MONASH University

Information Technology

Undergraduate Courses | **2016**

monash.edu/it

[it's more than you think]

How can Information Technology help you prepare for a bushfire? Find out more inside.

AUSTRALIA ▸ CHINA ▸ INDIA ▸ ITALY ▸ MALAYSIA ▸ SOUTH AFRICA

GROUP OF EIGHT AUSTRALIA

Are you prepared if a bushfire threatens the safety of you and your loved ones?

Professor Ann Nicholson of the Faculty of Information Technology is developing sophisticated probability models to help us manage the risk bushfires pose to life and property. Using this Bayesian network technology in which she's a world leader, Professor Nicholson is working on an online tool that allows you to make an informed decision on whether to leave, or stay and defend your property.

The same technology has been used since 2006 to predict fog at Melbourne Airport, and by the Victorian Government to monitor threats to endangered species like the Leadbeater's possum.

This is just one of the many ways IT at Monash is changing the world.

For more information visit monash.edu

Contents

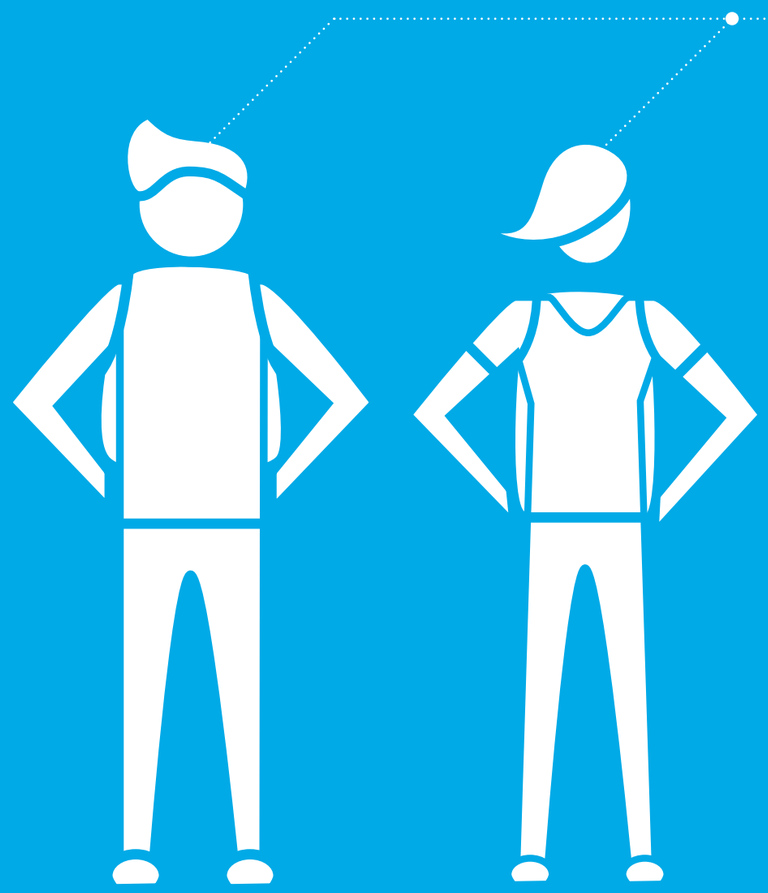
Why IT?

IT is everywhere – our modern world would be inconceivable without it. More than ever people and organisations are seeing opportunities to leverage IT, and as an IT professional, you are a vital part of this transformation.

You can take your career anywhere you choose with excellent financial rewards and great job prospects. The diversity is second to none, with the added bonus of being able to combine IT with whatever your interests are. Your skills and knowledge are globally accepted, and your IT degree will provide exciting travel opportunities.

Is IT for *you*?

The great thing about an IT career is that it offers something for everyone. You can specialise in areas from business to games to cybersecurity, or work across varying fields from banking to the environment. You will work in teams to deliver great IT solutions, with lots of scope for individual flair and effort. If you enjoy solving complex problems with analytical thinking, or like driving innovation with your imagination and creativity, then IT is for you. A career in IT enables you to make a positive difference to our world.



