

## Science

Whether it is exploring the universe, investigating a crime scene or studying the health of marine creatures, Monash is the place to begin a career in science.



### What makes Science at Monash special?

- **Flexibility and Choice.** Science at Monash offers students the opportunity to tailor their studies to fit their interests with more than 30 areas of specialisation to choose from.
- **Transferable skills.** Monash Science graduates are well equipped to be career scientists and leaders of the future in any of the traditional or emerging areas of science.
- **Facilities, technology and teaching.** Internationally renowned teaching staff and newly renovated teaching facilities provide science students with exciting learning opportunities.
- **Honours programs.** Honours in Science offers students the chance to enhance their science qualification by undertaking independent research under the guidance of world experts.
- **Double Degrees.** Combining science with another degree is a great way to combine interests, broaden your knowledge base and create a unique career path for yourself.

### Research tools

- The Faculty of Science has a wide variety of internationally renowned researchers, facilities and an extensive breadth of research centres operating within the faculty. All this allows for students to have access to the best teachers and researchers in the country.
- Science students have numerous opportunities to participate in hands-on based enquiry-activities in field trips both within and outside of Australia and on campus research projects.
- The Australian Synchrotron: Third-year science students have exceptional opportunities to access Australia's only particle accelerator.

### Professional recognition

The Faculty of Science has strong links with industry. All major areas of study are designed with input from relevant professional bodies and accredited by these bodies where appropriate. Students can therefore be assured that they are studying major sequences that are relevant and are informed by industry needs.



Graduate profile

**Jeffrey Leong**

**Bachelor of Commerce/  
Bachelor of Science**

**Business Analyst at A.T. Kearney**

*"I was attracted to Monash when I attended Clayton Open Day. I liked the feeling of this campus. Lots going on and it felt young, vibrant and kind of refreshing.*

*I enjoyed many aspects of my course. A core unit 'The practice and application of science' looks at science as a discipline, what science is and covers different areas including climate and stem-cell science. This complemented my in-depth studies in mathematics, physics and economics.*

*I've found double degrees to be really good if you have two very different areas of interest. They are more flexible and you develop multiple skills. These skill sets distinguish you from the pack and make you more employable".*



**Science stirs public debate**

As part of Monash University's 50th Anniversary, the Faculty of Science was pleased to host a public lecture: **A Vision for Australian Sustainability** presented by Professor Tim Flannery. More than 1000 people packed into Federation Square to hear the scientist, writer and Monash alumnus, outline his climate change predictions. Professor Flannery, Australian of the Year in 2007, reviewed historical evidence on climate change saying that if carbon dioxide levels continue to increase at current rates, the resulting climate change would have serious consequences for the environment. He said that failure to act on climate change may eventually force the creation of a global carbon dictatorship to regulate carbon use across all nations. In a positive light Professor Flannery spoke of the important roles plants play in undoing the negative effects of air pollution and the positive effects revegetation had on the environment and climate change. Professor Flannery urged individuals to play their role in climate conservation.

**Shaping the future**

**Science Advanced with Honours**

Generating renewable energy resources, improving mining techniques and ensuring future water resources are some of the current burning issues. The future will be shaped by the minds of scientists, their ability to contemplate issues abstractly, carry out meaningful research and influence government policy.

It is therefore imperative that science students are well prepared in the areas of critical thinking and research. A strong scientific foundation and research skills are an important and central feature of the Science Advanced with Honours course.

Throughout this prestigious course students will have access to academic mentors, and a private common room that is accessible 24 hours a day and will be eligible to join the Monash Advanced Science and Science Scholars Society which is the Faculty of Science elite group of undergraduate students.

Graduates from this course will be the scientific leaders of the future and society will look in their direction to correct past wrongs and to make the world a better place.

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**Contact**

For further information, talk to one of our advisers:  
 Faculty of Science  
 Domestic student enquiries: +61 3 9905 4604  
 International student enquiries: +61 3 9627 4852  
 Email: [study@monash.edu.au](mailto:study@monash.edu.au)  
 Fax +61 3 9905 1450  
 Email enquiries: [sci.monash.edu.au](mailto:sci.monash.edu.au)  
[www.sci.monash.edu](http://www.sci.monash.edu)

## Bachelor of Biotechnology

Ever thought about boosting crop yields, or where food will come from in the future? Biotechnology – or technology based on plants, animals and biological processes – has moved to the forefront of science. This field will be a force in the future, used in such vital tasks as improving the quality of food, reducing waste, and developing new medicines.

