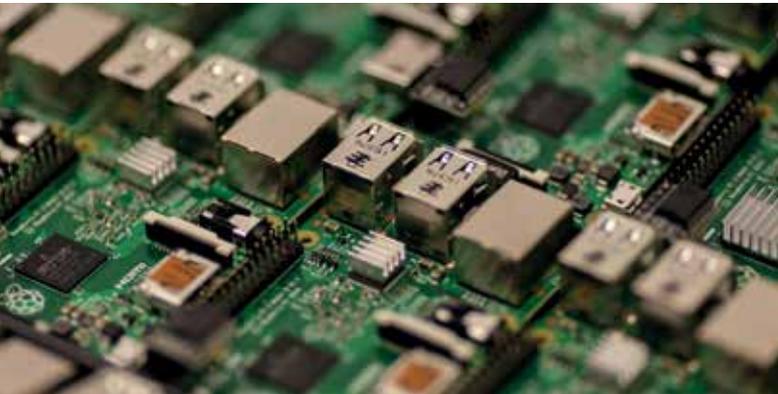




UNIVERSITY OF
BIRMINGHAM

SCHOOL OF
ENGINEERING

ELECTRONIC, ELECTRICAL AND SYSTEMS ENGINEERING



Welcome

Welcome to the Department of Electronic, Electrical and Systems Engineering (ESEE) at the University of Birmingham. We are delighted that you are interested in studying with us.

Our Department supports students in developing the skills required to meet societal challenges in the 21st century. You will learn to connect the physical world and the digital world through the flow of energy and information between people, machines and computers. We have a distinguished history of innovation and impact around the world, dating back to the first Professor in Electrical Engineering, Gisbert Kapp, who was appointed in 1905. Start your journey here.

Professor Peter Gardner
 Head of Department of Electronic, Electrical and Systems Engineering



WHY STUDY HERE?

Because in terms of teaching and research, we are among the very best. Our track record speaks for itself: it was our research that enabled the development of radar and the microwave oven; we were the first UK university to run a fleet of hydrogen cars to exploit greener fuel, and thanks to us, the global digitalisation of the railways is going full steam ahead. It's fair to say our graduates are in huge demand.

THE LEARNING ENVIRONMENT

ESEE is benefitting greatly from ongoing and substantial investment in new teaching spaces. Labs are kitted out with brand new, hi-tech equipment – supplied by multinational companies like National Instruments – and extensive key software through our partnership agreement with Microsoft. Here you will be taught by staff who are global experts in their fields and with strong links to industry, who will provide you with the creative, problem-solving and technical skills needed to undertake your final-year individual project. As well as specialised labs with state-of-the-art facilities such as simulators, you will also get to work with internationally leading research groups. Also, opportunities to work in industry provide real-world experience.

FLEXIBLE DEGREES

Our degree programmes provide a breadth of study opportunities, with pathways spanning a diverse range of topics: robotics, interactive systems, digital communications, energy and power, condition monitoring, system capacity and systems engineering. From building robots to team-building exercises, our modules offer you variety, stimulation and challenge. Because we want you to study what you're most interested in, our degree programmes are flexible, allowing you to specialise gradually as you develop your skills and passions.

PIONEERING GLOBAL RESEARCH

As one of the UK's top research universities, everything we do is innovative, cutting-edge and industry-driven. Our research (86% of which is rated world-leading or internationally excellent according to REF 2014) feeds into our undergraduate programmes: the work we are doing on terahertz (THz) radar for autonomous vehicles, for example, and the technologies we've developed to make rail travel faster, safer and more efficient. You might do groundbreaking research yourself: ten years before Birmingham New Street Station was redeveloped, a group of students drew up plans for a new-look design and presented them to industry.

