

# Bachelor of Computer Science Bachelor of Software Engineering

Clayton School of Information Technology



[www.infotech.monash.edu.au](http://www.infotech.monash.edu.au)

# Information Technology at Monash

Since it was established some forty years ago, Monash University has become the largest and one of the most prestigious Australian universities. Monash is a member of Australia's leading Group of Eight (Go8) universities. The Group of Eight undertakes 70% of all research conducted in Australian universities and more than half of all basic research conducted throughout Australia.

Visit the website: [www.g08.edu.au](http://www.g08.edu.au)

Monash was the first university to recognise the importance of information and communications technology as a separate group of disciplines, requiring specialist teaching and research, and is the only Group of Eight university to have a dedicated IT faculty.

Monash aims for academic excellence in its teaching and research. The Faculty of Information Technology at Monash is one of the largest research organisations in Australia with over 80% of the academic staff research qualified to PhD or masters level. The faculty teaches and conducts research on six of Monash's campuses. Around 50% of IT enrolments are from international students, who provide a diversity and perspective that enhances the experience for all students. Outstanding facilities include more than 1500 work stations networked across the Australian teaching campuses and upgraded every 2-3 years.

For the student interested in an information and communications technology career, Monash's Faculty of Information Technology offers high academic and research standards, a global profile and a range of courses and units from across the whole information and communications technology spectrum.

## Computer Science and Software Engineering

Staff working in the disciplines of Computer Science and Software Engineering are located at the Clayton School of Information Technology and have over 30 years experience in computer education. They are engaged in leading-edge research and development and are proud of the vibrant research culture. Many of the research projects in which staff are involved are supported by government and/or commercial funding. In addition, they have fostered a number of research partnerships with prominent information technology and telecommunications corporations. Many of the academic staff are internationally recognised as leading experts in their field.

## Industry-Based Learning (IBL) Placement Program \*

Computer Science and Software Engineering students now have the opportunity to participate in the Industry-Based Learning Placement Program in their third year of study. Students selected into the IBL Placement program will undertake a 22-week placement with a Monash University approved industry partner and receive a \$15,000 scholarship. Students apply technical skills gained from their studies in real working environments and familiarise themselves with a range of technical processes and systems used in industry. The program provides students with the best opportunities in industry, via relevant hands-on experience working in leading Australian and global organisations. Work during the placements is structured and assessed as part of the degree.

Selected second year Computer Science and Software Engineering students will be invited to apply for the IBL Placement program and go through an interview process conducted by our industry partners. Selection criteria includes communication skills, maturity, enthusiasm, initiative, leadership qualities, extra-curricular interests and participation, academic performance, career interests and personal employment history.

\* The IBL Placement program is available to domestic students only.



# Degrees offered by the Clayton School of Information Technology

Professionals are now expected to have a broader knowledge base and there is an increased demand for a complete package of technical, interpersonal and business skills.

## The IT skills employers are looking for

Employers worldwide look for practical and technical IT and people skills in everyone they recruit. You will find that this program provides you with the fundamental skills required for entry-level jobs in information technology fields.

## Common core units

A key feature of our undergraduate IT degrees are the seven common core units, which are taught on all campuses and also by off-campus learning (OCL) mode.

The IT core units are:

- Computer systems
- Computer programming
- IT in organizations
- Networks and data communications
- Database
- Systems analysis and design
- IT project management

## Tailored for industry relevance

The common core units will provide you with the vital information technology skills that all employers want. These units ensure that every Monash IT degree is tailored for industry relevance and fit – so that when you graduate you will be well prepared for work.

## Flexibility – you choose

These core units also offer students flexibility. They give you an understanding of fundamental information technology concepts and principles. This will provide you with the knowledge and skills to meet the ongoing challenge of working in the rapidly changing field of information technology, as well as a foundation for further specialisation and research.

