology;
- are able to communicate the results of their studies in both written and oral form;
- have an appreciation of the historical background and evolution of scientific concepts;
- have the knowledge, skill and attitude to enable adaptation to scientific, technological and social change, have a sense of intellectual curiosity and a desire for lifelong learning, and a capacity to be creative and innovative.

Bachelor of Science (Honours) graduates should, in addition to the above, be able to define and solve problems relating to their speciality and be capable of conducting supervised research in their field.

### Duration

Students enrolled full-time usually take three years to complete the BSc course.

### Course requirements

A minimum of 300 points is required, which must include at least 237.5 science points, comprising:

- between 75 and 125 science points at the 100-level;
- completion of 50 points of a prescribed science major at the 300-level.

Note that:

- at least 75 science points at 100-level must be completed;
- a maximum of 125 points of science and non-science subjects at 100-level can be included;
- at least 50 points at the 100-level must be completed before proceeding to 200-level subjects;
- there are no 200-level requirements;
- the 300 points can include up to 62.5 non-science points. Of the 62.5 non-science points, up to 25 points can be at the 100-level. The only exception to this is if students undertake a sequence of 100-level language subjects: in these cases the 62.5 non-science points can include up to 37.5 points at the 100-level.
- students completing a major in psychology must complete 50 science points at 300-level. (37.5 points of prescribed 300-level psychology subjects plus an additional 12.5 points of 300-level science subjects).
- Students considering applying for Bachelor of Science (Honours) should attempt at least 87.5 points of 300-level science subjects to maximise their faculty honours score. Students planning to apply for entry into the BSc (Hons) should refer to *Bachelor of Science (Honours) and Bachelor of Information Systems (Honours) (p.1)* for further details.

See *Science and non-science subjects (p.6)* for discussion as to what constitutes subjects earning science points.

### Students who commenced prior to 1999

Students who first enrolled in the BSc before 1999 must complete the requirements set out above except they need to complete 50 science points at the 300-level of subjects of their choice rather than a prescribed science major.

### Selection into BSc (Hons)

Students planning to apply for entry into the BSc (Hons) should refer to *Bachelor of Science (Honours) and Bachelor of Information Systems (Honours) (p.1)* for further details.

## Combined courses involving the Bachelor of Science

Students who complete a combined course will graduate with two undergraduate degrees. Combined course students therefore have an increased choice of subjects and an opportunity to either specialise in inter-related discipline areas across two faculties, and/or to broaden their educational base.

Students wanting to specialise in a science discipline should consider completing the BSc degree and undertaking postgraduate study in their area of interest rather than completing a combined course.

The wide-ranging objectives of each of the combined courses can be gleaned by referring to the objectives for both the BSc and the other degree forming the combined course.

For the full list of combined courses offered by the Faculty of Science, see *Faculty courses (p.1)*.

### Combined course requirements

All combined course students must satisfy the requirements of both components of the combined course in which they are enrolled, as well as accumulating a minimum number of points. These requirements vary and are stated in the specific entry for each combined course.

Students enrolled in BSc combined courses should read the section *Course planning information for the BSc, BASc and BSc combined courses (p.5)* for information relevant to the BSc, including details about majors and science and non-science subjects. Combined course students should also note that no credit toward the BSc component of combined courses will be awarded for non-science subjects. Science and non-science subjects are defined on page 6.

### Enrolment of combined course students in Bachelor of Science (Honours)

Students need to have completed at least 300 points, including the requirements of the BSc, to be considered for entry into the BSc (Hons) course.

Students planning to apply for BSc (Hons) should also ensure that all departmental requirements for entry into BSc (Hons) have been satisfied.

The faculty will use the weighted average mark achieved for the 300-level science subjects to determine if a combined course student can enter BSc (Hons). The faculty usually requires a weighted average of 65 per cent or more for the 300-level science subjects that have been completed.

BSc (Hons) will require at least one extra year of study. Further information about honours is provided in *Bachelor of Science (Honours) and Bachelor of Information Systems (Honours) (p.1)*.

## Bachelor of Arts/Bachelor of Science (BA/BSc)

The BA/BSc combined course provides students with an opportunity to obtain a general education in the humanities, social sciences and the languages and cultures of other people, and to also complete a major in one or more science disciplines.

### Duration

The BA/BSc combined course is normally completed over five years.

### Course requirements

Students enrolled in the BA/BSc combined course must accumulate a total of 500 points. Within the 500 points students must satisfy the minimum requirements for both the BSc component and the BA component. These requirements are detailed below.

**All subjects offered by the Departments of Geography and Environmental Studies, and History and Philosophy of Science must count toward the arts component of the combined course.**

Students undertaking psychology subjects can receive credit toward *either* the science or arts component of the combined BA/BSc course. Credit for psychology cannot be split between the two faculties. Students should advise the Faculty of Science office if they would like psychology to count toward the BSc component of the BA/BSc combined course.

### Science component

A minimum of 237.5 science points is required, which must include:

- between 75 and 125 science points at the 100-level;
- completion of 50 points of a prescribed science major at the 300-level.

There are no 200-level requirements.

Students who first enrolled in the BA/BSc before 1999 must complete the requirements set out above with the exception that they do not need to complete a prescribed science major, but rather 50 science points at the 300-level of subjects of their choice.

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See *Science and non-science subjects (p.6)* for discussion of what constitutes subjects earning science points.

### Arts component

A minimum of 225 arts points is required, of which:

- 50 points must be at the 100-level;
- 75 points must be at the 200-level;
- 100 points must be at the 300-level.

Please refer to the Faculty of Arts introduction section for a list of teaching departments. Also refer to *Combined arts degree requirements (p.8)*.

### Balance of points

The remaining 37.5 points may be taken from subjects offered by either faculty.

## Bachelor of Commerce/Bachelor of Science (BCom/BSc)

### Duration

The BCom/BSc combined course is normally completed over five years.

### Course requirements

Students enrolled in the BCom/BSc combined course must accumulate a total of 500 points. Within the 500 points students must satisfy the minimum requirements stated below for both the BSc component and the BCom component.

#### Science component

A minimum of 237.5 science points is required, which must include:

- between 75 and 125 science points at the 100-level;
- completion of 50 points of a prescribed science major at the 300-level.

There are no 200-level requirements.

Students who first enrolled in the BCom/BSc before 1999 must complete the requirements set out above with the exception that they do not need to complete a prescribed science major, but rather 50 science points at the 300-level of subjects of their choice.

See *Science and non-science subjects (p.6)* for discussion of what constitute subjects earning science points.

#### Commerce component

A minimum of 200 commerce points is required, which must include:

- 50-125 points at the 100-level;
  - at least 50 points at the 300-level;
  - the following compulsory subjects:
    - 316-101 Introductory Macroeconomics
    - 316-102 Introductory Microeconomics
    - 316-130 Quantitative Methods 1
- and one of:
- 316-205 Introductory Econometrics
  - 316-206 Quantitative Methods 2
  - 325-210 Managerial Decision Analysis
  - 325-212 Market Research.

The 200 commerce points must be chosen from subjects taught by departments in the Faculty of Economics and Commerce, or subjects with a 732 prefix taught by the Faculty of Law.

### Balance of points

The remaining 62.5 points may be taken from subjects offered by the Faculties of Economics and Commerce, Science, and Arts.

## Bachelor of Arts and Sciences (BASc)

The Bachelor of Arts and Sciences is a single degree course which allows students to study subjects from both the Faculties of Arts and Science.

BASc students will be able to complete majors in both faculties, and have the option to complete an honours year in either arts or science. The degree will appeal to applicants who wish to study more broadly than is currently possible in either the BA or the BSc, but who do not wish to complete the five years of study required for the combined BA/BSc course.

### Course objectives

The Bachelor of Arts and Sciences course has as its objectives that graduates:

- can demonstrate a sound knowledge and understanding of selected fields of study in the sciences, humanities, languages and social and behavioural sciences, and a higher understanding in one or more of these disciplines;

- can access and appreciate national and international debates in their areas of study;
- can apply critical and analytical skills and methods to the identification and resolution of problems within a changing social context;
- when solving scientific problems:
  - are capable of applying appropriate knowledge,
  - are able to access relevant information,
  - understand the principles of project and experimental design,
  - have a capacity to apply practical skills and technology;
- have the knowledge, skill and attitude to enable adaptation to scientific, technological and social change, and have an appreciation of the historical background and evolution of scientific concepts;
- can demonstrate an independent approach to knowledge that uses rigorous methods of inquiry and appropriate theories and methodologies that are applied with intellectual honesty and respect for ethical values;
- can communicate effectively and, in the case of those students undertaking a language major, are able to read, write and speak with fluency and with an appreciation of the cultural context of the language;
- can act as informed and critically discriminating participants within the community of scholars, as citizens and in the workplace;
- have a sense of intellectual curiosity and a desire for lifelong learning, and a capacity to be creative and inventive; and
- are proficient in the use of appropriate modern technologies, such as computer and audio-visual systems, for the acquisition, processing and interpretation of data.

### Duration

The course involves four years of full-time study, and may be studied part time.

### Course requirements

The BASc degree requires the completion of 400 points of study, and at least 200 points of subjects from approved departments of *each* faculty. The study must be completed according to the requirements stated below.

#### Subjects offered by the Departments of Geography and Environmental Studies, and History and Philosophy of Science must count toward the arts requirement of the BASc course.

Students undertaking psychology subjects can receive credit toward *either* the science or arts requirement of the BASc course. Credit for psychology cannot be split between the two faculties. Students should advise the Faculty of Science office if they would like psychology to count toward the science requirement of their BASc course.

#### Arts requirement

A minimum of 200 arts points is required, of which:

- 50 points must be at 100-level;
- 75 points must be at 200-level;
- 75 points must be at 300-level.

This study must be in arts-approved subjects. Refer to list of arts-approved subject areas ( see page 4). All language subjects are also arts-approved.

#### Science requirement

A minimum of 200 science points is required, which must include:

- 50 points, but no more than 75 points, at the 100-level;
- completion of 50 points of a prescribed science major at the 300-level.

Students who first enrolled in the BASc course before 1999 must complete the requirements set out above with the exception that they do not need to complete a prescribed science major, but rather 50 science points at the 300-level of subjects of their choice.

Students should refer to the course planning information on page 5 for details relating to their science studies, including information about majors and science and non-science points.

## Course planning information for the BSc, BASc and BSc combined courses

### Points

The Bachelor of Science, BASc and combined courses, are organised on a points system. Students must complete a minimum number and type of points to satisfy the requirements of each course.

Every subject taught in the faculty has a points value that is determined by the workload associated with that subject. Accordingly, the faculty awards points for the successful completion of each subject. The points a student will receive if they successfully complete a particular subject are noted in the Handbook entry for that subject.

## Science and non-science subjects

The distinction between *science* and *non-science* subjects is relevant to all students enrolled in the BSc, BASc and BSc combined degree courses, as these courses require the accumulation of a certain number of science points. Non-science subjects cannot be counted towards the science component of a BSc combined course or the BASc.

Students enrolled in the BSc/BIS course cannot receive science credit for any information systems subjects. For these students, all information systems subjects count towards the information systems component.

Most subjects listed in the Faculty of Science entry of this Handbook are available for science credit, but there are important exceptions including the following.

- Some subjects offered by the Department of Information Systems are non-science subjects. In the information systems entry (see page 1), the science or non-science status of each subject is clearly stated.
- Several other non-science subjects are taught by the Department of Mathematics and Statistics, School of Earth Sciences, the School of Chemistry and the School of Physics to students in courses such as engineering. If a subject does not earn science credit, it is labelled as non-science in the subject description.

*Any subject that does not appear in the Faculty of Science section of this Handbook is a non-science subject.*

## Course planning

All students are responsible for their own learning and their course. Faculty advisers and members of individual departments are experienced and willing to assist in planning courses, but it is your responsibility as a student to integrate the advice and make the final selection of subjects. Departments offer a number of course plans, based around the majors, which students can refer to.

### First year course planning

Students selected into courses offered by the faculty are invited to attend introductory information sessions at the University. At these sessions students will be given important information about course requirements, majors available and the enrolment process. Shortly afterwards, students meet with a faculty adviser to plan their first year of study. The course plan that is authorised will reflect the student's current areas of interest and allow for flexibility in future studies.

### Course planning in later years

A student's subject selection is a balance between previous studies and achievements, career choice, personal interest, course requirements, and a desire to obtain a basic scientific education at the tertiary level. Sometimes, however, practical considerations such as timetabling or quota restrictions can impose limitations.

Students should refer to this Handbook in the first instance. The sections *Majors* (p.8) and *Co-majors* (p.15) outline recommended course plans for the various majors and co-majors.

Students requiring further information may obtain course advice from student advisers in the faculty office. Students may also discuss course options with members of academic staff who are designated as first-year coordinators and departmental course advisers.

Students are required to submit a course plan for the following year if they will be continuing with their study. Departmental course advisers assist in planning courses. This usually occurs in Semester 2, and students will be advised of course planning arrangements for the following year by mail or email. Course plans are submitted on the Student Information System at <<http://sis.unimelb.edu.au>>. All course plans must be approved by the faculty. Course plans are applications for selection into subjects. Once a course plan has been submitted, no further action is required unless a student fails a prerequisite subject, misses entry into quota-restricted subjects or wishes to alter their course plan. In these cases, the student should seek advice from the faculty office.

### Overloads in Semester 1 and 2

50 points per semester is regarded as a normal full-time enrolment. A workload in excess of 50 points per semester is an overload. 25 points is a normal full-time enrolment for the Summer Semester.

The faculty will normally only allow students to enrol in up to 62.5 points per semester if they have:

- successfully completed at least 37.5 points in the previous semester;
- no fails in the previous semester; and
- an average of at least H2B (i.e. 70 per cent) for all subjects attempted in the previous semester.

In cases where a student was on leave in the previous semester, the faculty will consider the workload attempted and results achieved in the most recent semester in which the student was undertaking subjects.

The average of at least H2B requirement may be waived if an overload of 62.5 points will enable the student to complete course requirements at the end of the semester. Requests to enrol in more than 62.5 points per semester will be considered on a case-by-case basis.

The faculty will not accept or consider requests to overload in:

- Semester 1 2002 until the Semester 2 2001 results have been released;
- Semester 2 2002 until the Semester 1 2002 results have been released.

### Late changes to subjects

The subject descriptions listed in this Handbook are correct at the time of printing, however the University retains the right to suspend or change the details of any subject, see *Changes to subjects/courses* (p.2). Updated information specific to Faculty of Science subjects and courses will be located at <<http://www.science.unimelb.edu.au/hbupdates>>.

### Quota subjects

Some of the subjects offered by the Faculty of Science are termed 'quota subjects' as there are usually not enough places available in the subject to meet student demand for that particular subject.

### Selection process

Selection into quota subjects is based on academic merit.

### Re-enrolling students

Most students are selected automatically on the basis of grades obtained in previous subjects. For selection into 200-level subjects, the results obtained in the best 75 science points at 100-level are considered. For 300-level subjects, the results obtained in the best 75 science points at 200-level are considered. Allowance may be made to vary this for combined course students who have completed less than 75 science points.

Non-science subjects are not considered when allocating places in quota subjects.

The teaching department offering the quota subject offers the remaining places. Places in each subject will be offered in accordance with an applicant's rank on the waiting list and until all places available in the subject have been filled.

### New and resuming students

New and resuming students will be ranked, together with re-enrolling students, in order of merit following an evaluation of their results in previous studies.

Non-award course students may fill any remaining places in quota restricted subjects after the selection of all award course students.

### Enrolment process

Students need to indicate their wish to be considered for a place in quota subjects on their course plan. There are a number of rounds of offers into quota restricted subjects before the start of the academic year. Students will automatically be considered for the quota subjects they have listed on their course plan in rounds two and three if they are not offered a place in round one. In July of each year, a 'top-up' of places in Semester 2 quota subjects occurs. Students who have not previously applied for a place in Semester 2 quota subjects will need to submit the appropriate form to the Faculty of Science office before the application deadline.

Students who are offered places in quota subjects will be notified by mail. Round one quota offers will be included on the authorised enrolment record. Confirmation of the enrolment will signify acceptance of the place in the quota subjects. Failure to confirm the enrolment may jeopardise the place in quota subjects.

For rounds two and three of quota subject selection, students will receive a letter of offer. Students offered a place in quota subjects in rounds two and three will need to confirm acceptance of the place before the specified date to secure their place. It is therefore important to ensure that the Faculty of Science office has your current postal address.

For administrative reasons, offers of specific subjects to students are made at set times prior to the commencement of the subject. The faculty over-fills the quota and allows subject changes to correct the over-enrolment. One student withdrawing from a particular subject does not mean, therefore, that a place will automatically become available for another student.

### Quota subjects for 2002

A list of the quota subjects for 2002 will be available from the faculty office and on the faculty web site at the time of course planning for 2002.

### First year packages

First year students will normally complete at least one of the following first year packages.