Students complete specific training in biotechnology, and gain knowledge about the commercial, organisational and regulatory aspects of the biotechnology industry.

Developed in consultation with the biotechnology industry, this course offers the opportunity to complete studies in a specialised area of biotechnology.

### Course Outline

All students undertake a common first year and then select one of five specialist streams in their second year. The common first year lets students explore where their interests and aptitudes lie, allowing an informed choice at a more advanced level in their studies.

The five specialist streams are:

- Bioprocessing
- Chemical Biotechnology
- Medical Biotechnology
- Materials and Nanotechnology
- Plant Biotechnology

At the end of third year, students choose to undertake either a pass degree involving further studies to broaden and deepen their knowledge or students can complete an honours program which requires them to complete a research project involving a thesis and a commercial biotechnology project.

### Career Outlook

Graduates will have a strong science degree with a competitive advantage when seeking employment in the biotechnology industry.

Graduates work as biomedical chemists, biotechnologists, biotechnology commercialisation and business development officers, pharmaceutical chemists, drug development chemists, environmental toxicologists, forensic scientists, waste and resource management experts, genetic engineers, and policy development managers as well as in the traditional science areas.

### Course Details

Four years full-time, eight years part-time

Clayton campus

2009 clearly-in ENTER: 86.55

VCE prerequisites: Units 3 and 4 – a study score of at least 30 in English (ESL) or 25 in any other English. A study score of 25 in chemistry and in mathematical methods (either) or specialist mathematics).

2009 CSP fee: \$4425

2009 IB score: 31

IB prerequisites: English at a minimum of grade four at standard level and one of mathematical methods (SL or HL), further mathematics (HL) or specialist mathematics at a grade four standard level.

## Bachelor of Environmental Science

Environmental Science is an exciting and challenging area of study and research, and encompasses many science disciplines including biology, chemistry, geology, geography, mathematics and physics.

### Course Outline

The degree provides students with a strong foundation in sciences to enable them to complete a major and a minor in different areas of study selected from atmospheric science, biology, chemistry, geoscience or geography. In addition students study six core units across levels one to three of the course which provide understanding of the regulatory and policy framework, incorporating cross disciplinary knowledge and technologies. This structure ensures students gain an appreciation of the interdisciplinary skills required in environmental science.

It starts with a common first year to give students a broad grounding in scientific disciplines and an excellent foundation on which to build.

At the end of third year, students choose to undertake either a pass degree involving further studies to complete a second major sequence in a science area of study to broaden and deepen their knowledge or can complete an honours degree which requires them to undertake a research project.

### Career Outlook

With the environment and environmental issues being a global priority graduates with strong science, analytical and communication skills are highly sought after by both the private and public sector. Careers range from technical through to managerial covering policy, scientific management and development. Environmental Science graduates can work in the traditional science areas but also have the capacity to contribute to growth areas such as sustainable practices and innovation, biodiversity management, clean technologies and alternate energies, environmental modelling and responses to climate change, and the effective use of land and water resources.

### Course Details

Four years full-time, eight years part-time

Clayton campus

2009 clearly-in ENTER: 76.60

VCE prerequisites: Units 3 and 4 – a study score of at least 30 in English (ESL) or 25 in any other English.

2009 CSP fee: \$4419

2009 IB score: 27

IB prerequisites: English at a minimum of grade four at standard level.

## Bachelor of Science

Scientific discoveries and developments both large and small continue to change the world. Science is a way of life suited to people who are open-minded and able to question why and how things work. Scientists embrace the challenge to imagine an alternative future, are passionate about new knowledge, and are dedicated to making a difference in their area of expertise.

Internationally recognised, the Bachelor of Science is a transportable qualification that maintains its prestigious standing with employers worldwide.

The flexible nature of the degree provides a broad education across the major scientific disciplines, as well as in-depth training in at least one specialised area.

### Course Outline

In the first year of study, students sample from the wide range of units available to cover breadth across science disciplines. This provides the opportunity to try areas that have not been previously studied and to make an informed decision on areas of specialisation. Over the three years, students may complete up to two majors and one minor from the list opposite. In addition to specialising in an area of science, students also have the choice of completing a major in a non-science discipline.