## Elective units

Elective units allow you to choose studies that match the career you are working towards. Electives also allow you more depth in your foundation studies, or enable you to broaden the scope of your IT and other studies.



## Mode of study

These degrees are offered on-campus during the day at Clayton and can be undertaken on either a full-time or part-time basis.

## Duration of course

- Bachelor of Computer Science (BCompSc)  
3 years full-time
- Bachelor of Software Engineering (BSE)  
4 years full-time
- Bachelor of Arts/Bachelor of Computer Science (BA/BCompSci)  
4.25 years full-time
- Bachelor of Science/Bachelor of Computer Science (BSc/BCompSc)  
4 years full-time

## Degree intakes

There are intakes for the degree in early March and mid-July each year for local and international students.

## Gaining credit for prior study

You can apply for credit for prior study of approved courses at recognised tertiary institutions. For more information, visit the faculty website at [www.infotech.monash.edu](http://www.infotech.monash.edu)

## Owen Rodda

**Bachelor of Software Engineering (Honours), (Dean's Scholars program)  
Graduated 2003**

***Now working as a programmer,  
Systems Group, Livedoor Co. Ltd.  
Japan***

"My primary role at Livedoor is development of services related to the company's portal website. Working in a Japanese environment, my main challenge is communication; in this area too, I have applied my skills to technological solutions where possible. It's taught me a great deal about internationalisation and usability.

"I chose Monash due to the Dean's Scholars course, which offered flexibility and rewards above and beyond the other courses I had investigated. Software engineering builds upon programming skills with complementary management, design, and communication concepts. The best part of this degree is the opportunity to apply the concepts learnt in a real-world environment. Whether it is a business placement via IBL in Business Systems or the year-long Software Engineering group project, there are a number of chances to reinforce theoretical learning with significant industry experience."

# Computer science: computers for problem-solving

## Bachelor of Computer Science

**Course code:** 2380

**CRICOS code:** 030782E

**Course duration:** 3 years full-time,  
4 years (honours)

**Entry requirements:** Completion of VCE or equivalent qualification, including units 3 and 4 with 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).

**Location:** Clayton and Malaysia

**Accreditation:** The degree satisfies the requirements for professional-level membership of the Australian Computer Society (ACS).

Computer science is concerned with the scientific design and use of computer hardware and software. Computer science spans a range of areas from its theoretical and algorithmic foundations to cutting-edge developments in robotics, computer vision, intelligent systems, and bioinformatics. This course provides an in-depth study of computing with a focus on the software, hardware and theory of computation to solve commercial, scientific and technical problems.

The course emphasises:

- **Software implementation:** the analysis, design, coding, testing and maintenance of software written in many different programming languages.
- **Computation:** understanding the science of information processing, the limits of computability, and the many ways to measure and predict the behaviour, complexity, and performance of computer systems.
- **Application areas:** advanced studies in computer graphics, artificial intelligence, machine learning, image processing, user interfaces, networking, cryptography, the internet and the World Wide Web.

Along with supporting studies in mathematics, computer science may be combined with another area of interest by using **free** electives from any discipline, including from another faculty (eg. maths, biology, economics, philosophy). Or they can be used build a specialisation in another field of IT ( eg. software engineering, multimedia, or network computing). During the course, students must also undertake a substantial project work involving the development of a realistic software or hardware system.

On completion of the Bachelor of Computer Science, students have the option of continuing their studies. Comprising four coursework subjects and a thesis component, an Honours year may open a range of career opportunities. Graduates with research skills are particularly sought after by employers. An Honours degree may also lead to postgraduate study or a research degree (such as a Masters by research or a PhD).