## Faculty of Science

<b>Life sciences</b>	Points	<b>Earth sciences and geography</b>	Points
This package leads to 200-level studies in biological, biomedical and biotechnological sciences: botany, genetics, zoology, ecology, anatomy and cell biology, biochemistry and molecular biology, microbiology and immunology, pharmacology, physiology and pathology.		625-102 Understanding Planet Earth ( <i>p.1</i> )	12.5
<b>Biology</b>		625-103 The Atmosphere and Oceans ( <i>p.2</i> )	12.5
600-141 Biology of Cells and Organisms ( <i>p.1</i> )	12.5	<b>Geography and environmental studies</b>	
600-142 Genetics & The Evolution of Life ( <i>p.1</i> )	12.5	121-010 Famine in the Modern World ( <i>p.2</i> )	12.5
<b>Chemistry</b>		121-012 Environmental Change ( <i>p.2</i> )	12.5
<i>One of</i>		121-013 Global Ecology and Biogeography ( <i>p.2</i> )	12.5
610-141 Chemistry ( <i>p.2</i> )	12.5	<b>Plus two of chemistry, physics, mathematics and statistics, or biology</b>	
610-121 Chemistry (Advanced Studies Program) ( <i>p.2</i> )	12.5	<b>Chemistry</b>	
<i>and one of</i>		<i>One of</i>	
610-142 Chemistry ( <i>p.2</i> )	12.5	610-141 Chemistry ( <i>p.2</i> )	12.5
610-122 Chemistry (Advanced Studies Program) ( <i>p.2</i> )	12.5	610-121 Chemistry (Advanced Studies Program) ( <i>p.2</i> )	12.5
<b>Mathematics and statistics</b>		<i>and one of</i>	
620-160 Experimental Design & Data Analysis ( <i>p.5</i> )	12.5	610-142 Chemistry ( <i>p.2</i> )	12.5
<b>Plus</b>		610-122 Chemistry (Advanced Studies Program) ( <i>p.2</i> )	12.5
Three elective subjects	37.5	<b>Physics</b>	
<b>Total</b>	<b>100.0</b>	<i>One of</i>	
Notes.		640-121 Physics A (Adv) ( <i>p.2</i> )	12.5
• 620-161 Introductory Mathematics A ( <i>p.5</i> ) discusses biological and economic modelling and is a suitable companion subject for 620-160.		640-141 Physics A ( <i>p.2</i> )	12.5
• 610-171 Fundamentals of Chemistry ( <i>p.3</i> ) is available as an alternative chemistry subject in Semester 1 for students who have not completed VCE Chemistry.		640-161 Physics: Principles & Applications A ( <i>p.3</i> )	12.5
<b>Physical sciences</b>	Points	640-176 The Solar System and the Cosmos ( <i>p.3</i> )	12.5
This package leads to 200-level studies in physics, mathematics and statistics, chemistry and computer science.		<i>and one of</i>	
<b>Mathematics and statistics</b>		640-122 Physics B (Adv) ( <i>p.2</i> )	12.5
<i>One of</i>		640-142 Physics B ( <i>p.2</i> )	12.5
620-141 Mathematics A ( <i>p.4</i> )	12.5	640-162 Physics: Principles & Applications B ( <i>p.3</i> )	12.5
620-121 Mathematics A (Advanced) ( <i>p.4</i> )	12.5	640-177 Stars and Galaxies ( <i>p.3</i> )	12.5
<i>and one of</i>		<b>Mathematics and statistics</b>	
620-143 Applied Mathematics ( <i>p.5</i> )	12.5	620-160 Experimental Design & Data Analysis ( <i>p.5</i> )	12.5
620-123 Applied Mathematics (Advanced) ( <i>p.4</i> )	12.5	620-161 Introductory Mathematics A ( <i>p.5</i> )	12.5
620-113 Applied Mathematics (Advanced Plus) ( <i>p.3</i> )	12.5	<b>Biology</b>	
<i>and one of</i>		600-141 Biology of Cells and Organisms ( <i>p.1</i> )	12.5
620-142 Mathematics B ( <i>p.5</i> )	12.5	600-142 Genetics & The Evolution of Life ( <i>p.1</i> )	12.5
620-122 Mathematics B (Advanced) ( <i>p.4</i> )	12.5	<b>Plus</b>	
620-112 Mathematics B (Advanced Plus) ( <i>p.3</i> )	12.5	Two elective subjects	25
<b>Plus at least one of chemistry, physics or computer science</b>		<b>Total</b>	<b>100.0</b>
<b>Chemistry</b>		Notes.	
<i>One of</i>		• 610-171 Fundamentals of Chemistry ( <i>p.3</i> ) is available as an alternative chemistry subject in Semester 1 for students who have not completed VCE Chemistry.	
610-141 Chemistry ( <i>p.2</i> )	12.5	• Students with specialist mathematics should consider taking 620-141 Mathematics A ( <i>p.4</i> ) or 620-121 Mathematics A (Advanced) ( <i>p.4</i> ) instead of 620-161.	
610-121 Chemistry (Advanced Studies Program) ( <i>p.2</i> )	12.5	<b>Environmental sciences</b>	Points
<i>and one of</i>		This package leads to a co-major in conjunction with another major	
610-142 Chemistry ( <i>p.2</i> )	12.5	<b>Biology</b>	
610-122 Chemistry (Advanced Studies Program) ( <i>p.2</i> )	12.5	600-141 Biology of Cells and Organisms ( <i>p.1</i> )	12.5
<b>Physics</b>		600-142 Genetics & The Evolution of Life ( <i>p.1</i> )	12.5
<i>One of</i>		<b>Chemistry</b>	
640-121 Physics A (Adv) ( <i>p.2</i> )	12.5	<i>One of</i>	
640-141 Physics A ( <i>p.2</i> )	12.5	610-141 Chemistry ( <i>p.2</i> )	12.5
640-161 Physics: Principles & Applications A ( <i>p.3</i> )	12.5	610-121 Chemistry (Advanced Studies Program) ( <i>p.2</i> )	12.5
<i>and one of</i>		<i>and one of</i>	
640-122 Physics B (Adv) ( <i>p.2</i> )	12.5	610-142 Chemistry ( <i>p.2</i> )	12.5
640-142 Physics B ( <i>p.2</i> )	12.5	610-122 Chemistry (Advanced Studies Program) ( <i>p.2</i> )	12.5
640-162 Physics: Principles & Applications B ( <i>p.3</i> )	12.5	<b>Mathematics and statistics</b>	
<b>Computer Science</b>		620-160 Experimental Design & Data Analysis ( <i>p.5</i> )	12.5
433-141 Computing Fundamentals A ( <i>p.13</i> )	12.5	<b>Plus one of</b>	
433-142 Computing Fundamentals B ( <i>p.13</i> )	12.5	<b>Earth Sciences</b>	
<b>Plus</b>		625-101 Earth Sciences - The Global Environment ( <i>p.1</i> )	12.5
Elective subjects for remaining 100-level points		<b>Geography and environmental studies</b>	
<b>Total</b>	<b>100.0</b>	121-012 Environmental Change ( <i>p.2</i> )	12.5
Notes.		<b>Plus</b>	
• 610-171 Fundamentals of Chemistry ( <i>p.3</i> ) is available as an alternative chemistry subject in Semester 1 for students who have not completed VCE Chemistry.		Two elective subjects	
<b>Earth sciences and geography</b>	Points	<b>Total</b>	<b>100.0</b>
This package leads to 200-level studies in earth sciences, geography, chemistry and biology.		Notes.	
<b>Two subjects from either earth sciences or geography</b>		• 610-171 Fundamentals of Chemistry ( <i>p.3</i> ) is available as an alternative chemistry subject in Semester 1 for students who have not completed VCE Chemistry.	
<b>Earth sciences</b>		• Students wishing to pursue environmental sciences may alternatively take the physical sciences package and enrol in 620-142 Mathematics B ( <i>p.5</i> ) and 620-143 Applied Mathematics ( <i>p.5</i> ) or 620-160 Experimental Design & Data Analysis ( <i>p.5</i> ) in second year.	
625-101 Earth Sciences - The Global Environment ( <i>p.1</i> )	12.5		

## Majors

All students commencing the BSc, BASc or a BSc combined course in 1999 and beyond are expected to complete a science major which will be included on an academic transcript. A science major is defined as 50 points at 300-level in a discipline. The psychology major is the only exception to this rule. To major, students can complete one of the specialisations listed below. Students may complete alternative combinations of subjects to major, provided they have the approval of the relevant department.

The 100-level and 200-level subjects listed in the specialisations below are recommended subjects only. Students are not required to undertake particular subjects at these levels to complete a science major, but should be aware that these subjects are often recommended because they are prerequisites for the required 300-level subjects.

Students are permitted to do more than one science major, however to do so requires completion of 50 points at 300-level in each discipline. Up to the equivalent of one 12.5 points subject at 300-level can be counted towards both science majors where applicable. Students must complete a minimum of 87.5 points at 300-level to be awarded two science majors. A maximum of two science majors (or one major and one co-major) will be identified on a student's transcript. Students qualifying for more than two majors will need to nominate the two science majors (or one major and one co-major) to appear on their transcript.

Co-majors are available in biotechnology, environmental science and history and philosophy of science. Students undertaking a co-major must also complete a major. See page 15 for details.

Note: Students who commenced their course before 1999 do not need to complete a major.

Science majors available:

- anatomy, page 8
- animal biology, page 8
- biochemistry and molecular biology, page 8
- cell biology, page 9
- chemistry, page 9
- computer science, page 9
- conservation and Australian wildlife, page 9
- earth sciences, page 10
- ecology, page 10
- environmental science (specified combined degrees only), page 10
- genetics, page 10
- geography, page 11
- immunology, page 11
- marine biology, page 11
- mathematics and statistics, page 11
- microbiology, page 12
- neuroscience, page 13
- pathology, page 13
- pharmacology, page 13
- physics, page 13
- physiology, page 14
- plant sciences, page 14
- psychology, page 15
- vision science, page 15

## ANATOMY

Teaching departments: Anatomy and Cell Biology, Physiology, Zoology

**Anatomy** Points

**Contact:** Department of Anatomy and Cell Biology

### First year

Life sciences package

### Second year

50 points

516-201	Cell Biology: Tissues and Organs (p.1)	12.5
516-204	Anatomy 1 (p.1)	12.5
516-207	Anatomy 2 (p.2)	12.5
516-209	Introductory Neuroscience (p.2)	12.5

### Third year

50 points

516-303	Anatomy of the Head and Neck (p.3)	12.5
516-304	Functional and Applied Anatomy (p.3)	12.5
516-305	Structure & Function of the Brain (p.3)	12.5
<i>plus one of</i>		
516-302	Developmental Biology (p.2)	12.5

## Anatomy

516-306	Developmental Neurobiology (p.3)	12.5
516-307	Project Study in Anatomy & Cell Biology (p.3)	12.5

## ANIMAL BIOLOGY

Teaching department: Zoology

### Animal Biology

Points

**Contact:** Department of Zoology

#### First year

Life sciences packages, including

620-160	Experimental Design & Data Analysis (p.5)	12.5
600-111	Biology of Australian Flora & Fauna (p.1)	12.5

#### Second year

50 points

654-201	Animal Diversity (p.1)	12.5
654-202	Animal Structure and Function (p.1)	12.5
654-203	Animal Physiology: Cells and Organs (p.1)	12.5
654-204	Ecology: Individuals and Populations (p.2)	12.5

#### Third year

50 points selected from

516-302	Developmental Biology (p.2)	12.5
654-301	Animal Physiology: Comparative Approach (p.2)	25
654-302	Experimental Marine Ecology (p.2)	12.5
654-303	Experimental Animal Behaviour (p.2)	25
654-304	Reproduction (p.3)	25
654-309	Field Biology of Marsupials & Monotremes (p.3)	25
654-312	Marine Ecology (p.4)	12.5

## BIOCHEMISTRY AND MOLECULAR BIOLOGY

A biochemistry and molecular biology major will minimally comprise 50 points of 300-level biochemistry and molecular biology subjects including 521-301 or 521-302; plus at least one laboratory-based practical subject. Outlined below are recommended streams for students who intend either to concentrate on the broad area of biochemistry and molecular biology, or to specialise in one of the three fields of functional genomics; biophysics and bioinformatics; and biochemical and molecular biotechnology.

Teaching department: Biochemistry and Molecular Biology

### Biochemistry and molecular biology

Points

**Contact:** Department of Biochemistry and Molecular Biology

#### First year

Life sciences package

#### Second year

37.5 points

521-211	Biochemistry & Molecular Biology Part A (p.2)	12.5
521-220	Techniques in Protein & Gene Technology (p.2)	12.5
521-212	Biochemistry & Molecular Biology Part B (p.2)	12.5

#### Third year

50 points

521-301	Protein Structure, Design & Engineering (p.3)	12.5
521-302	Functional Genomics (p.3)	12.5

*Plus one of*

521-321	Gene Technology & Protein Expression (p.4)	12.5
521-322	Protein Biochemistry and Proteomics (p.4)	12.5

*Plus one of*

521-303	Molecular Aspects of Cell Biology (p.3)	12.5
521-304	Hormone & Neurotransmitter Biochemistry (p.3)	12.5
521-305	Biochemistry of Metabolism & Nutrition (p.3)	12.5
521-306	Plant Biochemistry & Biotechnology (p.4)	12.5

Students may request permission from the head of department to replace one of 521-301 and 521-302 with an alternative subject from the above list.

### Functional genomics

Points

**Contact:** Department of Biochemistry and Molecular Biology

#### First year

Life sciences package

#### Second year

37.5 points

521-211	Biochemistry & Molecular Biology Part A (p.2)	12.5
521-212	Biochemistry & Molecular Biology Part B (p.2)	12.5
521-220	Techniques in Protein & Gene Technology (p.2)	12.5

#### Third year

50 points

521-301	Protein Structure, Design & Engineering (p.3)	12.5
521-302	Functional Genomics (p.3)	12.5
521-303	Molecular Aspects of Cell Biology (p.3)	12.5
521-321	Gene Technology & Protein Expression (p.4)	12.5

## Faculty of Science

<b>Biophysics and bioinformatics</b>	Points	<b>Chemistry</b>	Points
<i>Contact: Department of Biochemistry and Molecular Biology</i>		610-220 Organic Chemistry (p.4)	12.5
<b>First year</b>		610-240 Inorganic and Bio-inorganic Chemistry A (p.4)	12.5
Any first year package that includes two 100-level chemistry subjects		<b>Third year</b>	
<b>Second year</b>		50 points	
37.5 points		Two of	
521-211 Biochemistry & Molecular Biology Part A (p.2)	12.5	610-311 Physical Chemistry IIIB (p.5)	12.5
521-203 Macromolecular Structure & Bioinformatics (p.2)	12.5	610-321 Organic Chemistry IIIB (p.6)	12.5
610-260 Analysis in Chemical and Life Sciences (p.5)	12.5	610-341 Inorganic Chemistry IIIB (p.7)	12.5
<i>It is recommended that a selection of relevant 200-level subjects from biochemistry and molecular biology be included.</i>		610-360 Analytical & Environmental Chemistry (p.7)	12.5
<b>Third year</b>		Plus two of	
50 points		610-315 Physical Chemistry Practical III (p.6)	6.25
521-301 Protein Structure, Design & Engineering (p.3)	12.5	610-325 Organic Chemistry Practical III (p.6)	6.25
521-307 3D-Macromolecular Structure and Dynamics (p.4)	12.5	610-345 Inorganic Chemistry Practical III (p.7)	6.25
521-322 Protein Biochemistry and Proteomics (p.4)	12.5	Plus 12.5 points of 300-level chemistry selected from	
610-332 Bio-organic Chemistry (p.6)	12.5	610-310 Physical Chemistry IIIA (p.5)	12.5
<b>Biochemical and molecular biotechnology</b>	Points	610-311 Physical Chemistry IIIB (p.5)	12.5
<i>Contact: Department of Biochemistry and Molecular Biology</i>		610-315 Physical Chemistry Practical III (p.6)	6.25
<b>First year</b>		610-320 Organic Chemistry IIIA (p.6)	12.5
Any first year package that includes two 100-level chemistry subjects		610-321 Organic Chemistry IIIB (p.6)	12.5
<b>Second year</b>		610-325 Organic Chemistry Practical III (p.6)	6.25
50 points		610-332 Bio-organic Chemistry (p.6)	12.5
521-211 Biochemistry & Molecular Biology Part A (p.2)	12.5	610-333 Molecular Technology and Processes (p.6)	12.5
521-212 Biochemistry & Molecular Biology Part B (p.2)	12.5	610-340 Inorganic Chemistry IIIA (p.7)	12.5
521-203 Macromolecular Structure & Bioinformatics (p.2)	12.5	610-341 Inorganic Chemistry IIIB (p.7)	12.5
521-220 Techniques in Protein & Gene Technology (p.2)	12.5	610-345 Inorganic Chemistry Practical III (p.7)	6.25
<b>Third year</b>		610-360 Analytical & Environmental Chemistry (p.7)	12.5
50 points			
521-301 Protein Structure, Design & Engineering (p.3)	12.5	<b>COMPUTER SCIENCE</b>	
521-302 Functional Genomics (p.3)	12.5	This science major is not available to students enrolled in the software engineering stream of the BE/BSc. These students will be required to complete a major in an alternative science discipline.	
521-321 Gene Technology & Protein Expression (p.4)	12.5	Teaching department: Computer Science and Software Engineering.	
521-322 Protein Biochemistry and Proteomics (p.4)	12.5	<b>Computer Science</b>	Points
<b>CELL BIOLOGY</b>		<i>Contact: Department of Computer Science and Software Engineering</i>	
Teaching departments: Anatomy and Cell Biology, Biochemistry and Molecular Biology, Botany, Genetics, Physiology, Zoology		<b>First year</b>	
<b>Cell and molecular biology</b>	Points	Any first year package including	
<i>Contact: School of Botany</i>		433-141 Computing Fundamentals A (p.13)	12.5
<b>First year</b>		433-142 Computing Fundamentals B (p.13)	12.5
Life sciences package		plus at least 25 points of mathematics and statistics	
<b>Second year</b>		<b>Second year</b>	
50 points		50 points	
606-205 Cell Biology (p.2)	12.5	433-252 Software Engineering Principles & Tools (p.14)	12.5
516-201 Cell Biology: Tissues and Organs (p.1)	12.5	433-253 Algorithms and Data Structures (p.14)	12.5
521-211 Biochemistry & Molecular Biology Part A (p.2)	12.5	433-254 Software Design (p.14)	12.5
plus one of		433-255 Logic and Computation (p.14)	12.5
521-212 Biochemistry & Molecular Biology Part B (p.2)	12.5	<b>Third year</b>	
606-201 The Living Plant (p.1)	12.5	50 points selected from	
536-201 Principles of Physiology (p.1)	12.5	433-303 Artificial Intelligence (p.15)	12.5
652-215 Genes and Genomes (p.1)	12.5	433-313 Computer Design (p.15)	12.5
652-216 Molecular & General Genetics Practical (p.1)	12.5	433-330 Theory Of Computation (p.15)	12.5
<b>Third year</b>		433-332 Operating Systems (p.15)	12.5
50 points		433-341 Software Engineering Process & Practice (p.15)	12.5
516-302 Developmental Biology (p.2)	12.5	433-351 Database Systems (p.16)	12.5
521-303 Molecular Aspects of Cell Biology (p.3)	12.5	433-353 Networks & Communications (p.16)	12.5
606-309 Cell Biology III (p.3)	12.5	433-361 Programming Languages Implementation (p.16)	12.5
plus one of		433-371 Interactive System Design (p.16)	12.5
516-307 Project Study in Anatomy & Cell Biology (p.3)	12.5	433-380 Graphics and Computation (p.17)	12.5
516-306 Developmental Neurobiology (p.3)	12.5	433-385 Modelling, Analysis and Visualisation (p.17)	12.5
521-306 Plant Biochemistry & Biotechnology (p.4)	12.5	<b>CONSERVATION AND AUSTRALIAN WILDLIFE</b>	
<b>CHEMISTRY</b>		Teaching departments: Botany, Zoology	
Teaching department: Chemistry		<b>Conservation and Australian wildlife</b>	Points
<b>Chemistry</b>	Points	<i>Contact: Department of Zoology</i>	
<i>Contact: School of Chemistry</i>		<b>First year</b>	
<b>First year</b>		Life sciences package including	
Any first year package which includes two 100-level chemistry subjects		620-160 Experimental Design & Data Analysis (p.5)	12.5
<b>Second year</b>		600-111 Biology of Australian Flora & Fauna (p.1)	12.5
50 points		<b>Second year</b>	
610-210 Light, Matter & Chemical Change A (p.3)	12.5	50 points selected from	
610-260 Analysis in Chemical and Life Sciences (p.5)	12.5	606-202 Plant Biodiversity (p.1)	12.5
		606-204 Ecology: Communities and Ecosystems (p.1)	12.5
		606-207 Flora of Victoria (p.2)	12.5
		654-202 Animal Structure and Function (p.1)	12.5

