Graduate science degrees at Melbourne are designed to empower students to apply scientific thinking and analysis to issues that impact on the world today and are the challenges of tomorrow. We have one of the most diverse, internationally recognised pools of scientific expertise, creativity and productivity in Australia. Our many strengths include the popular disciplines of biological, chemical, mathematical and physical sciences, but our breadth of expertise extends to other disciplines such as geography, earth and climate sciences, ecosystem and forest sciences and horticulture. The influential QS World University Rankings place Melbourne in the top 30 Universities in the world for both the physical and life sciences.

We are enormously enthusiastic about the strength and quality of our graduate science programs. Our research training Master of Science degrees allow you to pursue research at the most advanced level, with supervision from internationally renowned researchers. Our professional Masters degrees offer graduate science training that is focussed on skills appropriate for industry, business and government. These programs combine advanced knowledge in core disciplines with high-level training in business, communication and technical skills, maximising our graduates’ employment opportunities.

Professor Karen Day  
Dean, Faculty of Science
The Faculty includes seven schools, the Office for Environmental Programs, the Bio21 Molecular Science and Biotechnology Institute, and has close links with many internal and external research and training facilities.

OUR CAMPUSES
The University of Melbourne has a campus community of around 45,000 students, including around 12,500 students from over 150 different countries. Our beautiful and historic main campus is located in Parkville, only minutes from the CBD. Horticulture students will spend time at our Burnley campus, where gardens and green infrastructure dominate the urban environment, while forestry students can study amongst the trees at Creswick, located on 20 hectares approximately 120 kilometres from the city.

OUR STUDENTS
There are more than 1800 graduate students studying in the Faculty of Science, in both research and coursework degrees. Our entry standards are amongst the highest in Australia, creating an environment that nurtures the very best from our students.

OUR STAFF
With close to 500 academic research and teaching staff, the Faculty of Science attracts over $50 million annually in research income. Being amongst the top-ranked research universities in the world, the University of Melbourne attracts lecturers and professors who are the finest minds at the forefront of their fields.

OUR SERVICES
In addition to assistance with administrative processes and course enquiries, graduate students in the Faculty of Science have access to computer labs, meeting rooms and a student lounge. Other available student services include:
- Tutorials and ESL workshops run by the Academic Skills Unit
- Internship and employment advice from the Melbourne Careers Centre
- Childcare provided by Children’s Services
- Free counselling provided by Counselling and Psychological Services
- Individualised assistance from Student Equity and Disability Support
- Financial assistance from Student Financial Aid
- Bulk-billed medical appointments through Health Services
- Tenancy advice from Student Housing Services
- Faith-based services provided by Chaplaincy

For a complete list of student services, visit: services.unimelb.edu.au

Students can also take part in range of social activities both on and off-campus, with a huge range of opportunities available. From trips to the University’s lodge on Mount Buller with the Ski Club or taking the boat out with the Waterski and Wakeboard Team, to volunteering for the University chapter of a global non-profit or joining one of Victoria’s leading choirs, the Melbourne University Choral Society, there is something for every skillset and interest.

Choosing Science at Melbourne

“Melbourne Uni provided the best opportunity for me to study at the highest level of science education in Australia. As well as facilitating the highest standard of teaching, Melbourne’s recognition on the international circuit as a premier University was a strong driving point for me.”

Jesse Beasley
Master of Science (Botany)
OUR RESEARCH CENTRES
The Faculty of Science is committed to leadership and excellence in scientific development, and our affiliated research centres include:

Bio21 Molecular Science and Biotechnology Institute
A flagship multidisciplinary research facility in the heart of the Parkville biomedical precinct with specialised platform technologies in medical, agricultural and environmental biotechnology, and nanobiotechnology.

Victorian Life Sciences Computational Initiative (VLSCI)
A $100 million initiative of the Victorian Government in partnership with the University and the IBM Research Collaboratory for Life Sciences, the VLSCI is the biggest supercomputer facility devoted to life sciences in the world.

ARC Centre of Excellence for Mathematical and Statistical Frontiers (ACEMS)
ACEMS comprises a diverse range of partners, working together to achieve a common goal of delivering world-leading research in mathematical and statistical theory and methods. ACEMS mathematicians and statisticians work closely together and the results of this collaborative approach will address challenging scientific problems in the real world.

Melbourne Energy Institute (MEI)
MEI provides a critical access point for industry, government and community seeking to work with leading researchers on delivering solutions to meet the world’s future energy needs.

OUR FACILITIES
Students have access to state-of-the-art resources and equipment through both the Faculty of Science and the affiliated research centres, including:
- Electron and optical microscope units
- Metabolomics infrastructure
- The Australian Synchrotron
- National eResearch Collaboration Tools and Resources (NeCTAR)
- An IBM supercomputer
GRADUATES AND CAREERS

The Faculty of Science is closely connected to a range of industry, business and government organisations. These connections influence our core curriculum, ensuring relevance and readiness for real world careers. Students can also further engage with the public and private sectors through industry projects and professional development opportunities.

INTERNSHIPS

Internships provide students with the opportunity to integrate the academic knowledge and skills they have developed in their program with genuine work experience.

In addition to developing employability skills and attributes, students improve their knowledge of how science and technology is applied in different organisations, experience a workplace culture first-hand and are encouraged to explore potential career pathways.

Placements vary in length and can be offered locally or internationally. Some subjects are supplemented by pre and post-placement classes designed to help students develop an understanding of science and technology professions and employer requirements in these domains.

Students will also learn how to recognise and articulate their employability skills and attributes, as well as how to identify gaps in the skills they need to focus on and develop. The placements intend to draw on students’ specific discipline skills associated with the science core of their degree, but also provide opportunities to explore the broader application of science and technology in the workplace.

INDUSTRY PROJECTS

These projects apply the talents of our graduate students to building the business of our industry partners. Students have the opportunity to develop and produce projects for partner organisations, drawing on their scientific, personal and professional skills in the process.

Past industry projects have been conducted in partnership with:

- Government agencies including Parks Victoria, the Department of Environment, Land, Water and Planning (formerly the Department of Environment and Primary Industries) and the City of Melbourne
- Global corporations including CSL, Visy, AJ Biologics, AstraZeneca, Murray Goulburn and Merck Millipore
- Start-up companies including BioDiem and Altrutec
- Industry organisations including AusBiotech, and the Nursery and Garden Industry of Victoria

INDUSTRY SEMINARS AND NETWORKING EVENTS

Graduate students have opportunities to connect with industry professionals and to find out how science is implemented outside of the classroom. Guests come from public and private enterprises to talk about their experiences and share insights into the type of work happening within their organisations, their own personal career progressions, and emerging markets and future career growth areas.

GRADUATE AMBASSADOR PROGRAM

The Graduate Ambassador Program is an opportunity for students to volunteer with the Faculty of Science as an ambassador for their particular course. Successful applicants will attend events and activities on behalf of the University, including Open Day and Graduate Study Expos. They will have the chance to develop leadership and teamwork skills, network with current, new and prospective students, improve their written and verbal communication techniques, and learn professional skills across many different fields.
BEFORE APPLYING

Please read and review the University of Melbourne’s entry standards, prerequisites and requirements before submitting an application. This includes the University’s English language requirements, detailed below:

<table>
<thead>
<tr>
<th>Program</th>
<th>IELTS (academic English only)</th>
<th>TOEFL (paper-based test)</th>
<th>TOEFL (internet-based test)</th>
<th>Pearson Test of English (academic)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All graduate programs offered by the Faculty of Science</td>
<td>6.5 (no band less than 6.0)</td>
<td>577 + TWE 4.5</td>
<td>79 + Writing 21; Speaking 18; Reading 13; Listening 13</td>
<td>58-64 inclusive and no communicative skill below 50</td>
</tr>
</tbody>
</table>

Ensure you submit a complete application, as incomplete applications will not be assessed.

Additional information about courses, subject choices and prerequisites can be found online; visit: handbook.unimelb.edu.au
Students are encouraged to refer to this website for the most up-to-date course and application information.

FINDING A SUPERVISOR FOR RESEARCH PROGRAMS

Some courses require students to consider potential academic supervisors prior to submitting an application; this is specified on the individual course pages. In some courses, a supervisor must be confirmed prior to admission, while other courses only require students to identify supervisors who they are interested in working with.

The University of Melbourne’s ‘Find an Expert’ website, which features all current academics and their research interests and availabilities, may assist you in identifying a potential supervisor to contact; visit: findanexpert.unimelb.edu.au. It is suggested that students contact potential supervisors via email, with an attached transcript of results, and provide a brief background of information about yourself, your research interests and why you would like to work with this particular supervisor.

SUBMITTING AN APPLICATION - LOCAL STUDENTS

Local students are required to submit an online application for all graduate programs offered by the Faculty of Science. For more information, visit: graduate.science.unimelb.edu.au/how-apply

SUBMITTING AN APPLICATION - INTERNATIONAL STUDENTS

International students can apply using one of the following options:
- Online direct to the University of Melbourne
- Through one of our overseas representatives

For more information, visit: graduate.science.unimelb.edu.au/how-apply

TIMELINES

Applications generally close for Semester 1 entry towards the end of November, and for Semester 2 entry towards the end of May. You can check the status of your application by logging into the Online Application System. Upon receiving an offer, you are responsible for accepting this offer and enrolling in your course. Orientation for new graduate students will occur in the weeks preceding the start date of semester.

“My favourite part of the program is actually the postgraduate student community in the School of Mathematics and Statistics. There are many student-run reading groups and seminar groups aimed at understanding some particular advanced topic. It can be really exciting to be involved in these, and to learn and figure things out as a group.

I would really encourage anyone considering studies in the Graduate School of Science to give it a go. Whether you’re interested in research or just want to delve deeply into a subject, there’s probably a course you’d love doing.”

Dougal Davis
Master of Science (Mathematics and Statistics)
LOCAL STUDENTS
Local students enrolling in a graduate program have the following fee options:

**Australian Fee Place**
Under this fee option, you will be required to pay the full cost of your tuition fees. Except for courses offered by the Office for Environmental Programs, all fee-paying graduate students are charged course-based fees.