### Career Outlook

Graduates have the skills necessary for employment in a range of scientific and non-scientific fields, leading to global employment opportunities in any of the traditional and emerging careers for scientists. Graduates are also well prepared for honours and postgraduate study which will further enhance their employability or prepare them for a research career. Science graduates are involved in research and technological development; in addressing the urgent environmental, climate, and sustainability challenges of the world; in contributing to the improvement of health and social well-being; in supporting industry and financial services; in policy making, and in teaching. These graduates in turn will also inspire and facilitate the development of the next generation of scientists.

### Course Details

Three years full-time, six years part-time

Clayton and Gippsland campuses

Off-campus study is available

2009 clearly-in ENTER: Clayton 75.20

Gippsland 71.35

VCE prerequisites: Units 3 and 4 – one of biology, chemistry, mathematical methods (either), physics, geography, psychology or specialist mathematics, and a study score of at least 30 in English (ESL) or 25 in any other English.

2009 CSP fee: \$4494

2009 IB score: Clayton 26

Gippsland 25

IB prerequisites: English at a minimum of grade four at standard level and one of psychology, geography, biology, physics, chemistry, mathematical methods (SL or HL) or further mathematics.

## Choice

Science at Monash allows students to develop a breadth of experience across a broad range of scientific areas. Students can choose to specialise in more than 30 areas of science, covering everything from astronomy to zoology.

Science majors for the Bachelor of Science are available in the following areas of study.

### Gippsland

- Applied biology
- Applied biochemistry
- Applied chemistry
- Applied microbiology
- Applied statistics
- Computing
- Human physiology
- Mathematics and modelling
- Psychology
- Resource and environmental management

### Clayton

- Applied statistics
- Astronomy and astrophysics
- Atmospheric sciences
- Biochemistry
- Biology
- Biotechnology
- Chemistry
- Computer sciences
- Developmental biology
- Ecology
- Environmental and conservation biology
- Genetics
- Geography and environmental sciences
- Geophysics
- Geosciences
- Human pathology
- Immunology
- Marine and freshwater biology
- Materials sciences
- Mathematics
- Microbiology
- Molecular biology
- Pharmacology
- Physics
- Physiology
- Plant sciences
- Psychology
- Soil sciences
- Statistics
- Zoology

Further details about the areas of study are available at [www.sci.monash.edu/prosp/undergraduate/bsci.html](http://www.sci.monash.edu/prosp/undergraduate/bsci.html)

## Bachelor of Science Advanced with Honours

This course is intended for high-achieving students who seek a degree that provides a strong background in science and research training, with the possibility of continuing on to postgraduate studies. Students gain a sound knowledge of several related areas of basic science, on which they develop an advanced level of understanding.

Research studies are an important feature of this course with students engaged with research methodologies and training at an early undergraduate stage. They undertake a research project in third year which leads to a full year of honours studies in the fourth year.

### Course Outline

Students specialise in either one or two areas of studies, chosen from the major list opposite.

The first two stages of the course provide students with a strong foundation in the enabling sciences and introduces the theory and practice of academic research. The next two stages concentrate on the development of research skills, leading to the completion of the honours program.

### Career Outlook

Graduates have advanced research skills in an area of contemporary science and demonstrated general science skills that will enhance their employability across a broad range of careers.

Career outcomes are similar to those of the Honours degree in the Bachelor of Science, but as this course focuses on training in scientific research, it is particularly suitable for students planning to continue on to postgraduate studies in their specialist areas.

### Course Details

Four years full-time

Clayton and Gippsland campuses

2009 clearly-in ENTER: Clayton 95.20

Gippsland consult faculty

VCE prerequisites: Units 3 and 4 – a study score of at least 35 in English (ESL) or 30 in any other English, a study score of at least 30 in mathematical methods (either) and in two of biology, chemistry, geography, physics or specialist mathematics.

2009 CSP fee: \$4399

2009 IB score: Clayton 36

Gippsland consult faculty

IB prerequisites: English, mathematical methods and at least two of biology, chemistry, geography, physics or mathematics at a minimum grade of five at standard level or grade four at higher level.