OPENING DOORS TO AN EXCITING FUTURE

We have been an academic partner of the Institution of Engineering and Technology (IET) for over a quarter of a century, providing employers with the assurance that our graduates have the qualities they seek. A good degree from Birmingham opens doors across all areas of industry. From Jaguar Land Rover and Network Rail to Siemens and the Ministry of Defence, national and international companies and organisations value the fact you will have been trained to work in a future we can't yet see.

NEW SCHOOL OF ENGINEERING BUILDING

In summer 2020, we will see the opening of the new home to the School of Engineering. The state-of-the-art building will bring together engineering disciplines from across the University providing different and flexible ways of working to support the training of the next generation of engineers. Equipped with spacious seminar rooms and media stations the combined school addresses research and education needs for today and the future.

ENTRY REQUIREMENTS

All MEng courses

A level: AAA

International Baccalaureate Diploma: 6, 6, 6 at Higher Level to include Mathematics with a minimum of 32 points overall

All BEng courses

A level: AAB

International Baccalaureate Diploma: 6, 6, 5 at Higher Level to include Mathematics with a minimum of 32 points overall

Required subjects and grades:

A level Mathematics

Please see page 18 for further information about entry requirements

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For more information, please visit

www.birmingham.ac.uk/eese

Introduction to Electronic, Electrical and Systems Engineering (EESA)

Since our first Professor of Electrical Engineering, Gisbert Kapp, took up his post more than a century ago, the world has become a very different place. More exciting. More challenging. More out-of-this-world. And we, here at Birmingham, continue to shape it.

Electronic, electrical and systems engineers are involved in the design and development of technology that has become vital to all aspects of modern living – from the telecommunications networks that keep us connected 24/7 to the computer and digital networks that send billions of bits of data streaming around the globe.

It is thanks to engineers that the stuff of science-fiction films – robots, drones, satellites and smart cars – is now a reality, and it will be engineers like you who continue to drive us into a future we can hardly envisage.

Many of the things people associate with scientific invention are, in fact, feats of electronic, electrical and systems engineering. The engines and environments in cars, trains, ships, spacecraft and aeroplanes are all controlled by electrical systems. So, if you've enjoyed maths and science at school, it doesn't mean you have to do maths and science at university – you can study EESA.

Choosing the EESA route will give you the chance to learn about all levels of design; from transistors, transmission media and electromagnetic devices to the organisation and control of large-scale systems such as computers, communications networks and energy distribution infrastructure. You can work on tiny scales, too, such as neural interfaces for prosthetic limbs and micromachining. Our stimulating degree programme gives you a solid grounding in the underlying physical and mathematical principles of the subject, along with a thorough overview of electronic technology and its applications.

One of the most exciting applications, today and in the future, is the rejuvenated rail industry. Railway projects are booming and we are at the forefront of developing and implementing technology to manage rail systems across

the world. Our Railway Engineering programme is the only one of its kind in the UK. As well as being an extremely broad subject, EESA is also one that encompasses a range of disciplines. Rooted in applied physics, mathematics and computing, it includes elements of psychology and materials, medical and biological sciences.

Some of the global challenges of the 21st century – power, communications, transport, health care and human-systems integration – can only be addressed by engineers. That means a good degree from Birmingham will open a host of exciting career doors across the world.

Yet even when you have chosen your career path, you can't be certain of the working and technological environment in which you'll be operating. Change is happening fast – and it's likely to happen faster in the future. That is why our overriding aim here at Birmingham is to equip you for a world you don't know – a world where technological advancement will be driven by people who know more than how to use an up-to-the-minute system; they can design an even better one. People who are engineers. People like you.



Programme organisation

All degree programmes

Engineering has many facets: sensing and interacting with the environment in order to control aspects of it; modelling and design; creativity; finding solutions to problems – and, more importantly than ever in today's fast-paced world, driving forward change to create new opportunities.

Aims

All programmes have a shared first year. You will work alongside Civil and Mechanical Engineers, giving you the opportunity to gain a deeper understanding of the fundamental principles of engineering.

In later years you will increase your depth of specialisation. Our industrial partners value this approach to engineering education. We've obviously got it right because our employability rates are very high.