**FEE-HELP**
FEE-HELP is an Australian government loan program to assist eligible fee-paying students with their tuition fees. You then repay your loan through the Australian taxation system when your income is above the minimum repayment threshold.

**Commonwealth Supported Place (CSP)**
A limited number of Commonwealth Supported Places are available for each program. Under this fee option, you will pay a student contribution amount, with this amount determined each year by the Australian Government and the subjects in which you enrol. The exact cost of your student contribution depends on the subjects you take, not the course you are studying.

Payment of the student contribution amount can be made prior to the census date (upfront), or can be deferred through HECS-HELP, the Australian government’s Higher Education Loan Program. HECS-HELP is an interest-free loan that enables Australian citizens and permanent humanitarian visa holders to defer payment of fees (the student contribution amount), then pay this loan back over time when your income is above the minimum repayment threshold.

**Research Training Scheme (RTS)**
The Australian Government’s Research Training Scheme is available to local students undertaking a Doctor of Philosophy (PhD) or Master of Philosophy (MPhil). Places offered under the RTS are exempt from tuition fee payment for the normal duration of the course.

For more information about fees, visit: [graduate.science.unimelb.edu.au/fees](http://graduate.science.unimelb.edu.au/fees)

INTERNATIONAL STUDENTS
Tuition fees are paid in Australian dollars and charged for each year that you are enrolled. You will pay tuition fees upfront according to your exact enrolment in any given semester. Except for courses offered by the Office for Environmental Programs, the tuition fees are course-based, which means you’ll pay according to the course you are undertaking, not the subjects you are studying. International students enrolled in a PhD or MPhil who are not awarded a fee remission scholarship will incur tuition fees.

For more information about fees, visit: [graduate.science.unimelb.edu.au/fees](http://graduate.science.unimelb.edu.au/fees)

**SCHOLARSHIPS**
The University of Melbourne has a range of scholarships, awards and other funding opportunities available to graduate students, both local and international. The Faculty of Science also has specific scholarships and awards available.

Scholarships may be merit-based or needs and circumstances-based, and range from one-off payments to annual stipends, full tuition waivers and funding for specific activities/items (eg relocation, residential costs or overseas study).

For more information about available scholarships and eligibility, visit: [futurestudents.unimelb.edu.au/admissions/scholarships](http://futurestudents.unimelb.edu.au/admissions/scholarships)

**FINANCIAL SUPPORT**
Many graduate courses at the University of Melbourne have been approved by the Australian Government for student income support payments such as Youth Allowance, Austudy and Abstudy. Eligible students undertaking approved graduate courses may be able to access these schemes. For more information about student income support payments, and general financial aid and assistance, visit: [services.unimelb.edu.au/finaid](http://services.unimelb.edu.au/finaid)

“"The field work involved in studying Earth Sciences adds extra costs that other disciplines don’t have. The Professor Kernot Scholarship helped fund my fieldwork in Africa, and has also been great for my professional development.”

**Jamie Rodden**
Master of Science (Earth Sciences) Professor Kernot Research Scholarship Recipient
MASTERS BY COURSEWORK
(RESEARCH TRAINING)

The Master of Science is a distinctive suite of programs designed to give you options in advanced research training, specialised coursework studies and professional skills development.

Designed in consultation with national and international educators, as well as employers from government and industry, the Master of Science prepares you for your career in science, or serves as a foundation for entry into a Doctor of Philosophy (PhD).

A key component of the Master of Science is the Research Project, which provides ideal preparation for potential graduate research studies, or builds sufficient expertise for graduates to be considered experts in a scientific field. The extensive nature of the project enables you to address substantive scientific questions, thereby developing excellent research skills and potentially publishing results in scientific literature.

PROFESSIONAL SKILLS SUBJECTS
The professional skills subjects in the Master of Science offer students the opportunity to expand the horizons of their technical and scientific knowledge and expertise by engaging those skills beyond the research lab and academy. These electives should both complement your Research Project by honing your professional skills and help you develop the skills that will enable you to engage the world with your research.

Subject choices and availability will depend on each individual stream. Options include:
- Business Tools: Money, People & Processes
- Business Tools: The Market Environment
- Science Communication
- Communication for Research Scientists
- Systems Modelling & Simulation
- Statistics for Research Workers
- Ethics & Responsibility in Science
- Science in Schools
- Industry Project in Science
- Science Internship
- Thinking & Reasoning with Data

For a full list of professional skills subjects specific to your chosen stream, visit: handbook.unimelb.edu.au

ENTRY REQUIREMENTS
An undergraduate degree with a major in an appropriate discipline, with at least a 65% average in the major (or equivalent), is required for all streams in the Master of Science. Additional entry requirements are listed for entry into each individual stream on the corresponding page.

MASTER OF SCIENCE PLUS PHD
(RESEARCH TRAINING PROGRAM IN SCIENCE)
This is a pathway for high-achieving students interested in pursuing research studies. Students accepted into one of the following Master of Science streams with a weighted average mark of 80% or higher in the prerequisite major of their undergraduate degree are eligible for a conditional offer* into the Doctor of Philosophy (PhD) program: BioSciences, Chemistry, Earth Sciences, Ecosystem Science, Geography, Mathematics and Statistics, Physics and Vision Sciences This is a five-year course of study comprising the Master of Science and the PhD.

*This offer is conditional upon completion of the Master of Science with a weighted average mark of 80% or higher over the entire course of study (200 credit points). The Faculty of Science will guarantee the availability of at least one supervisor for the PhD in a relevant discipline.

Note: This conditional offer does not cover PhD scholarships; you will still need to apply for PhD scholarships separately.

“My favourite part is the research component. It’s a project that is self-initiated and motivated. I can decide what experiment I want to do, how to do them, and can claim the results as my own. There is nothing better than being the first person to discover something that no one else has seen. By the end, whilst stressful, you compile all of your work and effort into a thesis, and maybe even get the opportunity to publish your work for the world.”

Peter Markworth
Master of Science (Chemistry)
**PROGRAM DETAILS**

**Entry**
Semester 1 (February).
Mid-year intake (July) may be available.

**Additional entry requirements**
Undergraduate major disciplines that are appropriate for entry into this stream include: Biology and Biomedicine, Computer Science, and Mathematics and Statistics. Students must have completed at least one semester of university level study in calculus, and some experience in basic programming is desirable.

Visits: [graduate.science.unimelb.edu.au/master-of-science-bioinformatics](http://graduate.science.unimelb.edu.au/master-of-science-bioinformatics)

Bioinformatics is often described as the future of biology research: it is a multidisciplinary field that combines all areas of biology (including genetics, molecular biology, biochemistry and physiology) with computer science, statistics and applied mathematics to help understand biology and biological processes. Bioinformaticians act as an effective bridge between biologists and computer scientists.

The Master of Science (Bioinformatics) program draws on the expertise of high profile researchers and practitioners situated in the heart of the internationally renowned Parkville biomedical research precinct, one of the most highly concentrated biological research and health services precincts in the world.

This stream provides a broad education in bioinformatics, with strong foundations in computer science. Students will undertake independent research in bioinformatics with the potential to progress to a PhD degree.

Depending on your entry pathway (Biology, Computer Science or Mathematics and Statistics), you will take a customised set of first year subjects. All students take a common second year.

**CAREER OUTCOMES**
Bioinformatics is one of the key sciences of the new century and demand for specialists in the area is strong and growing. As a graduate of this program, you may enjoy a rewarding career in:
- Bioinformatics
- Scientific programming
- Computational biology

**SUBJECT CHOICES**

**Discipline core subjects**

**Biology and Biomedicine stream**
Students must take:
- Elements of Probability
- Programming & Software Development
- Elements of Statistics
- Algorithms & Complexity

**Computer Science stream**
Students must take:
- Genes Molecules & Cells (25 credit points)
- Elements of Probability
- Human Physiology
- Elements of Statistics

**Mathematics and Statistics stream**
Students must take:
- Genes Molecules & Cells (25 credit points)
- Programming & Software Development
- Human Physiology
- Algorithms & Complexity

**All streams**
Students must take:
- Elements of Bioinformatics
- Statistics for Bioinformatics
- Bioinformatics Research Project
- Bioinformatics Case Studies
- Algorithms for Functional Genomics

Plus one of:
- Computational Genomics
- Genomics and Bioinformatics

**Elective subjects**

**Biology and Biomedicine stream**
Students select two elective subjects in consultation with the Course Coordinator.

**Computer Science and Mathematics and Statistics streams**
Students select one elective subject in consultation with the Course Coordinator.

**Professional skills subjects**

**All streams**
Students must take:
- Communication for Research Scientists

**Research Project**
The Research Project involves the development and application of the tools of bioinformatics to address a significant research problem. The subject provides students with skills and knowledge for understanding original research, and enhanced written and oral communication skills.

The process of matching students with supervisors and projects will occur in the first semester of enrolment. Apart from the help and guidance from their supervisor(s), each student also has a committee that regularly meets with them and provides additional help and expertise. The Bioinformatics Research Project will be completed for a total of 50 credit points.

**SAMPLE COURSE PLAN (BIOLOGY/BIOMEDICINE STREAM)**

<table>
<thead>
<tr>
<th>First year Semester one</th>
<th>Elements of Bioinformatics</th>
<th>Elements of Probability</th>
<th>Programming &amp; Software Development</th>
<th>Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year Semester two</td>
<td>Elements of Statistics</td>
<td>Algorithms &amp; Complexity</td>
<td>Elective</td>
<td>Research Project</td>
</tr>
<tr>
<td>Second year Semester one</td>
<td>Statistics for Bioinformatics</td>
<td>Communication for Research Scientists</td>
<td>Genomics &amp; Bioinformatics</td>
<td></td>
</tr>
<tr>
<td>Second year Semester two</td>
<td>Bioinformatics Case Studies</td>
<td>Algorithms for Functional Genomics</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**PROGRAM DETAILS**

**Entry**
Semester 1 (February).
Mid-year intake (July) available.

**Additional entry requirements**
An undergraduate degree in a discipline appropriate to the Master of Science (BioSciences) with a weighted average mark of at least 65% in the best 50 points in appropriate discipline studies at third year.