## Bachelor of Science (Science Scholar Program)

This unique course is for outstanding students with a clear science focus. Guided by an academic mentor students undertake a program that differs from the normal science degree in both depth and breadth. Programs are individually designed to match students' academic interests and aspirations. Depending on the students' background and interests the course may be completed in two years, allowing students to graduate with an honors degree in three years.

### Course Outline

With the assistance of an assigned mentor, an individual course of study will be devised for each student in this program.

Students can select studies from the full range of science disciplines offered at Monash, including earth sciences, life sciences, mathematical and computational sciences, and physical sciences.

Students are required to maintain a constant high level of achievement throughout the program and complete at least one major and one minor sequence in science.

### Career Outlook

Graduates will have specialist training in one or more science discipline, with the potential for postgraduate study, leading to employment opportunities in any of the traditional or emerging careers for scientists. The course provides students with improved employment skills through a general appreciation of science and demonstrated competence in the effective use of information technology, problem solving, data handling, laboratory skills, and a capacity to apply discipline, knowledge and critical thinking to analyse and solve complex problems.

### Course Details

Three years full-time. Depending on previous studies and interests, in some cases students may complete the degree in two years by taking an accelerated program, or to undertake enrichment studies while completing the degree in three years.

Clayton and Gippsland campuses

2009 clearly-in ENTER: Clayton 99.25

Gippsland consult faculty

VCE prerequisites: Units 3 and 4 – a study score of at least 35 in English (ESL) or 30 in any other English, a study score of at least 40 in mathematical methods (either) or specialist mathematics and in one of chemistry or physics.

2009 CSP fee: \$4327

2009 IB score: Clayton 41

Gippsland consult faculty

IB prerequisites: English at a minimum of grade five at standard level or grade four at higher level, either mathematical methods at grade seven or mathematics at grade six, and either chemistry or physics at a minimum of grade seven at standard level or grade six at higher level.

## Bachelor of Science (Biotechnology)

Biotechnology is an exciting field of science in which living organisms or their products are used in place of traditional chemical and engineering strategies to produce innovative and sustainable new technologies.

This course covers the aspects of biochemistry, cell biology, chemistry, microbiology, molecular biology, physiology and instrumental analysis needed to make a contribution in this cutting-edge field.

### Course Outline

This tightly structured course requires students to develop skills in biochemistry, cell biology, chemistry, microbiology, molecular biology, physiology and instrumental analysis. Following a common first year students can select to specialise in a strand of biotechnology.

#### Industrial Biotechnology (Gippsland campus Only)

This program covers studies in microbial function and immunology, food and industrial microbiology, environmental microbiology, design of molecules and macromolecules, bioactive chemistry.

#### Medical Biotechnology (Gippsland campus Only)

This program covers studies in microbial function and immunology, medical microbiology, medical aspects of cell biology, design of molecules and macromolecules, bioactive chemistry

#### Generic (Sunway campus only)

This program covers studies in crop science, plant biotechnology, genetics, genomics and molecular genetics.

### Career Outlook

Depending on the specialist area studied, graduates may find employment in animal breeding programs, production of vaccines, antibiotics, drugs and diagnostic kits, waste treatment processes, environmental monitoring programs, mineral extraction, quality control, production of alternate fuels, synthesis of organic chemicals and polymers, food industry research, and medical research.

### Course Details

Three years full-time, six years part-time

Off-campus study is available

Gippsland and Sunway campus

2009 clearly-in ENTER: Gippsland 71.5

Sunway 70.00

VCE prerequisites: Units 3 and 4 – one of biology, chemistry, mathematical methods (either), physics, geography, psychology or specialist mathematics, and a study score of at least 30 in English (ESL) or 25 in any other English.

2009 CSP fee: \$4496

2009 Tuition fee: RM 34,760

2009 IB score: Gippsland 25

Sunway 24

IB prerequisites: Psychology, geography, biology, physics, chemistry, mathematical methods (SL or HL) or further mathematics and English at a minimum of grade four at a standard level.

## Bachelor of Science (Food Science and Technology)

Food science involves using fundamental sciences like chemistry, physics, mathematics and engineering to study and improve the way food is processed, handled and preserved.

It can have far reaching outcomes for human health and the adequate distribution of food resources.

The course provides specialist training in the physical, chemical and biological sciences as it relates to food science and technology.

Students have the opportunity to complete an eight-week industry placement during this course.