Study

Our flexible three-year BEng and four-year MEng courses are structured to bring together all these facets to give you a thorough understanding of electronics-based technology, so that you are equipped to meet the challenges of your individual and group projects – as well as a life and career beyond university. Digital and analogue technologies and their applications will continue to evolve at lightning speed, so our modules are designed to ensure you can play a leading role in inventing, designing and managing them. At the same time, we will ensure you get a solid grounding in the underlying physical and mathematical principles of electronic, electrical and communications systems.

Project work, which is highly valued by employers, is the thread that runs through your degree, underpinned by coursework.

Learning and teaching

You will be taught by staff who are experts in their fields, staff with extensive industrial connections, research staff and staff with teaching qualifications. We offer a mixture of large-scale lecture tuition, small-group teaching (six students or fewer), and lab and other practical classes. We make extensive use of online learning tools, too, so you

can study even when you're not on campus. Courses are assessed by a mixture of exams and coursework. You will also have a personal tutor with whom you'll have one-to-one progress meetings throughout your time here.

We are a small department within a large engineering school – so you get the best of both worlds. In the first year, you are part of a large interdisciplinary group of students (with whom you'll keep contact throughout your degree), but as you start to specialise you will spend progressively more time within our department. It means you will get to know the staff and teaching assistants well.