Visit: graduate.science.unimelb.edu.au

The Master of Science (BioScience) gives students the opportunity to undertake a substantive Research Project in one of the discipline areas available within the School of BioSciences: Ecology, Evolution and Environmental Science; Genetics, Genomics and Development; and Plant Science. The program offers students the flexibility to develop their own interests by selecting from a broad range of coursework subjects, including core discipline study and a professional skills component that provides high-level training in the areas of communication, business and science application. The Masters of Science (BioSciences) is a pathway to PhD study or to the workforce.

**CAREER OUTCOMES**
As a graduate of this program, you may enjoy a rewarding career in:
- Environmental & agricultural sciences
- Science outreach & communications
- Research & development
- Endangered species monitoring
- Resource management
- Regulatory agencies

**SUBJECT CHOICES**

**Discipline core subjects**
Students select one subject from:
- Graduate Seminar: Environmental Science
- Graduate Seminar in Ecology & Evolution
- Advanced Seminars in Physiology
- Current Topics in Developmental Genetics

**Plus one of:**
- Thinking & Reasoning with Data
- Biometry

**Elective subjects**
Students select 25 to 37.5 points of discipline elective subjects. A student may complete a Level 3 subject if no suitable alternative is available at the graduate level. Students wishing to take a second-year subject or more than one third-year subject will need the approval of the MSc Coordinators and the Associate Dean (Graduate Programs).

**Professional skills subjects**
Students must take:
- Communication for Research Scientists
And may choose one subject from the available professional skills subjects; see the full list on page 6.

**SAMPLE COURSE PLAN**

<table>
<thead>
<tr>
<th>First year Semester one</th>
<th>Current Topics in Developmental Genetics</th>
<th>Elective</th>
<th>Elective</th>
<th>Research Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year Semester two</td>
<td>Biometry</td>
<td>Elective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second year Semester one</td>
<td>Communication for Research Scientists</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second year Semester two</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

“Feeling like a part of a close-knit team of talented botanists is the most rewarding thing for me at this early stage of my degree. Visiting the plantation I will be sampling from, where Bosisto’s Eucalyptus oil is sourced and seeing a steam distillery in action was an exciting and eye-opening experience.”

Demi Gamble
Master of Science (Botany)

**Research Project**
The Research Project involves laboratory or field-based experimental research in an area of ecology and evolutionary biology, genetics, genomics and developmental biology, or plant biology. The projects cover a broad range of research from molecular to population and evolutionary biology in micro-organisms, insects, plants and animals. The project will be based in the laboratory of an academic staff member in the School of BioSciences or an approved external supervisor, depending on the particular Research Project. This aims to develop a range of experimental and technical skills, a capacity to set goals and to design and plan experiments.

The project will be taken over four consecutive semesters, beginning in the semester of entry, and will be completed for a total of 125 credit points.
CAREER OUTCOMES
Chemistry is applied to many fields of industry and research. As a graduate of this program, you may enjoy a rewarding career in:
- Commercial & government laboratories
- Science outreach & communication
- Environmental monitoring & remediation
- Renewable energy
- Patent law
- Education
- Commercial, pharmaceutical or industrial companies
- Food manufacturing & food science
- Scientific instrumentation
- Nanomaterials
- Investment analysis
- Policy development
- Scientific industries sales & service

SUBJECT CHOICES

Discipline core subjects
Students must take:
- Advanced Spectroscopy

Elective subjects
Students select two to four subjects from:
- Chemical Synthesis & Characterisation 1
- Chemical Synthesis & Characterisation 2
- Advanced Chemical Applications 1
- Advanced Chemical Applications 2

Professional skills subjects
Students select one or two subjects from the available professional skills subjects; see the full list on page 6.

Research Project
The Research Project involves undertaking experimental and/or theoretical research in an area currently relevant to one of the research groups in the School of Chemistry. It will enable students to develop the process and practice of chemical research, increase the student’s knowledge and understanding of chemical science, encourage the development of individual investigative skills, critical thought and the ability to evaluate information and to analyse experimental data, and ensure that students receive essential training in laboratory safety procedures.

The project will be taken over four consecutive semesters, starting in the semester of entry.

The Chemistry Research Project will be completed for a total of 125 credit points.

SAMPLE COURSE PLAN

<table>
<thead>
<tr>
<th>First year Semester one</th>
<th>Advanced Spectroscopy</th>
<th>Chemical Synthesis &amp; Characterisation 1</th>
<th>Research Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year Semester two</td>
<td>Advanced Chemical Applications 1</td>
<td>Science in Schools</td>
<td></td>
</tr>
<tr>
<td>Second year Semester one</td>
<td>Business Tools: The Market Environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second year Semester two</td>
<td>Advanced Chemical Applications 2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Discipline core
- Professional skills subject
- Elective
- Research Project
The Master of Science (Computer Science) program is coordinated by the Department of Computing and Information Systems in the Melbourne School of Information; visit: cis.unimelb.edu.au for more information about the Department.

Our research focuses on three core areas: Distributed and Parallel Computing, Declarative Languages, and Knowledge Technologies such as data mining, bioinformatics, and language analysis and web search. The University of Melbourne is the most exciting technology hub in the country, home to the Victorian Life Sciences Computation Initiative and our associated research collaboration with IBM.

During a Master of Science (Computer Science) students will study core subjects, undertake a Research Project, and choose from one of three specialisations.

### PROGRAM DETAILS

**Entry**
Semester 1 (February).
Mid-year intake (July) available.

**Additional entry requirements**
An undergraduate degree with a major in Computer Science or equivalent. Students must have studied at least 25 points of university level Mathematics or Statistics subjects (in addition, some knowledge of formal logic and discrete mathematics, and second-year university level Mathematics/Statistics are recommended).

Visit: [graduate.science.unimelb.edu.au/master-of-science-computer-science](http://graduate.science.unimelb.edu.au/master-of-science-computer-science)

### CAREER OUTCOMES

As a Computer Science graduate, you will be well prepared for a career in research and industry, and/or further PhD studies. As a graduate of this program, you may enjoy a rewarding career in:
- Applications programming
- Information architecture
- Systems & network analysis
- Software designing & engineering
- Project management
- Computational research

### PROFESSIONAL ACCREDITATION

This course has Euro-Inf® accreditation. The Euro-Inf® system is awarded to informatics degree programs that meet a set of international professional standards. This label is recognised as a mark of quality by employers worldwide and facilitates easier access to other Euro-Inf® Masters programs, allowing for greater academic and professional mobility.

### SUBJECT CHOICES

**Discipline core subjects**
Students must take:
- Knowledge Technologies
- Declarative Programming
- Distributed Systems
- Research Methods

*Students who have taken any of these subjects or equivalent as part of their undergraduate studies are exempt from this requirement, and will make up an equivalent number of subject points from the pool of elective subjects.*

**Elective subjects**
Students select four or five subjects from:
- Advanced Database Systems
- Algorithms for Functional Genomics
- Computational Genomics
- Web Search & Text Analysis
- Cryptography & Security
- Programming Analysis & Transformation
- Programming Language Implementation
- Software Agents
- Constraint Programming
- Cluster & Cloud Computing (PDC)
- Parallel & Multicore Computing
- Sensor Networks & Applications
- Mobile Computing Systems Programming
- Distributed Algorithms
- Statistical Machine Learning
- Advanced Theoretical Computer Science

**Professional skills subjects**
Students select one or two subjects from the available professional skills subjects; see the full list on page 6.

**Research Project**
The Research Project provides students with an opportunity to deepen and apply their computer science knowledge, addressing a challenging research problem in areas such as distributed and cloud computing, complex and intelligent systems, knowledge discovery and optimisation, and programming languages. Projects may involve significant software systems development. The aims of the project, research questions, methodology, software design and implementation, experiments and analyses are guided by the expertise of a supervisor from the Department of Computing and Information Systems. Students will prepare a thesis and undertake an oral presentation and/or demonstration of their outcomes in the final semester of their project. Completion of the project is an excellent basis upon which to begin a Research Program, or to enter industry with valuable specialised skills.

### SAMPLE COURSE PLAN

<table>
<thead>
<tr>
<th>First year</th>
<th>Knowledge Technologies</th>
<th>Constraint Programming</th>
<th>Computational Genomics</th>
<th>Science in Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester one</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First year</td>
<td>Declarative Programming</td>
<td>Advanced Database Systems</td>
<td>Parallel &amp; Multicore Computing</td>
<td>Research Project</td>
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<tr>
<td>Semester two</td>
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<tr>
<td>Second year</td>
<td>Distributed Systems</td>
<td>Web Search &amp; Text Analysis</td>
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<tr>
<td>Semester one</td>
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<tr>
<td>Second year</td>
<td>Research Methods</td>
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<tr>
<td>Semester two</td>
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</table>

Legend: Discipline core, Professional skills subject, Elective, Research Project
Coordinated by the School of Earth Sciences, the Master of Science (Earth Sciences) program offers two streams: Atmospheric Science and Geology.

The School of Earth Sciences is home to diverse research activities that are well supported by equipment and technology both in the lab and field. Our research interests include the solid Earth, the fluid Earth (including our atmosphere and oceans) and processes that operate at the interface between these regions. Current research activities include: climate variability and change, sedimentary geology, palaeontology, and the physics and chemistry of the Earth’s deep interior.

**PROGRAM DETAILS**

**Entry**
Semester 1 (February).
Mid-year intake (July) available.

**Additional entry requirements**
Undergraduate major disciplines that are appropriate for entry into this stream include: Agricultural Science, Biochemistry, Botany, Chemistry, Climate and Weather, Engineering, Environmental Science, Food Science, Genetics, Geography, Geology, Mathematics and Statistics, Microbiology, Physics, Plant Science and Zoology.

Students entering this stream are expected to have organised an academic supervisor within the School of Earth Sciences as part of the application process - see page 5 'Finding a supervisor' for more information.