<b>Conservation and Australian wildlife</b>	Points	<b>Ecology</b>	Points
654-204 Ecology: Individuals and Populations (p.2)	12.5	50 points	
654-207 Australian Wildlife Biology (p.2)	12.5	606-204 Ecology: Communities and Ecosystems (p.1)	12.5
<b>Third year</b>		654-204 Ecology: Individuals and Populations (p.2)	12.5
50 points		<i>Plus 25 points selected from</i>	
606-310 Field Botany (p.3)	12.5	121-018 Geomorphology (p.3)	12.5
654-308 Conservation Biology (p.3)	12.5	606-201 The Living Plant (p.1)	12.5
654-309 Field Biology of Marsupials & Monotremes (p.3)	25	606-202 Plant Biodiversity (p.1)	12.5
		606-207 Flora of Victoria (p.2)	12.5
<b>EARTH SCIENCES</b>		654-201 Animal Diversity (p.1)	12.5
Teaching department: Earth Sciences		654-207 Australian Wildlife Biology (p.2)	12.5
<b>Geology</b>	Points	<b>Third year</b>	
<i>Contact: School of Earth Sciences</i>		50 points selected from	
<b>First year</b>		121-030 Applied Ecology (p.5)	25
Earth sciences package		121-033 Environmental Hydrology A (p.5)	25
<b>Second year</b>		121-029 Environmental Hydrology B (p.5)	12.5
50 points		606-301 Applied Ecology (Theory) (p.2)	12.5
625-221 Geological Methods (p.2)	12.5	606-304 Environmental Plant Physiology (p.3)	12.5
625-222 Mineralogy and Igneous Petrology (p.2)	12.5	654-302 Experimental Marine Ecology (p.2)	12.5
625-223 Sedimentary Geology & Hydrogeology (p.2)	12.5	654-312 Marine Ecology (p.4)	12.5
625-224 Tectonics (p.2)	12.5		
<b>Third year</b>		<b>ENVIRONMENTAL SCIENCE</b>	
50 points		Available as a major only to students enrolled in engineering/science, science/engineering, science/forest science and geomatics/science. Students enrolled in other BSc programs and BASc may co-major, see environmental science, page 15.	
625-301 Structural Geology & Geodynamics (p.3)	12.5	Teaching departments: Botany, Chemistry, Earth Sciences, Anthropology, Geography and Environmental Studies, Mathematics and Statistics, Zoology	
625-302 Sedimentary Geology (p.3)	12.5	<b>Environmental science</b>	Points
<i>Plus two of</i>		<i>Contact: environmental science coordinator</i>	
625-303 Geochemistry & Petrogenesis (p.3)	12.5	<b>First year</b>	
625-304 Applied Geophysics (p.3)	12.5	Environmental science package plus two mathematics subjects (as required by engineering/geomatics course or physical sciences package)	
625-305 Economic Geology (p.3)	12.5	<b>Second year</b>	
625-307 Hydrogeology & Environmental Management (p.3)	12.5	50 points	
625-311 Field Applications of Structural Geology (p.4)	12.5	600-203 Environmental Measurement (p.1)	12.5
625-312 Field Geology (p.4)	12.5	620-270 Applied Statistics (p.8)	12.5
600-311 Research Project A (p.1)	12.5	600-201 Physical Environment (p.1)	12.5
600-312 Research Project B (p.1)	12.5	610-280 Environmental Chemistry (p.5)	12.5
<b>Atmosphere and earth sciences</b>	Points	<i>Corequisite (ecology) - one of</i>	
<i>Contact: School of Earth Sciences</i>		606-204 Ecology: Communities and Ecosystems (p.1)	12.5
<b>First year</b>		654-204 Ecology: Individuals and Populations (p.2)	12.5
Earth sciences package		121-025 Biodiversity (p.7)	12.5
<b>Second year</b>		<b>Third year</b>	
25 points		50 points	
625-227 Weather and Climate Systems (p.2)	12.5	600-303 Environmental Risk Assessment (p.2)	12.5
625-228 Atmospheric Environment Processes (p.2)	12.5	600-301 Problem Solving in Environmental Science (p.2)	12.5
<b>Third year</b>		620-371 Linear Models (p.11)	12.5
50 points		<i>plus one of</i>	
625-331 Atmosphere-Ocean Interaction (p.4)	25	625-307 Hydrogeology & Environmental Management (p.3)	12.5
625-332 Climate: Mechanisms & Variability (p.4)	25	121-029 Environmental Hydrology B (p.5)	12.5
<b>Environmental earth sciences</b>	Points	654-308 Conservation Biology (p.3)	12.5
<i>(to be taken with an environmental science co-major)</i>		606-301 Applied Ecology (Theory) (p.2)	12.5
<i>Contact: Department of Earth Sciences</i>		<b>GENETICS</b>	
<b>First year</b>		Teaching department: Genetics	
Earth sciences package		<b>Genetics</b>	Points
<b>Second year</b>		<i>Contact: Department of Genetics</i>	
37.5 points		<b>First year</b>	
600-201 Physical Environment (p.1)	12.5	Life sciences package	
625-221 Geological Methods (p.2)	12.5	<b>Second year</b>	
625-223 Sedimentary Geology & Hydrogeology (p.2)	12.5	37.5 points	
<b>Third year</b>		652-214 Principles of Genetics (p.1)	12.5
50 points		652-215 Genes and Genomes (p.1)	12.5
625-302 Sedimentary Geology (p.3)	12.5	652-216 Molecular & General Genetics Practical (p.1)	12.5
625-307 Hydrogeology & Environmental Management (p.3)	12.5	<b>Third year</b>	
625-312 Field Geology (p.4)	12.5	50 points	
<i>plus 12.5 points of other 300-level earth sciences subjects</i>		652-304 Genetic Analysis (p.2)	12.5
<b>ECOLOGICAL</b>		652-302 Molecular Genetics (p.2)	12.5
Teaching departments: Botany, Zoology, Anthropology, Geography and Environmental Studies		<i>Plus two of</i>	
<b>Ecology</b>	Points	652-301 Genomes and Evolution (p.2)	12.5
<i>Contact: Departments of Anthropology, Geography and Environmental Studies and Zoology and School of Botany</i>		652-303 Developmental and Cellular Genetics (p.2)	12.5
<b>First year</b>		652-305 Human Genetics (p.2)	12.5
Life sciences package including		652-306 Experimental Genetics (p.3)	12.5
600-111 Biology of Australian Flora & Fauna (p.1)	12.5		
121-013 Global Ecology and Biogeography (p.2)	12.5		
<b>Second year</b>			

## Faculty of Science

### GEOGRAPHY

Teaching department: Anthropology, Geography and Environmental Studies

**Geography** Points

*Contact: Department of Anthropology, Geography and Environmental Studies*

#### First year

Earth sciences package including geography

#### Second year

25 points selected from

121-018	Geomorphology (p.3)	12.5
121-021	Environmental Politics and Management (p.4)	12.5
121-022	Development and Urban Environments (p.4)	12.5
121-024	GIS and Remote Sensing in Geography (p.4)	12.5
121-025	Biodiversity (p.7)	12.5

#### Third year

50 points selected from

121-028	Sustainable Development (p.4)	12.5
121-030	Applied Ecology (p.5)	25
121-458	Australian Quaternary Environments (p.5)	25
121-033	Environmental Hydrology A (p.5)	25
121-432	Environmental Field Class (p.8)	25
121-435	Environmental Management Systems (p.6)	12.5
121-071	Coastal Geomorphology (p.5)	12.5
121-434	Fieldwork Research Project (p.6)	12.5

(Students seeking 300-level science credit for 121-434 require Faculty of Science approval)

### IMMUNOLOGY

Teaching department: Microbiology and Immunology

**Immunology** Points

*Contact: Department of Microbiology and Immunology*

#### First year

Life sciences package

#### Second year

31.25 points of theory and 12.5 points of practical 200-level subjects from microbiology and immunology, biochemistry and molecular biology, physiology, anatomy and cell biology, or genetics.

#### Third year

50 points selected from

526-304	Principles of Immunology (p.2)	12.5
526-305	Medical and Applied Immunology (p.2)	12.5
526-324	Immunological Techniques (p.4)	12.5
526-323	Projects: Medical/Biomedical/Immunology (p.3)	12.5

or one other 12.5 point subject approved by the department

### MARINE BIOLOGY

Teaching departments: Botany, Chemistry, Anthropology, Geography and Environmental Studies, Zoology.

**Marine biology** Points

*Contact: Department of Zoology*

#### First year

Life sciences package including

620-160	Experimental Design & Data Analysis (p.5)	12.5
600-111	Biology of Australian Flora & Fauna (p.1)	12.5

#### Second year

50 points selected from

606-203	Biodiversity of Protists (p.1)	12.5
610-260	Analysis in Chemical and Life Sciences (p.5)	12.5
654-201	Animal Diversity (p.1)	12.5
654-204	Ecology: Individuals and Populations (p.2)	12.5

#### Third year

50 points selected from

606-302	Marine Botany (p.2)	25
600-311	Research Project A (p.1)	12.5
600-312	Research Project B (p.1)	12.5
610-360	Analytical & Environmental Chemistry (p.7)	12.5
654-312	Marine Ecology (p.4)	12.5
654-313	Marine Zoology (p.4)	12.5
654-302	Experimental Marine Ecology (p.2)	12.5

Only one of 600-311 and 600-312 can be counted towards the Marine Biology major.

### MATHEMATICS AND STATISTICS

Teaching departments: Mathematics and Statistics, Physics

### Applied mathematics

Points

*Contact: Department of Mathematics and Statistics*

#### First year

Physical sciences package including three mathematics subjects

#### Second year

37.5 points

One of

620-231	Vector Analysis (p.7)	12.5
620-233	Vector Analysis (Advanced) (p.7)	12.5

Plus one of

620-232	Mathematical Methods (p.7)	12.5
620-234	Mathematical Methods (Advanced) (p.7)	12.5

Plus one of

620-221	Real and Complex Analysis (p.6)	12.5
620-252	Analysis (p.7)	12.5

#### Third year

50 points

620-331	Applied Partial Differential Equations (p.9)	12.5
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Plus three of

620-332	Integral Transforms & Asymptotics (p.9)	12.5
620-341	Dynamical Systems & Chaos (p.10)	12.5
620-342	Industrial & Applied Mathematics (p.10)	12.5
620-352	Graph Theory (p.10)	12.5
620-381	Computational Mathematics (p.11)	12.5

### Pure mathematics

Points

*Contact: Department of Mathematics and Statistics*

#### First year

Physical sciences package including three mathematics subjects

#### Second year

37.5 points

One of

620-231	Vector Analysis (p.7)	12.5
620-233	Vector Analysis (Advanced) (p.7)	12.5

Plus

620-222	Linear and Abstract Algebra (p.7)	12.5
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Plus one of

620-221	Real and Complex Analysis (p.6)	12.5
620-252	Analysis (p.7)	12.5

#### Third year

50 points

620-311	Metric Spaces (p.9)	12.5
620-321	Algebra (p.9)	12.5

Plus two of

620-302	Chance and Options Pricing (p.8)	12.5
620-312	Linear Analysis (p.9)	12.5
620-322	Topology (p.9)	12.5
620-351	Number Theory (p.10)	12.5
620-352	Graph Theory (p.10)	12.5

### Statistics

Points

*Contact: Department of Mathematics and Statistics*

#### First year

Any package which includes 620-141 and 620-142 (or advanced versions); plus a statistics subject

#### Second year

37.5 points

One of

620-201	Probability (p.6)	12.5
620-203	Probability (Advanced) (p.6)	12.5

Plus one of

620-202	Statistics (p.6)	12.5
620-204	Statistics (Advanced) (p.6)	12.5

Plus one of

620-221	Real and Complex Analysis (p.6)	12.5
620-252	Analysis (p.7)	12.5
620-261	Introduction to Operations Research (p.8)	12.5
620-270	Applied Statistics (p.8)	12.5

(620-221 and 620-252 have the prerequisite 620-143)

#### Third year

50 points

620-301	Stochastic Modelling (p.8)	12.5
620-371	Linear Models (p.11)	12.5

Plus two of

620-302	Chance and Options Pricing (p.8)	12.5
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**Statistics**

620-372	Applied Statistical Analysis ( <i>p.11</i> )	Points	12.5
620-381	Computational Mathematics ( <i>p.11</i> )		12.5
620-382	Biostatistics ( <i>p.11</i> )		12.5

**Operations research**

*Contact: Department of Mathematics and Statistics*

**First year**

Any package which includes 620-141 and 620-142 (or advanced versions)

**Second year**

37.5 points

620-261	Introduction to Operations Research ( <i>p.8</i> )	Points	12.5
620-262	Decision Making ( <i>p.8</i> )		12.5

*Plus one of*

620-201	Probability ( <i>p.6</i> )	Points	12.5
620-203	Probability (Advanced) ( <i>p.6</i> )		12.5
620-221	Real and Complex Analysis ( <i>p.6</i> )		12.5
620-222	Linear and Abstract Algebra ( <i>p.7</i> )		12.5
620-231	Vector Analysis ( <i>p.7</i> )		12.5
620-233	Vector Analysis (Advanced) ( <i>p.7</i> )		12.5
620-252	Analysis ( <i>p.7</i> )		12.5

(620-221, 620-231, 620-233 and 620-252 have the prerequisite 620-143)

**Third year**

50 points

620-361	Operations Research: Techniques ( <i>p.10</i> )	Points	12.5
620-362	Applied Operations Research ( <i>p.11</i> )		12.5

*Plus two of*

620-301	Stochastic Modelling ( <i>p.8</i> )	Points	12.5
620-311	Metric Spaces ( <i>p.9</i> )		12.5
620-312	Linear Analysis ( <i>p.9</i> )		12.5
620-341	Dynamical Systems & Chaos ( <i>p.10</i> )		12.5
620-352	Graph Theory ( <i>p.10</i> )		12.5
620-372	Applied Statistical Analysis ( <i>p.11</i> )		12.5
620-381	Computational Mathematics ( <i>p.11</i> )		12.5

**Decision management**

*Contact: Department of Mathematics and Statistics*

**First year**

Any package which includes 620-141 and 620-142 (or advanced versions) and a statistics subject

**Second year**

37.5-50 points

620-261	Introduction to Operations Research ( <i>p.8</i> )	Points	12.5
620-262	Decision Making ( <i>p.8</i> )		12.5

*Plus either*

620-270	Applied Statistics ( <i>p.8</i> )	Points	12.5
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*or one of*

620-201	Probability ( <i>p.6</i> )	Points	12.5
620-203	Probability (Advanced) ( <i>p.6</i> )		12.5

*and one of*

620-202	Statistics ( <i>p.6</i> )	Points	12.5
620-204	Statistics (Advanced) ( <i>p.6</i> )		12.5

**Third year**

50 points

620-361	Operations Research: Techniques ( <i>p.10</i> )	Points	12.5
620-371	Linear Models ( <i>p.11</i> )		12.5

*Plus two of*

620-362	Applied Operations Research ( <i>p.11</i> )	Points	12.5
620-382	Biostatistics ( <i>p.11</i> )		12.5
620-301	Stochastic Modelling ( <i>p.8</i> )		12.5
620-372	Applied Statistical Analysis ( <i>p.11</i> )		12.5

**Financial mathematics**

*Contact: Department of Mathematics and Statistics*

**First year**

Physical sciences package including three mathematics subjects

*Plus*

620-131	Scientific Programming & Simulation ( <i>p.4</i> )	Points	12.5
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*Plus*

433-171	Introduction to Programming ( <i>p.14</i> )	Points	12.5
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*or both*

433-141	Computing Fundamentals A ( <i>p.13</i> )	Points	12.5
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433-142	Computing Fundamentals B ( <i>p.13</i> )	Points	12.5
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**Second year**

37.5 points of mathematics and statistics

**Financial mathematics**

620-261	Introduction to Operations Research ( <i>p.8</i> )	Points	12.5
<i>Plus one of</i>			
620-201	Probability ( <i>p.6</i> )	Points	12.5
620-203	Probability (Advanced) ( <i>p.6</i> )		12.5

*Plus one of*

620-202	Statistics ( <i>p.6</i> )	Points	12.5
620-204	Statistics (Advanced) ( <i>p.6</i> )		12.5

**Third year**

50 points of mathematics and statistics

620-301	Stochastic Modelling ( <i>p.8</i> )	Points	12.5
620-302	Chance and Options Pricing ( <i>p.8</i> )		12.5
620-381	Computational Mathematics ( <i>p.11</i> )		12.5

*Plus one of*

620-341	Dynamical Systems & Chaos ( <i>p.10</i> )	Points	12.5
620-361	Operations Research: Techniques ( <i>p.10</i> )		12.5
620-371	Linear Models ( <i>p.11</i> )		12.5
620-372	Applied Statistical Analysis ( <i>p.11</i> )		12.5

**Mathematical physics**

*Contact: Department of Mathematics and Statistics*

**First year**

Physical sciences package including physics and three mathematics subjects

**Second year**

50 points

*One of*

620-231	Vector Analysis ( <i>p.7</i> )	Points	12.5
620-233	Vector Analysis (Advanced) ( <i>p.7</i> )		12.5

*Plus one of*

620-232	Mathematical Methods ( <i>p.7</i> )	Points	12.5
620-234	Mathematical Methods (Advanced) ( <i>p.7</i> )		12.5

*Plus one of*

640-223	Quantum Mechanics & Thermal Physics(Adv) ( <i>p.3</i> )	Points	12.5
640-243	Quantum Mechanics & Thermal Physics ( <i>p.4</i> )		12.5

