

UNIVERSITY OF  
**Southampton**

# CREATE TOMORROW'S TECHNOLOGIES

ELECTRONIC ENGINEERING  
ELECTRICAL AND ELECTRONIC ENGINEERING  
ELECTRICAL ENGINEERING  
MECHATRONIC ENGINEERING  
AEROSPACE ELECTRONIC ENGINEERING  
BIOMEDICAL ENGINEERING (ELECTRONICS)

**JOIN  
US+**

# FLEXIBILITY

In Electronics and Computer Science we are committed to making our courses as flexible as possible so that you have every opportunity to align your degree with your aspirations and interests as they develop. We do not offer general engineering degrees, so we specialise right from the start. However, we appreciate that many students won't have had previous experience of these subjects, so our programmes are designed to ensure that you are on the course best suited to you.

## Optional modules

We offer a wide variety of optional modules and you can change your option choices up until two weeks after the start of each semester.

## Transferring between programmes

You can transfer onto Electronic Engineering, Electrical and Electronic Engineering (EEE) or Electrical Engineering at the end of Year 1 (provided your average mark is at least 58 per cent). It is possible to transfer at other times, between other programmes, and in other circumstances with the consent of the programme leader.

## Transferring between BEng (three-year) and MEng (four-year) programmes

You can transfer from the BEng degree to the MEng degree (provided your average mark is at least 58 per cent) at the end of Year 2 and possibly during Year 3. MEng students can choose to leave with a BEng degree at the end of Year 3.

## Transferring between specialist programmes

You can transfer between any of our specialist 'MEng Electronic Engineering with X' programmes until the end of Year 2.



The Electronics and Computer Science facilities you have access to are quite frankly phenomenal – no other university provides the same standard and quantity of equipment. Additionally, there are extra facilities for those in their third and fourth years to ensure you always have access to equipment.”

**Lydia Moore**

MEng Electrical and Electronic Engineering with Industrial Studies, 2021

# You must study eight modules each year

## Year 1

### Core foundations and skills

Maths for Electronic and Electrical Eng. I	●	●	●	●	●	●
Programming	●	●	●	●	●	●
Digital Systems and Microprocessors	●	●	●	●	●	●
Electronic Circuits	●	●	●	●	●	
Solid State Devices	●	●	●	●	●	
Electrical Materials and Fields	●	●	●	●		●
Electronic Systems	●	●	●	●	●	
Mechanics		○	●	●	●	●
Advanced Programming	●	○				
Flight Mechanics and Aerospace Systems Operation					●	
Biomedical Engineering Design						●
Biomolecular Systems						●
Sensor Interfaces						●

## Year 2

### Specialising into degree stream

Maths for Electronic and Electrical Eng. II	●	●	●	●	●	●
Control and Communications	●	●	●	●	●	
Digital Systems and Signal Processing	●	●			●	●
Electrical Machines		○	●	●	●	
Power Electronics and Drives		●	●	●	●	
Computer Engineering	○	○				
Advanced Electronic Systems	○	○				●
Materials		○	●	●		
Devices	○	○				
Electronic Design	●					
Electromagnetism for Communications	●					
Electrical and Electronic Engineering Design		●				
Power Circuits and Transmission		●	●			
Applied Electromagnetism Engineering Design		●	●	●	●	
Circuits and Systems			●	●		
Aerospace Electronics Design						●
Radar Techniques and Applications						●
Healthcare Technology Design						●
Semiconductor Devices, Materials and Sensors						●
Fundamentals of Cell Biology and Physiology (contributes 2 modules)						●
Biomedical Control						●
Photonics I	○	○				

## KEY

●/○ Required/Optional

●/○ Electronic Engineering

●/○ Electrical and Electronic Engineering

●/○ Electrical Engineering

●/○ Mechatronic Engineering

●/○ Aerospace Electronic Engineering

●/○ Biomedical Engineering (Electronics)