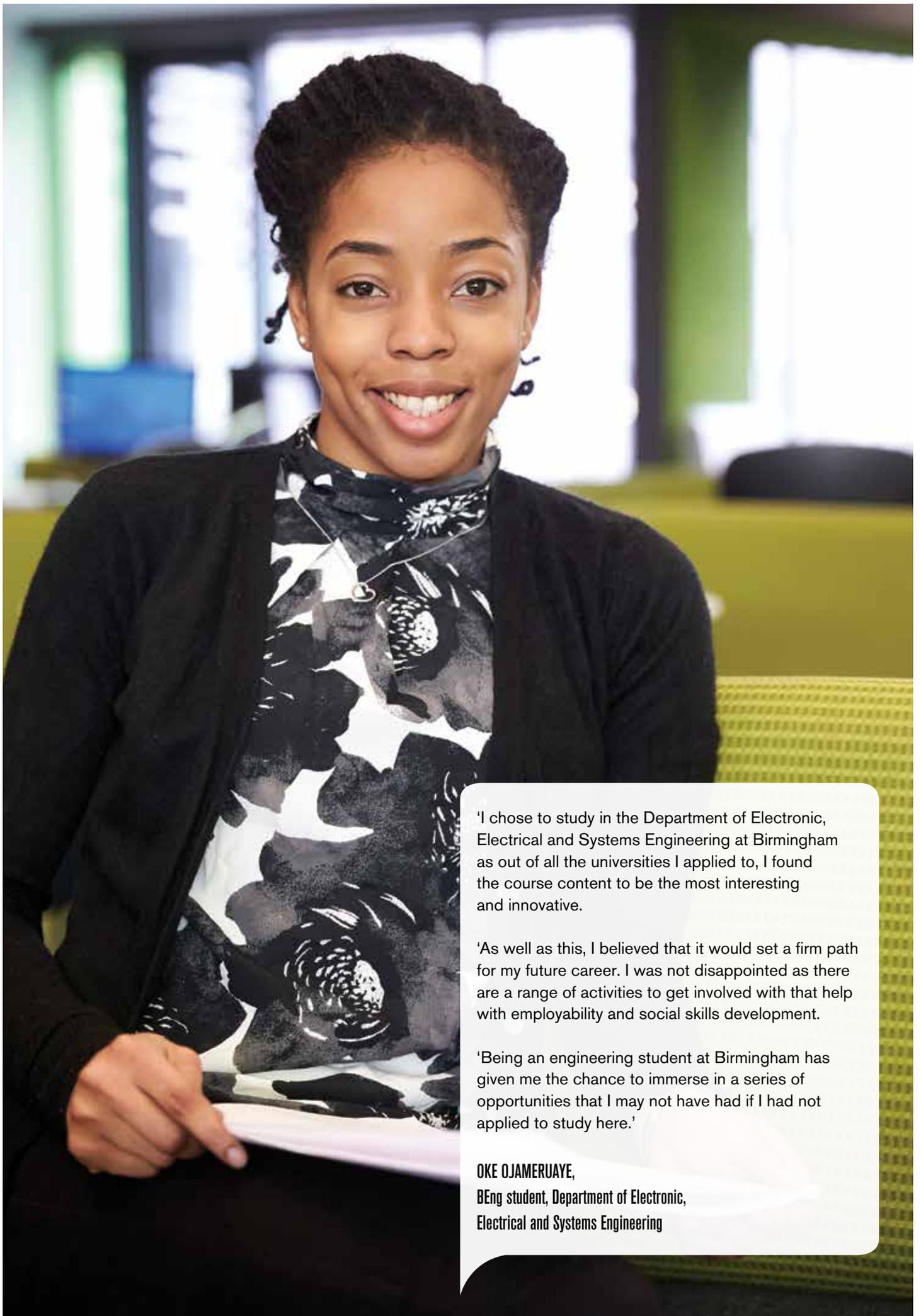
ENGINEERING FOUNDATION YEAR

If you want to study Electrical Engineering at Birmingham but don't possess the recommended qualifications for entry to one of our degree programmes, we offer an engineering foundation year programme. For further information visit:

www.birmingham.ac.uk/engineering-fy

ACCREDITATION

All the degrees in Electronic, Electrical and Systems Engineering are accredited by the Institution of Engineering and Technology. The renewal of our accreditation takes us past a 40-year unbroken record of offering professional engineering qualifications. The MEng programmes fully meet the academic requirement for registration as a Chartered Engineer. The BEng programmes fully meet the academic requirement for registration as an Incorporated Engineer and partly meet the academic requirement for registration as a Chartered Engineer.



'I chose to study in the Department of Electronic, Electrical and Systems Engineering at Birmingham as out of all the universities I applied to, I found the course content to be the most interesting and innovative.

'As well as this, I believed that it would set a firm path for my future career. I was not disappointed as there are a range of activities to get involved with that help with employability and social skills development.

'Being an engineering student at Birmingham has given me the chance to immerse in a series of opportunities that I may not have had if I had not applied to study here.'

OKE OJAMERUAYE,
BEng student, Department of Electronic,
Electrical and Systems Engineering

Electronic and Electrical Engineering

Year 2 onwards

Our Electronic and Electrical Engineering degree gives you the opportunity to study core subjects and explore your own pathway with optional modules.

YEAR 2

This year you will begin to specialise. Your core courses will cover digital systems and embedded computing, electronic circuits, devices and electromagnetics, maths for engineering, energy systems and control, communications systems, and software engineering. You will enjoy undertaking both discipline-specific and interdisciplinary group projects. In recent years students have built, programmed and raced robots in the end-of-year challenge. Assessments in the integrated design project are devised in consultation with our partners in industry, and are presented in an end-of-term showcase.