*Plus one of*

640-225	Electromagnetism & Relativity (Adv) ( <i>p.4</i> )	Points	12.5
640-245	Electromagnetism & Relativity ( <i>p.4</i> )		12.5

**Third year**

50 points

620-331	Applied Partial Differential Equations ( <i>p.9</i> )	Points	12.5
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*Plus one of*

620-332	Integral Transforms & Asymptotics ( <i>p.9</i> )	Points	12.5
620-341	Dynamical Systems & Chaos ( <i>p.10</i> )		12.5
620-342	Industrial & Applied Mathematics ( <i>p.10</i> )		12.5

*Plus one of*

640-321	Quantum Mechanics (Adv) ( <i>p.5</i> )	Points	12.5
640-341	Quantum Mechanics ( <i>p.6</i> )		12.5

*Plus one of*

640-322	Thermal Physics (Adv) ( <i>p.5</i> )	Points	12.5
640-342	Thermal Physics ( <i>p.6</i> )		12.5

**MICROBIOLOGY**

Teaching department: Microbiology and Immunology

**Medical microbiology**

*Contact: Department of Microbiology and Immunology*

**First year**

Life sciences package

**Second year**

25 points

526-201	Principles of Microbiology & Immunology ( <i>p.1</i> )	Points	12.5
526-221	Practical Microbiology ( <i>p.1</i> )		12.5

*The following is recommended:*

526-205	Microbes: Infections and Responses ( <i>p.1</i> )	Points	12.5
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**Third year**

50 points

526-311	Medical Microbiology: Pathogens ( <i>p.3</i> )	Points	12.5
526-312	Medical Microbiology: Infections ( <i>p.3</i> )		12.5

*plus two of*

526-304	Principles of Immunology ( <i>p.2</i> )	Points	12.5
526-321	Molecular Microbiology Techniques ( <i>p.3</i> )		12.5
526-323	Projects: Medical/Biomedical/Immunology ( <i>p.3</i> )		12.5
526-324	Immunological Techniques ( <i>p.4</i> )		12.5

an approved project in

526-322	Projects: Biotechnology ( <i>p.3</i> )	Points	12.5
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**Faculty of Science**

<b>Microbial biotechnology</b>	Points	<b>Pathology</b>	Points
<i>Contact: Department of Microbiology and Immunology</i>		<b>Second year</b>	
<b>First year</b>		<i>50 points</i>	
Life sciences package		531-201 Basic Principles of Pathology-Science (p.1)	12.5
<b>Second year</b>		521-211 Biochemistry & Molecular Biology Part A (p.2)	12.5
<i>25 points</i>		521-212 Biochemistry & Molecular Biology Part B (p.2)	12.5
526-201 Principles of Microbiology & Immunology (p.1)	12.5	521-220 Techniques in Protein & Gene Technology (p.2)	12.5
526-221 Practical Microbiology (p.1)	12.5	<b>Third year</b>	
<b>Third year</b>		<i>50 points</i>	
<i>50 points</i>		531-301 Cellular Basis of Disease (p.1)	12.5
526-301 Biotechnology 1:Microbial Genes & Cells (p.2)	12.5	531-302 Techniques for Investigation of Disease (p.2)	12.5
526-302 Biotechnology 2: Processes & Innovations (p.2)	12.5	531-303 Molecular/Genetic Basis of Disease-Lect (p.2)	12.5
526-322 Projects: Biotechnology (p.3)	12.5	<i>Plus one of</i>	
526-321 Molecular Microbiology Techniques (p.3)	12.5	531-304 Molecular/Genetic Basis of Disease-Prac (p.2)	12.5
		531-305 Molecular/Genetic Basis of Disease-Lab (p.2)	25
<b>NEUROSCIENCE</b>		<b>PHARMACOLOGY</b>	
Teaching departments: Anatomy and Cell Biology, Biochemistry and Molecular Biology, Botany, Pharmacology, Physiology and Zoology		Teaching departments: Pharmacology, Physiology, Biochemistry and Molecular Biology, Chemistry	
<b>Neuroscience</b>	Points	<b>Pharmacology</b>	Points
<i>Contact: Department of Anatomy and Cell Biology</i>		<i>Contact: Department of Pharmacology</i>	
<b>First year</b>		<b>First year</b>	
Life sciences package		Life sciences package	
<b>Second year</b>		<b>Second year</b>	
<i>50 points</i>		<i>50 points</i>	
516-209 Introductory Neuroscience (p.2)	12.5	534-201 Pharmacology (p.1)	12.5
<i>Plus 37.5 points from</i>		<i>Plus 37.5 points from</i>	
516-201 Cell Biology: Tissues and Organs (p.1)	12.5	536-201 Principles of Physiology (p.1)	12.5
606-205 Cell Biology (p.2)	12.5	536-211 Physiology:Control of Body Function (p.2)	12.5
521-211 Biochemistry & Molecular Biology Part A (p.2)	12.5	536-202 Physiology (General Practical) (p.1)	6.25
536-201 Principles of Physiology (p.1)	12.5	521-211 Biochemistry & Molecular Biology Part A (p.2)	12.5
534-201 Pharmacology (p.1)	12.5	521-212 Biochemistry & Molecular Biology Part B (p.2)	12.5
<b>Third year</b>		521-220 Techniques in Protein & Gene Technology (p.2)	12.5
<i>50 points</i>		610-220 Organic Chemistry (p.4)	12.5
536-303 The Brain: Neurophysiology of Behaviour (p.3)	12.5	610-221 Organic & Bio-organic Chemistry (p.4)	12.5
516-305 Structure & Function of the Brain (p.3)	12.5	610-225 Organic Chemistry Practical (p.4)	6.25
<i>Plus two of</i>		<b>Third year</b>	
534-302 Neuropharmacology (p.1)	12.5	<i>50 points</i>	
516-307 Project Study in Anatomy & Cell Biology (p.3)	12.5	534-301 Principles of Pharmacology (p.1)	25
654-305 Animal Behaviour (p.3)	12.5	<i>Plus either</i>	
516-306 Developmental Neurobiology (p.3)	12.5	534-304 Pharmacology of Therapeutic Substances (p.2)	25
536-302 Molecular Neurophysiology (p.3)	12.5	<i>or two of</i>	
516-303 Anatomy of the Head and Neck (p.3)	12.5	534-302 Neuropharmacology (p.1)	12.5
521-304 Hormone & Neurotransmitter Biochemistry (p.3)	12.5	534-303 Molecular Pharmacology (p.2)	12.5
		534-305 Toxicology (p.2)	12.5
<b>Behavioural neuroscience</b>	Points	534-306 Drug Discovery (p.2)	12.5
<i>Contact: Department of Anatomy and Cell Biology</i>		<b>PHYSICS</b>	
<b>First year</b>		Teaching departments: Physics, Mathematics and Statistics	
Life sciences package plus		<b>Physics</b>	Points
512-120 Introductory Experimental Psychology 1 (p.1)	12.5	<i>Contact: School of Physics</i>	
512-121 Social, Develop. & Clinical Psychology 1 (p.1)	12.5	<b>First year</b>	
<b>Second year</b>		Physical sciences package including 100-level physics	
<i>50 points</i>		<b>Second year</b>	
512-224 Cognitive Psychology 2 (p.2)	12.5	<i>50 points</i>	
512-222 Behavioural Neuroscience 2 (p.1)	12.5	<i>One of</i>	
<i>Plus either both</i>		640-223 Quantum Mechanics & Thermal Physics(Adv) (p.3)	12.5
536-201 Principles of Physiology (p.1)	12.5	640-243 Quantum Mechanics & Thermal Physics (p.4)	12.5
536-211 Physiology:Control of Body Function (p.2)	12.5	<i>and one of</i>	
<i>or both</i>		640-225 Electromagnetism & Relativity (Adv) (p.4)	12.5
654-201 Animal Diversity (p.1)	12.5	640-245 Electromagnetism & Relativity (p.4)	12.5
654-202 Animal Structure and Function (p.1)	12.5	<i>and</i>	
<b>Third year</b>		640-299 Laboratory Work (p.5)	12.5
<i>50 points</i>		<i>Plus one of</i>	
536-303 The Brain: Neurophysiology of Behaviour (p.3)	12.5	640-237 Astrophysics & Optics II (p.4)	12.5
516-305 Structure & Function of the Brain (p.3)	12.5	640-234 Further Classical & Quantum Mechanics (p.4)	12.5
512-350 Brain, Cognition and Behaviour 3 (p.3)	12.5	640-251 Instrumentation for Scientists (p.5)	12.5
<i>Plus one of</i>		<i>Corequisites</i>	
512-330 Human Psychophysiology 3 (p.3)	12.5	<i>One of</i>	
512-335 Advanced Cognition 3 (p.3)	12.5	620-231 Vector Analysis (p.7)	12.5
		620-233 Vector Analysis (Advanced) (p.7)	12.5
<b>PATHOLOGY</b>		<i>Plus one of</i>	
Teaching department: Pathology		620-232 Mathematical Methods (p.7)	12.5
<b>Pathology</b>	Points	620-234 Mathematical Methods (Advanced) (p.7)	12.5
<i>Contact: Department of Pathology</i>		<b>Third year</b>	
<b>First year</b>			
Life sciences package			

<b>Physics</b>	Points	<b>Animal physiology</b>	Points
50 points		536-304 Seminars & Experimental Physiology (p.3)	12.5
One of		654-314 Reproduction (Lectures) (p.4)	12.5
640-321 Quantum Mechanics (Adv) (p.5)	12.5	<b>PLANT SCIENCES</b>	
640-341 Quantum Mechanics (p.6)	12.5	Teaching departments: Anatomy and Cell Biology, Botany, Biochemistry and Molecular Biology, Genetics and Zoology	
Plus one of		<b>Biodiversity and evolutionary plant biology</b>	Points
640-393 Laboratory Work (p.7)	12.5	<b>Contact: School of Botany</b>	
640-394 Laboratory Work (p.7)	12.5	<b>First year</b>	
640-364 Computational Physics (p.7)	12.5	Life sciences package	
Plus two other 300-level physics subjects		<b>Second year</b>	
<b>Mathematical physics</b>	Points	50 points	
<b>Contact: Department of Mathematics and Statistics</b>		606-201 The Living Plant (p.1)	12.5
See description of mathematical physics course structure page 11.		606-202 Plant Biodiversity (p.1)	12.5
<b>PHYSIOLOGY</b>		606-203 Biodiversity of Protists (p.1)	12.5
Teaching departments: Anatomy and Cell Biology, Biochemistry and Molecular Biology, Botany, Physiology, Zoology		Plus one of	
<b>Systems physiology</b>	Points	606-204 Ecology: Communities and Ecosystems (p.1)	12.5
<b>Contact: Department of Physiology</b>		606-207 Flora of Victoria (p.2)	12.5
<b>First year</b>		652-214 Principles of Genetics (p.1)	12.5
Life sciences package		652-215 Genes and Genomes (p.1)	12.5
<b>Second year</b>		<b>Third year</b>	
37.5 points		50 points	
536-201 Principles of Physiology (p.1)	12.5	606-303 Botany Systematics & Evolution (p.3)	12.5
536-202 Physiology (General Practical) (p.1)	6.25	Plus 37.5 points from	
536-203 Physiology (Integrative Physiology) (p.2)	6.25	606-302 Marine Botany (p.2)	25
536-211 Physiology:Control of Body Function (p.2)	12.5	606-310 Field Botany (p.3)	12.5
<b>Third year</b>		606-314 Experimental Techniques in Plant Science (p.4)	12.5
50 points		<b>Plant pathology</b>	Points
536-301 Integrative Physiology: Heart & Kidney (p.3)	12.5	<b>Contact: School of Botany</b>	
536-303 The Brain: Neurophysiology of Behaviour (p.3)	12.5	<b>First year</b>	
536-304 Seminars & Experimental Physiology (p.3)	12.5	Life sciences package	
Plus one of		<b>Second year</b>	
536-308 Physiology of Muscle & Exercise (p.4)	12.5	50 points	
536-311 Molecular/Cellular Basis of Physiology (p.4)	12.5	606-201 The Living Plant (p.1)	12.5
<b>Mammalian cellular physiology</b>	Points	606-202 Plant Biodiversity (p.1)	12.5
<b>Contact: Department of Physiology</b>		Plus one of	
<b>First year</b>		652-214 Principles of Genetics (p.1)	12.5
Life sciences package		606-205 Cell Biology (p.2)	12.5
<b>Second year</b>		<b>Third year</b>	
37.5 points		50 points	
536-201 Principles of Physiology (p.1)	12.5	606-307 Fungi & Plant Disease (p.3)	12.5
536-202 Physiology (General Practical) (p.1)	6.25	Plus 37.5 points from	
521-211 Biochemistry & Molecular Biology Part A (p.2)	12.5	606-303 Botany Systematics & Evolution (p.3)	12.5
536-211 Physiology:Control of Body Function (p.2)	12.5	606-304 Environmental Plant Physiology (p.3)	12.5
<b>Third year</b>		606-310 Field Botany (p.3)	12.5
50 points		606-309 Cell Biology III (p.3)	12.5
536-302 Molecular Neurophysiology (p.3)	12.5	<b>Plant cell and molecular biology</b>	Points
536-304 Seminars & Experimental Physiology (p.3)	12.5	<b>Contact: School of Botany</b>	
Plus two of		<b>First year</b>	
536-301 Integrative Physiology: Heart & Kidney (p.3)	12.5	Life sciences package	
536-303 The Brain: Neurophysiology of Behaviour (p.3)	12.5	<b>Second year</b>	
536-308 Physiology of Muscle & Exercise (p.4)	12.5	50 points	
536-310 Research Project in Physiology (p.4)	12.5	606-201 The Living Plant (p.1)	12.5
536-311 Molecular/Cellular Basis of Physiology (p.4)	12.5	606-205 Cell Biology (p.2)	12.5
<b>Animal physiology</b>	Points	521-211 Biochemistry & Molecular Biology Part A (p.2)	12.5
<b>Contact: Department of Zoology</b>		<b>Third year</b>	
<b>First year</b>		50 points	
Life sciences package, including		606-304 Environmental Plant Physiology (p.3)	12.5
620-160 Experimental Design & Data Analysis (p.5)	12.5	606-309 Cell Biology III (p.3)	12.5
<b>Second year</b>		606-314 Experimental Techniques in Plant Science (p.4)	12.5
50 points selected from		521-306 Plant Biochemistry & Biotechnology (p.4)	12.5
536-201 Principles of Physiology (p.1)	12.5	<b>Plant biotechnology</b>	Points
536-202 Physiology (General Practical) (p.1)	6.25	<b>Contact: School of Botany</b>	
536-211 Physiology:Control of Body Function (p.2)	12.5	<b>First year</b>	
654-202 Animal Structure and Function (p.1)	12.5	Life sciences package	
654-203 Animal Physiology: Cells and Organs (p.1)	12.5	<b>Second year</b>	
<b>Third year</b>		50 points	
50 points		606-201 The Living Plant (p.1)	12.5
654-301 Animal Physiology: Comparative Approach (p.2)	25	600-205 Biotechnology in Practice (p.1)	12.5
536-302 Molecular Neurophysiology (p.3)	12.5	521-211 Biochemistry & Molecular Biology Part A (p.2)	12.5
Plus one of		521-212 Biochemistry & Molecular Biology Part B (p.2)	12.5
		<b>Third year</b>	
		50 points	

## Faculty of Science

### Plant biotechnology

606-304	Environmental Plant Physiology (p.3)	Points	12.5
606-309	Cell Biology III (p.3)		12.5
606-314	Experimental Techniques in Plant Science (p.4)		12.5
521-306	Plant Biochemistry & Biotechnology (p.4)		12.5

### PSYCHOLOGY

Teaching department: School of Behavioural Science

A major study in psychology, accredited by the Australian Psychological Society (APS), consists of a minimum of ten subjects and 125 points. The 50 points at 300-level definition of a science major is waived in this instance. Science students will instead need to complete a minimum of 50 science points at 300-level. Refer to *Psychology as a major (p.8)* for further information.

#### Psychology

**Contact:** School of Behavioural Science  
See description of psychology as a major course structure page 8.

### VISION SCIENCE

Teaching department: Optometry and Vision Sciences

#### Vision science

**Contact:** Department of Optometry and Vision Sciences

##### First year

Life sciences package or physical sciences package including the electives

655-101	Optical Systems (p.1)	Points	12.5
655-111	Vision: How The Eye Sees The World (p.1)		12.5

##### Second year

50 points

655-211	Ocular Anatomy & Histology (p.1)	Points	12.5
655-221	Human Visual Functions (p.2)		12.5
655-210	Optical Design and Ophthalmic Metrology (p.1)		12.5

Plus one of

655-222	Visual Processing and Control (p.2)	Points	12.5
521-211	Biochemistry & Molecular Biology Part A (p.2)		12.5
521-212	Biochemistry & Molecular Biology Part B (p.2)		12.5
536-211	Physiology:Control of Body Function (p.2)		12.5

##### Third year

50 points

655-321	Visual Physiology and Perception (p.2)	Points	12.5
655-331	Light & Image Formation: Applications (p.2)		12.5
655-351	Ophthalmic Prosthetics I (p.2)		12.5
516-305	Structure & Function of the Brain (p.3)		12.5

### Co-majors

Students may undertake a co-major in conjunction with a major. Science co-majors available:

- environmental science
- history and philosophy of science
- biotechnology

### ENVIRONMENTAL SCIENCE

Teaching departments: Botany, Chemistry, Earth Sciences, Anthropology, Geography and Environmental Studies, Geomatics, Mathematics and Statistics and Zoology.

**Contact:** environmental science coordinator

**Dr Roderick Brown, School of Earth Sciences**

#### Environmental science

**First year** Points

Environmental sciences package

##### Second year

50 points

600-203	Environmental Measurement (p.1)	Points	12.5
620-270	Applied Statistics (p.8)		12.5

Plus at least two\* of

600-201	Physical Environment (p.1)	Points	12.5
610-280	Environmental Chemistry (p.5)		12.5

an ecology subject from the list: 600-111, 654-204, 606-204, 606-207, 526-204, 121-030, 121-033, 121-013, 121-025

##### Third year

37.5 points

600-303	Environmental Risk Assessment (p.2)	Points	12.5
600-301	Problem Solving in Environmental Science (p.2)		12.5
451-312	GIS & Remote Sensing for Enviro Science (p.6)		12.5

\* It is recommended that students undertaking a co-major in environmental science include 200-level study in chemistry, ecology and earth sciences in

their programs, whether as part of their major or their environmental science co-major.