\* Only available for MEng Electronic Engineering with Mobile and Secure Systems

\*\* Only available for MEng Electronic Engineering with Artificial Intelligence

\*\*\* Only available for MEng Electronic Engineering with Photonics

### Year 3

#### Specialist knowledge and skills

Individual Project (contributes 3 modules)	● ● ● ● ● ●
Engineering Mgmt. and Law (MEng students)	● ● ● ● ● ●
Engineering Mgmt. and Law (BEng students)	○ ○ ○ ○ ○ ●
Robotic Systems	○ ○ ○ ○ ○ ○
Control System Design	○ ○ ○ ○ ○ ○
Digital Control System Design	○ ○ ○ ○ ○ ○
Advanced Partial Differential Equations	○ ○ ○ ○ ○ ○
Operational Research	○ ○ ○ ○ ○ ○
Integral Transform Methods	○ ○ ○ ○ ○ ○
Optimisation	○ ○ ○ ○ ○ ○
Real-time Computing and Embedded Systems	○ ○ ○ ○ ○ ○
Signal and Image Processing	○ ○ ○ ○ ○ ○
Power Systems Engineering	○ ○ ○ ○ ○ ○
Digital IC and Systems Design	○ ○ ○ ○ ○ ○
Analogue and Mixed-Signal Electronics	○ ○ ○ ○ ○ ○
Computational Biology	○ ○ ○ ○ ○ ○
Wireless and Optical Communications	○ ○ ○ ○ ○ ○
Power Systems Technology	○ ○ ○ ○ ○ ○
High Voltage Engineering	○ ○ ○ ○ ○ ○
Advanced Computer Architecture	○ ○ ○ ○ ○ ○
Web and Cloud Based Security*	○ ○ ○ ○ ○ ○

### Year 3 (cont'd)

#### Specialist knowledge and skills

Digital Coding and Transmission	○ ○ ○ ○ ○ ○
Nanoelectronic Devices	○ ○ ○ ○ ○ ○
Green Electronics	○ ○ ○ ○ ○ ○
Introduction to Bionanotechnology	○ ○ ○ ○ ○ ○
Photonics II	○ ○ ○ ○ ○ ○
Mechanical Power Transmission and Vibration	○ ○ ○ ○ ○ ○
Manufacturing and Materials	○ ○ ○ ○ ○ ○
Automobile Systems	○ ○ ○ ○ ○ ○
Fluids and Mechanical Materials	○ ○ ○ ○ ○ ○
Guidance, Navigation and Control	○ ○ ○ ○ ○ ○
Space Systems Engineering	○ ○ ○ ○ ○ ○
Principles of Neuroscience	○ ○ ○ ○ ○ ○
Biosensors and Diagnostics	○ ○ ○ ○ ○ ○
Security of Cyber Physical Systems	○ ○ ○ ○ ○ ○
Machine Learning Technologies	○ ○ ○ ○ ○ ○
Foundations of Machine Learning	○ ○ ○ ○ ○ ○
Embedded Networked Systems	○ ○ ○ ○ ○ ○
Cloud Application Development	○ ○ ○ ○ ○ ○
Biomaterials	○ ○ ○ ○ ○ ○
Orthopaedic Biomechanics	○ ○ ○ ○ ○ ○
Global Health	○ ○ ○ ○ ○ ○
Intercultural Communication in a Global World	○ ○ ○ ○ ○ ○
Social Enterprise	○ ○ ○ ○ ○ ○
Ethics in Science, Engineering and Technology	○ ○ ○ ○ ○ ○
Engineering Replacement Body Parts	○ ○ ○ ○ ○ ○
Bioinformatics and Systems Biology	○ ○ ○ ○ ○ ○

- Programmes may place restrictions on the combinations of modules that can be studied, e.g. you are required to take certain options with specialist 'MEng Electronic Engineering with X' degrees. For full details visit [www.ecs.soton.ac.uk/ug](http://www.ecs.soton.ac.uk/ug)
- Optional modules will only run if enough students choose them.
- Some optional modules require you to have already taken certain modules.
- All modules, subjects and policies contained in this leaflet are believed to be correct at the time of going to print (Sept 2021).
- Our programmes are regularly reviewed and updated, so changes are likely to occur. This affects new and continuing students.
- All transfers may be subject to visa restrictions.
- EEE students must choose at least one optional module considered to be 'electrical' and one considered to be 'electronic' in year 3 (and year 4 for MEng students).