### Course Outline

This tightly structured course provides a solid scientific foundation in the biological and the physical sciences together with knowledge of the scope of food science and its relationship with nutrition and food technology, food composition and processing and formulation of agricultural raw materials into safe and nutritious food products.

At stage one and two students gain the necessary scientific knowledge and skills appropriate to food science and technology, including biology, chemistry, biochemistry, microbiology, food chemistry, recombinant DNA technology, instrumental analysis, data handling and analysis. At level three the program covers core discipline areas including human nutrition, food preservation, functional foods, food and industrial microbiology and laboratory and workplace management.

### Career Outlook

Students completing this course will have advanced knowledge and skills in a broad spectrum of areas relating to food science and technology. In addition, graduates will be equipped with skills and techniques related to the processing of agricultural raw materials, and will have a working knowledge of food science and technology within industries. Graduates work chiefly in the food production industry in areas such as food chemistry, quality control, product development and consulting.

### Course Details

Three years full-time, six years part-time

Sunway campus

2009 clearly-in ENTER: 70.00

2009 Tuition fee: RM 34,760

2009 IB score: 25

IB prerequisites: Psychology, geography, biology, physics, chemistry, mathematical methods (SL or HL) or further mathematics and English at a minimum of grade four at a standard level.

## Bachelor of Science (Medical Bioscience)

This course has an emphasis on biomedical science techniques with a focus on biotechnology.

Students study a wide range of subjects that cover the breadth of skills required to work in this highly technical biomedical field. They also have the chance to further develop these skills by undertaking meaningful research during the course.

Honours students must take-up industrial training via a professional attachment to a clinical or medical laboratory.

### Course Outline

The course commences with a foundation year covering biology, biotechnology, chemistry and statistical reasoning and analysis. At level two and three the course covers core discipline areas of anatomy and medical terminology, Recombinant DNA technology, biochemistry, cellular metabolism, microbiology and microbial biotechnology, human physiology, molecular biology and biotechnology, pathology, applied immunology and pharmacology.

### Career Outlook

Graduates will have developed quantitative and qualitative research skills and will have an understanding of the importance of an ethical base for scientific research and development activity particularly in the context of areas such as bioengineering and human health. Career opportunities exist both within Malaysia and Australia, in management, research, education, and specialised laboratory work. Graduates can work in clinical, diagnostic, pharmaceutical, and forensic laboratories.

### Course Details

Three years full-time, six years part-time

Sunway campus

2009 clearly-in ENTER: 70.00

2009 Tuition fee: RM 34,760

2009 IB score: 25

IB prerequisites: Psychology, geography, biology, physics, chemistry, mathematical methods (SL or HL) or further mathematics and English at a minimum of grade four at a standard level.

## Bachelor of Science (Environmental Management)

The prosperity of a country or region depends greatly on its natural resources (including minerals, fossil fuels, water catchments, agricultural land, forests and fisheries) and how those resources are managed.

This course, offered at the Sunway campus, Malaysia, is designed for students who are concerned about the environment and how natural resources can best be managed. The core units of the course raise the issues of environmental management and provide a range of analytical, monitoring and management skills. Students may select elective units from other disciplines of science and mathematics, or from related science studies in computing, business management, communication, economics or engineering.

### Course Outline

The course consists of a combination of compulsory core subjects from the disciplines of biology, chemistry and instrumental science, along with a number of specialist units dealing more specifically with industry, resources and their environmental management.

### Career Outlook

Graduates work in government or industry (in management, technical and quality control areas) or as private consultants. For example, they may work as natural resource managers, park rangers, land care managers, environmental planners and waste management officers.

### Course Details

Three years full-time, six years part time.

Sunway campus

2009 Clearly in ENTER: Consult Faculty

2009 IB score: Consult faculty

IB prerequisites: English at a minimum of grade four at standard level.

2009 Tuition fee: RM 34,760

## Bachelor of Arts/ Bachelor of Science

Monash's commitment to double degrees allows students to combine their strengths in maths and science with more creative interests. Combining science with arts gives arts-oriented students a stronger technological or scientific base, while science-oriented students gain greater communication skills.

Students can graduate with two degrees while completing only one additional year of study.

This course provides students who have a wide variety of interests the opportunity to design a program to suit their needs. Students can select any of the major study areas within the Bachelor of Science – and more than 50 major study areas within the Bachelor of Arts.