Bachelor of Computer Science	
First year	
#	Computer systems
#	Computer programming
#	IT in organizations
+	Computer science
+	Mathematics for computer science I
+	Mathematics for computer science 2
	Two free electives
Second year	
#	Systems analysis and design
#	Networks and data communications
#	Database
+	Algorithms and data structures
+	Theory of computation
+	Computer systems 2
	Two free electives
Third year	
#	IT Project management
+	Analysis and design of algorithms
+	Software engineering: architecture and design
+	Computer science project <b>or</b>
+	Software engineering project
	Two free electives
*	Two computer science approved electives
#	Faculty common core units
+	BCS core units
*	Computer science approved electives:

### Computer science approved electives

**Level 1:** Introduction to software engineering; Digital logic; Advanced level 1 project (by invitation)  
**Level 2:** Software engineering practice; Technical documentation for software engineers; Advanced level 2 project (by invitation)  
**Level 3:** Formal methods for software engineering; System tools and programming languages; Multimedia programming and the www; Artificial intelligence; Image processing; Programming languages and paradigms; Numerical computing; Computer graphics.

**Note:** This course map is indicative only, as at June 2008. Please see [www.infotech.monash.edu.au](http://www.infotech.monash.edu.au) for current unit information and approved course variations.



## Chitrleka Appalanaidu

**Bachelor of Computer Science –  
3rd year 2006**

**International student – Malaysia**

“As a future IT graduate, the profile of the university I come from is very important to me. A degree from Monash made me certain that I will develop good skills that will market me for great job opportunities with leading employers.

“The Bachelor of Computer Science is a degree that explores the intricacies of computers such as how problems are solved through computer technology, how software is programmed, and how a computer really works. The most attractive feature of this course is its challenging nature.

“The best thing about studying IT at Monash is the course content. All aspects of computer science are covered, from the basic to the advanced concepts. The lecturers at Monash are friendly, approachable and helpful.”

## Career options include

- Software Engineer
- Systems Analyst
- Technology Consultant
- Algorithm Designer
- Research and Development in:
  - Artificial Intelligence
  - Bioinformatics
  - Networking and Cryptography
  - Computer Games
  - Multimedia
  - Robotics

# Software engineering: building large-scale industrial software

## Bachelor of Software Engineering

**Course code:** 2770

**CRICOS code:** 026690K

**Course duration:** 4 years

**Entry requirements:** Completion of VCE or equivalent qualification, including units 3 and 4 with 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).

**Location:** Clayton

**Accreditation:** The degree satisfies the requirements for professional-level membership of the Australian Computer Society (ACS) and the Institute of Engineers Australia (IE Aust).

The Bachelor of Software Engineering is intended to produce quality, world-class graduates. The degree has been specially designed in response to industry demand to produce graduate software engineers with large-scale software systems project capability. Graduates who can offer skills in these areas are in demand by business and government organisations concerned with software development on a large scale. Such skills are equally important to small projects and businesses, providing software engineering and integration services to government or large private organisations.

The study of software engineering involves computer science, problem-solving, mathematical foundations of software engineering, programming, software development methodologies, software processes and lifecycles, software quality, testing and technical documentation.

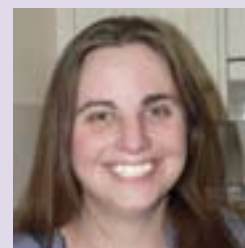
Software engineering addresses the issues of building large complex software systems to meet information processing challenges. Skills in group management and dynamics are developed, as well as professional communication skills such as technical writing, documentation and presentation.

In their fourth year students undertake a full-year group studio project with an industry client. Students who perform well in year 3 are invited into the fourth year Honours stream, where they take a research project, replacing two electives. This degree is often used as a pathway to postgraduate study and research.

### Vacation employment

To satisfy the requirements of accreditation by IE Aust, students must fulfil a 12-week vacation employment (typically during the summer break between years 3 and 4 of their course). This work must be full-time, paid employment related to software engineering, computer science, IT or engineering.

