GLOBAL INNOVATION

MONASH University

ELECTRICAL & COMPUTER SYSTEMS ENGINEERING

SEE YOUR FUTURE IN A NEW LIGHT
DID YOU KNOW?

The Monash Vision Direct-to-Brain Bionic Eye will use groundbreaking technology to bypass damaged optic nerves and could benefit up to 80% of people who are already blind. Human trials will begin from 2016.

The IEEE, Institute of Electrical and Electronic Engineers, the electronic engineering association, is the largest professional association for the advancement of technology.

In 2014/15 smartphone sales worldwide surpassed 1.3 billion units, with global revenue exceeding US$250 billion; android operating systems held 80% market share.

The Chancellor of Monash University, Dr Alan Finkel is a graduate of the Department Electrical and Computer Systems Engineering at Monash.

CHALLENGING. EXCITING. REWARDING.

THE WORLD OF ELECTRICAL AND COMPUTER SYSTEMS ENGINEERING IS CHANGING RAPIDLY.

THERE ARE NEW AND EMERGING AREAS FOR EMPLOYMENT AND RESEARCH INFLUENCING A RANGE OF INDUSTRIES AND THE WAY WE LIVE AND OPERATE DAY TO DAY.

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FINAL YEAR PROJECT

During level four, you will undertake an independent full-year project in an area of personal interest. Projects are often related closely to the department’s exceptionally strong research and collaborative industry programs within research centres.

One key objective is to give you the experience of tackling a real problem and developing practical solutions.

The final year project often leads to graduate opportunities in that area - employers are very impressed by this practical demonstration of a graduate’s abilities and interests.

The final year project builds self-reliance and planning capabilities in both individual and team-based environments.

THIRD YEAR DESIGN PROJECT

Students use knowledge from electronics, computer systems and communications engineering, to tackle a group project to design a robot.

This allows them to apply project management skills, and extend their experience of working in groups.

At the end of the semester, all robots are pitted against each other in a nerve wracking competition to find out which team’s design and implementation is the best.
BROADEN YOUR CAREER OPTIONS

SEE YOUR FUTURE IN A NEW LIGHT!

ANALOG ELECTRONICS
Diodes, transistors, op-amps, linear electronic circuits, feedback, complex impedances, sinusoidal analysis and phasors, frequency response and small signal analysis.

Applications
Amplifiers, telecommunications and sensor/actuator design for cars, aircraft and industrial automation.

DIGITAL ELECTRONICS
Logic gates, flipflops, arithmetic logic units, programmable logic devices, hardware description language (HDL), RAM and ROM and VLSI.

Applications
Telecommunications, computer design (from supercomputers to embedded systems in banking smartcards or myki).

MATHMATICS
Geometry, vectors, matrices, Eigen values and vectors, calculus, Taylor series, complex variables, differential equations, statistics, finite element analysis and numerical methods.

Applications
Everything!

POWER ELECTRONICS
DC machines, induction motors, motor control, three-phase AC networks, transformers, transmission line modelling, power system control, generation and supply, power converters and high voltage engineering.

Applications
Understanding power generation and distribution systems, generation from renewables, developing smart grid technologies and motor driven systems such as electric/hybrid vehicles.

COMPUTER VISION
2D image processing, detection of edges and corners in images, matching between views, inferring 3D structure from 2D images, visual tracking.

Applications
Robotics, medical imaging and intelligent user interfaces such as mobile phone augmented reality applications.

BIOMEDICAL ENGINEERING
Instrumentation, optics, biomechanics, muscles as motors and brakes, medical imaging, computational methods, medical technology innovation (from concept to market).

Applications
Developing hospital equipment, prosthetics (from artificial limbs to bionic eyes), diagnostic tools and assistive technologies.

SIGNAL PROCESSING
Sampling, aliasing, digitising, Fourier series and spectra, filters, wavelets, adaptive and real-time filtering.

Applications
Information transmission, data compression and processing sensor data.

CONTROL SYSTEMS
Feedback loops, Laplace transforms, Nyquist and Bode diagrams, gain and phase margins, poles and zeros, state spaces, transfer functions, observability and controllability.

Applications
Industrial automation for our water supply, chemical plants, factories, medical equipment and robotics.

COMPUTING
Programming in Matlab and C, data types, program statements, functions, parameters, data types, numerical methods such as Gaussian elimination, solution of nonlinear equations and numerical calculus, object-oriented programming, interfacing with hardware, CPUs, data paths, concurrency and memory structures.

Applications
Computer design, video games, user interface design and digital control systems such as automotive management systems.

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1. Why did you choose ECSE?

I chose ECSE because I thought it looked very interesting. I thought electricity seemed like magic, and found myself very curious to find out how it all worked!

2. What did you like most about the course?

The great thing about ECSE was that there were a lot of practical projects, enabling you to apply the learning straight away and see the outcome of your work.

3. Where is ECSE going to take you?

In 2010 I secured a position in the Ericsson graduate program, working as a Radio Access Network services engineer. My work is centered around the design of next generation large scale communications networks: at the moment, I’m working on LTE / 4G technology trials based in Singapore. Earlier this year I was working on similar projects in Hong Kong and also for Telstra in Australia. Early next year there is an opportunity to begin a 6 month training activity in Sweden working with the product development unit - ECSE has taken me half way around the world!

4. How has it helped in your career?

ECSE teaches you to think in a uniquely rational and logical way. This new way of thinking will set you up well for whatever career path you decide to take. The skills I obtained during my four years helped me obtain a graduate position with a global corporation.

5. In a nutshell, why would you recommend ECSE?

I would recommend ECSE because it is immensely rewarding and fulfilling. I found that I was able to complete projects that I thought impossible at the beginning.