### HISTORY AND PHILOSOPHY OF SCIENCE

Teaching department: History and Philosophy of Science

#### History and philosophy of science (HPS)

Points

**Contact:** Department of History and Philosophy of Science

##### First year

Any first year package

##### Second year

37.5 points

Three HPS subjects earning science points

##### Third year

50 points

Four HPS subjects earning science points

The seven HPS subjects taken at second and third year must include a subject in two of the following areas: history of science, philosophy of science, and sociology of science. In addition, one subject must be from the following:

136-052	Science as Practice and Culture (p.4)	Points	12.5
136-054	Controversies in Philosophy of Science (p.4)		12.5
136-055	Approaches to the History of Science (p.5)		12.5

### BIOTECHNOLOGY

Teaching departments: Anatomy and Cell Biology, Biochemistry and Molecular Biology, Botany, Chemistry, Genetics, Microbiology and Immunology, Pathology, Pharmacology, History and Philosophy of Science

**Contact:** Biotechnology coordinator

**Assoc Professor Chris Cobbett, Department of Genetics**

#### Biotechnology

Points

##### First year

Life sciences package

##### Second year

Students must be undertaking a life sciences major in anatomy, biochemistry and molecular biology, cell biology, chemistry, genetics, immunology, microbiology, neuroscience, pathology, pharmacology, physiology, plant sciences or zoology. Students must also take:

600-205	Biotechnology in Practice (p.1)	Points	12.5
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Students need to fulfil prerequisite requirements for their chosen major and for the elective subjects they plan to take in third year.

##### Third year

Students will have taken 600-205 Biotechnology in Practice (p.1) and will be completing a selected life sciences major. Additionally students must take at least 37.5 points including three other elective 300-level biotechnology subjects from the lists on see page 1. At least two of these subjects must be from a department different to that responsible for teaching the major. Two practical subjects must be included, either within the co-major or the major.

For additional detail on the structure of the biotechnology co-major, see *Biotechnology (p.1)*.

### Compensatory passes

Compensatory passes (CP) allow BSc, BASc, BBiomedSc and BSc combined course students who have failed in certain subjects to receive credit points for the subject that was failed under the following conditions:

**Table 1: A CP can only be awarded for the following sequential subject pairs**

	Semester 1 subject	Semester 2 subject
Biology	600-141	600-142
	600-131	600-132
Chemistry	610-051	610-052
Geomatics	451-100	451-101
Physics	640-121	640-122
	640-141	640-142
	640-151	640-152
	640-161	640-162

- CPs are normally only available for the sequential subject pairs listed in Table 1 (p.15);
- CPs only apply for the first two semesters of a student's enrolment;
- a maximum of 25.0 points may be awarded as compensatory passes (i.e. a CP can be awarded for no more than two subjects);

- CPs are only available if a student obtains a mark of 45-49 per cent in the failed subject AND a combined average mark of at least 50 per cent is obtained in both subjects forming the sequential pair;
- a mark of 45-49 per cent in the Semester 1 subject of a sequential pair will enable a student to enrol in the Semester 2 subject of the pair in order to seek a CP;
- CPs are awarded at the end of the academic year and will appear as a letter grade 'NCP' with the fail mark on academic transcripts;
- a student may choose not to accept a CP, for example, in order to repeat the failed subject;
- CPs in chemistry are only available for 610-051 and 610-052 in the Bachelor of Biomedical Science course;
- CPs will be accepted as prerequisites for the 200-level subjects offered by the following departments:  
Anatomy and Cell Biology; Botany; Environmental Science; Geomatics; Genetics; Anthropology, Geography and Environmental Studies; Optometry and Vision Sciences; Pharmacology; Physics; Zoology.  
Physiology will only accept CPs in 640-121 and 640-122 or 640-141 and 610-142.

## Bachelor of Biomedical Science (BBIomedSc)

This course aims to produce flexible and well-informed graduates with specific training in a wide range of biomedical applications of the basic sciences. The course provides strategic training in the fundamentals of state-of-the-art biomedical science and a unique blend of genome science, whole animal systems biology and bioinformatics.

The Bachelor of Biomedical Science course is jointly offered by the Faculty of Science and the Faculty of Medicine, Dentistry and Health Sciences. The course is administered by the Faculty of Science, with the academic business of the degree program being implemented on the advice of the Joint Faculty Biomedical Science Course Advisory Committee. Enquiries regarding selection, subject changes, course planning and other course-related matters should be directed to the Faculty of Science office.

### Course objectives

Upon completion of the course students will:

- have a broad knowledge of science across a range of disciplines, with a high level of understanding and appreciation in specialist areas of the biomedical sciences;
- have an appreciation of integrated cellular tissue and whole body systems, particularly in the context of the new age of cell and molecular biology, genetic manipulation, rational drug design and therapeutics;
- have an appreciation of comparative biology and the value of a range of single cell organisms (e.g. yeasts) as model systems for investigating biomedically-relevant cellular processes;
- have well developed skills in bioinformatics (computational molecular biology) and state-of-the-art laboratory techniques of biomedical relevance;
- when solving scientific problems:
  - be capable of applying appropriate knowledge,
  - be able to access relevant information particularly through the use of information technology and traditional libraries,
  - understand the principles of project and experimental design,
  - have a capacity to apply practical skills, technology and computational systems;
- be able to communicate the results of their studies in both written and oral form and through computer-based presentations;
- have experience in teamwork and leadership;
- have an appreciation of the historical background and evolution of scientific concepts; and
- have an awareness of bioethics, particularly in the context of areas such as the new genetics and animal cloning investigations.

### Duration

The Bachelor of Biomedical Science course requires a minimum of three years full-time study, or the equivalent on a part-time basis.

### Course requirements

A total of 300 points must be obtained comprising:

- 125 points of core subjects,
- 75 points of subjects specified in one of eight specialist streams at the third year level,

- 100 points from selected science subjects including 25 points of prescribed 100-level physics, 12.5 points of prescribed 100-level mathematics and 12.5 points of prescribed 100-level statistics. Science subjects are any subjects listed in the Faculty of Science entry of this Handbook, except those specifically labelled as non-science.

The selection of subjects outside the core subjects at the 200 and 300-levels of the course will depend on the requirements of the individual specialist stream of interest to the student. The design of the 300-level streams requires that students select the necessary prerequisite(s) at the 200-level. In addition to the two 200-level generic core subjects, students must take 200-level subjects in individual discipline areas currently offered in the BSc course. A requirement of no more than two 12.5 point prerequisite subjects (total of 25 points) within any one discipline at the 200-level exists for any 300-level subjects offered with the BBIomedSc degree. With this provision a student will be able to select from at least two possible streams at the third year level.

Due to the multidisciplinary content of the 200-level Integrated Biomedical Science generic core subjects, students enrolled in the BBIomedSc degree will be excluded from the following 200-level BSc subjects:

- 516-201 Cell Biology: Tissues and Organs (p.1)
- 521-211 Biochemistry & Molecular Biology Part A (p.2)
- 521-212 Biochemistry & Molecular Biology Part B (p.2)
- 521-220 Techniques in Protein & Gene Technology (p.2)
- 606-205 Cell Biology (p.2)
- 536-201 Principles of Physiology (p.1)
- 536-202 Physiology (General Practical) (p.1)
- 536-211 Physiology:Control of Body Function (p.2)
- 652-215 Genes and Genomes (p.1)

**Table 2: Bachelor of Biomedical Science course structure**

Year	Semester 1	Semester 2
First year 100-level	600-131 Biomed: Molecules, Cells & Organisms (p.1) <sup>1</sup>	600-132 Biomed: Genetics & Biodiversity (p.1) <sup>1</sup>
	610-051 Chemistry (Biomedical Science A) (p.1) <sup>1</sup>	610-052 Chemistry (Biomedical Science B) (p.1) <sup>1</sup>
	640-151 Physics for Biomedical Science A (p.2) or 640-121 Physics A (Adv) (p.2)	640-152 Physics for Biomedical Science B (p.2) or 640-122 Physics B (Adv) (p.2)
	620-151 Introduction to Biomedical Mathematics (p.1) or a mainstream mathematics subject.	620-152 Introduction to Biomedical Statistics (p.2) or a second mathematics subject (statistics must be taken at second year).
Second year 200-level	521-213 Integrated Biomedical Science I (p.2) <sup>1</sup>	536-250 Integrated Biomedical Science II (p.3) <sup>1</sup>
	Choice of additional subjects totalling 50 points selected from existing science subjects according to intended specialisation at 300-level.	
Third year 300-level	521-308 Genome Science (p.3) <sup>1</sup>	536-350 Genes to Phenotype:Control & Integration (p.3) <sup>1</sup>
	Choice of one of eight specialist streams totalling 75 points. Each stream includes a stream-specific core of four subjects and a choice of two electives from an approved list of 300-level science subjects (see below).	

1. Compulsory core subject

## Specialist streams

The following specialist streams are available. Course structures may be subject to minor modifications.

- Stream 1: Functional, computational and applied genomics
- Stream 2: Physiological genomics
- Stream 3: Biotechnology and therapeutics
- Stream 4: Molecular biology of the cell in health and disease
- Stream 5: Reproductive and developmental biology
- Stream 6: Neuroscience
- Stream 7: Microorganisms, infection and immunity
- Stream 8: Biomedical physics and chemistry

In the course structures listed below, the total points listed to be completed under each year level is 100. Where appropriate, additional subjects must be completed to make up this total.

### Stream 1: Functional, computational and applied genomics

**Coordinators:** Professor M-J Gething and Associate Professor J Camakaris

Students completing this stream will achieve an understanding of the organisation and expression of the human genome and other eukaryotic and prokaryotic genomes, and acquire valuable skills in several areas of molecular biology including functional genomics, genetic analysis, bioinformatics, and analysis of protein structure and function. Basic knowledge will be integrated with applications such as gene mapping (as part of gene discovery), gene therapy, biotechnology and understanding the molecular basis of genetic diseases and cancer. This stream provides an excellent grounding for careers in basic science, medical research and biotechnology. Employment opportunities will exist in university departments, research institutes and hospitals, and in the biotechnology and pharmaceutical industries.

#### Second year

Points

Note: the compulsory 200-level subjects serve as sufficient prerequisites for all 300-level subjects, except for 526-301 which requires 526-201 or 526-205, and 531-301 which requires 531-201.

#### Semester 1

521-213	Integrated Biomedical Science I (p.2)	25
652-214	Principles of Genetics (p.1)	12.5

Plus one of

Any other eligible 200-level BSc subjects which may include:

526-201	Principles of Microbiology & Immunology (p.1)	12.5
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#### Semester 2

536-250	Integrated Biomedical Science II (p.3)	25
652-216	Molecular & General Genetics Practical (p.1)	12.5

Plus one of

521-203	Macromolecular Structure & Bioinformatics (p.2)	12.5
526-205	Microbes: Infections and Responses (p.1)	12.5
531-201	Basic Principles of Pathology-Science (p.1)	12.5
534-201	Pharmacology (p.1)	12.5

#### Total

100.0

#### Third year

Points

#### Semester 1

521-308	Genome Science (p.3)	12.5
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#### Stream specific core

521-301	Protein Structure, Design & Engineering (p.3)	12.5
652-302	Molecular Genetics (p.2)	12.5

#### Electives - choose one of

521-303	Molecular Aspects of Cell Biology (p.3)	12.5
521-321	Gene Technology & Protein Expression (p.4)	12.5
526-301	Biotechnology 1: Microbial Genes & Cells (p.2)	12.5
531-301	Cellular Basis of Disease (p.1)	12.5
652-304	Genetic Analysis (p.2)	12.5
652-305	Human Genetics (p.2)	12.5

#### Semester 2

536-350	Genes to Phenotype: Control & Integration (p.3)	12.5
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#### Stream specific core

521-302	Functional Genomics (p.3)	12.5
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Plus one of

521-322	Protein Biochemistry and Proteomics (p.4)	12.5
531-303	Molecular/Genetic Basis of Disease-Lect (p.2)	12.5
652-301	Genomes and Evolution (p.2)	12.5
652-303	Developmental and Cellular Genetics (p.2)	12.5

#### Electives - choose one of

516-302	Developmental Biology (p.2)	12.5
521-306	Plant Biochemistry & Biotechnology (p.4)	12.5
521-307	3D-Macromolecular Structure and Dynamics (p.4)	12.5

#### Third year

Points

521-322	Protein Biochemistry and Proteomics (p.4)	12.5
531-303	Molecular/Genetic Basis of Disease-Lect (p.2)	12.5
652-301	Genomes and Evolution (p.2)	12.5
652-303	Developmental and Cellular Genetics (p.2)	12.5
652-306	Experimental Genetics (p.3)	12.5

#### Total

100.0

### Stream 2: Physiological genomics

**Coordinators:** Professor S Harrap and Dr M Wlodek

This stream is for students wishing to enter the rapidly expanding world of physiological genomics. This new post-genomic discipline defines the function of genes in living tissues. Physiological genomics is important in tracing the effects of newly discovered genes and mutations and provides insights into new means of preventing or treating genetic diseases. It combines molecular and physiological skills in the context of complex living systems. Students will develop an understanding of the interactions that characterise the integrated and coordinated way in which genetic codes are translated into the function of cells, tissues, organs and the organism. With the emerging application of genomic discoveries graduates could consider careers to both basic science as well as clinical research. Employment opportunities exist in university academic departments, research institutes, hospitals, pharmaceutical industry and biotechnology companies.

#### Second year

Points

Note: Students should take care in selecting 200-level subjects so that prerequisites for intended 300-level subjects will be met.

#### Semester 1

521-213	Integrated Biomedical Science I (p.2)	25
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Plus

Any other eligible 200-level BSc subjects	25
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#### Semester 2

536-250	Integrated Biomedical Science II (p.3)	25
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Plus

Any other eligible 200-level BSc subjects	25
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#### Total

100.0

#### Third year

Points

#### Semester 1

521-308	Genome Science (p.3)	12.5
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#### Stream specific core

Any two of

536-301	Integrative Physiology: Heart & Kidney (p.3)	12.5
536-302	Molecular Neurophysiology (p.3)	12.5
536-308	Physiology of Muscle & Exercise (p.4)	12.5

#### Electives - choose one of

521-305	Biochemistry of Metabolism & Nutrition (p.3)	12.5
534-302	Neuropharmacology (p.1)	12.5
536-301	Integrative Physiology: Heart & Kidney (p.3)	12.5
536-302	Molecular Neurophysiology (p.3)	12.5
536-308	Physiology of Muscle & Exercise (p.4)	12.5
600-311	Research Project A (p.1)	12.5

#### Semester 2

536-350	Genes to Phenotype: Control & Integration (p.3)	12.5
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#### Stream specific core

536-311	Molecular/Cellular Basis of Physiology (p.4)	12.5
521-304	Hormone & Neurotransmitter Biochemistry (p.3)	12.5

#### Electives - choose one of

516-302	Developmental Biology (p.2)	12.5
521-302	Functional Genomics (p.3)	12.5
536-304	Seminars & Experimental Physiology (p.3)	12.5
600-312	Research Project B (p.1)	12.5
652-303	Developmental and Cellular Genetics (p.2)	12.5
654-314	Reproduction (Lectures) (p.4)	12.5

#### Total

100.0

### Stream 3: Biotechnology and therapeutics

**Coordinator (Biotechnology):** Dr D Tribe

**Coordinator (Therapeutics):** Associate Professor A Stewart

Within Stream 3 there are two themes of study which are designed to provide insight into the rapidly developing interdisciplinary approaches that are generating new chemicals to improve our quality of life. Biotechnology is primarily concerned with the methods of production of new agents, whereas pharmacology is concerned with the mechanisms of action of such agents. Graduates with research training in these areas could be destined for a career in the pharmaceutical industry or in regulatory affairs. Research opportunities also exist in universities, research institutes, hospitals and an increasing number of start-up biotechnology companies. The biotechnology theme will provide students with an understanding of the wide range of tools and tech-

niques that are being used to manipulate genes, manage cell growth, and control enzyme catalysis for the creation of new products and manufacturing processes. It also provides familiarity with the ongoing conceptual advances and scientific innovations that are driving the continued expansion of biotechnology. Students may choose subjects that constitute a plant biotechnology substream.

The therapeutics theme will provide students with an understanding of the principles of pharmacology, which is the science of drug action at the molecular and physiological level. New developments in methods of drug discovery will be described and students will be given practical experience in the skills used by pharmacologists to unravel the mechanisms by which drugs produce their effects. Other topics include the study of the toxic actions of drugs and other environmental chemicals and the way that the body breaks down and eliminates such chemicals.

### Second year

Points

Note: Students should take care in selecting 200-level subjects so that prerequisites for intended 300-level subjects will be met. For example, 526-301 requires 526-201 or 526-205; 531-301 requires 531-201; 652-303 requires 652-214 and 300-level pharmacology subjects require 534-201.

#### Semester 1

521-213 Integrated Biomedical Science I (p.2) 25  
*Plus*

Any two eligible 200-level BSc subjects which may include:

526-201 Principles of Microbiology & Immunology (p.1) 12.5  
 606-201 The Living Plant (p.1) 12.5  
 610-260 Analysis in Chemical and Life Sciences (p.5) 12.5

#### Semester 2

536-250 Integrated Biomedical Science II (p.3) 25  
*Plus*

Any two eligible 200-level BSc subjects which may include:

534-201 Pharmacology (p.1) 12.5  
 526-205 Microbes: Infections and Responses (p.1) 12.5  
 531-201 Basic Principles of Pathology-Science (p.1) 12.5  
 606-202 Plant Biodiversity (p.1) 12.5

**Total 100.0**

Students intending to undertake 300-level conservation biology, which covers effects of genetically modified organisms should take the prerequisite 654-204 Ecology: Individuals and Populations (p.2).