## Year 4

(MEng) Advanced knowledge and skills

Group Design Project (contributes 3 modules)	●	●	●	●	●	●
Individual Research Project	○	○	○	○	○	○
Biologically Inspired Robotics	○	○	○	○	○	○
Applied Control Systems	○	○	○	○	○	○
Numerical Methods	○	○	○	○	○	○
Modelling with Differential Equations	○	○	○	○	○	○
Wireless Networks		○	○	○	○	○
Microfluidics and Lab-on-a-chip	○	○	○	○	○	○
Image Processing	○	○		○	○	○
Medical Electrical and Electronic Technologies	○	○	○	○		
Power Electronics for DC Transmission		○	○	○	○	○
Adv. Wireless Comms. Nwks. and Systems	○	○			○	
Wireless Transceiver Design and Implementation	○	○			○	
Cryptography	○	○			○	
Secure Hardware and Embedded Devices	○	○				
Digital System Synthesis	○	○				
VLSI Systems Design	○	○				
VLSI Design Project	○	○				
Microfabrication	○	○				
Nanofabrication and Microscopy	○	○				
Power Generation: Technology and Impact on Society		○	○	○		
Power Distribution: Design, Operation and Protection		○	○	○		
High Voltage Insulation Systems		○	○	○		
Quantum Devices and Technology	○	○				
Embedded Processors	○	○				
Analogue and Mixed Signal CMOS Design	○	○				

## Year 4 (cont'd)

(MEng) Advanced knowledge and skills

Silicon Photonics	○	○				
Optical Fibres	○	○				
Software Project Management and Secure Development	○					
Advanced Machine Learning**	○					
Evolution of Complexity	○	○				○
Future Wireless Techniques	○					
GPS and its Applications						○
Robotic (Autonomous)						○
Aerospace Vehicles						○
Electronics for Spacecraft						○
Medical Sensors and Instrumentation						○
Bio/Micro/Nano Systems	○	○	○	○	○	○
Microsensor Technologies	○	○	○	○	○	○
Machine Learning for Wireless Comms	○	○				
Data Mining**	○					
Deep Learning**	○					
Reinforcement and Online Learning**	○					
Computer Vision	○					
Power Systems Operation and Economics		○	○	○		
Bionanotechnology			○	○		
Advanced Fibre Technology***	○					
Optical Fibre Sensors***	○					
Biometrics						○
Data Visualisation						○
Biomedical Implants and Devices						○
Biomedical Technology						○
Biomedical Application of Signal and Image Processing						○
Computational Methods in Biomedical Engineering Design						○



Find out more:

[www.southampton.ac.uk/ecs/ugcourses](http://www.southampton.ac.uk/ecs/ugcourses)

# GROUP PROJECTS

Our students get the chance to develop their design skills through a variety of group projects.

For a major part of Year 2, teams of students take part in a range of system design exercises that challenges them to apply their skills, knowledge and understanding to develop solutions to challenging problems.

Year 4 MEng students work with companies to solve real industrial problems in the Group Design Project. Working

in small teams they apply their graduate-level engineering knowledge and skills to the technical challenge.

The quality of our teaching, combined with industry links and experience, makes Southampton students extremely employable, with a number of graduates working for the company that sponsored their group project.



“The laboratory facilities ECS students get to use are amazing. It’s really cool that we get to use such a wide range of state-of-the-art equipment every day, both for lab work and personal projects.”

**Jemma Watson**

MEng Electronic Engineering, 2019  
Hardware Engineer at Sky



We organise our own Careers Fair attracting around 80 companies each year

## EMPLOYABILITY

At Southampton we ensure our students have the potential to graduate with a wide range of employable skills.

Our courses are highly regarded throughout industry – we are second in the UK for graduate prospects\*.

To enhance their employability further we encourage and support our students to take industrial summer placements. We also participate in industrial scholarship and placement schemes including the UK Electronic Skills Foundation (where Southampton students have the highest success rate and highest number of scholarships awarded since the scheme began in 2010) and the IET Power Academy.

Our faculty's Careers Hub provides information on our partner companies and organisations, lists hundreds of graduate roles and internships each year from the world's leading companies, and helps ensure strong relationships between our students and top employers. In 2018 more than 60 companies visited the department to give presentations and hold interviews with our students.

Some of our students also choose to spend a year with a company either as part of our 'with Industrial Studies' degrees or by suspending their studies for a year.

\*Guardian University Guide 2021



**Find out more:**

[www.southampton.ac.uk/ecs](http://www.southampton.ac.uk/ecs)

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[enquiry@southampton.ac.uk](mailto:enquiry@southampton.ac.uk)

+44 (0)23 8059 9699

International enquiries:

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+44 (0)23 8059 9699



*Cover image:*

**Wen Rai Do** working on her 4th Year group design project. MEng Electrical and Electronics 2020.

Graduate Software Engineer at JP Morgan.

Throughout their degree programmes, students spend time working on both individual and group assignments in our state-of-the-art laboratories. In addition to providing a place to undertake course related work, our computing labs are a place to socialise and spend time on personal projects.



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