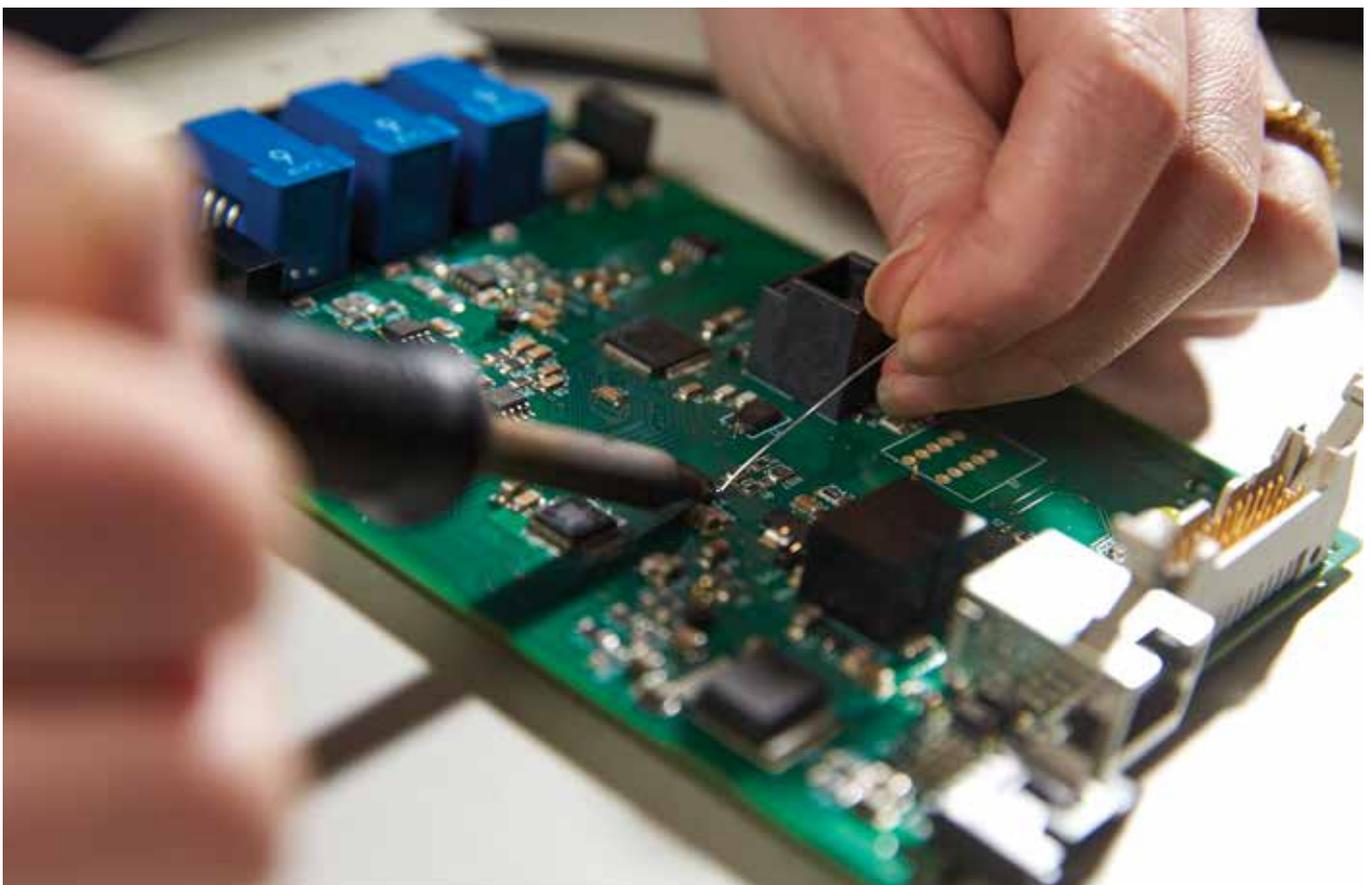
YEAR 3

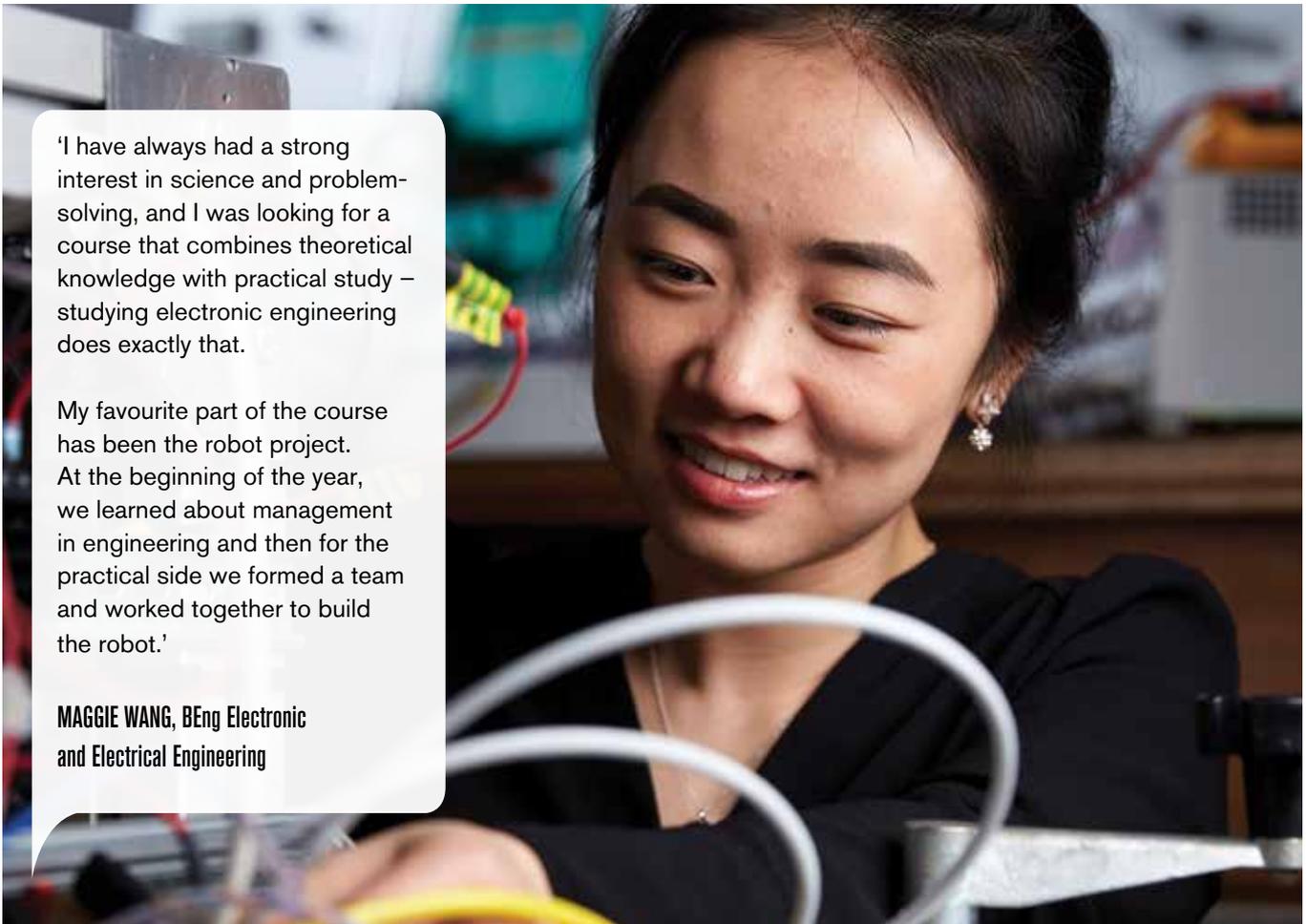
If you are studying for a BEng degree, this is your final year. In year 3 you have the chance to on the areas that interest you the most. Module subject areas are shown in the graphics box. You will apply the creative, technical, analytical and decision-making skills you have developed into delivering an individual research project as well as a group design project. You will choose options to complete your degree.

If you are on an MEng course, you will take all the modules shown in the graphic. If you are on the BEng course, you choose two of the modules shown.

YEAR 4

This is the flagship year for students studying for the MEng degree, which gives you the greatest choice of options to follow your interests. All students carry out an individual research project in close collaboration with an academic supervisor. Your project makes up one-third of your studies for the year. The remaining two-thirds comprises four specialised Masters-level courses based around three pathways – Communications Engineering, Power Engineering and Computer Engineering. Examples of modules within these pathways are shown in the graphic on page 8.