### Third year

Points

#### Semester 1

521-308 Genome Science (p.3) 12.5

#### Stream specific core

*Either*  
 534-301 Principles of Pharmacology (p.1) 25  
*or both*

521-301 Protein Structure, Design & Engineering (p.3) 12.5  
 526-301 Biotechnology 1: Microbial Genes & Cells (p.2) 12.5

#### Electives - choose one of

521-301 Protein Structure, Design & Engineering (p.3) 12.5  
 521-303 Molecular Aspects of Cell Biology (p.3) 12.5  
 521-305 Biochemistry of Metabolism & Nutrition (p.3) 12.5  
 521-321 Gene Technology & Protein Expression (p.4) 12.5  
 526-301 Biotechnology 1: Microbial Genes & Cells (p.2) 12.5  
 531-301 Cellular Basis of Disease (p.1) 12.5  
 534-302 Neuropharmacology (p.1) 12.5  
 534-303 Molecular Pharmacology (p.2) 12.5  
 536-301 Integrative Physiology: Heart & Kidney (p.3) 12.5  
 536-302 Molecular Neurophysiology (p.3) 12.5  
 606-309 Cell Biology III (p.3) 12.5  
 610-332 Bio-organic Chemistry (p.6) 12.5

#### Semester 2

536-350 Genes to Phenotype: Control & Integration (p.3) 12.5

#### Stream specific core

*Either*  
 534-304 Pharmacology of Therapeutic Substances (p.2) 25  
*or both*

521-322 Protein Biochemistry and Proteomics (p.4) 12.5  
 526-302 Biotechnology 2: Processes & Innovations (p.2) 12.5

#### Electives - choose one of

521-302 Functional Genomics (p.3) 12.5  
 521-304 Hormone & Neurotransmitter Biochemistry (p.3) 12.5  
 521-306 Plant Biochemistry & Biotechnology (p.4) 12.5  
 521-307 3D-Macromolecular Structure and Dynamics (p.4) 12.5  
 526-305 Medical and Applied Immunology (p.2) 12.5  
 531-303 Molecular/Genetic Basis of Disease-Lect (p.2) 12.5

### Third year

Points

534-305 Toxicology (p.2) 12.5  
 534-306 Drug Discovery (p.2) 12.5  
 536-311 Molecular/Cellular Basis of Physiology (p.4) 12.5  
 606-304 Environmental Plant Physiology (p.3) 12.5  
 606-307 Fungi & Plant Disease (p.3) 12.5  
 606-314 Experimental Techniques in Plant Science (p.4) 12.5  
 652-303 Developmental and Cellular Genetics (p.2) 12.5

**Total 100.0**

### Stream 4: Molecular biology of the cell in health and disease

**Coordinator:** Associate Professor P Whittington

The subjects in this stream deal with the link between gene function and phenotype at all levels of organisation - from cells to organisms. This link is pivotal to applying recent advances in our understanding of the human genome to the solution of medical problems. Students will emerge from this stream with a sound understanding of the genetic and molecular basis for normal cell and tissue function. They will also appreciate how cellular processes can be disrupted as a result of inherited or environmentally induced mutations, inappropriate diet or infection. This stream provides an ideal grounding for careers in biomedical research into human diseases such as cancer, diabetes, hypertension etc. as well as basic research in cell and developmental biology. It opens up employment opportunities in university departments, research institutes and biotechnology companies developing diagnostic and therapeutic products.

### Second year

Points

Note: Students should take care in selecting 200-level subjects so that prerequisites for intended 300-level subjects will be met. For example: 526-301 requires 526-201 or 526-205; 531-301 requires 531-201; 652-303 and 652-305 require 652-214; 652-304 requires 652-214 and 652-216.

#### Semester 1

521-213 Integrated Biomedical Science I (p.2) 25

*Plus*

Any two eligible 200-level BSc subjects which may include:

526-201 Principles of Microbiology & Immunology (p.1) 12.5

#### Semester 2

536-250 Integrated Biomedical Science II (p.3) 25

*Plus*

Any two eligible 200-level BSc subjects which may include:

526-205 Microbes: Infections and Responses (p.1) 12.5

531-201 Basic Principles of Pathology-Science (p.1) 12.5

**Total 100.0**

### Third year

Points

#### Semester 1

521-308 Genome Science (p.3) 12.5

#### Stream specific core

521-303 Molecular Aspects of Cell Biology (p.3) 12.5

606-309 Cell Biology III (p.3) 12.5

#### Electives - choose one of

516-307 Project Study in Anatomy & Cell Biology (p.3) 12.5  
 521-301 Protein Structure, Design & Engineering (p.3) 12.5  
 521-321 Gene Technology & Protein Expression (p.4) 12.5  
 526-301 Biotechnology 1: Microbial Genes & Cells (p.2) 12.5  
 526-304 Principles of Immunology (p.2) 12.5  
 531-301 Cellular Basis of Disease (p.1) 12.5  
 531-302 Techniques for Investigation of Disease (p.2) 12.5  
 534-303 Molecular Pharmacology (p.2) 12.5  
 536-302 Molecular Neurophysiology (p.3) 12.5  
 536-304 Seminars & Experimental Physiology (p.3) 12.5  
 652-302 Molecular Genetics (p.2) 12.5  
 652-304 Genetic Analysis (p.2) 12.5  
 652-305 Human Genetics (p.2) 12.5

#### Semester 2

536-350 Genes to Phenotype: Control & Integration (p.3) 12.5

#### Stream specific core

516-302 Developmental Biology (p.2) 12.5

*Plus one of*

521-302 Functional Genomics (p.3) 12.5

531-303 Molecular/Genetic Basis of Disease-Lect (p.2) 12.5

652-303 Developmental and Cellular Genetics (p.2) 12.5

#### Electives - choose one of

516-307 Project Study in Anatomy & Cell Biology (p.3) 12.5

521-302 Functional Genomics (p.3) 12.5

521-304 Hormone & Neurotransmitter Biochemistry (p.3) 12.5

521-322 Protein Biochemistry and Proteomics (p.4) 12.5

## Faculty of Science

<b>Third year</b>		Points
526-305	Medical and Applied Immunology (p.2)	12.5
531-303	Molecular/Genetic Basis of Disease-Lect (p.2)	12.5
531-304	Molecular/Genetic Basis of Disease-Prac (p.2)	12.5
536-304	Seminars & Experimental Physiology (p.3)	12.5
536-311	Molecular/Cellular Basis of Physiology (p.4)	12.5
652-303	Developmental and Cellular Genetics (p.2)	12.5
<b>Total</b>		<b>100.0</b>

The elective 516-307 may be taken in Semester 1 or Semester 2, but not both.

### Stream 5: Reproductive and developmental biology

**Coordinator:** Professor M Renfree

This is a stream for students who are interested in such areas as the molecular and cell biology or physiology of reproduction and development, sexual determination and differentiation, stem cell and cloning biology, assisted reproduction, including in-vitro fertilisation (IVF) in humans and domestic animals and for conservation of endangered species or fertility control of overabundant species. This stream has a strong practical component and leads to careers such as medical research (e.g. Department of Health, hospitals, assisted reproductive technology companies such as IVF Australia, universities, veterinary science and agriculture), scientific research (e.g. with CSIRO, Environment Australia and State departments such as Natural Resources and Environment and the Victorian Institute of Animal Science) and scientific consultancy.

<b>Second year</b>		Points
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Note: Students should take care in selecting 200-level subjects so that prerequisites for intended 300-level subjects will be met.

<b>Semester 1</b>		Points
521-213	Integrated Biomedical Science I (p.2)	25
<i>Plus</i>		
Any two eligible 200-level BSc subjects which may include:		25
654-207	Australian Wildlife Biology (p.2)	12.5
652-214	Principles of Genetics (p.1)	12.5
652-216	Molecular & General Genetics Practical (p.1)	12.5
<b>Semester 2</b>		Points
536-250	Integrated Biomedical Science II (p.3)	25
<i>Plus</i>		
Any two eligible 200-level BSc subjects which may include:		25
654-202	Animal Structure and Function (p.1)	12.5
654-203	Animal Physiology: Cells and Organs (p.1)	12.5
652-216	Molecular & General Genetics Practical (p.1)	12.5
<b>Total</b>		<b>100.0</b>

<b>Third year</b>		Points
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Note: A number of 300-level subjects have specified 200-level prerequisites.

<b>Semester 1</b>		Points
521-308	Genome Science (p.3)	12.5
<i>Plus one of</i>		
516-306	Developmental Neurobiology (p.3)	12.5
521-303	Molecular Aspects of Cell Biology (p.3)	12.5
606-309	Cell Biology III (p.3)	12.5
654-301	Animal Physiology: Comparative Approach (p.2)	25
<i>Plus</i>		
Any other eligible 300-level BSc subjects		
<b>Semester 2</b>		Points
536-350	Genes to Phenotype:Control & Integration (p.3)	12.5
<b>Stream specific core</b>		Points
654-304	Reproduction (p.3)	25
516-302	Developmental Biology (p.2)	12.5
<b>Total</b>		<b>100.0</b>

### Stream 6: Neuroscience

**Coordinator:** Professor A Goodwin

Understanding the human brain is one of the pre-eminent scientific challenges of the 21st century. Neuroscience is a broad discipline and in this stream is addressed over a wide range from the molecular and cellular mechanisms underlying neural function to complex behaviours such as thought and language. The range of subjects offered aims to provide students with insight into the molecular and cellular mechanisms fundamental to neural function; an understanding of how neurons form the building blocks of the nervous system, how they transmit information, communicate with each other, form elementary circuits, and store information; an appreciation of the fundamentals of systems underlying sensory perception; an understanding of how the nervous system initiates and controls movements of the body; an appreciation of the plasticity of the nervous system, how it adapts to changing environments, how it ages, how nerve injuries may be repaired or may lead to irreversible damage; insight into how drugs and diseases affect the nervous system. A

neuroscience background leads to career opportunities in scientific and medical research in university departments, research institutes, hospitals; and to broader opportunities in drug companies, and in bioengineering companies (diagnostic and therapeutic equipment, robotics).

<b>Second year</b>		Points
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<b>Semester 1</b>		Points
521-213	Integrated Biomedical Science I (p.2)	25
<i>Plus</i>		
Any two eligible 200-level BSc subjects		25
<b>Semester 2</b>		Points
536-250	Integrated Biomedical Science II (p.3)	25
534-201	Pharmacology (p.1)	12.5
<i>Plus</i>		
Any eligible 200-level BSc subject which may include:		12.5
516-209	Introductory Neuroscience (p.2)	12.5
<b>Total</b>		<b>100.0</b>

<b>Third year</b>		Points
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<b>Semester 1</b>		Points
521-308	Genome Science (p.3)	12.5
<b>Stream specific core</b>		Points
534-302	Neuropharmacology (p.1)	12.5
536-303	The Brain: Neurophysiology of Behaviour (p.3)	12.5
<b>Electives - choose one of</b>		Points
516-303	Anatomy of the Head and Neck (p.3)	12.5
516-306	Developmental Neurobiology (p.3)	12.5
516-307	Project Study in Anatomy & Cell Biology (p.3)	12.5
536-302	Molecular Neurophysiology (p.3)	12.5
654-305	Animal Behaviour (p.3)	12.5
<b>Semester 2</b>		Points
536-350	Genes to Phenotype:Control & Integration (p.3)	12.5
<b>Stream specific core</b>		Points
516-305	Structure & Function of the Brain (p.3)	12.5
521-304	Hormone & Neurotransmitter Biochemistry (p.3)	12.5
<b>Electives - choose one of</b>		Points
516-302	Developmental Biology (p.2)	12.5
516-307	Project Study in Anatomy & Cell Biology (p.3)	12.5
536-304	Seminars & Experimental Physiology (p.3)	12.5
<b>Total</b>		<b>100.0</b>

The elective 516-307 may be taken in Semester 1 or Semester 2, but not both.

### Stream 7: Microorganisms, infection and immunity

**Coordinators:** Professor J McCluskey and Ms S Uren

Infectious diseases are the major world wide cause of morbidity and mortality. The Stream 7 core subjects provide a deep understanding of the diverse agents of infection (bacteria, viruses, fungi and parasites), and the many diseases they cause. The molecular basis of the ability of various microorganisms to cause disease (pathogenesis) will be discussed, together with strategies to interrupt this process, including the development of new antibiotics and other agents. The immunology component of the course allows students to become familiar with the way the immune system responds to defend the body against infections. Techniques to boost the immune response by the development of novel vaccines and other interventions are explored. As well, the immunology subjects provide an understanding of the mechanisms operating in response to tumours, transplants, and in allergies and autoimmune diseases. Stream 7 electives have been chosen to allow students to further focus on areas of particular interest to them. This stream opens up employment opportunities in the areas of medical microbiological and immunological diagnostics, food science, biotechnology (including medical and veterinary vaccine and therapeutics development and production), and basic research into a range of microorganisms (including those bacteria and viruses which cause diarrhoea, HIV, influenza and tuberculosis), microbial genetics and pathogenesis. The depth of the immunological content of the course allows students to continue to explore the immune system by research into such diverse areas as allergies, autoimmune diseases including diabetes and arthritis, transplantation and cancer immunology.

<b>Second year</b>		Points
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Note: 526-201 and 526-205 are alternative prerequisites for the 300-level stream-specific core subject 526-311.

<b>Semester 1</b>		Points
521-213	Integrated Biomedical Science I (p.2)	25
526-201	Principles of Microbiology & Immunology (p.1)	12.5
<i>Plus</i>		
Any eligible 200-level BSc subject which may include:		12.5
526-221	Practical Microbiology (p.1)	12.5
<i>(526-221 is strongly recommended)</i>		
<b>Semester 2</b>		Points

<b>Second year</b>	
536-250 Integrated Biomedical Science II (p.3)	Points 25
526-205 Microbes: Infections and Responses (p.1) <i>Plus</i>	12.5
Any eligible 200-level BSc subject (526-221, if not taken in Semester 1, is strongly recommended)	12.5
<b>Total</b>	<b>100.0</b>
<b>Third year</b>	Points
At least one (12.5 points) of the practical subjects of the four offered (526-321, 526-322, 526-323, 526-324) must be selected. It is highly recommended that students undertake two practical subjects.	
<b>Semester 1</b>	
521-308 Genome Science (p.3)	12.5
<b>Stream specific core</b>	
526-304 Principles of Immunology (p.2)	12.5
526-311 Medical Microbiology: Pathogens (p.3)	12.5
<b>Electives - choose one of</b>	
526-301 Biotechnology 1: Microbial Genes & Cells (p.2)	12.5
526-321 Molecular Microbiology Techniques (p.3)	12.5
526-324 Immunological Techniques (p.4)	12.5
<b>Semester 2</b>	
536-350 Genes to Phenotype: Control & Integration (p.3)	12.5
<b>Stream specific core</b>	
526-312 Medical Microbiology: Infections (p.3)	12.5
<i>Plus one of</i>	
526-305 Medical and Applied Immunology (p.2)	12.5
526-323 Projects: Medical/Biomedical/Immunology (p.3)	12.5
<b>Electives - choose one of</b>	
526-302 Biotechnology 2: Processes & Innovations (p.2)	12.5
526-305 Medical and Applied Immunology (p.2)	12.5
526-322 Projects: Biotechnology (p.3)	12.5
526-323 Projects: Medical/Biomedical/Immunology (p.3)	12.5
<b>Total</b>	<b>100.0</b>
Note: A number of elective subjects have a Semester 1 prerequisite and/or a Semester 1 or 2 corequisite.	

**Stream 8: Biomedical physics and chemistry****Coordinator (Physics):** Associate Professor D Jamieson**Coordinator (Chemistry):** Associate Professor C Schiesser

<b>Second year</b>	
Note: for other physics and chemistry subject options at 200-level, consult course coordinator or stream coordinators. Those students interested in 200- and 300-level physics units should see the physics stream coordinator as soon as possible in the first year of study to get advice on the recommended corequisite mathematics subjects.	
<b>Semester 1</b>	
521-213 Integrated Biomedical Science I (p.2)	Points 25
<i>Plus</i>	
Any two eligible 200-level chemistry and/or physics subjects which may include:	25
610-220 Organic Chemistry (p.4)	12.5
610-260 Analysis in Chemical and Life Sciences (p.5)	12.5
640-223 Quantum Mechanics & Thermal Physics (Adv) (p.3)	12.5
640-243 Quantum Mechanics & Thermal Physics (p.4)	12.5
(plus corequisite mathematics subject where applicable)	
<b>Semester 2</b>	
536-250 Integrated Biomedical Science II (p.3)	25
<i>Plus</i>	
Any two eligible 200-level chemistry and/or physics subjects which may include:	25
610-240 Inorganic and Bio-inorganic Chemistry A (p.4)	12.5
(plus corequisite mathematics subject where applicable)	
<b>Total</b>	<b>100.0</b>
<b>Third year</b>	Points
<b>Semester 1</b>	
521-308 Genome Science (p.3)	12.5
<b>Stream specific core</b>	
<i>Select three of</i>	
521-301 Protein Structure, Design & Engineering (p.3)	12.5
521-321 Gene Technology & Protein Expression (p.4)	12.5
610-332 Bio-organic Chemistry (p.6)	12.5
610-340 Inorganic Chemistry IIIA (p.7)	12.5
640-321 Quantum Mechanics (Adv) (p.5)	12.5
640-341 Quantum Mechanics (p.6)	12.5

<b>Third year</b>	
Additional 300-level chemistry and physics subjects may be made available.	
<b>Semester 2</b>	
536-350 Genes to Phenotype: Control & Integration (p.3)	Points 12.5
<b>Stream specific core</b>	
<i>Select three of</i>	
521-307 3D-Macromolecular Structure and Dynamics (p.4)	12.5
521-322 Protein Biochemistry and Proteomics (p.4)	12.5
534-305 Toxicology (p.2)	12.5
534-306 Drug Discovery (p.2)	12.5
610-320 Organic Chemistry IIIA (p.6)	12.5
640-353 Atomic, Molecular & Solid State Physics (p.6)	12.5
640-364 Computational Physics (p.7)	12.5
Additional 300-level chemistry and physics subjects may be made available.	
<b>Total</b>	<b>100.0</b>

**Course planning****First year course planning**

Students selected into the Bachelor of Biomedical Science course are invited to attend introductory information sessions at the University prior to enrolment. At these sessions students will be given important information about course requirements, disciplines available and the enrolment process. Students then meet with a faculty adviser to plan their first year of study. As shown in the *Course requirements* (p.16), the first year of the course comprises:

- 50 points of compulsory core subjects (biology and chemistry);
- 25 points of physics subjects;
- a minimum of 12.5 points of mathematics and 12.5 points of statistics.

**Course planning in later years**

In addition to completing the four compulsory core subjects at second and third year, students will study additional subjects according to their intended specialisation at third year.

Students requiring further information may obtain course advice from student advisers in the Faculty of Science office, the course coordinator and from academic staff in relevant departments.

During Semester 2 each year, a course planning exercise is conducted, during which students are provided with the opportunity to meet with academic staff to discuss their course plan for the following year. Students are notified by mail of the relevant dates and procedures for this exercise.

Course plans are applications for selection into subjects and must be approved by the faculty. No further action is required unless a student fails a prerequisite subject, misses entry into quota-restricted subjects or wishes to alter their course plan. In these cases, the student should seek advice from the Faculty of Science office.

