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“Congratulations on your entrance into the University of Melbourne community. I am delighted to welcome you as you take your first major step on an exciting journey of discovery in the science, technology and engineering arena.”

Message from the Dean

Dear Student,

The Faculty of Science, through the Eastern Precinct Student Centre (EPSC), supports students commencing first year in 2011 in the Bachelor of Science (BSc) as well as students pursuing higher years in a range of other courses.

The BSc course is challenging and rewarding and provides pathways to a variety of career opportunities.

For example, it offers a comprehensive program spanning the science, technology and engineering systems areas of study. You can tailor your program of study to your individual interests and career goals. You may choose to concentrate on a particular area or take a multidisciplinary route. You will be able to explore several areas of study during first year and gradually refine your choices as you proceed from year to year through the degree.

While the degree prepares graduates to advance directly to employment, other pathways have been designed for students wishing to continue to professionally accredited graduate programs, for example in engineering or the health science professions, or to science masters programs with an industry orientation. Honours and Master of Science research training programs are also available as a pathway to research higher degrees such as the PhD.

EPSC Student Advisers are available to assist you to plan your individual route through the degree – please make excellent use of the expert advice they offer.

The faculties involved in teaching into the BSc have a proud tradition of teaching, research and community service. I am sure you will enjoy working with us to be a part of and extend that tradition. You are the future of science, technology and engineering in Australia and, potentially, internationally. I wish you every success in your studies.

Enjoy your time at the University of Melbourne. Respond to the academic challenges and seize the opportunities the University provides.

Professor Robert Saint
Dean, Faculty of Science,
The University of Melbourne
As you begin your science, technology and engineering study at the university you enter a community that will support you throughout your course. Teaching and support staff, and your student colleagues, will all play their part in shaping your experience of the course and the extra-curricular components of the Melbourne Experience. You can find out about the support and enrichment services later in this booklet. We begin here with those that specifically support you in your course and subjects.

**Teaching departments**

Teaching departments look after designing and providing the learning activities in your subjects, and their assessment. In some cases there will be several departments collaborating on a subject, with one of them taking responsibility for the overall running of the subject. If you are seeking assistance with subject material or need guidance about assessment tasks or extensions for assignments, you should contact the relevant teaching department. The Learning Management System subject site (see below) will inform you about how to make a subject enquiry. In most cases the subject coordinator, or the First Year Learning Centre (if applicable) will be your initial contact point, or you may be encouraged to contact your lecturer or tutor directly.

**LMS – subjects online**

The Learning Management System (LMS) provides a secure and reliable web-based teaching and learning environment that allows you to access subject materials. Many of your first year subjects will have subject schedules and outlines, lecture notes and recordings, and tutorial questions posted on the LMS. To login to the LMS use your University email account name and password.

www.lms.unimelb.edu.au

**Eastern Precinct Student Centre (EPSC)**

Eastern Precinct Student Centre
Grid reference J19 on the Parkville Campus map
13MELB (13 6352)
http://www.studentcentre.unimelb.edu.au/eastern

The Eastern Precinct Student Centre offers advice on your course and information about University services and facilities. If they are unable to assist you directly, EPSC staff can direct you to the appropriate person or place. You can talk to the Enquiries Officers or make an appointment to see a Student Adviser. These are just some of the queries they can assist you with:

- Enrolment queries;
- Course or degree advice;
- Advice on career and further study pathways;
- If something goes wrong – on occasion, you might be distracted from your studies by factors such as illness or personal issues. If a problem is serious or persists over a long period, and is substantially affecting your academic performance, you should talk to a Student Adviser.
- Student Advisers can provide ongoing advice and assistance to students facing difficulties, in order to assist them to study successfully. You can make an appointment by contacting the Eastern Precinct Student Centre. Advisers may refer students to other University services such as the Counselling Service, the Disability Liaison Unit, the Chaplaincy and the Academic Skills Unit for their specialised expertise.
- Special consideration – If factors such as illness and personal issues significantly impact on your study, you should consider applying for special consideration. Conditions apply.

**Seeking assistance in departments**

If you miss an assessable item in a science subject, are seeking assistance with subject material or need assistance with assessment tasks or extensions for assignments, you should contact the relevant teaching department. You can contact the subject coordinator, the First Year Learning Centre (if applicable), department office or contact your lecturer or tutor directly for advice.
YOU AND YOUR COURSE

This section provides a brief overview of important aspects of course planning, and ways you can tailor your course to best fit you. More detailed information regarding the Bachelor of Science is available in the 2011 Handbook online at: http://handbook.unimelb.edu.au

Glossary of important terms

Understanding the following terms is crucial to successfully planning your course.

Credit (Advanced Standing)
Students who have completed previous study at tertiary level (including enhancement or extension studies at an Australian university during Year 12) may be eligible to receive credit points towards a Science degree. For further information please refer to page 7 of this Guide.

Breadth
Melbourne’s New Generation degrees are designed to give all students depth and breadth of learning. Depth is reflected in the expertise you gain by studying a core program in a major discipline. Breadth is a result of choosing additional, contrasting subjects from outside the core disciplines available in the Bachelor of Science, to develop other kinds of knowledge and expertise. See page 29 for more information about choosing your breadth subjects.

Complementary subject
A subject that is not required for the completion of a particular major, but has been recommended as complementary to subjects which do lead to the major.

Component
One part of a degree. For example, the science component or the breadth component of the BSc.

Concurrent
Studying two different programs at the same time. For example, if you take the Diploma in Languages (DL) while you are studying for your BSc, you are said to be studying the DL concurrently.

Key subjects
Subjects that are important to an area of study and that will develop fundamental knowledge on the pathway towards a major in third year.

Major
BSc students are required to complete a major, which involves a program of study across first, second and third year level subjects. This provides a coherent study experience and a depth of knowledge in a single discipline or an interdisciplinary area.

Melbourne Model
The Melbourne Model consists of six New Generation undergraduate degrees leading to one of three outcomes: direct entry into the workforce; a graduate professional degree; or pathway to a Research Higher Degree. This is underpinned by the Melbourne Experience, which aims to provide opportunities to enrich your studies including: research projects; internship opportunities, work experience and volunteering; studying overseas; and new and inviting buildings and spaces.

Points
You need to accumulate a certain number and type of points to qualify for your degree. Points are awarded for the successful completion of subjects. The points value of each subject is specified in its entry in the 2011 Handbook. You need to complete 300 course points to be awarded a BSc. Most subjects offered to science students are worth 12.5 points each.

Prerequisite
If a subject has prerequisites this means that students are required to have completed previous study before they can enrol in the subject. Refer to the ‘Prerequisites’ section on page 5 for further details.
Quantitative reasoning subjects
Subjects that teach mathematical concepts such as probability, data analysis, logic and critical thinking to solve practical problems. These subjects promote skills in reading and using quantitative data, understanding quantitative evidence and applying basic quantitative skills to the solution of real-life problems. Mathematics and Statistics, Physics, Chemistry and Psychology are examples of quantitative reasoning subjects.

Subject year levels
Subjects form a sequence across the years of your degree. Subjects at Level 2 and Level 3 generally require prerequisites from the previous year level. A subject’s year level is explicitly stated in the handbook entry.

Prerequisites
Entry into many subjects requires prior completion of prerequisite subjects. You must ensure that you have completed the necessary prerequisites before enrolling in subjects. Any enrolment you have in subjects where you lack the prerequisites (or do not obtain an appropriate waiver) may be cancelled. Should you fail to complete a subject where you lack the appropriate prerequisites, even with a waiver, the lack of the prerequisite is not grounds for special consideration or other concessions. If you do not meet the prerequisite for a subject, but would like to enrol in it, you will need to obtain a written waiver of the prerequisites signed by the relevant Subject Coordinator or the Head of Department and present this to the Eastern Precinct Student Centre.

Concurrent Diplomas
Students in any New Generation undergraduate degree have the opportunity to enrol in one of four concurrent diplomas in Informatics, Mathematical Sciences, Music (Practical) and Languages.

A concurrent diploma offers students the flexibility to take an additional major sequence alongside their core program. The additional studies for the diploma could take anywhere from 50 points (normally one semester) to 100 points (normally two semesters). Local students in Commonwealth Supported Places (CSPs) in their degree enroll in a concurrent diploma in mathematical sciences or languages may be able to complete the final 50 points of study HECS-free.

Students enrolling in the BSc in 2011 should discuss their application for enrolment for a concurrent diploma with a Student Adviser to ensure that they begin the diploma enrolment at the appropriate time in their degree. This is because some diplomas may require the completion of appropriate first year subjects in 2011 before applying to enrol in 2012, while other diplomas should be commenced at the start of 2011.