Interests

Choose your areas of interest

- Cyber Security
- Business
- Games
- Health
- Environment

Personality

Possible career options for you

Skills

Choose your unique skill set

- Entrepreneurial
- Innovation
- Problem Solving
- Teamwork

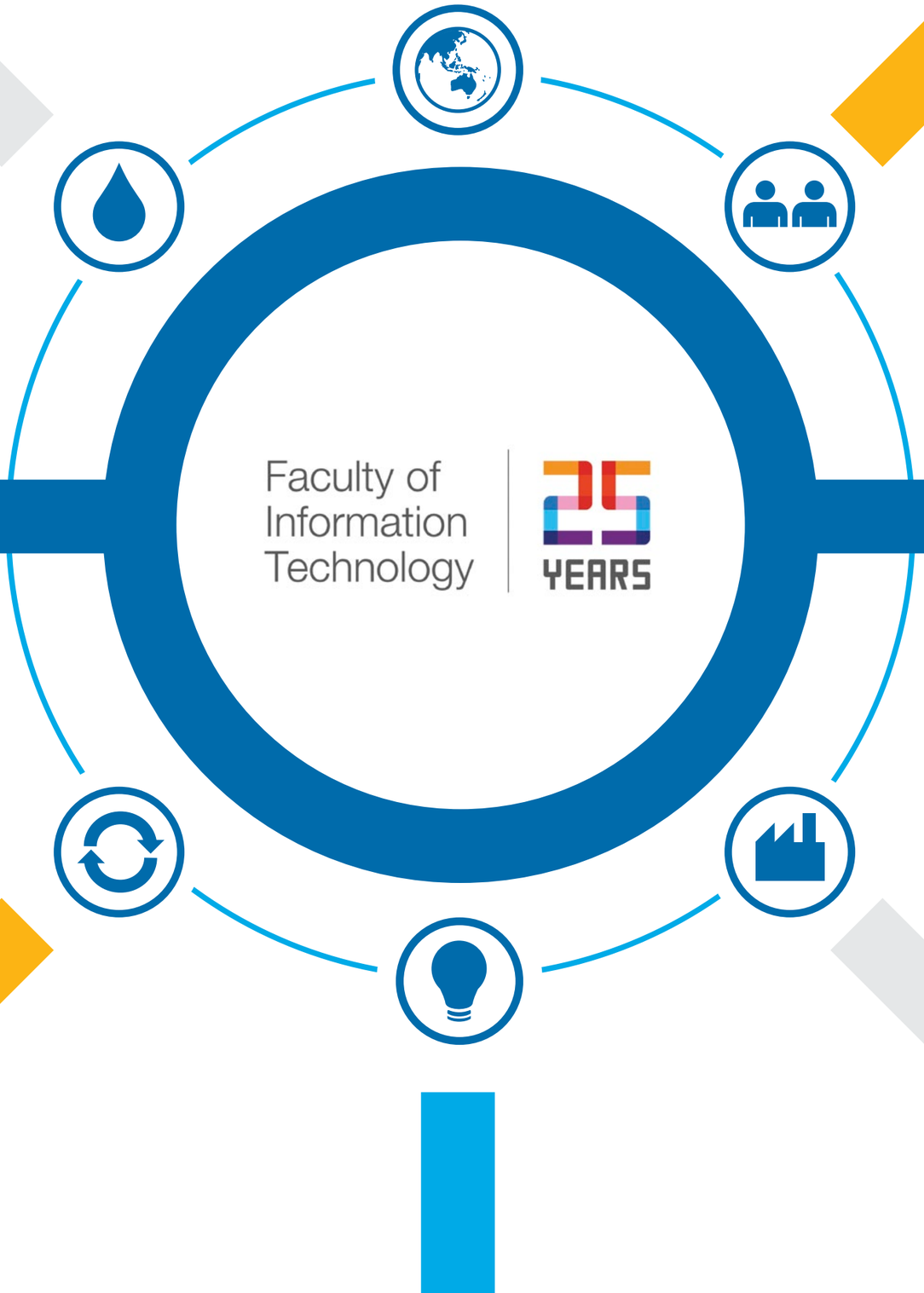
Recommended IT course

Bachelor of Information Technology

Business Information Systems (Major)
Environmental Science (Minor)
Cyber Security (Minor)

« Reselect | Confirm »

Why choose IT@Monash?



At Monash we are in the business of discovering how IT can help us meet key global challenges in the 21st century. We research how IT can better support and promote health and medicine, productivity and innovation, and social inclusion. We explore IT's role in supporting sustainable practices in water, energy and the manufacturing and delivery of goods and services.

Monash is unique as the only university in the prestigious Group of Eight universities with a dedicated information technology faculty offering breadth, depth and choice of courses and units. All of our courses have a strong practical focus so that our graduates are equipped to take on the professional world.

The Monash IT *experience*

Teaching innovation

We use innovative teaching models to enhance the learning of our students through:

- leading the way in studio based learning in IT, which focuses on ‘learning by doing’ in a collaborative environment,
- using the latest technology for interactive learning activities in lectures, and
- through students helping students through our Peer Assisted Study Sessions (PASS program).

Professional recognition

All of our undergraduate courses are accredited by the Australian Computer Society, so this means that when you graduate you can apply for professional-level membership with the ACS.

Research excellence

The Faculty of Information Technology has a strong reputation for excellence in research covering the spectrum of information technology from computer science to business information systems, to social science.

Our five research flagships are the focus for our internationally recognised research strengths in:

- Computational Biology
- IT for Resilient Communities
- Machine Learning
- Modelling, Optimisation and Visualisation
- Data Systems and Cybersecurity.

These are the hubs of our research networks.

Where Monash IT *can take you*

Chantel Garcia

Software Engineer, Microsoft USA, Monash IT graduate

"I chose Monash because it is one of the top universities in the world, it has its own Faculty of Information Technology and lastly because Monash University's IT degrees produce graduates with the technical skills necessary to pursue a successful career within the field of IT.

I am currently working for Microsoft in Seattle as a Software Engineer. The work is both challenging and extremely rewarding; knowing that what you work on will reach millions of end users."

Study abroad

The Monash Exchange and Study Abroad program offers students the opportunity to study one or two semesters outside Australia, providing guaranteed credit towards their degree. Students can choose to study at any of the Monash campuses in Australia, Italy, Malaysia or South Africa, or select from 120 partner institutions in 27 countries around the world.

Diploma of Languages

You can also pursue your interest in languages by undertaking a Diploma of Languages as part of your elective program. Students in this program often take part in study abroad or exchange in their final year to enhance their language development.

Study in Prato, Italy

Spend three weeks at Monash's Prato campus in Italy, over winter semester. You will develop a team-based interdisciplinary project that draws on Italy's rich historical, cultural and technological landscape.

▸ **More info: infotech.monash.edu.au/current/programs/prato.html**

Monash Undergraduate Research Projects Abroad (MURPA)

MURPA supports a summer mode placement in a leading research group overseas. It provides a unique two-month research experience for undergraduates at an elite international university.

▸ **Visit: it.monash.edu/murpa**

For more information go to:
monash.edu/studyabroad

Hayden Razzell

IBL Student, Software Engineering

"I've always had an affinity for technology and problem solving. In Software Engineering we learn everything from coding, algorithm design, teamwork, design strategies, maths and even project management.

I participated in the Monash Undergraduate Research Projects Abroad (MURPA) program, for which I spent two months at the University of California, San Diego. I worked with data scientists to develop a web portal that researchers could use to access the various supercomputer clusters. The trip was fully funded by Monash and it was a great opportunity to work with cutting edge technology and travel around California at the same time."