Visit: graduate.science.unimelb.edu.au/master-of-science-earth-sciences

**CAREER OUTCOMES**

As a graduate of this program, you may enjoy a rewarding career in:
- Government organisations
- Research institutions
- Environmental consultancy
- Oil, gas & mining industries
- Climatology
- Environmental consulting
- Environmental, exploration, mine or resources geology
- State geological surveying
- Weather forecasting

**SUBJECT CHOICES**

**Discipline core subjects**

**Atmospheric Science stream**

Students select four subjects from:
- Climate Analysis & Modelling
- Atmosphere Ocean Interaction & Climate
- Mesoscale Atmospheric Dynamics
- Current Topics in Atmospheric Science A
- Current Topics in Atmospheric Science B
- Current Topics in Atmospheric Science C

**Geology stream**

Students select four subjects (with two corresponding to your thesis topic) from:
- Geoscience in the Field
- Hydrogeology & the Environment
- Geophysics
- Deposit Models & Mineral Exploration
- Mineralogy & Mineral Identification
- The Geology of Ore Deposits
- Digital Geoscience
- Hydrogeology/Environmental Geochemistry
- Geochemistry & Geochronology
- Surface Processes & Geodynamics
- Energy
- Palaeontology & Biogeochemistry
- Structural Geology & Geodynamics
- Earth’s Biogeochemical Cycles
- Current Topics in Geology A
- Current Topics in Geology B
- Current Topics in Geology C
- Current Topics in Geology D

**Professional skills subjects**

**All streams**

Students select one or two subjects from the available professional skills subjects; see the full list on page 6.

**Research Project**

The Research Project comprises a major piece of original supervised research on a topic as agreed by the student and their supervisor.

Research topics may include: sedimentology, geochemistry, mineral exploration, climate of the past, structural geology and tectonics, geochronology, petrology, atmospheric composition, climate variability and change, and mesoscale atmospheric processes. Students will take responsibility for their own Research Project, including the design and management of field and/or laboratory experiments, where appropriate, collection, analysis and interpretation of data, and communication of research findings through oral and written presentations.

**SAMPLE COURSE PLAN (ATMOSPHERIC SCIENCE STREAM)**

<table>
<thead>
<tr>
<th>First year Semester one</th>
<th>Current Topics in Atmospheric Science A</th>
<th>Systems Modelling &amp; Simulation</th>
<th>Research Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year Semester two</td>
<td>Current Topics in Atmospheric Science B</td>
<td>Mineralogy &amp; Mineral Identification</td>
<td></td>
</tr>
<tr>
<td>Second year Semester one</td>
<td>Current Topics in Atmospheric Science C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second year Semester two</td>
<td>Atmosphere Ocean Interaction &amp; Climate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Discipline core
- Professional skills subject
- Elective
- Research Project
The Master of Science (Ecosystem Science) offers students the flexibility to develop their own interests by selecting from a wide range of coursework subjects, including discipline core subjects and a professional skills module that provides high-level training in the areas of science communication, data analysis and modelling, ethics and/or leadership in science.

This degree provides students with essential skills, knowledge and research training through a Research Project in one of the discipline areas represented in the School of Ecosystem and Forest Sciences. These include: conservation biology, ecology, ecophysiology, environmental psychology, environmental and landscape management, forest science, genetics, horticulture, hydrology and soil science.

CAREER OUTCOMES
As a graduate of this program, you may enjoy a rewarding career in:
- Environmental consultancy
- Research
- Government & non-profit organisations
- Conservation

PROGRAM DETAILS
Entry
Semester 1 (February).
Mid-year intake (July) available.

Additional entry requirements
An undergraduate degree in an appropriate discipline, such as: Agricultural Science, Botany, Ecology, Environmental Science, Environmental Management, Environmental Studies, Environmental Engineering, Forest Science, Genetics, Geography, Geology, Hydrology, Environmental Psychology, Soil Science, and Zoology, with a weighted average mark of at least 65% in the best 50 points in appropriate discipline studies at third year.

Visit: graduate.science.unimelb.edu.au

SUBJECT CHOICES

Discipline core subjects
Students select one subject from:
- Research Methods For Life Sciences
- Research Philosophies & Statistics
- Social Research Methods
- Biometry
- Statistics for Research Workers

Plus one of:
- Graduate Seminar: Environmental Science
- Graduate Seminar in Ecology & Evolution

Elective subjects
Students select 25 points of discipline elective subjects appropriate to their Research Project, in consultation with their supervisor. These electives can be chosen from the list of Level 9 science subjects. A student may complete a Level 3 subject if no suitable alternative is available at the graduate level.

Professional skills subjects
Students select two subjects from the available professional skills subjects; see the full list on page 6.

Research Project
The Research Project provides students with the opportunity to design and conduct independent research in one or more disciplines within the broad field of ecosystem science. Students will also develop skills in critically evaluating new knowledge within one or more scientific paradigms. Specific Research Projects will depend upon the availability of appropriate expertise, but may address questions in conservation biology, ecology, ecophysiology, environmental psychology, environmental and landscape management, forest science, genetics, horticulture, hydrology and/or soil science. Students will take responsibility for their own project, including the design and management of field and/or laboratory experiments, where appropriate; collection, analysis and interpretation of data; and communication of research findings through oral and written presentations.

The project will be completed over four consecutive semesters starting from the semester of entry, and will be completed for a total of 125 credit points.

SAMPLE COURSE PLAN

<table>
<thead>
<tr>
<th>First year</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Semester one</td>
<td>Research Methods for Life Sciences</td>
<td>Elective</td>
<td>Ethics &amp; Responsibility in Science</td>
<td>Research Project</td>
</tr>
<tr>
<td>First year</td>
<td>Graduate Seminar: Environmental Science</td>
<td>Elective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semester two</td>
<td>Professional skills subject</td>
<td></td>
<td></td>
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<tr>
<td>Second year</td>
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<tr>
<td>Semester one</td>
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<tr>
<td>Second year</td>
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<tr>
<td>Semester two</td>
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</tbody>
</table>
Epidemiologists are the medical detectives for populations. They solve puzzles about who gets diseases, what causes disease and how to prevent disease. Epidemiology is often called the basic science of public health, but its principles extend to clinical research and practice. Epidemiologists come from many academic disciplines, including biological and medical sciences, statistics, mathematics, physical sciences, engineering, social sciences, humanities and law, to name a few. To be a good epidemiologist, you need to have a curious and critical mind, and be comfortable working with numbers.

The Master of Science (Epidemiology) is taught by the Melbourne School of Population and Global Health, which is in the Faculty of Medicine, Dentistry and Health Sciences. The School has strong programs of epidemiological research in many areas of importance for public health in Australia and globally. For more information about the School, visit: mspgh.unimelb.edu.au

In this course, students will have the opportunity to undertake independent research in epidemiology with the potential to progress to a graduate research degree.

CAREER OUTCOMES
Epidemiologists are in high demand because of a national shortage. As a graduate of this program, you may enjoy a rewarding career in:
- Medical research institutes
- Universities
- Pharmaceutical companies
- Biotechnology companies

“...I love how wide ranging epidemiology can be. You can live anywhere and study almost anything to do with health. It is an opportunity to make real change in health and in healthcare for many people around the world.”

Julia Maguire
Master of Science (Epidemiology)
Geography is one of the most diverse fields of academic study. It seeks to understand the range of environmental and spatial processes that shape the world around us, and the interactions between humans and the environment. The intellectual focus of geography is summarised by the following key terms: space, place, landscape, processes, scale and environment. This setting will enable students to gain practical and relevant experience informed by dedicated staff with the latest knowledge available in the field.

CAREER OUTCOMES

As a graduate of this program, you may enjoy a rewarding career in:

- Environmental management and planning
- Education
- Research
- Policy development
- Geographic information systems
- Data analysis

SAMPLE COURSE PLAN (INTEGRATED GEOGRAPHY STREAM)

<table>
<thead>
<tr>
<th>First year Semester one</th>
<th>Contemporary Geographical Thought</th>
<th>Business Tools: The Market Environment</th>
<th>Ethics &amp; Responsibility in Science</th>
<th>Research Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year Semester two</td>
<td>Statistics for Research Workers</td>
<td>Social Impact Assessment &amp; Evaluation</td>
<td>Climate Change Politics &amp; Policy</td>
<td></td>
</tr>
<tr>
<td>Second year Semester one</td>
<td>Integrated River &amp; Catchment Management</td>
<td>Foundations of Spatial Information</td>
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<tr>
<td>Second year Semester two</td>
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</tr>
</tbody>
</table>

- Discipline core
- Professional skills subject
- Elective
- Research Project

*Not all electives are available to all streams.

Additional entry requirements

Students entering this stream are expected to have organised an academic supervisor within the School of Geography as part of the application process; see page 5 ‘Finding a supervisor’ for more information.

Visit: handbook.unimelb.edu.au

Mid-year intake (July) may be available.

Entry

Semester 1 (February).

SUBJECT CHOICES

Discipline core subjects

Students choose from one of three streams within Geography:
- Physical Geography [P]
- Human Geography [H]
- Integrated Geography [I]

Each stream has specific discipline core subjects; visit handbook.unimelb.edu.au

Elective subjects

Students select four or five subjects* from:
- Global Environment & Sustainability [P] [H] [I]
- Environmental Impact Assessment [P] [H] [I]
- Indigenous Land Management [P] [H] [I]
- Environmental Policy [P] [H]
- Conservation Genetics [P] [H]
- Coastal Landforms & Processes [P]
- River Ecology & Ecosystem Management [P]
- Integrated River & Catchment Management [P]
- Global Climate Change in Context [P] [I]
- Fluvial Geomorphology & Hydrology [P] [I]
- Foundations of Spatial Information [P] [I]
- Environmental Risk Assessment [P] [I]
- Integrated River & Catchment Management [I]
- Africa: Environment, Development, People [I]
- China Field Class PG [I] [H]
- The Political Ecology of Development [I] [H]
- Sustainable Development [I] [H]
- The Disaster Resilient City [I] [H]
- The Politics of Food [I] [H]
- Social Impact Assessment & Evaluation [I] [H]
- Climate Change Politics & Policy [I] [H]
- Sustainable Food Production [I] [H]
- Advanced Reading in Geography [H]
- Conservation & Cultural Environments [H]

*Not all electives are available to all streams.