**Quota subjects**

Students enrolled in the Bachelor of Biomedical Science course receive automatic entry to the compulsory core subjects of the degree - provided prerequisite requirements are satisfied. Quotas may exist on the additional subjects chosen at second and third year. Please refer to *Quota subjects* (p.6) for information regarding selection into quota subjects.

**Honours program**

Students planning to apply for entry into the honours program (fourth year studies) should refer to *Bachelor of Science (Honours) and Bachelor of Information Systems (Honours)* (p.1) for further details.

**Course coordinators**

Professor M-J Gething, Department of Biochemistry and Molecular Biology  
Dr M A Perugini, Department of Biochemistry and Molecular Biology

**Bachelor of Information Systems (BIS)**

The degree in information systems focuses on the design, specification, and creation of information systems, and on the human and organisational arrangements needed to use information systems to achieve organisational goals. To cover these increasingly interrelated topics, the course offers study in five key areas: information systems, information technology, organisations, analytical skills, and professional competencies.

Bachelor of Information Systems graduates will find employment in a variety of professional roles, ranging from the very technical to the very business oriented, in public and private organisations in Australia and overseas.

## Main themes

Specific capabilities will be developed through work in the five general themes of the course.

### Information systems

This is the central theme of the course: information systems collect, process, store, and distribute information so that it can be used to make decisions, to keep track of resources, and to plan for the future. Particular focus is placed on imagining, specifying, designing, justifying, building, implementing, managing, and using information systems to add value in organisations.

### Information technology

An understanding of the potential of information technology to add value is essential to the successful implementation and use of information systems. Students will become familiar with computer hardware and software, telecommunications, databases and data structures, information technology architectures, and information technology infrastructures. Practical experience in these areas will help students learn how to assess the current and future capability of information technology.

### Organisations

To implement information systems efficiently and effectively in organisations requires the ability to analyse and understand organisational functions, processes, environments, characteristics, and cultures. This organisational perspective on information systems, and its relationship to the technical perspective developed in the information technology theme, is a distinguishing characteristic of the Bachelor of Information Systems course.

### Analytical skills

Effective design, development, and implementation of information systems in organisations requires a broad range of analytical skills, including data classification and modelling, information mapping and representation, systems analysis and design, and statistics. These and other analytical skills are essential for understanding, and communicating about, complex organisational situations and the potential and performance of information systems.

### Professional competencies

Graduates will, in the course of their jobs, work with people across a broad spectrum of technical and business interests and skills. Success in these interactions will require a well-developed set of personal competencies, including listening, collecting and synthesising information, writing, presenting, and working in teams.

### Professional Skills Program (PSP)

Students enrolled in the Bachelor of Information Systems will participate in a Professional Skills Program covering a range of communication, professional and analytical skills. Students will be expected to complete the sequence satisfactorily at first, second and third year levels, and will be awarded a certificate on successful completion of this element of the course. The PSP aims to prepare students for the information systems workplace by teaching skills in communication, teamwork, leadership, writing, presenting in public, problem solving and more. It is a 55-hour course taught over a three-year or five-semester period. The PSP is a non-credit subject but attendance is a requirement of the Bachelor of Information Systems course.

First year PSP comprises an introduction to a range of professional skills, and the rationale for bringing such professional skills to the workplace. In second year, students study thinking skills, people skills, and oral and written communication skills. Third year PSP covers advanced presentation skills, advanced people skills such as negotiation and conflict resolution, and advanced problem-solving.

Note: Students in combined Bachelor of Information Systems courses can complete PSP over the five years of their course.

## Objectives of the course

The objective of the Bachelor of Information Systems course is to prepare students to be part of teams that imagine, specify, design, justify, build, implement, manage, and use information systems. To accomplish this objective, graduates must understand how to use information technology, including hardware, software, and telecommunications, as a conduit for the value-added information content of formal organisational systems. This understanding is based on a solid theoretical grounding in both technology and organisations, as well as on experience working both individually and in teams to apply the theory to practice.

Upon completion of the Bachelor of Information Systems course, students will:

- understand how people use information and information systems;
- understand the business value of information and information systems in organisations;
- understand the organisational settings in which information systems are used, including major business functions and processes;

- have familiarity with, and some experience in, studying large, complex information systems;
- understand, and be able to specify, the technical aspects of an information system;
- be able to build small information systems;
- be familiar with a range of techniques, standards, and tools for building and using large information systems in an organisational setting;
- be able to participate in imagining, designing, justifying, implementing, and managing large information systems;
- have professional competencies for effective work in organisations, including listening, writing, researching, analysing, presenting, and working in teams; and
- know how to operate ethically within society's legal framework.

## Duration

The Bachelor of Information Systems course normally requires three years of full-time study, and may be taken part time.

## Course requirements

Students must complete at least 300 points of approved studies, comprising:

- 200 points of core studies in information systems at 100-, 200-, and 300-level;
- 25 points of core business-oriented subjects, including
  - 325-101 Management, and
  - one of the following\*:
    - 306-102 Accounting Concepts
    - 306-104 Accounting 1B (note that this subject has prerequisites)
    - 316-101 Introductory Macroeconomics (note that this subject has prerequisites)
    - 316-102 Introductory Microeconomics
    - 732-103 Principles of Business Law
    - 325-102 Business in the Global Economy
    - 325-103 The Asian Economies
- a maximum of 112.5 points at 100-level;
- 37.5 to 50 points of electives in information systems or other discipline areas at 200- or 300-level;

## Core studies

Note: This list may change from time to time.

### 100-level

325-101 Management (*p.1*)

One of the following:

- 306-102 Accounting Concepts
- 306-104 Accounting 1B (note that this subject has prerequisites)
- 316-101 Introductory Macroeconomics (note that this subject has prerequisites)
- 316-102 Introductory Microeconomics
- 732-103 Principles of Business Law
- 325-102 Business in the Global Economy
- 325-103 The Asian Economies

615-120 Information Systems in Organisations (*p.1*)

615-145 Concepts in Software Development I (*p.2*)

615-150 Organisational Processes (*p.2*)

615-160 Tools of Analysis (*p.2*)

### 200-level

615-230 Database Concepts (*p.2*)

615-237 Telecommunications Concepts (*p.2*)

615-240 Concepts in Software Development II (*p.3*)

615-245 Systems Analysis and Design (*p.3*)

615-251 Organisational Analysis and Change (*p.3*)

615-252 Electronic Commerce (*p.3*)

### 300-level

615-328 Managing the Impact of IS (*p.4*)

615-347 Application Environments (*p.5*)

615-350 Case Studies in Information Systems (*p.5*)

615-355 Legal & Ethical Frameworks (*p.5*)

615-372 Project Management (*p.6*)

615-370 Information Systems Project (*p.6*)

Table 3: BIS course plan

Year	Sem	Subjects			
1	1	615-120 Information Systems in Organisations (p.1) (replace with an elective if 40+ in VCE Information Technology IP)	325-101 Management (p.1)	Completion of business oriented subject chosen from the list below.	Elective
	2	615-145 Concepts in Software Development I (p.2) (615-120)	615-150 Organisational Processes (p.2)	615-160 Tools of Analysis (p.2) (Pre or Coreq 615-145 or 433-142, or equivalent)	Elective
2	1	615-240 Concepts in Software Development II (p.3) (615-145)	615-251 Organisational Analysis and Change (p.3) (615-150)	615-230 Database Concepts (p.2) (615-145)	Elective at 200-level or higher
	2	615-245 Systems Analysis and Design (p.3) (615-150, 615-230)	615-252 Electronic Commerce (p.3) (615-150, corequisite 615-237)	615-237 Telecommunications Concepts (p.2) (615-145)	Elective at 200-level or greater
3	1	615-347 Application Environments (p.5) (615-230, 615-240)	615-355 Legal & Ethical Frameworks (p.5) (62.5 points of 200-level IS subjects)	615-372 Project Management (p.6) (62.5 points of 200-level IS subjects)	Elective at 200-level or greater
	2	615-328 Managing the Impact of IS (p.4) (615-251)	615-350 Case Studies in Information Systems (p.5) (62.5 points of 200-level IS subjects)	615-370 Information Systems Project (p.6) (615-245, 615-372 and 62.5 points of 200-level IS)	Elective at 200-level or greater
Notes: <ul style="list-style-type: none"> <li>Prerequisites for subjects are noted in italics where appropriate.</li> <li>This course plan is accurate at July 2001 and takes into account minor changes to the course that will occur from 2002.</li> <li>This course plan is subject to timetable availability.</li> <li>Students may apply to take 615-373 Industrial Project (p.6) instead of 615-370 Information Systems Project (p.6)</li> </ul>					

**Business oriented subjects:**

- 306-102 Accounting Concepts (p.1)
- 306-104 Accounting 1B (p.1) (prerequisite 306-103 Accounting 1A (p.1))
- 316-101 Introductory Microeconomics (p.1) (prerequisite 316-102 Introductory Microeconomics (p.1))
- 316-102 Introductory Microeconomics (p.1)
- 325-102 Business in the Global Economy (p.1)
- 325-103 The Asian Economies (p.1)
- 732-103 Principles of Business Law (p.1)

**Electives**

Students are encouraged to take electives that broaden their degree studies. Subjects with content that may overlap information systems core subject content are not encouraged. See page 1 for a list of Information Systems electives..

**Combined courses involving the Bachelor of Information Systems**

Information Systems in combination with other disciplines creates attractive professional opportunities in a number of areas. The following Bachelor of Information Systems combined courses are available:

- Bachelor of Commerce/Bachelor of Information Systems (BCom/BIS) (p.22)
- Bachelor of Science/Bachelor of Information Systems (BSc/BIS) (p.23)
- Bachelor of Geomatic Engineering/Bachelor of Information Systems (BGeomE/BIS) (p.7). (A description of the information systems component of this combined course appears onpage 24.)

**Bachelor of Commerce/Bachelor of Information Systems (BCom/BIS)**

The combined Bachelor of Commerce/Bachelor of Information Systems course provides a course of study for students who want to understand information systems from a technological perspective, the organisational contexts in which these systems are developed, and the business environments which determine how the systems can be used to create value. Graduates of this course will readily find employment across a spectrum of knowledge-intensive careers, including accounting, consulting, and general management.

**Course objectives**

As for the Bachelor of Commerce and the Bachelor of Information Systems (page 21).

It will be possible within the outlines of the BCom/BIS course to achieve either the approved undergraduate course of the Institute of Chartered Accountants in Australia (ICA) or the required subjects for associate status with CPA Australia.

**Duration**

The Bachelor of Commerce/Bachelor of Information Systems course normally requires five years of full-time study.

**Course requirements**

Students must complete a minimum of 500 points. Within the 500 points students must ensure that they satisfy the requirements of both the Commerce component and the information systems component as specified below.

**Commerce component**

A minimum of 200 commerce points is required, which must include:

- 50-125 points at the 100-level;
- at least 50 points at the 300-level;
- the following compulsory subjects:
  - 316-101 Introductory Macroeconomics
  - 316-102 Introductory Microeconomics
  - 316-130 Quantitative Methods 1
 and one of:
  - 316-205 Introductory Econometrics
  - 316-206 Quantitative Methods 2
  - 325-210 Managerial Decision Analysis
  - 325-212 Market Research.

The 200 commerce points must be chosen from subjects taught by departments in the Faculty of Economics and Commerce, or subjects with a 732 prefix taught by the Faculty of Law.

**Information Systems component**

A minimum of 212.5 points of core subjects must be completed, including the core subjects listed below, or approved alternate subjects.

**100-level**

- 615-120 Information Systems in Organisations (p.1)
- 615-145 Concepts in Software Development I (p.2)
- 615-150 Organisational Processes (p.2)
- 325-101 Management (p.1)

**200-level**

- 615-230 Database Concepts (p.2)
- 615-237 Telecommunications Concepts (p.2)
- 615-240 Concepts in Software Development II (p.3)
- 615-245 Systems Analysis and Design (p.3)
- 615-251 Organisational Analysis and Change (p.3)
- 615-252 Electronic Commerce (p.3)

**300-level**

## Faculty of Science

- 615-328 Managing the Impact of IS (p.4)  
 615-347 Application Environments (p.5)  
 615-350 Case Studies in Information Systems (p.5)  
 615-355 Legal & Ethical Frameworks (p.5)  
 615-370 Information Systems Project (p.6)  
 615-372 Project Management (p.6)

In no case may students receive credit for both a core subject and its alternate.

### Balance of points

The remaining 87.5 points may be taken from subjects offered by information systems, economics and commerce, or another faculty.

Year	Sem	Subjects			
1	1	615-150 Organisational Processes (p.2)	325-101 Management (p.1)	316-102 Introductory Microeconomics (p.1) <sup>1</sup>	306-103 Accounting 1A (p.1) <sup>1</sup> (replace with an elective if you achieved 44+ in VCE Accounting)
	2	615-120 Information Systems in Organisations (p.1) (replace with an elective if you achieved 40+ in VCE Information Technology IP)	316-130 Quantitative Methods 1 (p.1) <sup>1</sup>	316-101 Introductory Macroeconomics (p.1) <sup>1</sup> (316-102)	306-104 Accounting 1B (p.1) <sup>1</sup> (306-103)
2	1	615-145 Concepts in Software Development I (p.2) (615-120)	615-251 Organisational Analysis and Change (p.3) (615-150)	732-103 Principles of Business Law (p.1) <sup>1</sup>	316-205 Introductory Econometrics (p.1) or 316-206 Quantitative Methods 2 (p.1) <sup>1</sup> (316-130)
	2	615-237 Telecommunications Concepts (p.2) (615-145)	615-252 Electronic Commerce (p.3) (615-150, corequisite 615-237)	Elective	732-202 Corporate Law (p.1) <sup>1</sup> (732-102 or 732-103)
3	1	615-240 Concepts in Software Development II (p.3) (615-145)	615-230 Database Concepts (p.2) (615-145)	316-202 Intermediate Microeconomics (p.1) (316-102)	306-202 Intermediate Financial Accounting (p.2) <sup>1</sup> (306-104)
	2	615-245 Systems Analysis and Design (p.3) (615-150, 615-230)	Information Systems elective	333-201 Business Finance (p.1) <sup>1</sup> (306-104, 306-102, 316-130, corequisite 316-202)	306-201 Cost Management (p.1) <sup>1</sup> (306-104, 306-106 or 615-150)

Notes:

- Prerequisites for subjects are noted in italics where appropriate.
- This course plan is accurate at July 2001 and takes into account minor changes to the course that will occur from 2002.
- This course plan is subject to timetable availability.
- Students may apply to take 615-373 Industrial Project (p.6) instead of 615-370 Information Systems Project (p.6)

Year	Sem	Subjects			
4	1	615-347 Application Environments (p.5) (615-230, 615-240)	615-355 Legal & Ethical Frameworks (p.5) (62.5 points of 200-level IS subjects)	Elective	306-302 Enterprise Performance Management (p.2) <sup>1</sup> (306-201, 333-201)
	2	615-328 Managing the Impact of IS (p.4) (615-251)	732-303 Taxation Law (p.1) <sup>1</sup> (732-202)	Elective	Elective
5	1	615-372 Project Management (p.6) (62.5 points of 200-level IS subjects)	Elective	Elective	306-301 Financial Accounting (p.2) <sup>1</sup> (306-202, corequisite 306-203)
	2	615-350 Case Studies in Information Systems (p.5) (62.5 points of 200-level IS subjects)	615-370 Information Systems Project (p.6) (615-245, 615-372 and 62.5 point of 200-level IS subjects)	Elective	306-304 Auditing and Assurance Services (p.3) <sup>1</sup> (corequisite 306-301)

Notes:

- Prerequisites for subjects are noted in italics where appropriate.
- This course plan is accurate at July 2001 and takes into account minor changes to the course that will occur from 2002.
- This course plan is subject to timetable availability.
- Students may apply to take 615-373 Industrial Project (p.6) instead of 615-370 Information Systems Project (p.6)

1. These subjects make up the requirements for associate membership of CPA Australia.

## Bachelor of Science/Bachelor of Information Systems (BSc/BIS)

The combined Bachelor of Science/Bachelor of Information Systems course provides a course of study for students who want to combine their training in a scientific discipline with the ability to imagine, design, build, and use information systems applications. As a knowledge-intensive discipline, science increasingly relies on these abilities as well as on specific content knowledge. The graduates of this course will readily find employment across a spectrum of scientific careers, particularly those that involve the collection, analysis, reporting, and dissemination of data, and the technical and organisational skills to convert that data into useful information.

### Course objectives

Upon completion of the course, students will:

- have a broad knowledge of science across a range of disciplines, with a higher level of understanding in one or more of those disciplines;
- understand how to use information technology, including hardware, software, databases and networks, as the technical foundation for other organisational systems;
- have a solid theoretical grounding in both information technology and organisations;
- have gained practical experience working both individually and in groups to turn scientific theory into practice;
- be able to combine their knowledge of information technology and science to recognise opportunities for the use of information systems;
- be able to locate, access, use, and add to the information necessary for the solution of scientific problems;
- be able to place a value on the information created, by themselves as individual scientists and by the organisations of which they are a part, so that this information may be appropriately managed; and
- be able to disseminate knowledge as required to their scientific peers, to the members of their organisations, and to the general public.

## Duration

The Bachelor of Science/Bachelor of Information Systems combined course usually requires five years of full-time study.

## Course requirements

Students must complete a minimum of 500 points. Within the 500 points students must ensure that they satisfy the requirements of both the science component and the information systems component as specified below.

### Science component

A minimum of 237.5 science points is required, which must include:

- between 75 and 125 science points at the 100 level;
- completion of 50 points of a prescribed science major at the 300-level.

There are no specific requirements at the 200-level.

Information systems subjects (subject prefix 615-) cannot count towards the science component of the BSc/BIS.

Students who first enrolled in the BSc/BIS course before 1999 must complete the requirements set out above with the exception that they do not need to complete a prescribed science major, but rather 50 science points at the 300-level of subjects of their choice.

Students should refer to *Course planning information for the BSc, BAsc and BSc combined courses* (p.5) for more information about majors and what constitutes science points.

### Information systems component

A minimum of 212.5 points of core subjects consisting of the subjects listed below.