A world of *opportunities*

Multimedia development
Data Science
Intrusion detection specialist
Web designer
Team leader
Games designer
Software development
Computer Science
Computer networks and security
IT architect
Internet of things
Network administrator
User experience
Computer Science Advanced (Honours)
Software quality assurance
Data integrity officer
Information Technology
Software developer
Games development
IT Manager
Visualisation
Fraud and forensics consultant
Security consultant
Cloud developer
Technology business analyst
Cloud computing
eSolutions
Business Information Systems
Cryptographer
Multimedia developer
Animator
Programmer
Technology consultant
App developer
Mobile computing
Business Analyst
Systems analyst
Cybersecurity
Network architect
Software Engineering (Honours)
Creative technologist
Business analytics
Chief Information officer
Data scientist
Digital media specialist
Innovation designer
Project manager

Hands on *experience*

All of our students gain valuable practical experience, ensuring they are highly sought after in the job market. You will complete one of the following:

- one or two six-month IBL placements with one of our industry partners
- a team based IE studio project developing an IT system for a business client
- a Computer Science project designing and building a software solution
- a Data Science project analysing and interpreting real-world ‘big data’
- a collaborative studio project designing and developing a game or multimedia creation.

You build on the knowledge and skills acquired in your course while gaining high-demand, practical experience.

DID YOU KNOW

Each year, 100 per cent of our IBL students who seek employment receive graduate job offers

Industry Based Learning (IBL)

Gain valuable professional and business experience during one or two industry placements that count towards your degree. All IBL students receive a A$17,000 scholarship for each placement.

We are proud of our IBL placement program. Run for over 20 years, in conjunction with leading Australian and global organisations such as NAB, Deloitte and IBM, it is highly successful and recognised as a benchmark in work-integrated learning.

The key to that success is that it enables you to apply your academic skills in a professional organisation. You will undertake graduate level work in areas such as business analytics, IT consulting, information security, cutting-edge software development and project management during six-month industry placements.

▸ **Visit: it.monash.edu/ibl**

Final Year Team Projects

You apply the knowledge and expertise acquired in your course to a real-world problem, developing new skills in a team-based project.

Your team manages the project through all of its stages. You communicate with project stakeholders, develop project documentation, present your work to your clients, academics and other groups, and attend seminars. Academic supervisors mentor and oversee your work.

You could design and build:

- a mobile app hub connecting volunteers with not-for-profit organisations
- a full-scale game or 3D interactive animation that showcases your creative flair and technical skills to future employers
- a tool to capture, analyse and visualise a data stream from an online business

You will both enhance your technical skills and develop the essential ‘soft skills’ highly regarded by employers. Because you are working in a diverse team for an extended period of time, you develop your communication, teamwork and time management skills. You become an independent learner, an essential characteristic for IT professionals.

Our students consistently identify their final year project as the highlight of their course.

“The IBL program taught me to stand on my own two feet. It helped me clarify my career objectives, develop my interpersonal skills and establish an identity in the business world very early on.”

–

Rachael Sandel

Client Manager, Deloitte
Graduate, Business Information Systems

A$17,000
per IBL placement

Your course options

At Monash, we let you choose how you study. We offer two types of undergraduate courses – Comprehensive and Specialist. Each offer distinct benefits to you depending on your goals and ambitions, and both options offer a world-class education in your chosen field.

Aarushi Kansal
IBL Student, Software Engineering

"The best part of being a Monash student is the wide variety of societies on campus, there is a club or society for almost any interest area."

Comprehensive courses

You can choose a Monash Comprehensive course if you already know what your major study area will be, then choose the course that offers that major. You will still be able to select from a wide range of additional subjects that broaden your knowledge and suit your personal interests.

If you're still deciding where you'd like your studies to take you, but have a broad field in mind, our comprehensive courses offer the opportunity to try a range of subjects in year one, before choosing your major area of study.

Monash Comprehensive courses are made up of twenty-four units of study, studied over three years, eight each year. Eight units of study make up your primary major — the area in which you will develop your particular expertise. An additional eight units are specified by the course to add depth and breadth in the broad field, although there is some choice within that. The remaining eight units are free electives and offer you the flexibility to shape your course in a number of different ways, like extending your major to add depth, adding a second major or a minor from the same or another course, or studying a range of units from across the university. Go to page 20 for a list of IT majors and minors available to you.

COMPREHENSIVE COURSES AVAILABLE	SEE PAGE
■ Bachelor of Information Technology	18

Specialist courses

Monash Specialist courses enable you to concentrate in a particular area of study from day one, giving you the focus and depth required for entry into many careers as a graduate. They give you the knowledge and skills for professional practice and meet relevant accreditation requirements.

Most Monash Specialist courses offer a choice of specialisations you can take which determines the qualification you're awarded. Specialist courses are between three and five years in length. If you graduate from a course of four years or longer you receive an Honours qualification This is a higher-level qualification than a standard bachelor's degree, and means that you are usually eligible to complete a master's degree in the same discipline with only one additional year of study, or eighteen months in a different discipline.

SPECIALIST COURSES AVAILABLE	SEE PAGE
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Double degrees

Become an expert in two fields by choosing a double degree course. This allows you to study towards two different bachelor's degrees at the same time, providing you with more career flexibility and opportunities.

A double degree course takes at least two years less to complete than studying the two courses separately, because the required units from one course count as electives in the partner course.

Over 130 double degrees will be available from 2016.

DOUBLE DEGREE COMBINATIONS WITH IT

	Arts	Business / Business Specialist	Commerce / Commerce Specialist	Education	Design	Fine Art	Science
Computer Science			■	■			■
Information Technology	■	■	■	■	■	■	■
Software Engineering (Honours)	■		■				■

Elective Units – you choose

All of our single IT undergraduate courses offer you choices through elective units. Electives allow you to tailor a part of your studies to best suit your interests and skills.

These units can be used to:

- Undertake further in-depth study within an IT specialisation, or
- Give greater breadth by taking units from other areas of study ranging from languages, psychology, accounting to finance, marketing, sciences or education.