Research Project

Students will produce a 20,000 to 25,000-word thesis that presents the results of a major Research Project. Students will conceive, design and implement this project over a two-year period, working independently but under the supervision of one or more School of Geography staff; although supervision from staff outside of the School of Geography is welcomed, the principal supervisor must be within the School of Geography. The research topic can be in any area of geography. The student may choose a topic proposed by a potential supervisor (where it usually forms part of the supervisor’s wider research program) or devise their own topic. An updated list of available staff topics and research areas of interest is available on request from the program coordinator.

In addition to acquiring expertise in specific sub-discipline areas of geography, the Research Project allows students to develop a set of key skills, particularly in: research design, critical thinking, in-depth literature research, independent problem solving, project management, data collection, management, interpretation and presentation, and oral and written communication skills. It constitutes solid training for PhD studies, as well as careers in research and development in both private and public-sector organisations.
The Master of Science (Mathematics and Statistics) offers coursework subjects at an advanced level which, together with the research component, will prepare students for a career in research and industry and/or further graduate research studies.

**CAREER OUTCOMES**

Qualified mathematicians and statisticians are in high demand due to a national shortage. Consequently, graduates of higher-level degrees in these areas often attract head-hunters and above-average salaries. As a graduate of this program, you may enjoy a rewarding career in:

- Quantitative or equities analysis
- Statistics
- Operations management

**SAMPLE COURSE PLAN (PURE MATHEMATICS SPECIALISATION)**

<table>
<thead>
<tr>
<th>First year Semester one</th>
<th>Measure Theory</th>
<th>Commutative &amp; Multilinear Algebra</th>
<th>Mathematical Statistical Mechanics</th>
<th>Mathematical Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year Semester two</td>
<td>Representation Theory</td>
<td>Groups, Categories &amp; Homological Algebra</td>
<td>Stochastic Calculus with Applications</td>
<td>Research Project</td>
</tr>
<tr>
<td>Second year Semester one</td>
<td>Algebraic Topology</td>
<td>Differential Topology &amp; Geometry</td>
<td>Systems Modelling &amp; Simulation</td>
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<tr>
<td>Second year Semester two</td>
<td>Introduction to String Theory</td>
<td>Statistical Modelling</td>
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</tbody>
</table>

*Discipline core  Professional skills subject  Elective  Research Project*
research collaborations worldwide in the major and emerging areas of physics; collaborations include the Large Hadron Collider at CERN in Geneva, the LIGO gravitational wave detector and the MWA low-frequency radio telescope.

The School of Physics hosts the headquarters:
- The Centre of Excellence for Particle Physics at the Tera_scale (CoEPP)
- the Centre of Excellence for Coherent X-Ray Science (CXS)
- Melbourne node of the Centre of Excellence for Quantum Computation and Communication Technology (CQC2T)
- Melbourne node of the Centre of Excellence for All-Sky Astrophysics (CAASTO).

It also plays a major role in the Australia Synchrotron research program.

CAREER OUTCOMES
As a graduate of this program, you may enjoy a rewarding career in:
- Research and development
- Informatics
- Statistics
- Public health
- Meteorology
- Government
- Information technology
- Financial modelling & services
- Management consulting
- Business analysis
- Engineering
- Forecasting
- Logistics
- Education

It is an exciting time to be studying physics, an enabling science that expands our knowledge of the universe and underpins new technologies that benefit our society.

Coordinated by the School of Physics, the Master of Science (Physics) program is designed to prepare graduates for a career as a professional physicist and/or further research studies in physics.

The School of Physics is well established and internationally respected for our research excellence, broad-based undergraduate courses, and a challenging and rewarding postgraduate experience. Our programs in astrophysics, theoretical particle physics and experimental particle physics explore questions relating to the origin, evolution and fate of our universe, addressing some of the most important and fundamental problems of our age.

The School of Physics has numerous

PROGRAM DETAILS
Entry
Semester 1 (February).
Mid-year intake (July) may be available.

Additional entry requirements
Students entering this stream are expected to have made contact with a minimum of three academic supervisors from a minimum of two different research areas/groups within the School of Physics in order of preference as part of the application process; see page 5 ‘Finding a supervisor’ for more information.

Visit: graduate.science.unimelb.edu.au/master-of-science-physics

SAMPLE COURSE PLAN

<table>
<thead>
<tr>
<th>First year Semester one</th>
<th>Quantum Mechanics</th>
<th>Quantum Field Theory</th>
<th>Research Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year Semester two</td>
<td>Particle Physics</td>
<td>Physical Cosmology</td>
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<tr>
<td>Second year Semester one</td>
<td>Thinking &amp; Reasoning with Data</td>
<td>General Relativity</td>
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</tr>
<tr>
<td>Second year Semester two</td>
<td>Quantum &amp; Advanced Optics</td>
<td>Condensed Matter Physics</td>
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</tr>
</tbody>
</table>

- Discipline core
- Professional skills subject
- Elective
- Research Project

SUBJECT CHOICES

Discipline core subjects
Students must take seven subjects from:
- Quantum Mechanics
- Quantum Field Theory
- General Relativity
- Statistical Mechanics
- Physical Cosmology
- Particle Physics
- Condensed Matter Physics
- Quantum & Advanced Optics

Students may substitute a maximum of two approved subjects at Level 3 or higher.

Professional skills subjects
Students select one subject from the available professional skills subjects; see the full list on page 6.

Research Project
In the Research Project, students undertake a substantial program of original research in one of the many research fields in which the School of Physics is active and internationally recognised: astrophysics, condensed matter physics, optics and particle physics. The research may be experimental and/or theoretical in nature. It will be conducted under the supervision of a member of the School’s academic staff. The results will be reported in the form of a substantial thesis. In most instances, it is expected that the results will also be submitted for publication in a learned scientific journal. As part of their introduction to the research topic, students will be required to complete a seminar series and/or reading course providing advanced theoretical and/or practical training in the field.
and neural processing of colour vision.

**CAREER OUTCOMES**
As a graduate of this program, you may enjoy a rewarding career in:
- Vision research & education
- Commercial & government laboratories
- Management
- Science outreach & communication
- Policy development
- Imaging technology design, sales & consulting
- Scientific and/or medical industries sales & service
- Commercial, optometric, or industrial spin-offs
- Science outreach & communication
- Policy development
- Imaging technology design, sales & consulting
- Scientific and/or medical industries sales & service
- Commercial, optometric, or industrial spin-offs

**SUBJECT CHOICES**

**Discipline core subjects**
Students must take:
- Graduate Seminar in Vision Science
- The Eye and Vision: A Window to Disease

**Elective subjects**
Students select two elective subjects available through the Master of Science program, in consultation with your research supervisor. Elective subjects will be selected to broaden your training and enhance your skills in your chosen research area. Where appropriate, you may complete a maximum of two approved Level 2 or Level 3 undergraduate subjects.

**Professional skills subjects**
Students select two subjects from the available professional skills subjects; see the full list on page 6.

**Research Project**
The Research Project involves laboratory experimental research in an area of vision science. The project will be based in the laboratory of an academic staff member in the Department of Optometry & Vision Sciences. Specific Research Projects will depend upon the availability of appropriate expertise, but may address a broad spectrum of vision science issues. The Research Project aims to develop a range of experimental and technical skills and a capacity to set goals and to design and plan experiments. Apart from the help and guidance of their supervisor(s), each student also has a committee that regularly meets with them and provides additional help and expertise.

Vision science is the interdisciplinary study of the visual system and visual perception. It is the study of ocular, systemic and neurological disease, underpinned by foundations in biomedical, computation, statistical or social expertise.

This program prepares students for a career in research and industry, and/or further graduate research studies. The Master of Science (Vision Science) is taught by the Department of Optometry and Vision Sciences, which is in the Faculty of Medicine, Dentistry and Health Sciences. For more information about the school, visit: optometry.unimelb.edu.au.

The Department has an outstanding record in producing high-quality graduates who are sought after by employers. We were the first optometry school in Australia to introduce therapeutic management of ocular disease into our curriculum, some five years prior to any other optometry school. Core research areas include: mechanisms of ocular disease, optical sciences, visual function in ocular disease, applied clinical vision sciences, visual and cognitive neuroscience, visual psychophysics and perception, ocular infections and immunology, eye movements, vision and biophotonics.
“I certainly didn’t envisage being a patent attorney. I knew that I loved science. Certainly right up until I started my PhD I thought I’d stay in research for my career. I realised towards the end of my PhD, and certainly after a couple of years of postdoc, that that wasn’t for me, but that I still really wanted to stay in science. So I started looking for careers that enabled me to use that really strong technical background, but without having to be in a lab environment.”

Sarah Hennebry
BA, BSc (Hons) 2003, PhD 2007, MIP Law 2013
Patent attorney and University of Melbourne alumn
Biotechnology is the use of living organisms, or their systems, to make products of value. It is a fundamental area of applied science that covers a diverse range of specialist fields necessary to take biological and medical knowledge from a discovery to a marketable product.

The Master of Biotechnology is designed to provide a higher level of specialised scientific learning together with executive skills training and options in business, communications and management. This degree provides the flexibility to choose from a range of electives to complement your specific interests and focus.

The University of Melbourne is a hub for biotechnology research, and draws on high profile, active researchers to teach into the course. Not only will you be taught by world leaders in biotechnology, you will also benefit from:

- Industry events, where you can network with guest speakers from industry

**CAREER OUTCOMES**

Biotechnology is applied to many fields of industry and research, such as in modern medicine and pharmaceuticals, animal breeding and food science. As a graduate of this program, you may enjoy a rewarding career in:

- Product development
- Project management
- Pharmaceutical manufacturing
- Investment analysis
- Quality control
- Food and beverage companies
- Scientific legislation/patent consulting
- Hospitals
- Education/universities
- Primary or biochemical industries

**SUBJECT CHOICES**

**Discipline core subjects:**

Students must take:

- Microscopy for Biological Sciences
- Metabolomics & Proteomics
- Advanced Molecular Biology Techniques
- From Lab to Life
- Genomics & Bioinformatics
- Project Management in Science
- Data & Decision Making
- Leadership in Science
- Commercialisation of Science
- Regulation of Biotechnology
- Scientists, Communication & the Workplace
- Industry Project in Biotechnology
- Genetically Modified Organisms

**Elective subjects**

Students select two* subjects from:

- Drugs in Biomedical Experiments
- Food Biotechnology
- Food Safety & Quality
- Functional Genomics & Bioinformatics
- Genes: Organisation & Function
- Tissue Engineering & Stem Cells
- Bioprocess Engineering
- Biotechnology Research Project (25 points)*
- Concepts in Cell & Developmental Biology
- Stem Cells in Development & Regeneration
- Plant Molecular Biology & Biotechnology
- Methods in Agrifood Biotechnology
- Animal Disease Biotechnology 1
- Animal Disease Biotechnology 2
- Business Tools: Money, People & Processes
- Business Tools: The Market Environment

*Students who select the Biotechnology Research Project will not select a second subject. The Biotechnology Research Project is only available to high-achieving Master of Biotechnology students.