Concurrent Diplomas are available in:

Languages
Mathematical Sciences
(N.B. Not available to BSc students planning to pursue a Mathematics or Mathematical Physics major).
Music (Practical)
Informatics
(N.B. Not available to BSc students planning to pursue a Computer Science, Science Informatics or Software Systems major).
Diagnostic English Language Assessment (DELA)

An excellent command of academic English is integral to your performance at university.

Through the Diagnostic English Language Assessment (DELA), we identify areas you still need to develop in your academic English and provide programs to help you do this.

Commencing undergraduate students who have gained a result of less than 30 VCE English, 35 VCE ESL, 7 IELTS, or equivalent will be required to take the DELA. Your DELA results and recommendations for academic English programs will be emailed to you 3 working days after the assessment.

Your test result may indicate that you need further development in a particular area to meet your potential, or it may confirm that your academic English skills are sufficient for tertiary study.

If you are recommended to take up an academic English program, you are encouraged to contact the Eastern Precinct Student Centre to discuss your results and obtain further information about the support options available to you.

To read further information about DELA, please go to: http://www.services.unimelb.edu.au/asu/services/DELA/index.html

Academic accommodations for students with special needs

Students with an ongoing physical disability, mental health or medical condition are advised to register with the Disability Liaison Unit (DLU) for ongoing academic support and possible alternative exam arrangements. Appropriate documentation will be required from health professionals to assist staff in tailoring the best support for students’ circumstances. To receive a more detailed explanation of the services provided by the DLU visit their web site: www.services.unimelb.edu.au/disability

Alternatively, you may like to seek advice from the Eastern Precinct Student Centre’s Student Equity Officers with regards to receiving support under the Students Experiencing Academic Disadvantage policy. You can view the policy on the University’s website: http://policy.unimelb.edu.au/UOM0400
**First Year Learning Centres**

Many departments have special areas set aside as First Year Learning Centres, which provide academic resources for first year students. You will be able to access support materials, ask questions of staff on duty, and meet and collaborate with other students taking the same subject.

Find out where the Centres within these departments are located and take time out to visit them regularly. Do not wait until the end of the semester to locate them. Seek them early and see how they can assist your learning experience.

Physics: http://physics.unimelb.edu.au/Current-Students/First-Year-Students/FY-Learning-Centre

**Transition programs – succeed at uni!**

The Transition program aims to help first year students adjust to university life and study. It will assist you with your studies and with meeting other students. Many past participants enjoyed positive experiences:

- Attending the program enabled them to adapt to the university environment and thrive in their first semester;
- The seminars gave them greater confidence to seek out help from the Eastern Precinct Student Centre and Departments;
- The whole program helped them develop better study and lecture skills;

For further information regarding the Transition program, please refer to:
http://www.studentcentre.unimelb.edu.au/eastern/commencing_students/getting_started

**Students with credit**

Students who have completed previous study at tertiary level may be eligible to receive credit points towards a Science degree. Credit is assessed in accordance with the University of Melbourne Credit Policy.

See [www.services.unimelb.edu.au/policy/](http://www.services.unimelb.edu.au/policy/)

Newly enrolling students who have completed previous study at another university are asked to submit applications for credit during enrolment (semester 1 entry) or as part of their application for admission (semester 2 entry). Students who have previously completed study at the University of Melbourne are not required to complete applications for credit though they will need to nominate an intended major. Credit applications are assessed during the enrolment period.

For further information regarding credit in the Bachelor of Science please refer to:
http://www.studentcentre.unimelb.edu.au/eastern/course_information/advanced_standing

Or contact the Credit Coordinator, Melanie Dunkley
T: +61 3 8344 8228
E: mdunkley@unimelb.edu.au
WELCOME TO THE BACHELOR OF SCIENCE

You will choose from a range of 36 areas for detailed, in-depth study within your BSc major, building on your experiences in first and second year. During your course you will develop a broad understanding of the role of science and technology and develop skills to integrate your science understanding within a wider context. Your degree will equip you to make valuable contributions when an issue requires a science or technology-informed perspective.

The degree provides a diverse range of pathways to a wide array of career and further study opportunities. Further study opportunities include professional graduate programs in Medicine, Dental Surgery, Optometry and other health sciences, Engineering, Land and Environment, Law, Teaching, Veterinary Medicine, professionally-oriented science masters courses, as well as research-training Master of Science and Honours pathways to Research Higher Degrees.

All study streams have been designed to develop your logical, analytical and innovative thinking. While problem solving and numerical skills are the foundation of science, they are also highly sought after by employers. As a BSc graduate you will be well equipped to embark on a wide range of careers.

We welcome you and wish you well on your journey of discovery.

Course structure

The structure of the course provides flexibility and choice, which in many cases allows specialisation options to be kept open until the end of the second year at which time you will choose your major.

The major provides a coherent study experience and a depth of knowledge in a single science, technology or engineering systems discipline, or an interdisciplinary area.

In the third year of the degree there will be a capstone experience for each major, which integrates study within the major, focusing on how the knowledge and skills developed can be applied to research or a broader context.

Course completion requirements:

Successful completion of 300 points comprising:

- 225 points of science subjects including:
  - At least 62.5 points at Level 1
  - At least 62.5 points at Level 2
  - At least 75 points at Level 3 (including 50 points of a prescribed science major at Level 3)
- 50 points of breadth subjects including at least 12.5 points at Level 2 or Level 3
- 25 points (either science subjects or breadth subjects) at Level 1, 2 or 3

Additional requirements:

- No more than 125 points at Level 1 may be included in the BSc
- No more than 37.5 points of breadth at Level 1 may be included in the BSc
- Progression: Students must normally complete 50 points of study at one subject year level before proceeding to the next subject year level.
- Diversity of Level 1 science study: Students must complete Level 1 subjects from at least two different areas of study. A maximum of 37.5 points at Level 1 from any single area of study may be completed. The areas of study available are: Biology; Chemistry; Earth Sciences; Engineering Systems; Geography and Environments; Informatics; Mathematics and Statistics; Physics; Psychology; Vision Sciences

## EXAMPLE NEW GENERATION COURSE STRUCTURE

<table>
<thead>
<tr>
<th>Year</th>
<th>Major</th>
<th>Subjects Leading to a Major in Third Year</th>
<th>Complementary Subjects</th>
<th>Additional Science Subjects</th>
<th>Breadth Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Year 2</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Year 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### KEY/LEGEND

- **Major**
  - A major in the BSc is 50 points (four subjects) you will study in third year in a specific area of science, technology or engineering systems.

- **Subjects leading to a major in third year**

- **Complementary Subjects**
  - other Science areas of study to complement your major.

- **Additional Science subjects**

- **Breadth studies**
  - at least 50 points of breadth studies are required and up to 75 points are permitted. Breadth studies comprise of subjects outside the core disciplines of your degree. Up to 25 points of this shaded component may be science electives.
A major in the BSc consists of four 12.5 credit point subjects studied at Level 3 in a science-related field of study. You can delay your choice of major until your second year, however you will need to choose subjects at Level 2 that are required as prerequisites for Level 3 subjects. The following majors are available in the BSc. Specialisations are available within some of these majors.