### Course Outline

Students complete studies in two specialised areas of Science and two specialised areas from Arts.

For details of the arts study areas available refer to the Bachelor of Arts see page 41.

For information on science areas of study available refer to the Bachelor of Science see page 114.

### Career Outlook

Students can pursue the range of careers available to both science and arts graduates. Some examples include working as a business analyst, science journalist, environmental economist, laboratory manager, teacher, or public relations consultant or government advisor.

### Course Details

Four years full-time, eight years part-time

Clayton campus

2009 clearly-in ENTER: 88.05

VCE prerequisites: Units 3 and 4 – one of biology, chemistry, mathematical methods (either), physics, geography, psychology or specialist mathematics, and a study score of at least 30 in English (ESL) or 25 in any other English.

2009 CSP fee: \$4762

2009 IB score: 32

IB prerequisites: English at a minimum of grade four at standard level and one of psychology, geography, biology, physics, chemistry, mathematical methods (SL or HL) or further mathematics

## Bachelor of Biomedical Science/ Bachelor of Science

One of Science's most prestigious double-degrees, this program allows high achieving students to combine specialist training in biomedical science with the broad studies of science.

Students are taught by experts in the biomedical sciences and learn the skills necessary to understand and investigate the functions of humans and other mammals. Students combine this with studying traditional science areas that are relevant to medical research and health-care.

Graduates achieve two degrees while studying only one additional year at university.

### Course Outline

Students must complete a major and a minor in a different science area of study. The major study area must be taken from:

- Chemistry
- Biological sciences
- Genetics
- Physics
- Mathematics
- Statistics

Students must also complete studies from the Bachelor of Biomedical Science.

For information on topics available for study in the Bachelor of Biomedical Science see page 100.

### Career Outlook

As both science and biomedical science graduates are highly employable, the combination of the two degrees will increase the career prospects of graduates. Graduates will be well prepared for employment in the health-care and medical related industries as well as areas requiring advanced knowledge and skills in the fundamental sciences.

### Course Details

Four years full-time, eight years part-time

Clayton campus

2009 clearly-in ENTER: 93.05

VCE prerequisites: Units 3 and 4 – a study score of at least 35 in English (ESL) or 30 in any other English, a study score of at least 25 in chemistry and in one of mathematical methods (either), specialist mathematics or physics.

2009 CSP fee: \$5112

2009 IB score: 35

IB prerequisites: English at a minimum of grade four at standard level and one of chemistry, mathematical methods (SL or HL), further mathematics (HL) or specialist mathematics at a grade four standard level.

## Bachelor of Science/Bachelor of Business and Commerce

Using the country's natural resources and strong scientific expertise, Australian business and industry continues to develop and market innovative products that compete on a world stage.

Graduates of this double degree offer business and industry the professional skills of scientists and technologists, coupled with expertise in business and managerial practice.

Upon completion of this course, students will have advanced knowledge and skills in two areas of science and in at least one area of business and commerce.

### Course Outline

Students select a major study area from the Bachelor of Business and Commerce and complete the following subjects:

Principles of accounting and finance – Business law – Introductory microeconomics – Business statistics – Introduction to management – Marketing theory and practice.

For more information on study areas in the Bachelor of Business and Commerce see page 53.

Students also select one of the following science study areas:

Applied biochemistry – Applied biology – Applied statistics (minor only) – Applied chemistry – Applied microbiology – Computing – Resource and environmental management – Mathematics and modelling – Human physiology (minor only) – Psychology

### Career Outlook

Students can pursue the range of careers available to both science and business and commerce graduates. Some examples include working as a technical manager, scientific officer, technical sales manager, marketing manager, occupational health and safety officer or laboratory manager.

### Course Details

Four years full-time, eight years part-time

Off-campus study is available

Gippsland campus

2009 clearly-in ENTER: Consult faculty for further information

VCE prerequisites: Units 1 and 2 – two units from general mathematics and/or mathematical methods (either). Units 3 and 4 – a study score of at least 30 in English (ESL) or 25 in any other English, and one of biology, chemistry, mathematical methods (either), physics, geography, psychology or specialist mathematics.

2009 CSP fee: \$6950

2009 IB score: Consult faculty for further information

IB prerequisites: English and mathematics (any) at a minimum of grade four at standard level.