**SAMPLE COURSE PLAN**

<table>
<thead>
<tr>
<th>First year</th>
<th>From lab to life</th>
<th>Genomics &amp; Bioinformatics</th>
<th>Data &amp; Decision Making</th>
<th>Project Management in Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester one</td>
<td>Advanced Molecular Biology Techniques</td>
<td>Metabolomics &amp; Proteomics</td>
<td>Commercialisation of Science</td>
<td>Scientists, Communication &amp; the Workplace</td>
</tr>
<tr>
<td>Semester two</td>
<td>Microscopy for Biological Sciences</td>
<td>Leadership in Science</td>
<td>Genetically Modified Organisms</td>
<td>Industry Project in Biotechnology</td>
</tr>
<tr>
<td>Second year</td>
<td>Regulation of Biotechnology</td>
<td>Food Safety &amp; Quality</td>
<td>Tissue Engineering &amp; Stem Cells</td>
<td></td>
</tr>
</tbody>
</table>

- Discipline core
- Elective
- Industry Project
The Master of Enterprise (Science) creates skilled professionals who generate value for their organisations and society through effective management of science and technology.

The degree develops awareness of technology-intensive organisations, with a focus on the specific skills of innovation and entrepreneurship. It provides the knowledge required to bring science and technology projects to commercial fruition, and to realise these innovations effectively in organisational settings.

This program attracts experienced professionals from a wide variety of industries. This, combined with innovative teaching methods, facilitates valuable relationships and high-level classroom engagement. Rich, conceptual frameworks are combined with the sharing of practical wisdom to provide a unique learning experience delivering immediate value to your organisation and career.

**CAREER OUTCOMES**
As a graduate of this program, you may enjoy a rewarding career in:
- Research and development management
- Regional quality management
- Regulatory/quality assurance

**SAMPLE COURSE PLAN**

<table>
<thead>
<tr>
<th>First year Semester one</th>
<th>Commercialisation of Science</th>
<th>Communicating Science Effectively</th>
<th>Marketing for Managers</th>
<th>Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year Semester two</td>
<td>Data &amp; Decision Making</td>
<td>Managerial Economics</td>
<td>Elective</td>
<td>Strategy, Ethics &amp; Governance</td>
</tr>
<tr>
<td>Second year Semester one</td>
<td>Project Management in Science</td>
<td>Production and Operations Management</td>
<td>Quantitative Analysis for Managerial Decisions</td>
<td>Innovation &amp; Entrepreneurship Project</td>
</tr>
</tbody>
</table>

**SUBJECT CHOICES**

**Enterprise core subjects**
Students select four subjects from:
- Behaviour & Leadership in Organisations
- Financial & Performance Management
- Managerial Economics
- Marketing for Managers
- Production & Operations Management
- Quantitative Analysis for Managerial Decisions
- Leadership & Management

**Science core subjects**
Students must take:
- Communicating Science Effectively
- Commercialisation of Science
- Data & Decision Making
- Project Management in Science

**Capstone subjects**
Students must take:
- Strategy, Ethics & Governance
- Innovation & Entrepreneurship Project

**Elective subjects**
Students select two subjects from the graduate level offerings in Science and Business, approved by the program director as relevant to the student’s enterprise or science interests.
The Master of Environment is a multi-disciplinary program that develops knowledge and skills for professional practice in environment or sustainability.

This suite of programs allows you to design your own degree, with flexible entry points and the option of choosing from a number of different set specialisations or a tailored specialisation.

You will also have the opportunity to participate in research, internship placements, overseas study and collaborative problem-solving projects.

The program is delivered by the Office for Environmental Programs (OEP); visit: environment.unimelb.edu.au for more information.

CAREER OUTCOMES

The Master of Environment is strongly linked with the business community and government organisations through the Community and Advisory Board. As a graduate of this program, you may enjoy a rewarding career in:

- Local, state and federal government
- Non-government organisations
- Environmental consultancy
- Environmental management
- Education
- Research

SUBJECT CHOICES

Students who undertake the Master of Environment may pursue one of a number of set specialisations or the tailored specialisation, subject to approval by an academic advisor. Each specialisation offers a wide choice of elective subjects, in addition to two core subjects. Students will meet with an advisor prior to selecting their subjects and specialisation.

Specialisations include:

- Climate Change
- Conservation & Restoration
- Development
- Education & Social Change
- Energy Efficiency Modeling & Implementation
- Environment & Public Health
- Environmental Science
- Governance, Policy & Markets
- Integrated Water Catchment Management
- Sustainable Cities, Sustainable Regions
- Waste Management
- Tailored Specialisation

“...The Master of Environment gave me a diverse environmental knowledge-base on which to draw in any number of situations and I was able to take subjects that interested and challenged me. The degree fostered my interest in a new field and allowed me to explore areas that would have been closed off to me in most other programs.

After working as an energy consultant I am now putting theory into practice — working with Green Empowerment in a project to install solar panels and grey water systems in remote villages in Nicaragua.”

Kirsten Midura
Master of Environment
The Master of Forest Ecosystem Science offers the knowledge, skills and analytical capabilities to shape the development of forest and natural resource management enterprises worldwide. Delivered in intensive residential mode at the Creswick campus, with supplementary off-campus study, you will learn about climate change science, water resource management and biodiversity conservation, and develop the ability to conduct crucial experimental work in the field. You will also benefit from connections and experiences with forest, land and fire agencies and non-government organisations.

The Graduate Certificate and Graduate Diploma of Bushfire Planning and Management and the Graduate Certificate and Graduate Diploma of Forest Systems Management are pathways to this program.

**CAREER OUTCOMES**

Graduates of this course will be prepared for management positions within the forest and natural resource management sectors. As a graduate of this program, you may enjoy a rewarding career in:
- Forest and environmental management
- Research and development
- Ecological consulting
- Timber management and processing
- Land care and wildlife conservation
- Climate change science and policy
- Forest carbon investment and accounting
- Banking and other primary industry investment
- Aid and development agencies in Australia and internationally

**SUBJECT CHOICES**

**Discipline core subjects**
Students select eight subjects from:
- Forest Ecosystems
- Bushfire Planning & Management
- Forest Assessment & Monitoring
- Silviculture & Forest Dynamics
- Sustainable Forest Management
- Forests & Water
- Ecological Restoration
- Forests in the Asia Pacific Region
- Forests, Carbon & Climate Change
- Farm Trees & Agroforestry
- Forest Operations
- Trees in a Changing Climate
- Bushfire & Biodiversity
- Timber, Sustainable & Renewable Material
- Forest Planning & Business Management
- Bushfire & Climate
- International Forest Policy

**Research subjects**
Students must take a minimum of 25 points and a maximum of 50 points of research project subjects.

**Elective subjects**
Students select the remainder of their course load from their non-core discipline subject list, other approved university electives, and:
- Finance Management for Agribusiness
- Research Philosophies & Statistics
- Social Research Methods
- Research Methods for Life Sciences
- Leadership
- Managerial Psychology
- Project Management
- Business Strategy
- Public Values, Contested Landscapes
- Community Natural Resource Management
- Bushfire Interface Design Workshop
- Bushfire Urban Planning
- Building Behaviour in Bushfires
- Bushfire Interface Science

**SAMPLE COURSE PLAN**

<table>
<thead>
<tr>
<th>First year Semester one</th>
<th>Forest Ecosystems</th>
<th>Financial Management for Agribusiness</th>
<th>Forest Assessment &amp; Monitoring</th>
<th>Bushfire Planning &amp; Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year Semester two</td>
<td>Trees in a Changing Climate</td>
<td>International Forest Policy</td>
<td>Forest Operations</td>
<td>Ecological Restoration</td>
</tr>
<tr>
<td>Second year Semester one</td>
<td>Bushfire &amp; Climate</td>
<td>Managerial Psychology</td>
<td>Building Behaviour in Bushfires</td>
<td>Research subject</td>
</tr>
<tr>
<td>Second year Semester two</td>
<td>Business Strategy</td>
<td>Project Management</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**SUBJECT CHOICES**

**Discipline core**
- Students select six to nine subjects from:
  - Advanced Field Geology
  - Applied Geophysics
  - Economic Geology
  - Sedimentary Geology
  - Geobiology & Paleobiology
  - Geochemistry & Petrogenesis
  - Tectonics & Geodynamics
  - Hydrogeology & the Environment
  - Hydrogeology/Environmental Geochemistry
  - Energy
  - Geochemistry & Geochronology
  - Digital Geoscience
  - Geophysics
  - Geoscience in the Field
  - Palaeontology & Biogeochemistry
  - Current topics in Geology A
  - Current topics in Geology B
  - Deposit Models & Mineral Exploration
  - The Geology of Ore Deposits
  - Surface Processes & Geodynamics
  - Structural Geology & Geodynamics
  - Mineralogy & Mineral Identification
  - Current Topics in Geology C
  - Current Topics in Geology D
  - Earth’s Biogeochemical Cycles

*Up to 50 points can be assigned to Level 3 subjects. Students would generally be expected to take 25 points of Level 3 subjects in the first semester of their program, unless they have already taken the relevant subjects or their equivalents.*

**Core practical work**
- Students must take:
  - Practical Earth Science A
  - Practical Earth Science B
  - Project in Geoscience

**Professional skills subjects**
- Students select three to six subjects from:
  - Business Tools: Money, People & Processes
  - Scientists, Communication & the Workplace
  - Commercialisation of Science
  - Science Communication
  - Statistics for Research Workers
  - Business Tools: The Market Environment
  - Communication for Research Scientists
  - Data and Decision Making
  - Leadership in Science
  - Project Management in Science
  - Presenting Academic Discourse
  - Science in Schools

**Research Project (optional)**
- Subject to student performance in Practical Earth Science A and accompanying coursework, and subject to supervisor availability, a student may undertake the Research Project in Geoscience (25 points). This project is designed for students who demonstrate high aptitude and potential for research.