Bachelor of Software Engineering	
First year	
#	Computer systems
#	Computer programming
#	Engineering profession (Faculty of Engineering)
+	Introduction to software engineering
+	Computer science
+	Mathematics for computer science I
+	Mathematics for computer science 2
*	One approved elective
Second year	
#	Systems analysis and design
#	Networks and data communications
#	Database
+	Computer systems 2
+	Algorithms and data structures
+	Theory of computation
+	Software engineering practice
+	Technical documentation for software engineers
Third year	
#	IT project management
+	Software engineering: architecture and design
+	Parallel and distributed systems
+	Formal specification for software engineering
+	System tools and programming languages
+	Multimedia programming and the www
*	Two approved electives
+	12-week vacation employment
Fourth year (option 1)	
+	Software engineering studio project (full year)
+	System validation and verification, quality and standard
*	Five approved electives
Fourth year (option 2) – Honours	
+	Software engineering studio project (full year)
+	Software engineering research project (full year)
+	System validation and verification, quality and standard
*	Three approved electives
Fourth year (option 3) – Honours	
+	Software engineering research project (full year)
+	Systems validation and verification, quality and standard
*	Three approved electives



Erica Smith

### Bachelor of Software Engineering (Honours). Graduated 2005

"I am currently working as an analyst with Accenture, an international technology and business consulting company. The Bachelor of Software Engineering is a well-recognised degree with a strong core focus, yet still offers a range of interesting elective subjects that really appealed to me. My course materials gave me the theoretical background to work in software design, and our group projects gave me the experience to work in and lead a team. If you really want to be in IT, then seriously consider Monash. You'll have some unforgettable experiences, and meet some really wonderful people."

### Career options include

- Software engineer
- Software architect
- Software consultant
- Software developer
- Internet developer
- Programming specialist
- IT project manager
- Database designer and manager
- Network administrator
- Games programmer

#	Faculty common core units
+	BCS core units
*	Elective units (may be taken from approved IT or Engineering faculty lists)

Software engineering approved electives:

Level 1: Digital logic.

Level 3: Analysis and design of algorithms; Artificial Intelligence; Image processing; Programming languages and paradigms; Numerical computing; Computer graphics. Faculty of Engineering approved electives may be sequences taken from telecommunications, telematics or mechatronics.

Note: This course map is indicative only, as at June 2008. Please see [www.infotech.monash.edu.au](http://www.infotech.monash.edu.au) for current unit information and approved course variations.

# Combine computer science with science or arts degrees

## Bachelor of Science/ Bachelor of Computer Science

**Course code:** 3517

**CRICOS code:** 041540K

**Course duration:** 4 years

**Entry requirements:** Completion of VCE or equivalent qualification, including units 3 and 4 with 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.

**Location:** Clayton

In our computerised society, no modern scientist would be without knowledge of computers. First-level computer science is an introduction to computing and is suitable either for students whose major interest is in another science discipline, or students who wish to become computer scientists with an understanding of all the basic aspects of computing.

The Bachelor of Science/Bachelor of Computer Science enables students to combine minor and major studies in enabling and applied science with more comprehensive studies of computer science and information technology.

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 aims to equip graduates with the strong communication skills, critical analysis and problem-solving ability of a science degree, combined with numeracy and complex IT skills – qualifications which are highly-sought after by employers.

Not only will the course provide graduates with first-rate employment opportunities, it will engender an interest in emerging technologies that will stay with them for life – giving graduates the curiosity to keep abreast of change, and the skills to become change-generators. Graduates gain the benefits of both degrees, by combining strong written and oral communication skills and critical analysis with strong problem-solving, numeracy and IT skills.

### Workload requirements

This double degree program requires students to complete a total of 192 points, being: 96 points in the Bachelor of Science component and 96 points in the Bachelor of Computer Science component. Except with the permission of both faculties, students must complete the course within a maximum of ten years.

### Course structure

To satisfy the science component of the double degree students must satisfy the core requirement for the Bachelor of Science by completing *How science works* (replacing *IT in organizations* in the BCS core) and a mathematics unit. Overall, students must complete three core level-1 computer science units from the Faculty of Information Technology; and at least two sequences from the Faculty of Science (one of which must be mathematics).