## Bachelor of Science/Bachelor of Computer Science

Comprising the best of both worlds, this double degree meets growing demand for flexible, dynamic courses that recognise the changing face of today's workforce.

The course equips students with the strong communication skills, critical analysis and problem-solving ability of a science degree, combined with numeracy and complex IT skills – the perfect resume for the employee of the future.

The computer science component includes an in-depth study of the software, hardware and theory of computation needed to solve a range of commercial, scientific and technical problems. While the science section of the degree provides students with the opportunity to participate in laboratory sessions and field work.

### Course Outline

The course is divided evenly between science and computer science subjects.

For information on units studied in the Bachelor of Computer Science see page 80.

For details of major areas of study available in the Bachelor of Science see page 114.

### Career Outlook

Computer Science is one of the fastest growing job fields and combining this with science gives students twice the employment opportunities. Students graduating from this degree will meet the demands of employers of the future, with their strong communication skills, critical analysis and problem-solving abilities combined with numeracy and well developed IT skills. The double degree is a lucrative combination, maximising opportunities for employment in both science and information technology.

### Course Details

Four years full-time, eight years part-time

Clayton campus

2009 clearly-in ENTER: 80.50

VCE prerequisites: Units 3 and 4 – a study score of at least 30 in English (ESL) or 25 in any other English, and a study score of at least 20 in mathematical methods (either) or specialist mathematics or at least 35 in further mathematics.

2009 CSP fee: \$5507

2009 IB score: 29

IB prerequisites: English at a minimum of grade four at standard level and one of mathematical methods (SL or HL), further mathematics (HL) or specialist mathematics at a grade four standard level.

## Bachelor of Science (Biotechnology)/ Bachelor of Science (Medical Bioscience)

This course has been designed especially for the Malaysian environment, and emphasises techniques in tropical medicine with a focus on biotechnology.

The course offers students knowledge in a range of scientific disciplines, with a particular understanding and appreciation of medical bioscience and biotechnology.

Students not only develop the skills to use sophisticated equipment, they also learn to work effectively within a team environment, particularly in the field of patient care.

Applied research projects in third and fourth year enable students to undertake meaningful research. Students must complete industrial training via a professional attachment to a clinical or medical laboratory.

### Course Outline

Level One

Biology – Fundamentals of biotechnology – Chemistry – Introduction to statistical reasoning

Levels Two, Three and Four

Introduction to anatomy and medical terminology – Recombinant DNA technology – Biochemistry – Cellular metabolism – Crop science – Molecular biology and biotechnology – Plant biotechnology – Instrumental techniques – Foundations of genetics – Genetics of development – Genomics and molecular genetics – Essentials of pathology – Essentials of applied immunology – Microbiology – Principles of medical microbiology – Principles of pharmacology – Body systems physiology – Physiology of human health – The practice and application of science – Laboratory and workplace management

### Career Outlook

Graduates can pursue career opportunities in hospitals, veterinary clinics, medical research, diagnostic and forensic laboratories, pharmaceutical and product manufacturing, biomedical equipment and pharmaceutical sales, science units in government departments, universities and health-care projects.

### Course Details

Four years full-time, eight years part-time

Sunway campus

2009 clearly-in ENTER: 85.00

2009 Tuition fee: RM 34,760

2009 IB score: 30

VCE prerequisites: A study score of at least 30 in English (ESL) or 25 in any other English

IB prerequisites: English at a minimum of grade four at standard level

## Bachelor of Science (Biotechnology)/ Bachelor of Science (Environmental Management)

The double degree offers a range of fascinating and challenging areas of study that deal with both biotechnological and environmental issues.

Disciplines include genetics, biochemistry, ecology, environmental health, microbiology and molecular biology. Through field trips, students gain an understanding of environmental issues relating to tropical habitats such as rainforests and coral reefs.

### Course Outline

Students must complete a program of study including core subjects plus at least three elective studies. The elective units may be chosen from any school at the Sunway campus, including units offered for other science courses.

For more information about subjects offered in the Bachelor of Science (Biotechnology) and the Bachelor of Science (Environmental Management) consult the individual entries in this guide.

### Career Outlook

Graduates work in government, industry, consulting firms and research institutions. Students can pursue the range of careers available to both Bachelor of Science(Biotechnology) and Bachelor of Science(Environmental Management) graduates. Please refer to the career information for these degrees.