#### 100-level

325-101 Management (p.1)

One business-oriented subject chosen from the following\*:

- 306-102 Accounting Concepts
- 306-104 Accounting 1B (note that this subject has prerequisites)
- 316-101 Introductory Macroeconomics (note that this subject has prerequisites)
- 316-102 Introductory Microeconomics
- 732-103 Principles of Business Law
- 325-102 Business in the Global Economy
- 325-103 The Asian Economies

\*This list may be modified from time to time

615-120 Information Systems in Organisations (p.1)

615-145 Concepts in Software Development I (p.2)

615-150 Organisational Processes (p.2)

#### 200-level

615-230 Database Concepts (p.2)

615-237 Telecommunications Concepts (p.2)

615-240 Concepts in Software Development II (p.3)

615-245 Systems Analysis and Design (p.3)

615-251 Organisational Analysis and Change (p.3)

615-252 Electronic Commerce (p.3)

#### 300-level

615-328 Managing the Impact of IS (p.4)

615-347 Application Environments (p.5)

615-350 Case Studies in Information Systems (p.5)

615-355 Legal & Ethical Frameworks (p.5)

615-372 Project Management (p.6)

615-370 Information Systems Project (p.6)

### Balance of points

Students select Faculty of Science subjects to complete the remaining 50 points. Subject selection requires the completion of prerequisites and, in the case of quota restricted subjects, the offer of a place in the subject.

Students are required to include 615-160 Tools of Analysis (p.2) or any 100-level mathematics and statistics subject in the 50 points available.

## Bachelor of Geomatic Engineering/ Bachelor of Information Systems

Refer to *Bachelor of Geomatic Engineering/Bachelor of Information Systems (BGeomE/BIS)* (p.7).

### Course requirements

Refer to *Bachelor of Geomatic Engineering/Bachelor of Information Systems (BGeomE/BIS)* (p.7).

### Information systems component

A minimum of 212.5 points of core subjects consisting of the subjects listed below.

#### 100-level

325-101 Management (p.1)

One business-oriented subject chosen from the following\*:

- 306-102 Accounting Concepts
- 306-104 Accounting 1B (note that this subject has prerequisites)
- 316-101 Introductory Macroeconomics (note that this subject has prerequisites)
- 316-102 Introductory Microeconomics
- 732-103 Principles of Business Law
- 325-102 Business in the Global Economy
- 325-103 The Asian Economies

\*This list may be modified from time to time

615-120 Information Systems in Organisations (p.1)

615-145 Concepts in Software Development I (p.2)

615-150 Organisational Processes (p.2)

#### 200-level

615-230 Database Concepts (p.2)

615-237 Telecommunications Concepts (p.2)

615-240 Concepts in Software Development II (p.3)

615-245 Systems Analysis and Design (p.3)

615-251 Organisational Analysis and Change (p.3)

615-252 Electronic Commerce (p.3)

#### 300-level

615-328 Managing the Impact of IS (p.4)

615-347 Application Environments (p.5)

615-350 Case Studies in Information Systems (p.5)

615-355 Legal & Ethical Frameworks (p.5)

615-372 Project Management (p.6)

615-370 Information Systems Project (p.6)

## Diploma in Information Systems

Information systems (IS) is growing in importance in the workplace, and currently there is a shortage of IS-trained practitioners and professionals. The Diploma in Information Systems is designed to provide the core information systems skills to students enrolled in other courses. The diploma is only available to students concurrently enrolled in an undergraduate course at the University of Melbourne.

The diploma is comprised of core technical subjects from the existing Bachelor of Information Systems course, including programming, databases, and telecommunications.

Students who are interested in acquiring a more complete background in information systems, including subjects focused on the economics of IS and managing IS, should consider enrolling in the BIS or a BIS combined course.

### Course objectives

Upon completion of the course, students should:

- know how to utilise, analyse, and create the information content of formal organisational systems;
- have a solid theoretical grounding in the role of information systems in organisations;
- have gained practical experience working both individually and in groups to turn theory into practice;
- have a basic awareness of the major activities involved in a variety of business functions;
- be able to combine their knowledge of systems and of organisations to recognise and exploit opportunities to create value through the effective design and implementation of information systems;
- be able to communicate effectively, and have the skills in written, oral and electronic communication that are necessary for the pursuit of a professional career; and
- have a capacity and motivation for continued learning.

### Duration

The Diploma in Information Systems is a sequence of subjects taken in conjunction with an undergraduate course, typically over four years.

### Course requirements

Students must complete a minimum of 100 points. All subjects undertaken as part of the course are taught by the Department of Information Systems.

**Course structure**

**Students must complete the following core subjects.\***

	Points
615-120 Information Systems in Organisations (p.1)	12.5
615-145 Concepts in Software Development I (p.2)	12.5
615-150 Organisational Processes (p.2)	12.5
615-230 Database Concepts (p.2)	12.5
615-237 Telecommunications Concepts (p.2)	12.5
615-240 Concepts in Software Development II (p.3)	12.5
615-245 Systems Analysis and Design (p.3)	12.5

**Plus one other 200-level or 300-level information systems subject from the list below.**

615-220 Current Issues in Information Systems I (p.7)	12.5
615-251 Organisational Analysis and Change (p.3)	12.5
615-252 Electronic Commerce (p.3)	12.5
615-280 Multimedia and Communications (p.4)	12.5
615-328 Managing the Impact of IS (p.4)	12.5
615-330 Advanced Concepts in Database (p.4)	12.5
615-335 Distributed Systems (p.4)	12.5
615-347 Application Environments (p.5)	12.5
615-348 Human Computer Interaction (p.5)	12.5
615-350 Case Studies in Information Systems (p.5)	12.5
615-355 Legal & Ethical Frameworks (p.5)	12.5
615-367 Information Systems Security (p.5)	12.5

\*Students whose prior knowledge has exempted them from any of the core subjects should choose subjects from the list of available information systems subjects.

**Table 5: Diploma in Information Systems - recommended course map**

Year	Semester	Subject
1	1	37.5 points of undergraduate degree subjects 615-150 Organisational Processes (p.2)
	2	37.5 points of undergraduate degree subjects 615-120 Information Systems in Organisations (p.1)
2	1	37.5 points of undergraduate degree subjects 615-145 Concepts in Software Development I (p.2)
	2	37.5 points of undergraduate degree subjects 615-237 Telecommunications Concepts (p.2)
3	1	37.5 points of undergraduate degree subjects 615-230 Database Concepts (p.2)
	2	37.5 points of undergraduate degree subjects 615-245 Systems Analysis and Design (p.3)
4	1	37.5 points of undergraduate degree subjects 615-240 Concepts in Software Development II (p.3)
	2	37.5 points of undergraduate degree subjects Any 200-level or 300-level IS subject

Note: This course plan is subject to timetable availability.

**Bachelor of Optometry (BOptom)**

Optometry is a professional discipline based on the optical and visual sciences. The practice of optometry involves the diagnosis and treatment of functional disorders of the eye and vision: the optometrist's job is to solve patients' visual problems. The practice of optometry is regulated by the Optometrists Registration Act in each state of Australia. Under these Acts the practice of optometry can be carried out only by those whose names appear on the register of optometrists. Graduates holding the Bachelor of Optometry degree of the University of Melbourne are qualified to be registered for the practice of optometry in each state and territory of Australia and in New Zealand.

**Course objectives**

This course's objectives are for graduates to:

- have a sound foundation in the physical, chemical, mathematical and biological sciences, and in particular have a good knowledge and understanding of human biology;
- understand the passage of light through lenses and optical systems (including the eye) and be able to predict and measure the nature and quality of optical images;
- have a thorough knowledge and understanding of the performance and function of the human visual system;
- understand the dysfunctions and diseases of the eye and visual system and know their genesis, natural course, treatment and prognosis;
- have acquired skill in the techniques necessary for the examination of the eye and the assessment of visual function;
- have developed skills in problem identification, in deciding on effective strategies to gather information for the resolution of these problems, in weighing evidence prudently and in making decisions and are able to apply these skills to scientific problems in the visual and clinical sciences as well as to particular problems presented by patients;
- have developed the interpersonal and communication skills necessary in relationships with patients and professional colleagues and for the communication of the results of scientific enquiries;
- are professionally competent in the practice of optometry and are able to gain registration by the appropriate professional body;
- have the knowledge, skill and attitude to enable adaptation to scientific, technological and social change, have a sense of intellectual curiosity and a desire for lifelong learning and a capacity to be creative and innovative;
- have a strongly developed sense of professional and ethical responsibility for patients, colleagues and the community generally and are aware of the moral and legal responsibilities of professional practice.

**Duration**

From 2002 intake the Bachelor of Optometry course takes five years of full-time study incorporating a pre-optometry year followed by four years study of optometry.

For current students who commenced the course prior to 2002 the Bachelor of Optometry course is a four-year full-time program.

**Course requirements (2002 intake)**

From 2002 the Bachelor of Optometry becomes a five-year course in which the first year covers the fundamental sciences and the remaining four years comprises the Bachelor of Optometry.

Pre-optometry year	Points
600-141 Biology of Cells and Organisms (p.1)	12.5
600-142 Genetics & The Evolution of Life (p.1)	12.5
610-141 Chemistry (p.2)	12.5
610-142 Chemistry (p.2)	12.5
655-111 Vision: How The Eye Sees The World (p.1)	12.5
620-160 Experimental Design & Data Analysis (p.5)	12.5
<i>Plus one of</i>	
640-141 Physics A (p.2)	12.5
640-161 Physics: Principles & Applications A (p.3)	12.5
640-151 Physics for Biomedical Science A (p.2)	12.5
640-121 Physics A (Adv) (p.2)	12.5
<i>Plus one of</i>	
640-142 Physics B (p.2)	12.5
640-162 Physics: Principles & Applications B (p.3)	12.5
640-152 Physics for Biomedical Science B (p.2)	12.5
640-122 Physics B (Adv) (p.2)	12.5

**Total 100**

Note: An alternative chemistry sequence for students who did not complete Year 12 Chemistry is available commencing with 610-171 Fundamentals of Chemistry (p.3).

<b>BOptom year 1</b>		Points
655-201	Anatomy & Histology of the Eye ( <i>p.3</i> )	12.5
536-206	Physiology (Optometry) ( <i>p.2</i> )	12.5
521-204	Biochemistry and the Eye ( <i>p.2</i> )	12.5
655-221	Human Visual Functions ( <i>p.2</i> )	12.5
531-202	Basic Principles of Pathology-Optometry ( <i>p.1</i> )	12.5
655-202	Optical Systems	12.5
655-222	Visual Processing and Control ( <i>p.2</i> )	12.5
516-208	Structure & Function of the Brain ( <i>p.2</i> )	12.5

**Total** **100**

<b>BOptom year 2</b>		Points
655-321	Visual Physiology and Perception ( <i>p.2</i> )	12.5
534-307	Pharmacology (Optometry)	12.5
655-310	Optical Design and Ophthalmic Metrology	12.5
655-330	Functional Disorders of Vision ( <i>p.3</i> )	25
655-342	Ocular Histopathology	12.5
655-352	Ophthalmic Prosthetics I	
526-306	Microbiology and Immunology (Optometry)	12.5

**Total** **100**

<b>BOptom year 3</b>		Points
655-461	Fundamentals of Ocular Disease Management	12.5
655-451	Ophthalmic Prosthetics II	12.5
655-430	Clinical Optometry Practice	25
655-440	Diseases of the Eye	25
655-462	Clinical Ocular Therapeutics	12.5
655-422	Occupational Optometry and Visual Standards	12.5

**Total** **100**

<b>BOptom year 4</b>		Points
655-510	General Optometry Practice	25
655-521	Contact Lens, Paediatric and Low Vision Practice	25
655-540	Ocular Disease Management	25
655-530	Project Studies in Vision Sciences	25

**Total** **100**

The BOptom year 4 comprises 32 weeks.

### Course requirements (pre-2002 intake)

As shown below, the optometry course is essentially fixed, although there is some choice of subjects in the first year.

Students will be automatically enrolled in the subjects forming each of the later years of the course providing they have passed all subjects in the previous year.

<b>First year (100-level)</b>		Points
600-141	Biology of Cells and Organisms ( <i>p.1</i> )	12.5
600-142	Genetics & The Evolution of Life ( <i>p.1</i> )	12.5
610-006	Chemistry (Optometry) ( <i>p.3</i> )	12.5
655-121	Fundamentals of Optometric Science	
655-101	Optical Systems ( <i>p.1</i> )	12.5
Plus one of		
640-151	Physics for Biomedical Science A ( <i>p.2</i> )	12.5
640-121	Physics A (Adv) ( <i>p.2</i> )	12.5
Plus one of		
640-152	Physics for Biomedical Science B ( <i>p.2</i> )	12.5
640-122	Physics B (Adv) ( <i>p.2</i> )	12.5
Plus one of		
620-121	Mathematics A (Advanced) ( <i>p.4</i> )	12.5
620-141	Mathematics A ( <i>p.4</i> )	12.5

Note that:

- The first year mathematics subject selected by optometry students depends primarily on their performance in relevant subjects completed at Year 12 level.

Students should refer to the mathematics subject entries (and in particular, the prerequisite statement) to determine which mathematics subject to choose. Faculty advisers will also help with this decision at the time of enrolment.

- Chemistry subjects 610-161 and 610-162 cannot be completed as part of the BOptom course.
- Students who have very good results in Year 12 Mathematics may be permitted to substitute any other university subject of equivalent workload for mathematics. Students wishing to do this must obtain written approval from the Head of the Department of Optometry and Vision Sciences.

<b>Second year (200-level)</b>		Points
516-208	Structure & Function of the Brain ( <i>p.2</i> )	12.5
521-204	Biochemistry and the Eye ( <i>p.2</i> )	12.5

<b>Second year (200-level)</b>		Points
531-202	Basic Principles of Pathology-Optometry ( <i>p.1</i> )	12.5
536-206	Physiology (Optometry) ( <i>p.2</i> )	12.5
655-201	Anatomy & Histology of the Eye ( <i>p.3</i> )	12.5
655-210	Optical Design and Ophthalmic Metrology ( <i>p.1</i> )	12.5
655-221	Human Visual Functions ( <i>p.2</i> )	12.5
655-222	Visual Processing and Control ( <i>p.2</i> )	12.5

<b>Third year (300-level)</b>		Points
526-306	Microbiology (Optometry) ( <i>p.2</i> )	6.25
534-307	Ocular Pharmacology ( <i>p.2</i> )	6.25
655-321	Visual Physiology and Perception ( <i>p.2</i> )	12.5
655-330	Functional Disorders of Vision ( <i>p.3</i> )	25
655-340	Diseases of The Eye ( <i>p.3</i> )	25
655-351	Ophthalmic Prosthetics I ( <i>p.2</i> )	12.5
655-352	Ophthalmic Prosthetics II ( <i>p.3</i> )	12.5

<b>Fourth year (400-level)</b>		Points
655-410	Optometry ( <i>p.3</i> )	87.5
655-420	Community Optometry & Prof. Standards ( <i>p.4</i> )	12.5

The clinical year (fourth year) has 32 weeks. Students will be advised of the precise dates by the Department of Optometry and Vision Sciences.

### Extended Bachelor of Science Program

The Extended BSc Program has been specifically designed for international students who have completed secondary schooling outside Australia and at a level below that of the Victorian Certificate of Education (VCE). It provides a direct entry into the BSc course for students with high academic potential who do not meet the usual selection criteria for the Bachelor of Science degree.

The program extends the length of the Bachelor of Science course by one semester (equivalent to 50 points). Students must complete a total of 350 points to be awarded the Bachelor of Science.

The initial 18 months of the program consists of an integrated course of bridging material plus the first year of the Bachelor of Science. Students who have successfully completed the prescribed subjects of the bridging component will be able to transfer to the second year of the standard Bachelor of Science course at the end of the first 18 months.

Student advisers will tailor bridging programs for individual students. For the descriptions of bridging subjects in the Extended Bachelor of Science Program (see page 1 and page 12).

Students should discuss their course plan with a student adviser before the start of each semester. This will assist with later year planning and issues related to prerequisites. The student adviser will help ensure that the student's subject selection is appropriate for their preferred later year studies.

### Course structure

Course requirements are the same as for the Bachelor of Science (page 4) with the following exceptions:

- a minimum of 350 points are required, including 50 points of bridging subjects and electives;
- the extended 50 points of bridging subjects and electives will not be counted in the 125 point maximum of 100-level subjects, the 75 point minimum of science points at 100-level or the 25 point maximum of non-science points at first year level;
- the extended 50 points of bridging subjects and electives are not counted towards the minimum 237.5 science points required for the BSc.

The course structure normally depends on each student's English language proficiency (determined by IELTS score or equivalent). The following options refer to the 50 points of bridging subjects undertaken in the first 18 months in addition to 100 points of 100-level subjects.

<b>IELTS score of 5.5</b>		Points
<b>Students with an IELTS score of 5.5 are normally required to undertake the following four bridging subjects:</b>		
600-100	English for Academic Purposes A ( <i>p.1</i> )	12.5
620-081	Preliminary Mathematics A ( <i>p.12</i> )	12.5
600-101	English for Academic Purposes B ( <i>p.1</i> )	12.5
600-103	Intensive Academic Preparation (Special) ( <i>p.1</i> )	12.5

<b>IELTS score of 6.0</b>		Points
<b>Students with an IELTS score of 6.0 are normally required to undertake the following four subjects:</b>		
145-004	Advanced ESL 1 ( <i>p.2</i> )	12.5
620-081	Preliminary Mathematics A ( <i>p.12</i> )	12.5
600-102	Intensive Academic Preparation (Science) ( <i>p.1</i> )	12.5
plus one approved elective subject		12.5

## Faculty of Science

<b>IELTS score of 6.5</b>	Points
<b>Students with an IELTS score of 6.5 are normally required to undertake the following four subjects:</b>	
600-102 Intensive Academic Preparation (Science) ( <i>p.1</i> )	12.5
620-081 Preliminary Mathematics A ( <i>p.12</i> )	12.5
plus two approved electives	25.0
<b>Approved electives</b>	Points
<b>Approved electives that may be undertaken in a student's first semester:</b>	
600-111 Biology of Australian Flora & Fauna ( <i>p.1</i> )	12.5
610-141 Chemistry ( <i>p.2</i> )	12.5
(Note: Prerequisite is completion of studies equivalent to VCE Chemistry)	
625-102 Understanding Planet Earth ( <i>p.1</i> )	12.5
625-103 The Atmosphere and Oceans ( <i>p.2</i> )	12.5
640-177 Stars and Galaxies ( <i>p.3</i> )	12.5
<b>Approved electives that may be undertaken in a student's second semester:</b>	
610-142 Chemistry ( <i>p.2</i> )	12.5
(Note: Prerequisite is 610-141)	
620-160 Experimental Design & Data Analysis ( <i>p.5</i> )	12.5
(Note: Prerequisite is 620-081)	
620-082 Preliminary Mathematics B ( <i>p.12</i> )	12.5
(Note: Prerequisite is 620-081)	