Students then go on to complete 11 additional core and two elective units in computer science, plus appropriate science units to satisfy the requirements for at least one major and one minor sequence in science (one of which must be a minor sequence in mathematics), plus science elective units. Refer to the course structure for the Bachelor of Computer Science on page 4.

**Please see [www.infotech.monash.edu.au](http://www.infotech.monash.edu.au) for current unit information, approved course variations, and details of the Science component of the double degree.**



Kalpana Soni

### Bachelor of Software Engineering – 4th year 2006

“The Bachelor of Software Engineering provides me with a technical base and a diversity of electives. It is more analytical and project management focused than a computer science degree. Software engineering involves solving problems and I enjoy a good challenge. I can choose electives from different faculties and disciplines which gives me a chance to broaden my horizon for later studies such as an MBA. In this degree you have the opportunity to work with the latest software packages, and apply the knowledge you learn from theory. Some of the key skills that I have gained in this degree include analytical skills, the ability to work in a team, meeting deadlines, and being innovative. I love studying at Monash because it provides me with excellent academic and recreational facilities.”

### Vipul Swarup

#### Bachelor of Software Engineering (Honours) (Dean's Scholar's program), Graduated 2004

#### International student – India

“I am currently a consultant at IBM Australia. I chose Monash because it is a well-regarded university in Asia. I heard of Monash through a higher education agent. I have a keen interest in software development. The Bachelor of Software Engineering prepares students for a wide variety of roles in the software development process. It also prepares students to deal with business specific issues. Students come out of the course as highly-trained professionals.

“The best thing about studying at Monash is its good quality IT infrastructure. Over summer during my final year I worked at a major investment bank, where I built a Java application. I also worked as an intern at a minerals and resources company in India during the summer of my second year. I hope to become a solutions architect in the next 4-5 years.”

## Bachelor of Arts/Bachelor of Computer Science

**Course code:** 2672

**CRICOS code:** 037843G

**Course duration:** 4.25 years#

**Entry requirements:** Completion of VCE or equivalent qualification, including units 3 and 4 with 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).

**Location:** Clayton

The Bachelor of Arts/Bachelor of Computer Science double degree recognises the needs of students who want to maintain their interests in both these disciplines. Graduates will possess the combined talents of a computer technologist as well as having highly developed communication and visual skills. Thus, this degree gives the graduate an edge in a wide range of employment opportunities related to both information technology and arts.

The course provides an opening for exciting degree combinations such as cognitive science (combining psychology, linguistics, philosophy and artificial intelligence studies), and visual culture/ computational visualization (combining art history and theory, film and television studies or geographical information systems with computer graphics and multimedia programming). It will increase the flexibility and range of choices available to students, and enable students to graduate with a more comprehensive education. In addition, it will satisfy recent increases in market demand caused by the pervasiveness of computers in general and the world wide web (www) in particular.

# Students will be required to overload or complete units in summer semester if they wish to complete in 4 years.

### Workload requirements

This double degree program requires students to complete a total of 204 points, being: 96 points in the Bachelor of Arts component and 108 points in the Bachelor of Computer Science component. Except with the permission of both faculties, students must complete the course within a maximum of 10.5 years.

### Course structure

To satisfy the arts component of the double degree students must complete 96 'arts' points (Arts points are studies drawn from disciplines offered by schools in the Faculty of Arts). The 96 arts points must consist of EITHER a *major*, a *minor*, another *first year sequence* and a further *12 points*; OR *two majors*.

To satisfy the computer science component of the double degree students must complete 78 points of faculty common core and BCS core units, 12 points of mathematics and 18 points of BCS electives. Students must complete at least 36 points at third-year level. Refer to the course structure for the Bachelor of Computer Science on page 4.