<table>
<thead>
<tr>
<th>Science Major</th>
<th>First Year Package (s) leading to this major</th>
<th>Additional Information on required and recommended subject pairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Science</td>
<td>Life Sciences</td>
<td>Chemistry is also recommended.</td>
</tr>
<tr>
<td>Animal Health and Disease</td>
<td>Chemical Sciences or Life Sciences</td>
<td>Biology and Chemistry are required. Physics is also required. [1].</td>
</tr>
<tr>
<td>Animal Science and Management</td>
<td>Life Sciences</td>
<td>Chemistry is also recommended.</td>
</tr>
<tr>
<td>Atmosphere and Ocean Sciences</td>
<td>Earth Sciences or Physical Sciences</td>
<td>Earth Sciences and Mathematics are required. Physics is also recommended.</td>
</tr>
<tr>
<td>Biochemistry and Molecular Biology</td>
<td>Chemical Sciences or Life Sciences</td>
<td>Chemistry is required; Biology is also recommended.</td>
</tr>
<tr>
<td>Bioengineering Systems</td>
<td>Engineering Systems</td>
<td>Biology and Chemistry are required.</td>
</tr>
<tr>
<td>Biotechnology</td>
<td>Life Sciences</td>
<td>Chemistry is also recommended.</td>
</tr>
<tr>
<td>Cell and Developmental Biology</td>
<td>Life Sciences</td>
<td>Chemistry is also recommended.</td>
</tr>
<tr>
<td>Chemical Systems</td>
<td>Engineering Systems</td>
<td>Chemistry is also required.</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Chemical Sciences</td>
<td>Physics and/or Mathematics are also recommended.</td>
</tr>
<tr>
<td>Civil Systems</td>
<td>Engineering Systems</td>
<td></td>
</tr>
<tr>
<td>Computer Science</td>
<td>Information Technology</td>
<td>Mathematics is required.</td>
</tr>
<tr>
<td>Ecology and Evolutionary Biology</td>
<td>Environmental Sciences or Life Sciences</td>
<td>Biology is required; Chemistry is also recommended.</td>
</tr>
<tr>
<td>Electrical Systems</td>
<td>Engineering Systems</td>
<td>Physics is required [1], [2] and [3].</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>Environmental Sciences or Mathematical and Statistics</td>
<td>Mathematics is required and Chemistry is recommended.</td>
</tr>
<tr>
<td>Food Science</td>
<td>Chemical Sciences or Life Sciences</td>
<td>Biology and Chemistry are required.</td>
</tr>
<tr>
<td>Genetics</td>
<td>Life Sciences</td>
<td>Chemistry is also recommended.</td>
</tr>
<tr>
<td>Geography</td>
<td>Environmental Sciences</td>
<td>Geography and Environments are required.</td>
</tr>
<tr>
<td>Geology</td>
<td>Earth Sciences</td>
<td>Earth Sciences is required.</td>
</tr>
<tr>
<td>Geomatics</td>
<td>Engineering Systems or Information Technology</td>
<td>Informatics is also recommended.</td>
</tr>
<tr>
<td>Science Major</td>
<td>First Year Package (s) leading to this major</td>
<td>Additional Information on required and recommended subject pairs</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>---------------------------------------------</td>
<td>-------------------------------------------------------------------</td>
</tr>
<tr>
<td>Human Structure and Function</td>
<td>Life Sciences</td>
<td></td>
</tr>
<tr>
<td>Marine Biology</td>
<td>Life Sciences</td>
<td>Chemistry is also recommended.</td>
</tr>
<tr>
<td>Mathematical Physics</td>
<td>Mathematical and Statistical Sciences or Physical Sciences</td>
<td>Mathematics and Physics are required.</td>
</tr>
<tr>
<td>Mathematics and Statistics</td>
<td>Mathematical and Statistical Sciences or Physical Sciences</td>
<td>Mathematics is required.</td>
</tr>
<tr>
<td>Mechanical Systems</td>
<td>Engineering Systems</td>
<td>Physics is also required [1] and [3].</td>
</tr>
<tr>
<td>Microbiology, Infection and Immunology</td>
<td>Life Sciences</td>
<td>Chemistry is also recommended.</td>
</tr>
<tr>
<td>Neuroscience</td>
<td>Life Sciences</td>
<td></td>
</tr>
<tr>
<td>Pathology</td>
<td>Chemical Sciences or Life Sciences</td>
<td>Chemistry and Biology are required.</td>
</tr>
<tr>
<td>Pharmacology</td>
<td>Chemical Sciences or Life Sciences</td>
<td>Chemistry and Biology are required.</td>
</tr>
<tr>
<td>Physics</td>
<td>Physical Sciences</td>
<td></td>
</tr>
<tr>
<td>Physiology</td>
<td>Life Sciences</td>
<td>Chemistry is also recommended.</td>
</tr>
<tr>
<td>Plant Science</td>
<td>Life Sciences</td>
<td>Chemistry is also recommended.</td>
</tr>
<tr>
<td>Psychology</td>
<td>Behavioural Sciences</td>
<td></td>
</tr>
<tr>
<td>Science Informatics</td>
<td>Information Technology</td>
<td></td>
</tr>
<tr>
<td>Software Systems</td>
<td>Engineering Systems</td>
<td>Informatics is also required.</td>
</tr>
<tr>
<td>Zoology</td>
<td>Life Sciences</td>
<td>Chemistry is also recommended.</td>
</tr>
</tbody>
</table>

[1] Physics (any) is a prerequisite for second year subjects in this major for students who have not completed Physics at Year 12 level.

[2] Physics 2: Physical Science and Technology is a prerequisite for third year level subjects in this major.

[3] Physics 1 (any) and Physics 2 (Advanced or Physical Science and Technology) are required for entry to the relevant stream of the Master of Engineering.
**First Year Packages**

Several first year packages have been designed to assist you and provide you with flexibility to reach a decision about your final major of interest at a later stage in your degree. The first year packages have been designed to cater for different backgrounds and interests. Many majors require no more than 25 points of prerequisite study at first year level. Up to 75 points may be required for essential complementary study in a second discipline, or where multidisciplinary majors build on more than one discipline at first year level. These larger packages provide pathways to several major studies.

<table>
<thead>
<tr>
<th>Behavioural Sciences</th>
<th>Majors: Psychology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key subjects</td>
<td>Mind, Brain and Behaviour 1 and 2.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical Sciences</th>
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</thead>
<tbody>
<tr>
<td>Majors: Biochemistry and Molecular Biology; Chemistry; Geology, Food Science; Pathology; Pharmacology; Physics (including Chemical Physics specialisation).</td>
</tr>
<tr>
<td>Key subjects</td>
</tr>
<tr>
<td>Complementary subjects</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Earth Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Majors: Atmosphere and Ocean Sciences; Geology</td>
</tr>
<tr>
<td>Key subjects</td>
</tr>
<tr>
<td>Complementary subjects</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Majors: Ecology and Evolutionary Biology; Environmental Science; Geography</td>
</tr>
<tr>
<td>Key subjects</td>
</tr>
<tr>
<td>Complementary subjects</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engineering Systems</th>
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</thead>
<tbody>
<tr>
<td>Majors: Bioengineering Systems; Chemical Systems; Civil Systems; Electrical Systems; Geomatics; Mechanical Systems; Software Systems.</td>
</tr>
<tr>
<td>Key subjects</td>
</tr>
<tr>
<td>Complementary subjects</td>
</tr>
</tbody>
</table>

[5] Qualified students may replace Calculus 2 and Linear Algebra with Accelerated Mathematics 1 and 2.
### Information Technology

**Majors:** Computer Science, Geomatics; Science Informatics; Software Systems

**Key subjects**
Informatics 1 and 2.

**Complementary subjects**
Calculus 2 and Linear Algebra are required for Computer Science; Engineering Systems Design 1 and 2, Calculus 2 and Linear Algebra are required for Software Systems [5].

### Life Sciences

**Majors:** Agricultural Science; Animal Health & Disease; Animal Science and Management; Biochemistry and Molecular Biology, Biotechnology; Cell and Developmental Biology; Ecology and Evolutionary Biology; Food Science; Genetics; Human Structure and Function; Marine Biology; Microbiology, Infection and Immunology; Neuroscience; Pathology; Pharmacology; Physiology; Plant Science; Zoology.

**Key subjects**
Biology of Cells and Organisms and Genetics and the Evolution of Life.

**Complementary subjects**
Chemistry 1 and 2 are required for some majors. Note that subjects that develop quantitative reasoning should also be included, e.g. Mathematics, Data Analysis, Psychology, Physics.

### Mathematics and Statistics

**Majors:** Atmosphere and Ocean Sciences; Computer Science; Mathematical Physics; Mathematics and Statistics

**Key subjects**
Calculus 2 and Linear Algebra [5].

**Complementary subjects**
Earth, Atmosphere and Oceans is required for Atmosphere and Ocean Sciences; Informatics 1 and 2 are required for Computer Science; Physics 1 and 2 (any) are required for Mathematical Physics. Note that science subjects with a laboratory component should be included.

### Physical Sciences

**Majors:** Atmosphere and Ocean Sciences; Mathematics Physics; Mathematics and Statistics; Physics (including Chemical Physics specialisation)

**Key subjects**
Physics 1 and 2 (any) and Calculus 2 & Linear Algebra [5].

**Complementary subjects**
Chemistry 1 and 2 are required for Chemical Physics specialisation of the Physics major; Earth Atmosphere and Oceans is required for the Atmosphere and Ocean Sciences major.
WELCOME TO FIRST YEAR SCIENCE SUBJECTS

This section provides information about the subject areas and some of the specific science subjects available to students at the first year level. Use this section to assist with choosing your subjects, or if you are still unsure, use the web sites listed to find more information.

The first year of the Bachelor of Science aims to provide diverse opportunities within a framework that assists you to choose packages of complementary subjects. Students should choose subjects that complement one another and also provide the basis for multiple pathways through the degree. Subject pairs have been designed to provide a foundation to at least one major and/or enhance the foundation of other majors.

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Biology

www.biology.unimelb.edu.au
biology-info@unimelb.edu.au
Room 509, Level 5,
Redmond Barry building (115)
+61 3 8344 4881

First year Biology subjects introduce students to modern concepts in the biological sciences. The subjects look at the principles underlying the diversity of life as well as emphasising the principles unifying living things. Together, the subjects BIOL10004 and BIOL10005 prepare students for further study in the biological and biomedical sciences. BIOL10001 complements the other biology subjects while not being a prerequisite for majors in the biological sciences.