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**PROGRAM DETAILS**

**Entry**
- Mid-year entry (July) available.
- Semester 1 (February) available from 2017.

**Entry requirements**
- An undergraduate degree in Science with a major in Geology/Earth Science, and a weighted average mark of at least 65% in the best 50 points in appropriate discipline studies at third year. Students must also have the appropriate prerequisite studies for the subjects to be undertaken.

Visit: [graduate.science.unimelb.edu.au](http://graduate.science.unimelb.edu.au)

The Master of Geoscience provides graduate level coursework and training in specialised streams of Geoscience. Graduates from a broad range of scientific backgrounds undertake intensive specialised subjects in geoscience, business and leadership topics taught by leading academics and industry professionals to gain expertise and professional skills in these fields.

You have the opportunity to study core and elective subjects in a range of geoscientific fields at leading Australian universities through established shared local and national teaching programs.

This program is intended to expand on an undergraduate degree in Geoscience for entry into a professional workplace, or for professionals wishing to up-skill in their chosen field.

**CAREER OUTCOMES**

As a graduate of this program, you may enjoy a rewarding career in:
- Research
- Environmental consultancy
- Conservation
- Geological surveying
- Government institutions

**SAMPLE COURSE PLAN**

<table>
<thead>
<tr>
<th>First year Semester one</th>
<th>Practical Earth Science A</th>
<th>The Geology of Ore Deposits</th>
<th>Geochemistry &amp; Geochronolog</th>
<th>Data &amp; Decision Making</th>
</tr>
</thead>
<tbody>
<tr>
<td>First year Semester two</td>
<td>Mineralogy &amp; Mineral Identification</td>
<td>Sedimentary Geology</td>
<td>Applied Geophysics</td>
<td>Commercialisation of Science</td>
</tr>
<tr>
<td>Second year Semester one</td>
<td>Practical Earth Science B</td>
<td>Deposit Models &amp; Mineral Exploration</td>
<td>Research Project</td>
<td>Presenting Academic Discourse</td>
</tr>
<tr>
<td>Second year Semester two</td>
<td>Project in Geoscience</td>
<td></td>
<td></td>
<td>Science in Schools</td>
</tr>
</tbody>
</table>
The Master of Urban Horticulture is designed for students seeking professional employment or research careers in the design, implementation and management of urban landscapes. You will explore contemporary issues in urban landscape management, including plant selection for multi-functional landscapes, provision of environmental benefits through green roofs and rain gardens, climate change adaptation strategies, and community engagement through horticulture.

The Graduate Diploma in Urban Horticulture is a pathway to this program. It is also possible to use the Graduate Diploma as an exit pathway from the Master of Urban Horticulture.

The Master of Urban Horticulture is delivered on-campus at Burnley and Parkville.

CAREER OUTCOMES
As a graduate of this program, you may enjoy a rewarding career in:
- Urban landscape management
- Education & training
- Arboriculture & urban forestry
- Horticultural media
- Horticultural commerce & sales
- Garden design & management
- Local government
- Nursery production
- Research & development

SUBJECT CHOICES

**Discipline core subjects**
Students must take:
- Landscape Plants
- Contemporary Plant Production & Establishment
- Horticultural Plant Science
- Managing Urban Landscapes
- Urban Soils, Substrates & Water
- Urban Horticulture Issues & Perspectives

**Science Skills subjects**
Students select one subject from:
- Garden Design & Graphics
- Research Philosophies & Statistics
- Social Research Methods
- Research Methods for Life Sciences

**Business Skills/Scientific Communication subjects**
Students select one subject from:
- Industry Leadership
- Leadership
- Business Strategy
- Human Resource Management
- Project Management
- Financial Management for Agribusiness
- Managing Innovation & Change
- Science Communication

**Elective subjects**
Students select a minimum of two subjects from:
- Soil Science & Management
- Advanced Plant Breeding & Improvement
- Managing Trees in Urban Landscapes
- Therapeutic Landscapes
- Management of Plant & Animal Invasions

**Ecological Restoration**
- Industry Placement
- History of Landscape Architecture
- Green Infrastructure for Liveable Cities
- Farm Trees & Agroforestry
- Green Roofs & Walls
- Public Values, Contested Landscapes
- Food Production for Urban Landscapes
- Short Research Project
- International Internship in Environment
- Long Research Project B
- Plants & the Urban Environment

SAMPLE COURSE PLAN

<table>
<thead>
<tr>
<th>First year Semester one</th>
<th>Landscape Plants</th>
<th>Horticulture Plant Science</th>
<th>Advanced Plant Breeding &amp; Improvement</th>
<th>Research Methods for Life Sciences</th>
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<tr>
<td>First year Semester two</td>
<td>Contemporary Plant Production &amp; Establishment</td>
<td>Management of Plant &amp; Animal Invasion</td>
<td>Urban Horticulture Issues &amp; Perspectives</td>
<td>Managing Innovation &amp; Change</td>
</tr>
<tr>
<td>Second year Semester one</td>
<td>Food Production for Urban Landscapes</td>
<td>Soil Science &amp; Management</td>
<td>Landscape Design</td>
<td>Forest Ecosystems</td>
</tr>
<tr>
<td>Second year Semester two</td>
<td>Managing Urban Landscapes</td>
<td>Urban Soils, Substrates and Water</td>
<td>History of Landscape Architecture</td>
<td>Green Roofs &amp; Walls</td>
</tr>
</tbody>
</table>

![Rousseau’s Jungle First prize winner at the 2015 Melbourne International Flower & Garden Show. By Heather Forward, Master of Urban Horticulture](image-url)
GRADUATE RESEARCH DEGREES

DOCTOR OF PHILOSOPHY

Program details
Entry
Semester 1 and Semester 2 commencement available.

Entry requirements
A Master of Science or a four-year honours degree in a relevant discipline, with a minimum overall average grade of 75% (or equivalent), including a substantial research component equivalent to at least 25% of one year of full-time study.

Applicants must also demonstrate the relevance of their research experience to their proposed topic of research.

More information: graduate.science.unimelb.edu.au/graduate-research

The Doctor of Philosophy (PhD) is the University’s premier research degree. Under the supervision of one or more academic staff members who are experts in their field, students undertake research over three years culminating in the submission of a thesis that makes an original and distinct contribution to scientific knowledge.

Areas of study
- BioSciences
- Chemistry
- Earth Sciences
- Ecosystem and Forest Sciences
- Geography
- Mathematics and Statistics
- Physics

MASTER OF PHILOSOPHY

Program details
Entry
Semester 1 and Semester 2 commencement available.

Entry requirements
A Master of Science or a four-year honours degree in a relevant discipline, with a minimum overall average grade of 75% (or equivalent), including a substantial research component equivalent to at least 25% of one year of full-time study.

Applicants must also demonstrate the relevance of their research experience to their proposed topic of research.

More information: graduate.science.unimelb.edu.au/graduate-research

The Master of Philosophy (MPhil) is an internationally recognised Masters (by research) degree. It is designed for students to develop advanced skills in carrying out independent and sustained research. The thesis should demonstrate a critical application of specialist knowledge and make an independent contribution to existing scholarship in the area of research, completed over the course of 1.5 years full-time.

Areas of study
- BioSciences
- Chemistry
- Earth Sciences
- Ecosystem and Forest Sciences
- Geography
- Mathematics and Statistics
- Physics
**DIPLOMAS AND CERTIFICATES**

**GRADUATE CERTIFICATE/DIPLOMA IN SCIENCE**

**Program details**

**Entry**

Semester 1 (February). Mid-year intake (July) available.

**Entry requirements**

An undergraduate degree. Students must also have completed at least 25 credit points of study at Level 1 or above in an appropriate discipline as a prerequisite. The level of prerequisite discipline knowledge required will depend on the chosen discipline.

**Visit:** [graduate.science.unimelb.edu.au/graduate-diploma-science](http://graduate.science.unimelb.edu.au/graduate-diploma-science)

The Graduate Diploma in Science enables you to complete the equivalent of an undergraduate Science major, and is a pathway to the Master of Science*. It is designed for students who have taken undergraduate subjects in a particular discipline but did not complete the major, and who would now like to pursue a Master of Science in that discipline.

**Course structure**

Students in the Graduate Certificate of Science will complete 62.5 points of study, comprising 50 credit points of study at Level 3, and 12.5 points of study at Masters Level.

Students in the Graduate Diploma of Science will complete 125 credit points of study, comprising 50 credit points of study at Level 2 or above, 50 credit points of study at Level 3, and 25 credit points of study at Masters Level.

Students select from the following areas of study:

- Botany
- Chemistry
- Computer Science
- Medicinal Chemistry
- Genetics
- Integrated Geography
- Human Geography
- Physical Geography
- Geology
- Pure Mathematics
- Applied Mathematics
- Discrete Mathematics/Operations Research
- Statistics/Stochastic Processes
- Physics
- Zoology

*Students will be allowed to apply for entry into the associated Master of Science program after completing the undergraduate component (50 points) of the Graduate Certificate or 100 credit points of Level 2 and 3 study in the Graduate Diploma. If you then enter the Master of Science you will be able to have the relevant points credited back to the Graduate Diploma or Graduate Certificate to finalise completion.

**GRADUATE DIPLOMA IN SCIENCE (ADVANCED)**

**Program details**

**Entry**

Semester 1 (February). Mid-year intake (July) available.

**Entry requirements**

An undergraduate degree in a relevant discipline. Some areas of study also require a certain average in the appropriate discipline. Entry is also subject to the availability of an appropriate research topic and supervisor.