Bachelor of Information Technology

LOCATION
Clayton

ATAR
E: 80+

IB SCORE
E: 29+

DURATION
3 Years

STRUCTURE
Comprehensive

DEGREE AWARDED
Bachelor of Information Technology

E – Expected: The provided score is estimated and is to be used as a guide only.

Information technology is everywhere, but its power comes from the creative intelligence of the people behind it. Become the expert who designs and creates the IT systems we all rely on.

This highly practical course gives you the problem-solving skills you need to drive the ongoing revolution in the way we:

- communicate
- conduct business
- experience the world

At Australia's leading IT Faculty, you will learn from the best in a cutting-edge environment. Flexibility and choice – through our comprehensive range of majors, minors and double degrees – let you develop your strengths and explore new areas.

One third of your course is elective, so you can tailor your studies to suit your interests and career aspirations. The choice is yours:

- Your IT major or extended major – develop deep expertise.
- IT minors and electives – a huge range from 'Business Analytics' to 'Cybersecurity' and 'Games Design.'
- Monash-wide electives – complement your flair for IT or indulge your other passions.
- Double degree – gain an extra qualification in Arts, Business, Commerce, Design, Education, Fine Art or Science.
- Be global – study at Monash locations in Malaysia, South Africa or Italy, or at one of our prestigious partner universities.
- Go further – high achieving students can add an Honours research year or a 1.5-year IT Masters degree.

In your final year, you will put into practice the skills and knowledge you gained during the course, through an industry experience, games or multimedia studio project.

Alternatively, you can apply through the highly regarded Industry Based Learning (IBL) program to do one or two half-year placements with our industry partners (leading Australian and global organisations.) Placements count towards your course and are supported by generous scholarships. Each year, 100 per cent of our IBL students who seek employment have received graduate job offers.

The Bachelor of Information Technology is accredited by the Australian Computer Society.

Career options

This degree opens up a wide range of career opportunities for graduates. You acquire the knowledge and skills needed to use IT effectively and to develop and manage IT-based systems.

Roles include: ■ business analyst ■ systems analyst ■ network administrator or designer ■ IT security consultant ■ information manager ■ web designer ■ IT manager ■ games and multimedia developer ■ IT consultant.

LOOKING FOR BUSINESS INFORMATION SYSTEMS?

Our highly regarded program is now a major or extended major in the Bachelor of Information Technology.

Minors and Majors

Majors (five to choose from) and Minors (sixteen to choose from) allow you to specialise within the Bachelor of Information Technology.

Double Degrees available with

■ Arts ■ Business ■ Business Specialist ■ Commerce ■ Commerce Specialist ■ Design* ■ Education (Hons) ■ Fine Art* ■ Science

* This double degree is not available with all specialisations, see study.monash/courses for full details.

Prerequisite studies

VCE

English: Units 3 and 4: a study score of at least 30 in English (EAL) *or* 25 in English other than EAL

Maths: Units 1 and 2: satisfactory completion of two units (any study combination) of General Mathematics or Mathematical Methods; *or* Units 3 and 4: any mathematics

IB

English: At least 4 in English SL *or* 3 in English HL *or* 5 in English B SL *or* 4 in English B HL

Maths: At least 3 in any mathematics subject

James Siddel-Whipp

Delivery Analyst, Coles
Honours Graduate, Multimedia and Games Development

As a Delivery Analyst in the Digital and IT sector at Coles, James works across multiple areas of the business to create systems, websites and apps that reach millions of people every week.

"The broad knowledge that I was exposed to at Monash as well my user design and user experience skills have benefited me most at Coles.

Being in the IT field is very exciting right now. It's exploding into areas we could never have predicted. I can see IT and Digital expanding into every area of our lives."

Bachelor of Information Technology course map – *sample only*

YEAR	SEMESTERS 01	SEMESTERS 02
01	• Introductory programming unit • Introduction to computer systems, networks and security • Major unit 1 • Elective	• IT professional practice • Major unit 2 • Elective • Elective
02	• Databases • Systems development *or* Object oriented analysis, design and implementation • Major unit 3 • Elective	• IT project management • Major unit 4 • Major unit 5 • Elective
03	• Industry experience project • Major unit 6 • Major unit 7 • Elective	• Industry experience project • Major unit 8 • Elective • Elective

UNIT TYPES

- **Required information technology units**
- **Some choice:** you can choose from a prescribed list
- **Free choice:** you might choose further IT studies, or you can choose to study units from a different field

Note: Some majors include units which are also part of the Information Technology specified units. If so, you must complete additional elective information technology units to bring your overall total of credit points for IT units to at least 96 points. For students completing the double degree with Secondary education these elective units must be mathematics. In choosing electives you must ensure that you complete no more than 10 level-one units, and that you complete at least 36 points of study at level 3.

For in-depth course descriptions and structures visit:
study.monash/courses

Bachelor of Information Technology
Majors and Minors

Monash Researchers collaborating with the Peter McCallum Cancer Centre to find optimal internal radiotherapy treatment plans for prostate cancer patients.

Choice and flexibility

pick your major, then add:

- a second major, or
- one or two minors, or
- electives

Major and minor areas of study*

Area of study	Clayton
Business information systems	■ ■ ■
Computer networks and security	■ ■ ■
Games development	■ ■
Multimedia development	■ ■ ■
Software development	■ ■ ■
Business analytics	■
Computer science	■
Creative computing	■
Cybersecurity	■
Data science	■
Games design	■
Information and society	■
IT for business	■
Mobile apps development	■
Software engineering	■
Web development	■

■ Extended major ■ Major ■ Minor

*Some majors and minors require Year 12 or First Year mathematics.

Business information systems

All organisations, from the largest multinational to the smallest start-up, need information technology to carry them through change and ensure their long-term viability.

As a business information systems analyst, you will be at the forefront of change, guiding organisations toward their goals.

In this major, you will develop a thorough understanding of business-information systems, fundamental business IT concepts and how IT can be used to tackle business needs.

With the capacity to communicate with and understand the needs of software developers, business managers and users, you will be in demand to lead communication across all levels of business problem solving.