- BIOL10001: Biology of Australian Flora and Fauna
- BIOL10004: Biology of Cells and Organisms
- BIOL10005: Genetics and the Evolution of Life

Note: There are no prerequisites for first year level Biology.

Chemistry

www.chemistry.unimelb.edu.au
first-year-director@chemistry.unimelb.edu.au
First year enquiries office,
Level 1, Chemistry building (153)
+61 3 8344 7185

Chemistry is often called the central science because, as with mathematics and statistics, the knowledge gained from its study is essential for understanding and participating in nearly all branches of science and technology that support our modern society.

First year chemistry covers a broad range of topics designed to allow you to either pursue chemistry subjects in later years or to spread your interests across to other disciplines. The School of Chemistry has world-class teaching laboratories and is strongly supported by computer-aided learning (ChemCAL).

- CHEM10003: Chemistry 1
- CHEM10004: Chemistry 2
- CHEM10007: Fundamentals of Chemistry

A successful completion of both Chemistry 1 and Chemistry 2 will allow you to enrol in Level 2 chemistry subjects and any Level 2 subjects in other disciplines that require Level 1 chemistry as a prerequisite.
Have you completed VCE Chemistry 3/4 or its equivalent?

Yes

You are eligible to enrol in Chemistry 1 and Chemistry 2

No

You may enrol in Fundamentals of Chemistry (Semester 1 only). Completing this subject will allow you to enrol in Chemistry 1 and Chemistry 2.

How do you know which Chemistry subjects to take?

Note: If you fall into the following category, you should contact the Director of First Year Studies, Professor Muthupandian Ashokkumar (phone +61 3 8344 7090, or email first-year-director@chemistry.unimelb.edu.au) for advice:

- Students who completed VCE Chemistry or equivalent but wish to enrol in Fundamentals of Chemistry;

- Students who did not complete VCE Chemistry or equivalent in their final year of schooling, but wish to enrol in Chemistry 1 on the basis of a very high level of achievement in VCE Physics and Mathematics or equivalent.

> International Baccalaureate students

- Students who completed HL or SL Chemistry should enrol in Chemistry 1 and Chemistry 2;

- Students who did not complete Chemistry may enrol in Fundamentals of Chemistry in semester 1, 2011.

> GCE A level students or

> Trinity College Foundation Studies students or

> South Australian Matriculation (SAM) students

- Students who completed Chemistry may enrol in Chemistry 1 and Chemistry 2;

- Students who did not complete Chemistry may enrol in Fundamentals of Chemistry in semester 1, 2011.
Earth Sciences

www.earthsci.unimelb.edu.au

Level 4, Earth Sciences, McCoy building (200) (Corner of Swanston and Elgin Streets)

+61 3 8344 7677

One or both of the Level 1 Earth Sciences subjects: ERTH10001 and ERTH10002 form the starting point of an Earth Sciences major or can be included with any package (e.g. Geology, Atmosphere and Ocean Sciences).

Are you interested in understanding the evolution of our planet? Did you know that all major processes operating in the lithosphere, hydrosphere, biosphere and atmosphere are intertwined? The School of Earth Sciences offers two majors that will fulfill your interest: Geology, and Atmosphere & Ocean Sciences.

The Geology major relates to the solid earth, in particular the rocks and their constituent minerals and fossils. The study and interpretation of the geological record is of paramount importance in environmental studies and the search for natural resources like gold, coal, oil, ground-water and rock material used for construction work. It is also fundamental to the use of renewable resources such as geothermal energy.

The Atmosphere & Ocean Sciences major relates to the atmosphere, the oceans, their interaction and the influence of the earth’s surface on their motion. Understanding is sought of the basic mechanisms underlying the ever-changing problems of weather and climate and how human activities may yield significant changes in their patterns into the future.

ERTH10001: The Global Environment provides an overview of the processes controlling the formation and evolution of our global environment. Students gain a holistic view of the global environment, encompassing the solid and fluid Earth and its formation, evolution, and modern structure. Students will be familiar with: the materials that comprise the Earth, atmosphere and oceans; the complex interplays between these three media; the modes of formation, the underlying processes that drive the evolution of the solid Earth and landscape; and changes in the Earth’s climate on modern and geological timescales. The Global Environment provides the foundation for further study in Geology and/or Atmospheric & Oceanic sciences.

ERTH10002: Understanding Planet Earth is designed for students particularly interested in geology. This subject will allow students to gain a deeper understanding of the processes governing the geological evolution of the Earth. This will be achieved via a series of field trips and theoretical investigations of Victoria’s geology.

- ERTH10001: The Global Environment
- ERTH10002: Understanding Planet Earth
**Engineering Systems Design**

www.eng.unimelb.edu.au

Melbourne School of Engineering
Engineering Block A (173)

+61 3 8344 6703

ENGR10004: Engineering Systems Design 1 introduces students to the world of engineering through a mix of design projects, interactive workshops and lectures. This subject centres on the engineering method, the approach to problem solving and engineering design that makes engineers unique.

ENGR10003: Engineering Systems Design 2 builds directly on Engineering Design Systems Design 1 by further developing the students’ understanding of the engineering method and the importance of engineering in society. Engineering Systems Design 2 focuses on inter-relationships in engineering systems drawing on important examples from lightweight structures and digital electronic circuits. The importance of modelling change through dynamic models is also emphasized. Together with Engineering Systems Design 1, this subject will prepare students for an exciting and rigorous engineering education that will allow them to serve the needs of an increasingly complex society.

- ENGR10004: Engineering Systems Design 1
- ENGR10003: Engineering Systems Design 2

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**Geography and Environments**

**Geography**

www.land-environment.unimelb.edu.au

Melbourne School of Land and Environment
Room G11, Ground Floor, Old Agriculture Building

+61 3 8344 6390

Do you care about social justice? Are you interested in the environment? Geography is about the relationship between people and their environments. Geography combines both physical science and social science knowledge to provide students with the skills and conceptual frameworks needed to understand the environmental and social processes that shape the world around us. As Geography is a problem-focused and field-based discipline, the major enables students to gain practical and relevant research experience.

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**Famine in the Modern World**

www.land-environment.unimelb.edu.au

Melbourne School of Land and Environment
Room G11, Ground Floor, Old Agriculture Building

+61 3 8344 6390

This subject explains the causes of hunger and famine. It examines the problems of hunger, famine, poverty and population growth, and as it does so it introduces key issues, concepts and theories central to geography and development studies. The subject is structured around an examination of two contrasting theories of hunger and famine. Evidence is drawn together from demography, environmental change and degradation, the environmental impact of the green revolution, the implications of agribusiness and the global food trade, and the effect of war on food supply.

- GEOG10001: Famine in the Modern World
In this subject students will learn how information is used to support decision making in urban and rural environments. This includes methods of data collection, mapping, information communication through visualisation, and decision-support systems. This will be presented by studying the historical development of the supporting technologies, the social context of their use, and their current importance in the age of information. The practical sessions will give hands-on experience with a range of measurement, geographic information, image analysis and virtual reality technologies within a problem-solving context.

- ENVS10006: Mapping Environments

An understanding of natural systems is crucial for sustainable management and design. This subject introduces students to the main systems that shape the natural world and examines the evolution of the planet Earth, our climate and global weather and the formation and processes of our present landscapes and associated ecosystems. Topics for discussion include: plate tectonics; climate change; the water cycle; major biogeochemical processes, such as soil formation; and the interactions and implications of these processes for the distribution, properties and functioning of tropical and temperate forests, grasslands, deserts, arctic and alpine landscapes; historical and current patterns of plant and animal biodiversity; ecological principles, and the scales at which we examine natural systems. The subject utilises topical case studies from diverse discipline areas to emphasise key fundamentals underpinning sustainable management and design.

- ENVS10001: Natural Environments
**Informatics**

www.informatics.unimelb.edu.au

Level 4, ICT Building,
111 Barry Street, Carlton (105)

+61 3 8344 1500

The world is awash with information. In the last 5 years the world has produced and recorded more information than in the previous 50,000 years; and almost all of this new information is digital. Informatics is about working with digital information – gathering, using, storing, retrieving, and visualising information and data. It’s the study of tools and technologies to solve problems in all types of settings, like finance and economics, journalism, biology, health, engineering, communication. Informatics can help organisations such as banks work better by improving information flows, enable doctors to track the way a disease spreads through the population, and analyse social networks to understand how people relate and interact. As a student of Informatics you will map the data from a global network of temperature sensors, or use linguistic modelling to try to understand how language has changed over the centuries, or track global trends in finance and cross-reference off-the-wire news stories. In Informatics, you will integrate knowledge from computing, information modelling, human-computer interaction and graphics to unlock the power of information.

