Faculty of Engineering

Bachelor of Computer Systems Engineering

If your passion is computers, learn how they work and how they can be applied through the BCSE at Monash University:

- A unique combination of electrical engineering and computer science.

- Many modern products and developments involve computers interacting with and controlling the real world. This degree explains how.

- Fully accredited by both the Australian Computer Society and the Institution of Engineers Australia.

- You gain direct entry to this four year degree.

What do computer systems engineers do?

They design electronic and electro-mechanical systems for motorcars. These include engine management, airbag systems, active suspension, central locking, break by wire, climate control, entertainment and communications systems.

► **Did you know that by 2015 electronics will account for about 40% of the cost of a standard petrol driven motorcar?**

Avionics is the term used to cover communications, navigation, engine management and display electronics in modern aircraft. This is a rapidly expanding source of jobs for graduates of electrical and computer systems engineering.

► **Fact: Avionics makes up about 18% of the cost of a transport aircraft. The proportion is much greater for military aircraft.**

Computer systems engineers are involved in the design, development and manufacture of mobile phones, personal digital assistants, music players and personal computers. They also write system software and applications (apps) for all of these devices.

► **Did you know that by 2007 Australia had more than one mobile phone for every man, woman and child?**

All mass produced consumer products from petrol, margarine, chocolate bars and toilet soap to motor cars and complex electronics such as TVs and video games are produced in automated factories, where computers handle stock control, ordering of raw materials, control conveyor systems, perform quality control and form the very heart of assembly/palletizing/AGV robots and other complex machinery. All of these computerized functions require engineers to specify, design, install, maintain and program them.

► **Did you know the average Australian eats 5 kilograms of chocolate a year?**

With demand increasing for smaller electronic devices with more and more functions, integrated circuit design is more complex and contains more components and mix components that would have previously been fabricated as separate devices. Computer systems engineers are in demand to specify, design and test these devices.

► **Did you know that the first microprocessor, the Intel 4004, was introduced in 1971 and contained 2,300 transistors? Modern microprocessors contain well over 500,000,000 transistors.**
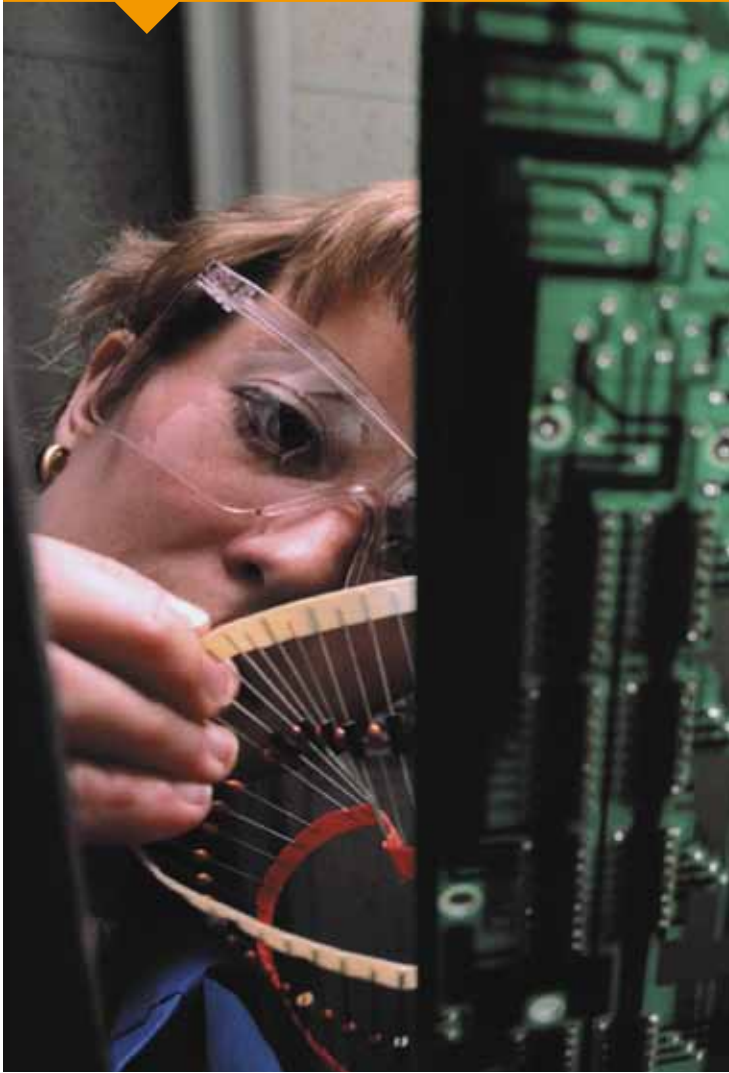
Computer systems engineers routinely:

- Liaise with clients to determine system requirements and plan complex projects

- Design servers and switches supporting the internet

- Develop microprocessor based control systems

- Implement hardware and protocols supporting telecommunications networks

- Prepare and interpret specifications, schematics and circuit diagrams

- Design real time operating systems

- Use software tools to design integrated circuits

- Develop software for business transactions, embedded control, compilers and editors, arithmetic and logic subroutines, simulation, CAD/CAM, office automation and educational applications

- Implement process control systems such as navigation, guidance, and pollution detection/monitoring instruments

- Analyse software reliability

- Specify and create graphical user interfaces for complex industrial control systems

- Provide advanced technical support for marketing or customer service staff

- Train technical staff and end users

- Develop and design recreational products and consumer electronics

- Develop database applications, design braking systems for vehicles, and implement diagnostic equipment for hospitals.

As a student of electrical and computer systems engineering you will study:

- Analogue and digital electronics

- Circuit theory

- Communications

- Computer applications

- Computer architecture and organisation

- Computer networks

- Electromagnetic field theory

- Electronic foundations

- Interfacing computers to the external world

- Mathematical foundations of electrical engineering

- Systems software

- The interaction between computer hardware and software.

► Computer systems engineers analyse, design, develop and organise the manufacture of all kinds of digital products and systems that incorporate both hardware and software.

They also plan, design, commission, monitor the performance of, optimise and manage complex computer systems.

Visit
www.eng.monash.edu/ecse
to learn more

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