Computer networks and security

Our world runs on networks. We use mobile devices and the internet every day, and behind these lie a constantly evolving and crucial infrastructure including mobile communications, the cloud and broadband networks. Companies depend on these information networks for mission-critical operations.

In this major, you will gain in-demand technical expertise in computer networks and communication and a deep understanding of how software is controlled across cyberspace.

Greater connectivity has changed the way we live and do business. But it has also brought with it increased risk from threats such as viruses, hackers and cyber-criminals.

You will learn how to develop safe software and design and implement security measures to protect information and keep organisations resilient and operational.

Games development

If you have a fascination for digital games, and want a career designing, developing and creating for the exciting and expanding computer-games industry, then this is the major for you.

Games development will provide you with a detailed understanding of the processes and technologies used in the development of games and their associated technical and creative content. You will learn to program with the main technologies, tools and languages used in the games industry, with an emphasis on interactive software development.

We teach in a collaborative studio environment, in which you can explore and create unique game ideas using advanced technology.

Multimedia development

Do you have a creative and enquiring mind? Do you like telling stories in innovative ways? And are you keen to explore – and extend – the potential of emerging digital technologies?

If so, then multimedia development is for you. Multimedia developers combine creativity, computing and communication to produce new media possibilities and experiences.

Whether you aspire to a career designing and developing websites, 3D interactive games, mobile apps, or social-media interfaces, Multimedia development will show you how to creatively engage a contemporary audience. You'll learn to explore technology-led creativity for the digital economy – gaining sophisticated technical understanding of digital technologies and being given the creative freedom to develop your ideas.

Software development

Software does everything from dispensing medicine to controlling flight paths and monitoring and shaping our shopping habits. As a software developer, you will build the applications that underpin contemporary life. Why not join this young and exciting field, which is constantly evolving, as new technologies emerge?

You will learn to analyse an organisation's needs and gain the technological skills needed to create robust and elegant software, from mobile apps to web services and large-scale enterprise systems.

Bachelor of Computer Science

LOCATION	ATAR	IB SCORE
Clayton	83.20	31

DURATION
3 Years

STRUCTURE
Specialist

DEGREE AWARDED*
- Bachelor of Computer Science
- Bachelor of Computer Science in Data Science

* The degree you are awarded will reflect your chosen specialisation.

Computer scientists and their creations are everywhere.

They drive everything from search engines to daily weather reports, animation, cybersecurity and scientific discoveries, pushing developments that use and transform information.

You will graduate with the skills to design algorithms (instructions for computers) and data structures (information storage), creating software that solves real-world problems.

Build expertise through a specialisation in either advanced computer science, or in the exciting new field of data science, exploiting the massive datasets of the information age.

In this course you will:

- Learn by doing, using cutting-edge technology in a rich collaborative environment.
- Gain a deep understanding of the theory of computation, its mathematical foundations and its practical applications.
- Learn how to apply this knowledge in many fields, creatively, efficiently and ethically.
- Graduate with a degree accredited by the Australian Computer Society.

One third of your course is elective, so you can tailor your studies to suit your interests and career aspirations. The choice is yours:

- Extend your expertise – do additional computer science and data science units.
- IT electives – a huge range from cybersecurity to web, mobile or games development.
- Monash-wide electives – complement your computing savvy with anything from maths to music.
- Double degree – gain an extra qualification in commerce, education or science.
- Be global – study at Monash locations in Malaysia, South Africa or Italy, or at one of our prestigious partner universities.
- Go further – high-achieving students can add an honours research year, or a 1.5-year IT masters.

Your studies will culminate in a substantial year-long project, giving you the practical experience to enter the workplace ahead of the game.

Alternatively, you can apply for the highly regarded Industry Based Learning (IBL) program to do a half-year placement with leading Australian and global organisations. This counts towards your course and is supported by a A$17,000 scholarship.

Double degrees available with

■ Commerce ■ Commerce Specialist ■ Education (Hons) ■ Science

Prerequisite studies

VCE	IB
English: Units 3 and 4: a study score of at least 30 in English (EAL) *or* 25 in English other than EAL	**English:** At least 4 in English SL *or* 3 in English HL *or* 5 in English B SL *or* 4 in English B HL
Maths: Units 3 and 4: a study score of at least 25 in either Mathematical Methods (CAS) *or* Specialist Mathematics*	**Maths:** At least 4 in Mathematics SL *or* 4 in Further Mathematics SL *or* 3 in Mathematics HL *or* 6 in Mathematics Studies SL

*For 2016 only, Further Mathematics with a score of at least 35 will be accepted as a transitional measure for the single BCompSci and BSc/BCompSci double but not other double degrees.

Find out more:
study.monash/courses

"Computer Science offers me a lot of flexibility to take electives not only from different parts of IT, but also from other faculties. This has given me the ability to explore and gain new skills across a range of disciplines. I'm interested in art and design, so my elective this semester is electronic design, where we design and produce magazines."

–

Kelly Ang

Student, Computer Science

Bachelor of Computer Science – Specialisations

Advanced Computer Science

Computer scientists are behind many solutions to the world's greatest information challenges. Computer Science is the theory and practice of applying computers and software to problem solving. Its practical applications span all disciplines, including science, engineering, business and commerce, the creative and performing arts and the humanities.

If you enjoy solving multi-dimensional problems requiring analytical thinking, have a mathematical or technical bent and want to use your talents to create new solutions, then a specialisation in Advanced Computer Science will work for you.

As a graduate you will be equipped to create substantial pieces of software, using advanced data structures and algorithms.

Career options

There is strong worldwide demand for computer scientists in roles such as specialist programmer, technical analyst, database administrator, research scientist, IT services manager and IT consultant.

Daniel Dalton

IBL Student, Computer Science

"I am learning about software development - algorithms and the underlying theory of computation. Ultimately I learn to design and develop useful software that is efficient.

I have taken several units focused on algorithm design to solve programming problems efficiently. I am also involved in a research unit which is looking at ways to make maps accessible to blind people on a tablet. This gives me the opportunity to apply the skills I have learned so far across the course to a real life project."