- INFO10001: Data on the Web
- INFO10002: Programming on the Web

**Life, Earth and Universe**

MULT10011@physics.unimelb.edu.au

A multi-disciplinary approach is required to understand the most profound questions about life on Earth, and the possibility of life elsewhere in the universe. This subject will explore the key ideas from the major scientific disciplines to understand the nature of life, the formation of the Earth and the structure of the universe. The development of life on the planet Earth is dependent on evolution of the surface of the planet, and in turn has affected the surface of the planet. Armed with an understanding of how life might have evolved on Earth, the subject will then explore the possibilities for life elsewhere in the solar system and beyond.

- MULT10011: Introduction to Life, Earth and Universe
Mathematics and Statistics

www.ms.unimelb.edu.au
fycoord@ms.unimelb.edu.au

Richard Berry building (160)
+61 3 8344 5550

Mathematics and statistics are powerful tools for understanding science and the world we live in. The Department of Mathematics and Statistics offers a variety of subjects at Level 1, Level 2 and Level 3 that are designed to prepare students for professional careers in mathematics and statistics, the pure and applied sciences, commerce, education, engineering, industry and technology, and the social sciences. Graduates of mathematics and/or statistics are currently in very high demand by employers.

First year subjects

Key mathematics subjects for VCE Specialist Mathematics 3/4 (or equivalent) background:
  Semester One
  • MAST10006: Calculus 2 (repeated semester 2)
  Semester Two
  • MAST10007: Linear Algebra (repeated summer semester and semester 1)

Key mathematics subjects – Accelerated Stream:
  Semester One
  • MAST10008: Accelerated Mathematics 1
  Semester Two
  • MAST10009: Accelerated Mathematics 2

Key mathematics subjects for VCE Mathematical Methods 3/4 (or equivalent) only background:
  • MAST10005: Calculus 1 (semester 1, repeated semester 2)
  • MAST10006: Calculus 2 (semester 2, repeated semester 1)
  • MAST10007: Linear Algebra (semester 2, repeated summer and semester 1)

Statistics subject:
  • MAST10010: Data Analysis 1 (semester 2)

How do I know which Mathematics and Statistics subjects to take?

In choosing your first year Mathematics and Statistics subjects you should bear in mind your own mathematical background, the options that you wish to keep open for later year studies and possible career paths that you may wish to follow. As a first step, we suggest that you be aware that the following two combinations of subjects are very popular. Many variations on these standard combinations of subjects are possible, and can be explored with a Student Adviser.

Please note that the BSc course requirements specify that you cannot enrol in more than three level 1 Mathematics and Statistics subjects (37.5 points) within the course.

> VCE students

Example one
A good combination for students who have taken VCE Mathematical Methods 3/4 only and who, after first year, wish to concentrate on Biological or other Experimental Sciences is:
  Semester One
  • MAST10005: Calculus 1
  Semester Two
  • MAST10010: Data Analysis 1

Example two
A good combination for students who have taken VCE Specialist Mathematics 3/4 and wish to study Mathematics, Statistics or Physics past first year level is:
  Semester One
  • MAST10006: Calculus 2
  Semester Two
  • MAST10007: Linear Algebra

Note: Students with a strong background in Mathematics should consider enrolling in both Accelerated Mathematics 1 and Accelerated Mathematics 2 instead of both Linear Algebra and Calculus 2 (subject to eligibility).
FIRST YEAR SCIENCE SUBJECTS

This flow chart indicates which subject is appropriate for your mathematical background:

Did you study VCE Specialist Mathematics 3/4?

Yes

What was your score in VCE Specialist Mathematics 3/4?

38 or more

You are eligible to study Accelerated Mathematics 1 and/or Accelerated Mathematics 2

27-39

You are eligible to study Calculus 2 and/or Linear Algebra.

Less than 40

You are eligible to study Calculus 1

Did you study VCE Mathematical Methods 3/4 (but not VCE Specialist Mathematics 3/4)?

Yes

You are eligible to study Calculus 1
Students who have taken VCE Specialist Mathematics 3/4 and achieved a study score of at least 30, or equivalent, are not permitted to enrol in Calculus 1.

Any student who does not satisfy the criterion for entry into Accelerated Mathematics 1, but wishes to enrol in that subject, may sit a 90 minute Advanced Placement Test, and if successful, enrol in Accelerated Mathematics 1. Contact the Department of Mathematics and Statistics for the time and venue of the test.

Students who have taken a Mathematics Extension/Enhancement Studies subject in Year 12 (e.g. UMEP Mathematics or Monash Enhancement) should seek advice about their subject choices from the Department of Mathematics and Statistics UMEP Coordinator, Dr Penny Wightwick.

> International Baccalaureate students

- Students who have achieved a score of at least 6 in HL Mathematics are eligible to enrol in Accelerated Mathematics 1/Accelerated Mathematics 2.
- Students who have achieved a score of at least 4 in HL Mathematics are eligible to enrol in Calculus 2/Linear Algebra.
- Students who have achieved a score of 4 in SL Mathematics are eligible to enrol in Calculus 1.
- Students who have completed other IB Maths subjects or have queries should speak with a course advisor in the Maths/Stats Learning Centre in regards to selecting appropriate subjects.

> GCE A Level students

- Students who have completed A Level Mathematics (P1, P3 + 2 options) may enrol in Accelerated Mathematics 1/Accelerated Mathematics 2 if they have achieved a grade of A or higher, otherwise they may enrol in Calculus 2/Linear Algebra.
- Students who have completed A Level Mathematics (P1 + 1 option) may enrol in Calculus 1.
- Students who have achieved other results or completed other A Level Mathematics subjects such as Pure Mathematics should speak with a course advisor in the Maths/Stats Learning Centre in regards to selecting appropriate subjects.

> Trinity College Foundation Studies students

- Students who have completed Mathematics 2 and Mathematics 1 are eligible to enrol in Calculus 1/Calculus 2.
- Students who have completed Mathematics 2 and Mathematics 1 with a result of at least 90 in Mathematics 2 are eligible to enrol in Accelerated Mathematics 1/Accelerated Mathematics 2.
- Students who have completed Mathematics 1 only, are eligible to enrol in Calculus 1.

Note: The pre-2010 courses Mathematics 1A and Mathematics 1B are NOT equivalent to Mathematics 1. Students who have completed those subjects should seek advice from a course advisor in the Mathematics and Statistics Learning Centre.

> South Australian Matriculation (SAM) students

- Students who have completed Mathematical Studies and Specialist Mathematics are eligible to enrol in Calculus 1/Calculus 2.
- Students who have completed Mathematical Studies and Specialist Mathematics, with a result of at least 18 in both, are eligible to enrol in Accelerated Mathematics 1/Accelerated Mathematics 2.
- Students who have completed Mathematical Studies only are eligible to enrol in Calculus 1.
How do I know which Physics subjects to take?

Semester One
Choose the physics subject that suits your interest in Physics and the strength of your physics and mathematics background.

- Physics 1: Advanced
  For students seeking a deep and more challenging introduction to physics, who have results of at least 35 in both VCE Physics 3/4 and VCE Specialist Maths 3/4, or equivalent. Students with this preparation are encouraged to undertake the advanced Physics sequence. A high achieving student has the same opportunity to achieve an excellent mark for Physics 1: Advanced as they would for Physics 1.

- Physics 1
  For students who are considering taking physics beyond first year or as a complement to their other science or engineering studies, who have a result of at least 30 in VCE Physics 3/4, or equivalent normally. For students who have not completed Specialist Mathematics, or equivalent, a concurrent enrolment in Calculus 1 is recommended but not required.

- Physics 1: Fundamentals
  An introductory subject that does not assume a previous physics background, for students who have not completed VCE Physics 3/4, or have a result less than 30 in VCE Physics 3/4, or equivalent. Physics 1: Fundamentals uses calculus to a lesser extent than Physics 1.

In physics you will study nature at its most fundamental level, helping you understand many familiar and interesting questions about how the world works. You will learn about the structure and interactions of matter on all scales, from particles inside the atomic nucleus, through to human-sized objects, and up to the forces that give rise to the structure of the whole universe.

An understanding of physics also underpins and complements many other areas of study, including engineering, chemistry, biological and environmental sciences.

The School of Physics offers different pathways through Level 1 Physics subjects to cater for students with a variety of backgrounds and with different needs and futures in mind.