### Course Details

Four years full-time, eight years part time  
Sunway campus  
2009 Clearly in ENTER: Consult Faculty  
2009 IB score: Consult faculty  
IB prerequisites: Consult faculty  
2009 Tuition fee: RM 34,760

### Other courses to consider:

Bachelor of Arts (Communication)/  
Bachelor of Science – p32  
Bachelor of Arts (Journalism)/  
Bachelor of Science – p32  
Bachelor of Commerce/  
Bachelor of Science – p52  
Bachelor of Science/  
Bachelor of Education (Primary) – p62  
Bachelor of Science/  
Bachelor of Education (Secondary) – p64  
Bachelor of Science/  
Bachelor of Engineering – p73  
Bachelor of Science/  
Bachelor of Laws – p91

## Associate Degree in Applied Sciences

In the pursuit of excellence, scientists set new standards that influence technological developments, contribute to improvements in health and social well-being, and support environmental sustainability.

This associate degree provides students with a broad general science education, featuring an emphasis on practical training in applied sciences. It allows students to develop a wide knowledge base and technical capacity required in a range of workplaces.

One additional year of full-time study will enable graduates to complete the Bachelor of Science degree.

### Course Outline

Students must complete three study areas in science, along with a specified number of science electives, a statistics subject, and a communication subject.

Students also choose from the following subject areas:

- Applied biochemistry
- Applied chemistry
- Applied microbiology
- Environmental science and resource management
- Human physiology
- Mathematics and modelling

### Career Outlook

The course will equip students with the ability to think critically, communicate effectively, and will develop research techniques and problem solving skills. Students acquire applied skills in three scientific disciplines, providing a foundation for a vocational career in science or for further study.

### Course Details

Two years full-time, four years part-time  
Gippsland campus  
2009 clearly-in ENTER: Consult faculty for further information  
VCE prerequisites: Units 3 and 4 – a study score of at least 30 in English (ESL) or 25 in any other English.  
2009 CSP fee: \$4162  
2009 IB score: Consult faculty for further information  
IB prerequisites: English at a minimum of grade four at standard level.

## Honours

The prestigious honours degree provides students with an exciting undergraduate capstone experience through engagement with deeper discipline knowledge and independent analysis and research. During the one-year program students work closely with a world-class leader in a chosen area of science, who provides individual guidance and one-on-one academic mentoring.

The program prepares graduates for employment or for higher degree studies. With their extended scientific knowledge and enhanced project management, communication and research skills, honours graduates stand out in the crowd as future leaders in their area of expertise.

### Course Outline

The honours program successfully brings together the whole spectrum of science disciplines research available across all faculties and campuses of Monash University, and caters for students who complete science degrees at Monash or a any other institution. It also provides the flexibility to accommodate cross-disciplinary projects.

The specific requirements for the honours degree is dependent on the field of study, but in general will include advanced coursework and specified assessment tasks, and a major research project, which is reported in seminar presentations, and in the form of a thesis.

Then course can be tailor-made to the interests of individuals students, although there maybe compulsory elements in some areas of study.

### Career Outlook

Honours graduates have advanced theoretical knowledge and practical expertise in their area of study and highly developed analytical skills and research experience that give them an edge over other graduates in the job market.

Strong career opportunities exist for honours graduates in the traditional science areas of biological sciences, chemistry, physics, and mathematical sciences within both the public and private sector.

Honours graduates are also highly sought after in other areas including biotechnology and genetic engineering, pharmaceutical science, synchrotron science, banking and finance, environmental consulting, biomedical science, mining, petroleum and engineering, scientific research and development, education, meteorology, nuclear science, and marine biology.

### Course Details

One year full-time, two years part time.  
Clayton, Gippsland and Sunway Campus (Not all programs available on all campuses)  
Entrance requirements: Completion of a Bachelor of Science or equivalent with a distinction grade average (70 per cent) or above in 24 points of studies in relevant units at level three. These 24 points of studies will normally include at least 18 points of units in the area of study in which students wish to undertake Honours.

Science honours are available in:  
Bachelor of Science  
Bachelor of Science (Medical Bioscience)  
Bachelor of Science (Biotechnology)  
Bachelor of Science (Science Scholar Program)

For more information visit:  
[www.sci.monash.edu/undergrad/honours/](http://www.sci.monash.edu/undergrad/honours/)