Bachelor of Computer Science - Advanced Computer Science specialisation course map – *sample only*

YEAR	SEMESTERS 01	SEMESTERS 02
01	• Introduction to algorithms and programming • Discrete mathematics for computer science • Computer systems, networks and security • Elective	• Introduction to computer science • Continuous mathematics for computer science • IT professional practice • Elective
02	• Algorithms and data structures • Object oriented analysis, design and implementation • Elective • Elective	• Theory of computation • Programming paradigms • Elective • Elective
03	• Computer science project • Approved level 3 computer science elective • Approved level 3 computer science elective • Elective	• Computer science project • Advanced data structures and algorithms • Parallel computing • Elective

UNIT TYPES

- **Required computer science units**
- **Some choice:** you can choose from a prescribed list
- **Free choice:** you might choose further computer science studies, or you can choose to study units from a different field

For in-depth course descriptions and structures visit:
study.monash/courses

Data Science

This is the era of 'big data'.

Data Science is a cutting-edge specialisation exploring the capture, management and use of the huge volumes of data generated by government, commerce and science in the fast-progressing world of the Information Age.

Monash brings an enormous breadth of expertise to bear on issues relating to big data. We have the greatest collection of expertise in the theory and practice of data analytics of any university in the Asia-Pacific region.

So if you're interested in a career solving the information challenges of big data in fields as diverse as marketing, medicine or finance, then Data Science is the specialisation for you and Monash is the place to do it.

Career options

Data science will provide you with the practical, applicable skills to set you on your chosen career path in roles such as a data scientist, analytics professional, information visualisation expert or chief information officer.

DID YOU KNOW?

Data Scientist is ranked #6 best job for 2015.*

*Careercast.com; the best jobs of 2015

Bachelor of Computer Science - Data Science specialisation course map – *sample only*

YEAR	SEMESTERS 01	SEMESTERS 02
01	• Introduction to algorithms and programming • Discrete mathematics for computer science • Computer systems, networks and security • Elective	• Introduction to computer science • Continuous mathematics for computer science • Introduction to data science • Elective
02	• Algorithms and data structures • Databases • Modelling for data science • Elective	• IT professional practice • Theory of computation • Elective • Elective
03	• Data science project • Approved level 3 data science elective • Data visualisation • Elective	• Data science project • Approved level 3 data science elective • Elective • Elective

UNIT TYPES

- **Required computer science units**
- **Some choice:** you can choose from a prescribed list
- **Free choice:** you might choose further computer science studies, or you can choose to study units from a different field

For in-depth course descriptions and structures visit:
study.monash/courses

Bachelor of Computer Science Advanced (Honours)

LOCATION	ATAR	IB SCORE
Clayton	E: 95+	E: 37+

DURATION
4 Years

STRUCTURE
Specialist

DEGREE AWARDED
Bachelor of Computer Science Advanced (Honours)

E – Expected: The provided score is estimated and is to be used as a guide only.

Imagine using your creative intelligence to discover new IT possibilities to help meet key global challenges.

This Honours version of the Bachelor of Computer Science is for high-achieving students with a research focus. It offers you all the benefits of the Advanced Computer Science specialisation, plus a stream of hands-on projects that engage you in research right from the start of your degree. You also do a research or industry placement, supported by a $17,000 scholarship.

In your fourth year, you will undertake a substantial individual research project with your own academic supervisor. Monash's IT research strengths include artificial intelligence, bioinformatics, cybersecurity, modelling, optimisation and visualisation. You will develop the exceptional programming and analysis skills and the research capabilities needed for postgraduate study or a career in the expanding world of digital research and development.

Graduating with Honours will not only enhance your employment opportunities – it also means you can complete a Masters in just one additional year, and provides excellent preparation for a PhD program.

Career options:

All areas in our modern world require digital solutions, and there are practical applications across a range of disciplines and professions. You will graduate with:

- a degree accredited by the Australian Computer Society
- deep computer-science knowledge
- strong research, analysis, problem solving, communication and team work skills, and
- hands-on experience in IT research.

Exciting areas for research and development will be open to you.

Prerequisite studies

VCE	IB
English: Units 3 and 4: at least 30 in English (EAL) *or* 25 in English other than EAL	**English:** At least 4 in English SL *or* 3 in English HL *or* 5 in English B SL *or* 4 in English B HL
Maths: Units 3 and 4: at least 25 in either Mathematical Methods (CAS) *or* Specialist Mathematics*	**Maths:** At least 4 in Mathematics SL *or* 4 in Further Mathematics SL *or* 3 in Mathematics HL *or* 6 in Mathematics Studies SL

*For 2016 only, Further Mathematics with a score of at least 35 will be accepted as a transitional measure.

Bachelor of Computer Science Advanced (Honours) course map – *sample only*

YEAR	SEMESTERS 01	SEMESTERS 02
01	• Introduction to algorithms and programming • Discrete mathematics for computer science • Computer systems, networks and security • Elective	• Introduction to computer science • Continuous mathematics for computer science • Research project 1 • Elective
02	• Algorithms and data structures • Research skills in computer science • Elective • Elective	• Theory of computation • Programming paradigms • Research project 2 • Elective
03	• Industry based learning *or* Research placement (18 points)	• Advanced data structures and algorithms • Approved level 3 data science Elective • Elective • Elective
	• SUMMER: L3 Computer science elective	
04	• Honours thesis • Approved level 4/5 elective • Elective	• Honours thesis • Approved level 4/5 elective • Elective

UNIT TYPES

- **Required computer science units**
- **Some choice:** you can choose from a prescribed list
- **Free choice:** you might choose further computer science studies, or you can choose to study units from a different field

For in-depth course descriptions and structures visit:
study.monash/courses

James MacIndoe
Student, Computer Science Honours

"My honours project is a collaboration with Huawei, a Chinese telecommunications company, to implement encryption in a database system. I'm working on the cryptography side of the project, figuring out how to implement cutting edge, search-able encryption research."