Semester One
- PHYC10001: Physics 1: Advanced
- PHYC10003: Physics 1
- PHYC10005: Physics 1: Fundamentals

Semester Two
- PHYC10002: Physics 2: Advanced
- PHYC10004: Physics 2: Physical Science & Technology
- PHYC10006: Physics 2: Life Sciences & Environment

Physics
www.physics.unimelb.edu.au
dfys@physics.unimelb.edu.au
Ground Floor, Physics building (192)
+61 3 8344 7670
**Semester Two**

Choose the physics subject that suits how you want to use your Physics and the strength of your physics and mathematics background:

- Physics 2: Advanced – this subject follows on from Physics 1: Advanced;

Or choose one of the following subjects:

- Physics 2: Physical Science & Technology  
- Physics 2: Life Sciences & Environment.

The same content of physics study will be explored in both of these subjects.

They will draw from examples across the spectrum of the sciences, but place greater emphasis on applications to particular areas of science. Your choice will depend on the context in which you want to study Physics in Semester 2 and any other science or engineering study you are seeking to complement, i.e. are you more interested in exploring physics in a subject that emphasises examples from the physical sciences, or would you prefer to study a subject that focuses on how physics principles can be applied in the life and environmental sciences?

Students who have completed Physics 1 or Physics 1: Fundamentals in Semester 1 may choose either of these Physics 2 subjects. Students beginning their physics study in Semester 2 who have completed VCE Physics 3/4 or equivalent, with a result of at least 30, may also choose either of these subjects. The subjects assume knowledge of a Semester 1 physics subject and advice will be provided about appropriate preparation for students beginning their study in Semester 2.

Note: If you fall into one of the following categories, you should contact the Director of First Year Studies in Physics (email: dfys@physics.unimelb.edu.au) for advice:

- Students who did not complete VCE Physics Unit 3/4 or equivalent in their final year of schooling, but wish to enrol in Physics 1 on the basis of a very high level of achievement in VCE Mathematics or equivalent;
- Students seeking to begin their physics study in Semester 2 who have not completed VCE Physics Unit 3/4 or equivalent;
- Students commencing their physics study in Semester 2 who are interested in undertaking Physics 2: Advanced.

**International Baccalaureate students**

- Students who have achieved a score of at least 5 in HL Physics or 7 in SL Physics and a score of 4 in HL Mathematics or a 6 in SL Mathematics are eligible to enrol in  Physics 1: Advanced or Physics 2: Advanced.
- Students who have achieved a score of at least 3 in HL Physics or 4 in SL Physics and a score of 3 in HL Mathematics or 4 in SL Mathematics are eligible to enrol in Physics 1.
- Students whose score in SL Physics is below 4 are eligible to enrol in  Physics 1: Fundamentals.

**GCE A Level students**

- Students who have achieved a grade of at least A in Physics and B in Mathematics (or Mathematics C, or Further Mathematics C) are eligible to enrol in Physics 1: Advanced or Physics 2: Advanced.
- Students who have achieved a grade of at least C in Physics, Mathematics (or Mathematics C, or Further Mathematics C) are eligible to enrol in Physics 1.
- Students who completed Physics with lower grades or have not completed Physics are eligible to enrol in Physics 1: Fundamentals.
> Trinity College Foundation Studies students
- Students who have achieved a score of at least 85 for both Physics and Mathematics are eligible to enrol in Physics 1: Advanced or Physics 2: Advanced.
- Students who have achieved a score of at least 60 for both Physics and Mathematics 2 are eligible to enrol in Physics 1. Students whose score in Physics is below 60 or have not completed Physics are eligible to enrol in Physics 1: Fundamentals.

> South Australian Matriculation (SAM) students
- Students who have achieved a score of at least 18 for both Physics and Mathematical Studies are eligible to enrol in Physics 1: Advanced or Physics 2: Advanced.
- Students who have achieved a score of at least 11 for both Physics and Mathematical Studies are eligible to enrol in Physics 1.
- Students whose score in Physics is below 11 or have not completed Physics are eligible to enrol in Physics 1: Fundamentals.

Note: Any two-semester sequence of Physics, together with appropriate mathematics will be sufficient prerequisite study for level 2 physics subjects.

Which Mathematics subjects should you take?
For students considering continuing physics beyond first year:
- MAST10006: Calculus 2 and
- MAST10007: Linear Algebra
or
- MAST10008: Accelerated Mathematics 1 and
- MAST10009: Accelerated Mathematics 2
or, for students who do not have the prerequisites for Calculus 2,
- MAST10005: Calculus 1
- MAST10006: Calculus 2 and
- MAST10007: Linear Algebra

For additional information refer to the Mathematics and Statistics section of this guide.

If you are not planning to pursue physics studies in later years, there is no requirement to take mathematics subjects alongside your physics. However, since increasing your mathematical skills will support your physics studies it may still be a good idea to take mathematics subjects.
**Psychology**

www.psych.unimelb.edu.au

enquiries@psych.unimelb.edu.au

Level 12, Redmond Barry building (115)

+61 3 8344 6377

Psychology is the study of the human mind, brain and behaviour and it is a major discipline underpinning the behavioural and cognitive neurosciences. Level 1 Psychology will look at every stage of human behaviour from Behavioural Neuroscience and cognitive processes through to the study of Developmental and Social Psychology and Personality and Clinical Psychology. You will also learn the basic techniques of Quantitative Methodology and Analysis essential to all research in Psychology.

There are no VCE prerequisites to study Psychology in first year. Whether Psychology is taken as an Australian Psychology Accreditation Council (APAC) accredited major or as a single subject, students will find that the discipline is complementary to many other subjects. Even if you do not ultimately choose a career in Psychology, the discipline is still fascinating and useful in its own right because the more you understand yourself and those around you, the greater your capacity for empathy with your environment, both social and physical.

- PSYC10003: Mind, Brain and Behaviour 1
- PSYC10004: Mind, Brain and Behaviour 2

**Vision Science**

www.optometry.unimelb.edu.au

Corner of Keppel Street and Cardigan Streets, Carlton (325)

+61 3 8344 7008

Vision Science is the study of the physical, physiological and neurophysiological factors which influence sight and the visual system. In the business world there are numerous problems that relate to vision, such as lighting for comfort, good vision and the design of computer screen displays for good legibility. The optical industry that produces spectacle lenses, contact lenses and other optical devices needs people who know about vision and optics to help with product development and to provide expert advice to clients.

New and emerging technologies, such as virtual reality, digital imagery (e.g. cameras, television, DVD), and ‘in-car’ technologies also present challenges and opportunities for experts in the visual and optics fields.

Please note that there is no major study in Vision Sciences in the Bachelor of Science.

- OPTO10001: Vision: How the Eye Sees the World
- OPTO10002: Optics: From Rainbows to Digital Imaging
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<tr>
<td><strong>Physics</strong></td>
<td>□ PHYC10001 Physics 1: Advanced</td>
<td>□ PHYC10002 Physics 2: Advanced</td>
</tr>
<tr>
<td>□ PHYC10001 Physics 1: Advanced</td>
<td>□ PHYC10004 Physics 2: Physical Science &amp; Technology</td>
<td></td>
</tr>
<tr>
<td>□ PHYC10003 Physics 1</td>
<td>□ PHYC10006 Physics 2: Life Sciences &amp; Environment</td>
<td></td>
</tr>
<tr>
<td>□ PHYC10005 Physics 1: Fundamentals</td>
<td>□ PHYC10006 Physics 2: Life Sciences &amp; Environment</td>
<td></td>
</tr>
<tr>
<td><strong>Psychology</strong></td>
<td>□ PSYC10003 Mind, Brain and Behaviour</td>
<td>□ PSYC10004 Mind, Brain and Behaviour 2</td>
</tr>
<tr>
<td><strong>Vision Science</strong></td>
<td>□ OPTO10001 Vision: How the Eye Sees the World*</td>
<td>□ OPTO10002 Optics: From Rainbows to Digital Imaging*</td>
</tr>
</tbody>
</table>

* These level 1 Science subjects are not specifically on the pathway to any science major.
** To be confirmed once the 2012 Handbook is available in late 2011.
BREADTH STUDIES

Under the Melbourne Model, students undertaking a New Generation undergraduate degree specialise by completing a major in a specific discipline (depth), and gain knowledge across disciplines by taking subjects from outside their core program (breadth). Breadth studies are one of the most exciting aspects of the New Generation degrees, allowing you to choose up to 25 per cent of your subjects from areas other than the ones that make up the core disciplines of your degree. By studying subjects beyond your core disciplines you will have the chance to develop different skills, expand your knowledge, learn complementary ways of thinking about issues and problems, and challenge your perceptions.

While graduates of the Bachelor of Science will be able to demonstrate a profound understanding of science and technology, they will also appreciate the broader context in which their skills will be employed and be ready to apply their knowledge to an increasingly wide range of situations. Depth is reflected in the expertise you gain by studying a core program in a major discipline or interdisciplinary area of study. Breadth is a result of choosing additional subjects from outside the core program of the degree to develop other kinds of expertise.