**Please see [www.infotech.monash.edu.au](http://www.infotech.monash.edu.au) for current unit information, approved course variations, and details of the Arts component of the double degree.**



Mathieu Tozer

### Bachelor of Arts/Bachelor of Computer Science – 4th year 2006

"I chose to study Computer Science following a desire to learn how to design and create software that people would actually enjoy using in their work and life. At Monash, I've gained skills in software analysis, design and implementation, which have sparked a creative streak for designing software; and programming subjects have taught me the skills needed for implementing my ideas. In addition to learning about commercial software development, I've also gained an understanding of computer theory, which is fascinating. For those who seek it out, there's a supportive network of tutors and lecturers who are there to help foster your own ideas. All the skills and know-how to create great software is available to the motivated IT student at Monash.

"Since 2005, I have been involved with plasq, a Melbourne-based company who collaborate with software developers all over the world to create award-winning products for Mac OS X, such as Comic Life. I localised Comic Life to Japanese, and have since been testing their new product, currently in the development stage. I'm now looking forward to an exciting career developing for the Mac."

# Expand your horizons

## Course fees

Australian citizens may apply for an Australian Commonwealth-supported place (CSP). This scheme applies to students enrolled in Information Technology undergraduate degree courses.

Full-fee-paying places are available to Australian citizens, Australian permanent residents, New Zealand citizens and international students.

For more information on domestic fees, visit the website: [www.monash.edu/courses/fees.html](http://www.monash.edu/courses/fees.html)

International students may apply for an international full-fee place.

The Australian government also requires international students to have current, private health insurance.

For more information on fees applicable to international students, visit the website: [www.monash.edu/international/courses/](http://www.monash.edu/international/courses/)

## International students

International students must provide evidence of English proficiency. For full details of Admission requirements for international students, please visit: [www.infotech.monash.edu.au/apply/requirements/undergraduate](http://www.infotech.monash.edu.au/apply/requirements/undergraduate)

International students need to have completed at least the equivalent of an Australian Year 12 mathematics study.

## How to lodge your application

### Domestic (local) students

Domestic applications for full-time and part-time on-campus study must be made through the Victorian Tertiary Admissions Centre (VTAC) for semester 1 which commences in March. The closing date for VTAC applications is the end of September each year.

Visit the VTAC website: [www.vtac.edu.au](http://www.vtac.edu.au)

For more information visit the website: [www.infotech.monash.edu/apply/requirements](http://www.infotech.monash.edu/apply/requirements)

Domestic students can also apply to enter the course starting in semester 2 (mid-July). For semester 2 intake, apply directly to the Faculty of Information Technology on any Monash campus.

### International students

Victorian Certificate of Education (VCE) and International Baccalaureate (IB) students residing in Australia should apply through VTAC as above.

International students wishing to apply for full-fee-paying places on-campus should apply directly to:

International Recruitment Services  
871 Dandenong Road  
Caulfield East, Victoria 3145  
Australia

Email: [study@monash.edu.au](mailto:study@monash.edu.au)  
Telephone: +61 3 9627 4852  
Fax: +61 3 9905 8297

Application forms may be downloaded from the Monash International website: [www.monash.edu/study/international/apply](http://www.monash.edu/study/international/apply)

Application forms must be submitted with certified copies of academic transcripts and English qualifications or results.

Applications may also be made through Monash agents, which are located in major cities around the world. For more information on Monash agents visit the website: [www.monash.edu/study/international/agents/using.html](http://www.monash.edu/study/international/agents/using.html)

## Find out more

### Information Technology at Monash

#### IT Admissions:

Telephone: +61 3 9902 6011  
Fax: +61 3 9903 2745  
Email: [admissions@infotech.monash.edu.au](mailto:admissions@infotech.monash.edu.au)

#### Computer Science, Software Engineering course enquiries:

Telephone: +61 3 9905 5200  
Fax: +61 3 9905 5159

Please visit our faculty website at:  
**[www.infotech.monash.edu.au](http://www.infotech.monash.edu.au)**

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