Bachelor of Software Engineering (Honours)

LOCATION	ATAR	IB SCORE
Clayton	E: 88+	E 32+

DURATION
4 Years

STRUCTURE
Specialist

DEGREE AWARDED
Bachelor of Software Engineering (Honours)

E – Expected: The provided score is estimated and is to be used as a guide only.

Software is everywhere. It does everything from dispensing medicine to controlling flight paths to monitoring and shaping our shopping habits. Our world's major companies, governments and organisations depend on smartly designed and well-built software. And they rely on the expertise of skilled software engineers to make it happen.

Software engineering is a specialisation in the Bachelor of Engineering (Honours), taught by the Faculty of Information Technology.

In your first year you will undertake the engineering Common First Year where you will immerse yourself in hands-on design-and-build activities, including building mobile apps. From second year onwards, you will focus on software engineering, in a combination of core and elective units.

As a software engineer, you will apply engineering principles to systematically analyse, develop and improve software to ensure it runs effectively, safely and securely. You will acquire high-level programming expertise, but software engineering goes well beyond writing code. Most modern IT systems are so complicated that teams of people must work together to create them. This specialisation's emphasis on collaborative studio-based learning will give you strong skills in teamwork, project management and communication.

You can apply for the highly regarded Industry Based Learning (IBL) program to do a half-year placement with leading Australian and global organisations. Placements count towards your course and are supported by a $17,000 scholarship.

Career options:

This project-rich specialisation is designed to address industry demand for tech-savvy graduates with large-scale software systems project capability. Why not join this young and exciting field of engineering which is constantly evolving as new technologies emerge? Specialise in software engineering at Monash for an exciting career designing and creating the cutting-edge IT software systems that we all rely on.

This degree is accredited by both Engineers Australia and the Australian Computer Society.

Double degrees available with

■ Arts ■ Commerce ■ Commerce Specialist ■ Science

Prerequisite studies

VCE

English: Units 3 and 4: a study score of at least 30 in English (EAL) *or* 25 in English other than EAL

Maths: Units 3 and 4: a study score of at least 25 in Mathematical Methods (CAS)

Science: Units 3 and 4: a study score of at least 25 in Chemistry *or* Physics

IB

English: At least 4 in English SL *or* 3 in English HL *or* 5 in English B SL *or* 4 in English B HL

Maths: At least 4 in Mathematics SL *or* 3 in Mathematics HL

Science: At least 4 in Chemistry SL *or* 3 in Chemistry HL *or* 4 in Physics SL *or* 3 in Physics HL

* For further information on the Engineering Common First Year, please refer to the Engineering Undergraduate Course Guide or visit eng.monash.edu

For in-depth course descriptions and structures visit:
study.monash/courses

Bachelor of Software Engineering (Honours) course map – *sample only*

YEAR	SEMESTERS 01	SEMESTERS 02
01	• Engineering design: lighter, faster, stronger • Mathematics for engineering • Foundation maths (if required) *or* Foundation physics (if required) *or* 1st year engineering elective • Elective	• Engineering design: cleaner, safer, smarter • Engineering mobile applications • Computing for engineers • Elective
02	• Introduction to computer science • Discrete mathematics for computer science • Object oriented analysis, design and implementation • Elective	• Software engineering process and management • Algorithms and data structures • Software quality and testing • Elective
03	• Computer architecture • Software engineering: architecture and design • Software engineering practice • Elective	• Operating systems • Databases • Software engineering practice • Elective
04	• Software engineering research project • Software engineering IE studio project • Computer networks • Elective	• Software engineering research project • Software engineering IE studio project • Software engineering technical elective • Elective

UNIT TYPES

- **Required software engineering units**
- **Some choice:** you can choose from a prescribed list
- **Free choice:** you might choose further software engineering studies, or you can choose to study units from a different field

Sajeeb Lohani
IBL Student, Software Engineering

"One of my study areas is cybersecurity. This includes finding vulnerabilities in programs and seeing if they are prone to being hacked. We also try to exploit these vulnerabilities so that we can learn and understand how to prevent them, and ensure that the applications developed are more secure."

DID YOU KNOW?

Software Engineer has been ranked as one of the top 10 best jobs for the last seven years.*

*Careercast.com; best jobs rankings

Taking your degree further

Honours

- An honours degree indicates that an advanced level of work has been undertaken and a higher standard has been reached. Honours is valued by employers, who appreciate the extra knowledge and skills acquired.
- The degree is fun – studies are based around individual research projects tailored to the interests of students and their personal supervisors.
- Honours is the usual precursor to postgraduate study, which is necessary for a career in industrial research or academia.

Honours degrees are available across all of our undergraduate degrees for students interested in research.

▸ **Visit: it.monash.edu/honours**

Postgraduate Study

Undergraduate degrees also provide qualification for entry to postgraduate study.

Postgraduate study options include:

- Graduate Certificates and Diplomas
- Masters by Coursework
- Master of Philosophy
- Doctor of Philosophy (PhD)

Students who complete an honours degree may be eligible to progress directly on to a PhD.

▸ **Visit: it.monash.edu/pgrad**

Alternative pathways

Technical and Further Education (TAFE)

Satisfactory completion of a TAFE certificate IV or diploma can enable you to gain admission into an IT degree. If your previous study in a diploma qualification is assessed as being equivalent to Monash University units, credit may be granted.

▸ **For more information go to: study.monash/courses/find-a-course**

Transfer from other universities

Students from other universities are able to transfer to Monash. If your previous study is assessed as being equivalent to Monash University units, credit may be granted.

▸ **For more information go to: study.monash/courses/find-a-course**

Single units of higher education study

If you successfully complete two approved higher education IT single units, you are eligible to apply for entry into a Monash IT undergraduate course.

▸ **For more information go to: study.monash/courses/find-a-course**

Monash College

▸ **See page 34**

Transfer from another Monash course

You can apply to transfer to a Monash IT degree from any other Monash degree, if you meet the criteria.