Choosing breadth in the Bachelor of Science

Undertaking breadth studies will enable you to tap into other bodies of knowledge, methods of enquiry, personal and professional skills. There are many ways to think about choosing subjects for the breadth component of your degree. For example, you could choose subjects in areas of study that:

- Provide skills and understanding to assist you to apply and contribute your science knowledge in the science-oriented professions, the business world, education and everyday life, e.g. bioethics, economics, communication, information systems, education, law, sociology;
- Develop your understanding of what is distinctive about science as a way of interpreting our world, and/or how it compares to other creative and evidence-based disciplines, e.g. history and philosophy of science; art history, architecture, linguistics;
- You have always wanted to pursue and now university provides you with that opportunity.

Breadth rules for the Bachelor of Science

- You can take up to 75 points (six subjects) of breadth study;
- You must complete a minimum of 50 points (four subjects) of breadth study including at least 12.5 points at Level 2 or Level 3;
- You may complete a maximum of 37.5 points of breadth (three subjects) at Level 1.

Breadth Tracks

A breadth track is a set of three or more subjects that progressively develops knowledge and skills relevant to some domain, theme, topic or issue. You are strongly encouraged to undertake at least one breadth track as part of your breadth studies.

For details about breadth tracks please go to: breadth.unimelb.edu.au.

Subjects available as breadth studies for Bachelor of Science students

Find breadth subjects for your course via the breadth search facility in the 2011 Handbook, online at: https://handbook.unimelb.edu.au/faces/htdocs/user/breadth/BreadthSearch.jsp

Learn more about breadth study and your Bachelor of Science breadth options online at: http://breadth.unimelb.edu.au/breadth/info/Science.html
GRADUATE PATHWAYS

Graduates of the BSc have the option of pursuing a range of further study opportunities in the sciences and technology, or other areas of interest. A graduate can:

- Continue further study in a range of Honours and Masters programs which in turn can lead to a research higher degree such as a PhD;
- Continue further study in a range of other professional graduate programs such as Health Sciences (including Medicine, Nursing Science, Optometry and Physiotherapy), Veterinary Science, Engineering, Management, Law, Social Work, Teaching and Urban Planning.

Science Honours and Graduate Programs

The Melbourne Graduate School of Science offers a range of Honours and Masters by coursework programs.

Science, technology and engineering coursework programs:

<table>
<thead>
<tr>
<th>Graduate course</th>
<th>First year package</th>
<th>Other information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Honours</td>
<td>As specified for major(s) of interest</td>
<td>For details visit the Bachelor of Science <a href="http://science.unimelb.edu.au/pathways/honours">science.unimelb.edu.au/pathways/honours</a></td>
</tr>
<tr>
<td>Master of Biotechnology</td>
<td>Life or Chemical Sciences</td>
<td>For details visit the Graduate School of Science <a href="http://graduate.science.unimelb.edu.au">graduate.science.unimelb.edu.au</a></td>
</tr>
<tr>
<td>Master of Environment (Environmental Science)</td>
<td>Life, Chemical or Earth Sciences</td>
<td>For details visit the Graduate School of Science <a href="http://graduate.science.unimelb.edu.au">graduate.science.unimelb.edu.au</a></td>
</tr>
<tr>
<td>Land and Environment Masters degrees</td>
<td></td>
<td>For details visit the School of Land and Environment <a href="http://www.landfood.unimelb.edu.au/future/graduate/index.html">www.landfood.unimelb.edu.au/future/graduate/index.html</a></td>
</tr>
<tr>
<td>Master of Information Systems</td>
<td>Information Technology recommended</td>
<td>For details visit the Graduate School of Science <a href="http://graduate.science.unimelb.edu.au">graduate.science.unimelb.edu.au</a></td>
</tr>
<tr>
<td>Master of Operations Research and Management Science</td>
<td>Mathematics and Statistics</td>
<td>For details visit the Graduate School of Science <a href="http://graduate.science.unimelb.edu.au">graduate.science.unimelb.edu.au</a></td>
</tr>
<tr>
<td>Master of Science</td>
<td>As specified for major(s) of interest</td>
<td>For details visit the Graduate School of Science <a href="http://graduate.science.unimelb.edu.au">graduate.science.unimelb.edu.au</a></td>
</tr>
</tbody>
</table>

Animal Health and Disease:

<table>
<thead>
<tr>
<th>Graduate course</th>
<th>First year package</th>
<th>Other information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor of Veterinary Medicine</td>
<td>Life Sciences</td>
<td>A major in Animal Health and Disease with Veterinary Bioscience specialisation. Physics is required for students who have not completed VCE Physics or equivalent. For details visit: <a href="http://www.vet.unimelb.edu.au">www.vet.unimelb.edu.au</a></td>
</tr>
</tbody>
</table>
### Health Sciences:

<table>
<thead>
<tr>
<th>Graduate course</th>
<th>First year package</th>
<th>Other Information/Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master of Nursing Science</td>
<td>Life Sciences</td>
<td>Tertiary study in human anatomy is required.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://www.nursing.unimelb.edu.au">www.nursing.unimelb.edu.au</a></td>
</tr>
<tr>
<td>Doctor of Dental Surgery</td>
<td>Life Sciences</td>
<td>Completion of prerequisite studies at Level 2:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ANAT20006 Principles of Human Structure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- PHYS20008 Human Physiology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- BCMB20002 Biochemistry and Molecular Biology</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://www.dent.unimelb.edu.au">www.dent.unimelb.edu.au</a></td>
</tr>
<tr>
<td>Doctor of Medicine</td>
<td>Life Sciences</td>
<td>Students who wish to apply for Graduate Medicine are required to complete:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ANAT20006 Principles of Human Structure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- PHYS20008 Human Physiology</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- BCMB20002 Biochemistry and Molecular Biology</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://www.medicine.unimelb.edu.au">www.medicine.unimelb.edu.au</a></td>
</tr>
<tr>
<td>Doctor of Physiotherapy</td>
<td>Life Sciences</td>
<td>Completion of prerequisite studies at Level 2:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ANAT20006 Principles of Human Structure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- PHYS20008 Human Physiology</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://www.physioth.unimelb.edu.au">www.physioth.unimelb.edu.au</a></td>
</tr>
<tr>
<td>Doctor of Optometry</td>
<td>Life Sciences</td>
<td>Physics or Optics are required plus three Level 2 or Level 3 subjects: one in Anatomy or Cell Biology; and two in any of the Molecular, Cellular or Physiological sciences. Completion of a tertiary level Mathematics and/or Statistics subject is also strongly recommended.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="http://www.optometry.unimelb.edu.au">www.optometry.unimelb.edu.au</a></td>
</tr>
</tbody>
</table>

**Other graduate study areas:**

- Master of Architecture
- Master of Construction Management
- Juris Doctor (Law)
- Master of Management
- Master of Landscape Architecture
- Master of Property
- Master of Teaching
- Master of Urban Planning

The entry requirements for each of these degrees can be met in the BSc.

For further information on graduate courses and pathways, please visit [http://coursesearch.unimelb.edu.au](http://coursesearch.unimelb.edu.au)

**Science, technology and engineering research programs**

After completion of either an honours year, or a masters degree that provides research training, students may pursue a research higher degree in one of the exciting areas of research offered by the faculties contributing to the BSc.

Research Programs include:

- Master of Philosophy
- Doctor of Philosophy (PhD)

For further information visit the Graduate Schools online at:

- Medicine, Dentistry and Health Sciences: [www.mdhs.unimelb.edu.au/future_students/research_higher_degrees](http://www.mdhs.unimelb.edu.au/future_students/research_higher_degrees)
- Science: [graduate.science.unimelb.edu.au](http://graduate.science.unimelb.edu.au)
For comprehensive information on the wide range of facilities and support services available to you, visit the following web sites:

- Getting Started – BSc student info  
  www.studentcentre.unimelb.edu.au/eastern/commencing_students/getting_started

- Getting Started – General University info  
  www.services.unimelb.edu.au/transition/transition/getting_started.html

- Student Information Directory  
  www.studentadmin.unimelb.edu.au

- Services for Students  
  www.services.unimelb.edu.au

**Student Portal**

Once you have confirmed your enrolment, you will be able to access the Student Portal (portal.unimelb.edu.au). The Student Portal gives you a central, personalised page from which to access all the information you will need while studying at the University of Melbourne, such as:

- Subject timetables
- Online subject changes and re-enrolment
- Exam timetables
- Results
- Change of address
- Your University email account
- Fees/HECS-Help
- Academic transcripts
- Special Consideration online application
- Link to the Handbook
- LMS
- Graduations

**Academic Skills Unit (ASU)**

The Academic Skills Unit (ASU) can assist students work towards achieving their full potential by focusing on teaching the academic and language skills necessary for continued learning. The ASU can assist students with study and organisational issues, writing, managing assessment, academic English and professional skills.

www.services.unimelb.edu.au/asu

**IT services**

**Email**

It is extremely important that every student activates their University of Melbourne email account:

www.services.unimelb.edu.au/transition/transition/getting_started.html

Check your email regularly as you will be receiving vital information from the University regarding exams, results, course planning and subject-related material. You will also receive the monthly newsletter email, which will alert you to important upcoming events.