**Visit:** [graduate.science.unimelb.edu.au/postgraduate-diploma-science](http://graduate.science.unimelb.edu.au/postgraduate-diploma-science)

The Graduate Diploma in Science (Advanced) enables you to acquire research skills and develop current, in-depth knowledge of your scientific field. For high-achieving students this can be a potential pathway to a graduate research degree, if a research component is completed.

**Course structure**

You will undertake a total of 100 credit points from one of the following areas of study:

- Botany
- Chemistry
- Computer Science
- Earth Sciences
- Genetics
- Mathematics and Statistics
- Physics
- Zoology

All areas of study have a coursework component and a majority also have a research component.

**GRADUATE CERTIFICATE IN ARBORICULTURE**

**Program details**

**Entry**

Semester 1 (February).

**Entry requirements**

An undergraduate degree; OR

- A relevant TAFE or Higher Education Advanced Diploma or equivalent, and three years of documented relevant work experience or equivalent; OR

- A relevant TAFE diploma and four and a half years of documented relevant work experience or equivalent; OR

- At least six years of documented relevant work experience, including at least three years in a demonstrated supervisory role.

**Visit:** [graduate.science.unimelb.edu.au/graduate-certificate-arboriculture](http://graduate.science.unimelb.edu.au/graduate-certificate-arboriculture)

The Graduate Certificate in Arboriculture investigates a wide range of tree management issues and emphasises the need to promote a strategic approach to tree management and the contribution trees can make to urban life. It aims to increase understanding of current issues in urban tree management through studies in growth and function, identification and selection, pests and diseases, and environmental stresses including planning in a changing climate. Writing management plans for urban trees is a strong focus of the course.

At the completion of this course participants are expected to be able to conduct tree risk assessments and have the ability to be engaged as an expert witness for local government or consumer and trade tribunal proceedings.

**Course structure**

To satisfy the requirements of the Graduate Certificate in Arboriculture students must successfully complete the following four core subjects (each being 12.5 credit points) for a total of 50 credit points:

- Tree identification and selection
- Urban tree health
- Urban tree growth and function
- Managing urban trees
GRADUATE CERTIFICATE/DIPLOMA IN BUSHFIRE PLANNING AND MANAGEMENT

Program details
Entry
Semester 1 (February). Mid-year intake (July) available.

Entry requirements
An undergraduate degree in a cognate discipline with at least a 65% weighted average, or equivalent; OR
An undergraduate degree in any discipline including at least 25 points in one or more of Chemistry, Biology, Mathematics or Statistics, or equivalent, and with at least a 65% weighted average, or equivalent; OR
An undergraduate degree in any discipline and a Graduate Certificate in Environment with at least a 65% weighted average in the Certificate, or equivalent; OR
A two-year associate degree or diploma in a relevant discipline, or equivalent, with five years documented relevant professional experience and an appropriate level of performance on a test conducted by the Selection Committee to confirm generic skills necessary for successful study in the program.

Visit: graduate.science.unimelb.edu.au/bushfire-planning-management

Course structure
Students in both the Graduate Certificate and Graduate Diploma must complete:
- Bushfire and Climate
- Bushfire Planning and Management

The Graduate Certificate comprises two further 12.5 point subjects according to stream (Planning or Management). The Graduate Diploma comprises 75 points worth of further core and elective subjects according to stream (Planning or Management).

GRADUATE CERTIFICATE IN ENVIRONMENT

Program details
Entry
Semester 1 (February). Mid-year intake (July) available.

Entry requirements
An undergraduate degree; OR
An undergraduate degree in a cognate discipline with at least a 65% weighted average, or equivalent; OR
An undergraduate degree in any discipline with at least a 65% weighted average, or equivalent, and two years of documented professional work experience related to the degree since graduation.

Visit: environment.unimelb.edu.au

Course structure
The Graduate Certificate in Environment is a flexible, multidisciplinary course that enables students to develop knowledge for professional practice in environment or sustainability. Depending on their academic background, interests and career aspirations students can choose from over 200 subjects taught by ten different faculties.

Students must complete:
- Sustainability, Governance and Leadership

Students choose the remainder of their course load (37.5 points) from the list of approved elective subjects; visit: handbook.unimelb.edu.au.

GRADUATE CERTIFICATE/DIPLOMA IN FOREST SYSTEMS MANAGEMENT

Program details
Entry
Semester 1 (February). Mid-year intake (July) available.

Entry requirements
An undergraduate degree in a cognate discipline with at least a 65% weighted average, or equivalent; OR
An undergraduate degree in any discipline including at least 25 points in one or more of Chemistry, Biology, Mathematics or Statistics, or equivalent, and with at least a 65% weighted average, or equivalent; OR
An undergraduate degree in any discipline and a Graduate Certificate in Environment with at least a 65% weighted average in the Certificate, or equivalent; OR
A two-year associate degree or diploma in a relevant discipline, or equivalent, with five years documented relevant professional experience and an appropriate level of performance on a test conducted by the Selection Committee to confirm generic skills necessary for successful study in the program.

Visit: graduate.science.unimelb.edu.au/forest-systems-management

Course structure
Students studying the Graduate Certificate in Forest Systems Management will be required to undertake two core subjects and two elective subjects. Students studying the Graduate Diploma in Forest Systems Management must complete 100 points of subjects comprising two core subjects (25 points) plus 25 points of Internship Project subject and four elective subjects (50 points).
**GRADUATE CERTIFICATE IN GARDEN DESIGN**

**Program details**

- **Entry**
  - Semester 1 (February).
  - Mid-year intake (July) available.

**Entry requirements**

- An undergraduate degree; OR
- A relevant TAFE or Higher Education Advanced Diploma or equivalent, and three years of documented relevant work experience or equivalent; OR
- A relevant TAFE diploma and four and a half years of documented relevant work experience or equivalent; OR
- At least six years of documented relevant work experience that demonstrates the capacity to successfully undertake the course.

**Visit:** graduate.science.unimelb.edu.au/graduate-certificate-garden-design

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**SPECIALIST CERTIFICATE IN GREEN ROOFS AND WALLS**

**Program details**

- **Entry**
  - Semester 2 (July).

**Entry requirements**

- An undergraduate degree; OR
- A relevant TAFE or Higher Education Advanced Diploma or equivalent, and three years of documented relevant work experience or equivalent; OR
- A relevant TAFE diploma and 4.5 years of documented relevant work experience or equivalent; OR
- Six years of documented relevant work experience, including at least three years in a supervisory role.

**Visit:** graduate.science.unimelb.edu.au/graduate-specialist-certificate-green-roofs-and-walls

The course has been developed to provide a qualification in garden design for those employed in the horticultural and landscape industries and for those in different careers wishing to gain employment in this area. Students are provided with a solid basis in garden design theory and practice, an understanding of relevant horticultural principles, an understanding of plant use and selection in design, and applications of sustainability thinking and practice in garden design and construction.

**Course structure**

To satisfy the requirements of the Graduate Certificate in Garden Design students must successfully complete four core subjects (each being 12.5 credit points) for a total of 50 points.

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**GRADUATE DIPLOMA IN URBAN HORTICULTURE**

**Program details**

- **Entry**
  - Semester 1 (February).
  - Mid-year intake (July) available.

**Entry requirements**

- An undergraduate degree or a graduate or postgraduate certificate any discipline with at least a 65% weighted average, or equivalent; OR
- An honours degree or graduate diploma in any discipline, or equivalent

**Visit:** graduate.science.unimelb.edu.au/master-of-urban-horticulture

The Graduate Diploma of Urban Horticulture is nested within the Master of Urban Horticulture. It is designed to fulfill the needs and demands of those who have qualifications in disciplines other than horticulture and who wish to emphasise the study of the horticultural system from a technological, sociological and management perspective. There is a focus on the design, implementation and management of urban landscapes. Employment opportunities can be found in a variety of settings including arboricultural services and tree management, urban parks and public open space, revegetation and restoration, residential landscape design, landscape and asset management, landscape construction and services.

The course provides excellent linkages to the urban horticulture industry, adding to the currency and relevancy of the study experience, but also building employment opportunities for the future.

The course can be completed as a pathway into, or an exit point from, the Master of Urban Horticulture.

**Course structure**

Students must complete:

- Plant & the Urban Environment
- Landscape Plants
- Contemporary Plant Production and Establishment
- Horticulture Plant Science

Students choose the remainder of their course load (50 points) from the list of approved elective subjects; visit: handbook.unimelb.edu.au
This image depicts a cross section of a grass (barley) root showing cellular resolution using the backscattered signal on the FEI Quanta ESEM (Bio21 institute Advanced Microscopy Facility). Roots are essential for plant growth and rhizosphere dynamics influencing host symbiont and pathogen interactions as well as soil structure. Roots develop from a finely orchestrated series of cell divisions arising from the quiescent centre ("stem cells") at the root apex. At cell division, a cell wall is laid down to give the plant structure and strength. The sub-cellular details involved in cell wall development and biosynthesis are still being dissected. Until recently whole plant tissues have only been viewed at the resolution at the light microscope and this work using the scanning electron microscope will allow the interactions of cell components to be observed in many growing cells simultaneously and illuminate interactions and patterns that have not been previously observed.

Credit: Dr Eric Hanssen (Bio21 Advanced Microscopy Facility and Department of Biochemistry and Molecular Biology) and Dr Allison Van De Meene (Bioscience and Plant Cell Wall ARC Center of Excellence)
Graduate Science Course Guide 2016

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Photography
Select photography by Peter Casamento

Authorised by: Manager, Academic Engagement, Faculty of Science, August 2015

CRICOS Provider Code: 00116K

Cover photography
The image presented is a blood clot derived from a healthy child, generated in vitro using Whole Blood. The significance of this image is that Whole Blood clots have never been imaged or studied in paediatrics. The spider-web like bands around the red blood cells represents Fibrin, a protein that is used to strengthen the clot. Fibrin fibre thickness directly translates to whether the clot is a strong or a weak clot, which has significant implications in clinical settings, especially for cardiovascular disease and stroke. The instrument used to obtain the image was an Oxford Instruments Aztec system on a FEI Quanta FEG 200 ESEM (environmental scanning electron microscope).