▸ **For more information go to: infotech.monash.edu/future/how**

Diploma of Higher Education (Clayton)

Satisfactory completion of the Diploma of Higher Education IT stream qualifies you for entry into the second year of Bachelor of Information Technology.

▸ **For more information go to: study.monash/courses/find-a-course/2016/higher-education-d0501**

Diploma of Higher Education Studies (Monash Malaysia)

Satisfactory completion of the Diploma of Higher Education IT stream qualifies you for entry into the second year of Bachelor of Computer Science at the Monash University Malaysia campus.

▸ **For more information go to: monash.edu.my/study/undergraduate/diploma-higher-education-studies**

Monash University English Language Centre (MUELC)

All of Monash's IT courses have minimum English language requirements. Our English language centre offers English language programs to assist students in meeting these requirements.

▸ **For more information, go to page 35 or visit: monash.edu/englishcentre**

Scholarships and awards

We have a wide range of scholarships, bursaries and awards, designed to reward excellence and support students who are disadvantaged.

IBL Entry Scholarship

$5,000 awarded to Year 12 students accepted into the IBL program, with a minimum ATAR of 80.

IBL Placement Scholarship

$17,000 per six-month placement, awarded to students accepted into the IBL placement program.

▸ see page 14 for further information on the IBL program

Visit: it.monash.edu/ibl

Women in IT Scholarship

$6,000 awarded to up to 50 commencing high-achieving female students.

IT Excellence Scholarships

$6,000 per year, awarded to our highest achieving students entering the Faculty of Information Technology with a minimum ATAR of 95.

International Merit Scholarships

$6,000 per year, awarded to international undergraduate students enrolled at one of Monash's Australian campuses, based on academic results in previous study.

IT Indigenous Scholarships

We offer a range of equity and merit scholarships for indigenous students.

Visit: study.monash/fees-scholarships/scholarships

Sir John Monash Scholarship Program

Designed to reward achievement and encourage participation for those whose financial and personal circumstances might otherwise restrict their participation in a Monash education.

High-achieving students awards

We give multiple awards annually to celebrate our high-achieving Faculty of IT students across all courses and year levels.

Sir John Monash Medal

Awarded to a final year undergraduate student to recognise extraordinary academic achievement and contribution to social justice, human rights and a sustainable environment.

Monash College

Monash College is a preferred pathway for students who aspire to study Information Technology at Monash University but who narrowly miss the academic requirements for direct entry. The course you choose depends on your current level of study and future career plans.

Monash University Foundation Year

The Monash University Foundation Year program is the preferred pathway into the first year of an IT course at Monash University. The program is designed to provide students with the skills and knowledge required to succeed at Monash University. After successfully completing the Foundation Year program and meeting the entry requirements and prerequisites, you will have a guaranteed place in the first year of your chosen IT degree.

Diploma of Engineering (IT Stream) Part 2

Monash College diplomas offer specialist preparation for second year entry in your chosen IT course. During the program you will study the same curriculum and complete the same assessments as first-year university students. After successfully completing Diploma Part 2 you will be guaranteed a place in the second year of your chosen degree.*

*Subject to meeting entry requirements and subject prerequisites.

For more information go to:
monashcollege.edu

English-language courses

The Monash University English Language Centre is the preferred English pathway into Monash University.

If you do not meet the English language requirement for direct entry into your course you may receive a conditional offer for one of our programs.

DISCUSS YOUR OPTIONS

If you'd like to discuss your options call us on 1800 MONASH (666 274) or email future@monash.edu to let us help you make your choice.

Monash English Bridging

Monash English Bridging (MEB) is ideal if you have met the academic requirements for Monash, but have narrowly missed the English requirements.

MEB offers students direct entry into Monash University.* Students who successfully complete the Bridging program do not need more testing.

See our website for entry requirements.

Note: *Not accepted for entry into all degrees. If you need extra English help, consider Monash English.

Monash English

Monash English (ME) will improve your English-language skills to prepare you for entry into Monash English Bridging or Monash University.

The program is taught from beginner to advanced levels. As you improve, you can move to the next level of ME.

To enter the University you will need to sit an IELTS test. We have workshops to help you practise and develop the skills you need to sit the test. Monash English courses start every five weeks.

How to apply

Domestic (Australian) and onshore international students

Apply through VTAC

If you are an Australian or New Zealand citizen, an Australian permanent resident, or you are an international student studying an Australian Year 12 or IB in Australia or New Zealand, apply through the Victorian Tertiary Admissions Centre (VTAC).

▸ **Visit vtac.edu.au**

Mid-year entry

For mid-year entry, apply directly to Monash.

▸ **Visit monash.edu/study/apply/mid-year**

Scholarships

▸ **Visit monash.edu/scholarships**

Fees

Commonwealth Supported Places

Reduced course fees for eligible applicants, and HECS-HELP.

▸ **Visit monash.edu.au/enrolments/loans/commonwealth-supported-place.html**

FEE-HELP

Loan options for eligible applicants.

▸ **Visit monash.edu.au/enrolments/loans/domestic-full-fee.html**

International students

▸ **For more information visit monash.edu/study/international**

Apply directly to Monash University

▸ **Visit study.monash/how-to-apply**

Fees

▸ **Fees for each course can be found at study.monash/courses/find-a-course**

MONASH University

Information Technology

Undergraduate Courses | **2016**

Monash online

monash.edu/it/undergraduate

Find a course
study.monash/courses

International students
monash.edu/study/international

Scholarships
monash.edu/scholarships

Off-campus learning
monash.edu/offcampus

Monash on YouTube
youtube.com/monashunivideo

Future student enquiries

Australian citizens, permanent residents, and New Zealand citizens

Tel: 1800 MONASH (666 274)

Email: future@monash.edu

monash.edu/study/contact

International students

Australia freecall tel: 1800 181 838

Tel: +61 3 9903 4788 (outside Australia)

Email: study@monash.edu