Remember to EMPTY your email inbox regularly by deleting old messages so that it does not exceed its size limit. This will prevent you from losing or missing important information.

**Computing skills**

Student IT offers e-learning resources in a variety of computing skills. For details visit:

www.studentit.unimelb.edu.au
**Computer access laboratories**

**General IT Spaces**

*ERC* – 1st floor ERC Library  
*Frank Tate Learning Centre* – Frank Tate building  
*Percy Baxter Learning Centre* – 1st floor Baillieu Library  

Departmental Labs are available if you are enrolled in a subject taught by that department:

*Biology Computer Labs*  
Level 5, Redmond Barry building (115)  
Mon – Thurs 9.30am – 4.30pm  
Fri 9.30am – 3.30pm  

*Department of Mathematics and Statistics Computer Labs*  
Ground Floor, Richard Berry Building (160)  
Mon – Fri 8.00am – 6.00pm during semester.  

*ICT Building*  
Science Informatics, Computer Science and Software Engineering students have multiple computer laboratories available to them in the ICT building. For information on the locations, access times and conditions, go to the Department of Information Systems or the Department of Computer Science and Software Engineering Office on Level 4 of the ICT building (105 P14).  

**Libraries**

For online searching, your library borrowing record, maps, floor plans, and other library resources go to:  
[www.lib.unimelb.edu.au](http://www.lib.unimelb.edu.au)

Library tours are held at the beginning of each semester and are very important for learning how to research the catalogue, electronic databases and other resources. They will also increase your familiarity with the library layouts.

<table>
<thead>
<tr>
<th>Library</th>
<th>Location and Telephone</th>
</tr>
</thead>
</table>
| Baillieu Arts and Humanities library | Professors Walk (177)  
8344 7928                        |
| Brownless Biomedical Library Servicing the life sciences: Botany, Genetics, Medicine and Zoology | Corner of Medical and Kernot Roads (182)  
8344 5718                     |
| Chemistry library               | Level 1, Chemistry building (153)  
8344 6479                     |
| Earth Sciences library          | Level 4, McCoy building (200)  
8344 6528                     |
| Mathematical Sciences library   | Level 1, Richard Berry building (160)  
8344 7599                     |
| Physics Research library        | Level 6, Physics building (192)  
8344 0444                     |
ADD EXTRA VALUE TO YOUR DEGREE

Once you have chosen your subjects, you might consider the way in which you can enhance the value of your science degree to improve your career prospects. Save this Guide so that you can refer to the following suggestions, and the timeline on the last page, as you progress through your course:

Kickstart Your Career

This program is designed to help you create a successful career out of your degree.

We help you to plan for your future, with alumni providing important insights into: the employment market, what it takes to refine your skills and how you can manage your career aspirations and experience.

It provides you with more information and motivation, so you can start your career search ahead of other candidates.

Participating during the first year of your course means you can utilise the skills and strategies learnt as part of your studies, giving you a head start once you graduate.

www.services.unimelb.edu.au/careers

In2science – Peer Mentoring in Schools

The In2science Peer Mentoring in Schools program is run by the Science and Engineering Faculties at Melbourne, Monash and LaTrobe Universities. The program places current undergraduate students in secondary schools to work in science and mathematics classes at Years 7 - 10 level. The program aims to motivate school students and make them enthusiastic about their science studies, as well as mentors serving as a resource to the classroom teacher. For more information see www.latrobe.edu.au/in2science or email Alison Wray at: asw@unimelb.edu.au.

Study Overseas with the Melbourne Global Mobility Program

Science is an international discipline and study overseas enables science students to engage with the international science community. The Melbourne Global Mobility Program is designed to encourage and support University of Melbourne students to undertake part of their studies overseas. Plan your exchange early, in most cases two semesters in advance, for either one or two semesters during your second or third year of study at Melbourne.

Why study overseas?

There are many benefits to completing part of your degree at an overseas institution. Listed below are some of the rewards you can expect from taking part in the exchange program.

- Study subjects or disciplines which are not offered at Melbourne;
- Gain research experience in areas not offered at Melbourne;
- Learn about a new language and/or culture;
- Meet new people and make new friends;
- Improve your cross-cultural communication skills;
- Travel and explore new places;
- Gain greater independence;
- Build international links;
- Give yourself a competitive edge;
- Make your resumé stand out.

General Information sessions

Melbourne Global Mobility runs Information Sessions twice a week during semester (usually at 1:00 to 2:00 pm).
Science-specific Information Sessions
The Eastern Precinct Student Centre runs two information sessions each semester. Sessions will be advertised in the Eastern Precinct Student Centre Newsletter.
Remember that you can always get advice from the Global Mobility Student Adviser via:
Email: epsc-abroad@unimelb.edu.au
Phone: +61 3 8344 8228

Summer internship programs
Many research institutes or other organisations offer professional development opportunities to students via internship programs. They give you the chance to complete a research project in an area of interest while experiencing work in a world-class research facility or company. Visit teaching department offices for advice, or if you have an institute or organisation in mind you may approach them directly.

Leadership, Involvement and Volunteer Experience – LIVE
LIVE is an organising platform providing students with unique opportunities to get involved both on and off campus in leadership, community engagement and volunteering activities, locally and globally.

LIVE will host:
- The Student Ambassador Leadership Program (SALP);
- The Student Development and Training Program (a SALP mentoring program);
- The Community Volunteer Program;
- Volunteers Online (via Careers Online).

LIVE will develop your skills:
- It is an excellent way to develop skills in areas such as leadership, communication, team building, project management, event organisation and public speaking;
- The program involves specific skills development via workshops and seminars as well as the chance to make an important contribution to the University community.

For further information on programs offered by LIVE, please refer to: www.services.unimelb.edu.au/live

Vacation work and professional work experience
The paid work you do alongside your studies can really help your career prospects, because the skills you gain in your part-time jobs cannot always be found in your studies. All types of work experience will complement the skills and knowledge you gain during your studies.

Careers and Employment have a wide range of resources and other programs to help you with your job search. Their professional development services are available to you during your course and up to one year after you graduate.
www.services.unimelb.edu.au/careers/
Value adding programs – a timeline for your course:

The Eastern Precinct Student Centre recommends that you participate in the enhancement programs we provide. They will help you to achieve your career goals when you graduate.

Below is a suggested program of events to help you plan ahead. These activities serve to maximise your chances of choosing the right career for you (ask a Student Adviser if you are not sure when to time these activities).

**First Year**

**Semester One**
- Transition programs
  - Maximise your study experience
  - Polish your study skills
  - Enhance your communication and team building abilities.

**Semester Two**
- Kickstart Your Career
  - Careers in Science seminars
  - Resume writing
  - Interview techniques
  - How to find vacation work.

**Summer Break**
- Vacation job
  - Customer service skills
  - Business acumen
  - Teamwork.

**Second Year**

**Semester One**
- Outgoing Exchange/Study Abroad planning
  - Attend an information session
  - Find out what it is and if it’s for you
  - Financial planning/budgeting.

**Semester Two**
- Kickstart Your Career (alternative time)
  - Careers in Science seminars
  - Leadership program
  - Communication skills
  - Setting personal challenges
  - Community involvement
  - Outgoing Exchange/Study Abroad (alternative time).

**Summer Break**
- Vacation job
  - Familiarity with work culture
  - Customer service skills
  - Teamwork.

**Third Year**

**Semester One**
- Outgoing exchange
  - Academic challenges
  - Unique cultural experiences
  - Develop independence.

**Semester Two**
- Applying for a Honours or Masters program
- Seeking professional work experience or internship.

**Summer Break**
- Professional work experience or summer internship program
  - Specific industry knowledge
  - Experience of the profession
  - Networking skills
  - Internships.

Make sure you regularly check the Eastern Precinct Student Centre web site for updates and further information: [www.studentcentre.unimelb.edu.au/eastern](http://www.studentcentre.unimelb.edu.au/eastern)
Before your first class

Your subjects
For more information on making changes to your subject enrolments visit www.studentcentre.unimelb.edu.au/eastern

Your text books
Wait until the first lecture to receive advice on textbooks. Visit the Book Shop in person or on the web www.bookshop.unimelb.edu.au

Your Orientation
Orientation program information is available at www.services.unimelb.edu.au/transition/orient/index.html

Your timetable
Access your timetable via www.services.unimelb.edu.au/timetabling/students/timetable.html