'I have always had a strong interest in science and problem-solving, and I was looking for a course that combines theoretical knowledge with practical study – studying electronic engineering does exactly that.

My favourite part of the course has been the robot project. At the beginning of the year, we learned about management in engineering and then for the practical side we formed a team and worked together to build the robot.'

MAGGIE WANG, BEng Electronic and Electrical Engineering

Year 1	Year 2	Year 3	Year 4 (MEng only)
Electrical Engineering 1	Electronic Circuits, Devices and Electromagnetics	Electronic Engineering	Individual Research Project
Integrated Design Project 1	Integrated Design Project 2	Integrated Design Project 3	Communications options include: <ul style="list-style-type: none"> ■ Radar Systems and Satellite Navigation ■ Electromagnetics, Antennas and Propagation ■ Satellite, Mobile and Optical Communications
Introduction to Computing for Engineers	Digital Systems and Embedded Computing	BEng only: <ul style="list-style-type: none"> ■ Individual Research Project MEng only: <ul style="list-style-type: none"> ■ Advanced Communications Systems ■ Power Electronics and Power Systems ■ The Internet of Things ■ Engineering Mathematics 3 	Computer Engineering options: <ul style="list-style-type: none"> ■ Data Mining and Machine Learning ■ Human Factors and Interactive System Design
Engineering Materials	Electrical Energy Systems and Control		Power options: <ul style="list-style-type: none"> ■ Renewable Energy Systems Integration ■ Power System Operation and Control
Mechanics 1	Multi Software and Systems Engineering		
Engineering Mathematics 1	Engineering Mathematics 2		
Fluid Mechanics and Energy Transfer	Communications Systems		

These are current modules and may be subject to change. For the most up-to-date list, please visit: www.birmingham.ac.uk/eese

Pathways in four-year MEng degrees



COMMUNICATIONS ENGINEERING

Imagine a radar screen where, instead of 'blobs', you see images of the objects detected by the radio waves – from a ship in the ocean to a pothole in the road. Such situation-recognition systems might one day soon be part of autonomous shipping and autonomous cars, thanks to world-leading terahertz (THz) sensing and communications research we are carrying out here at Birmingham. Bridging the THz gap could also lead to developments such as satellite systems to examine atmospheric gases and skin-imaging devices.

Wireless communications and remote sensing underpin most aspects of the modern electronic technologies that are instrumental in shaping the world, and we have long been leaders in radio frequency and microwave research.

All our research, which brings in about £4 million of funding a year, is undertaken in conjunction with industry: nationally we collaborate with the likes of BAE Systems and Jaguar Land Rover, while internationally we work with countries such as China and Brazil.

This is a pathway that will spawn new technologies with applications in areas such as additive manufacturing and micromachining, and lead to careers in almost all industrial sectors, from communications and radar to medical and security.



COMPUTER ENGINEERING

From the exceptional to the everyday, from interplanetary exploration to catching the bus, how many aspects of emerging 21st-century life won't involve some degree of embedded computation, interconnectivity and people-machine interactions? We might be caring for families and relatives; we could be seeking to understand human behaviour; we could be enabling advances in biological, medical or physical science, in all of these examples the ability to model processes and assist users in achieving their goals is central.

The modules offered in the computer engineering pathway will enable you to design the computer systems of the future, where design is informed by analysis and evaluated by value to the user. By the end of the course, you will have the skills to extract meaning from data and signals, to share and secure information, to devise ingenious algorithms enabling machines to learn.

Your final project will be chosen from topics such as these, in the areas where our research groups are having impact around the world. Recent projects have included recognition of the writers of Twitter posts, an interactive kitchen that knows you're looking for the teaspoon and instrumentation for underwater survey vehicles.

Our students, in placements during their degree or in graduate employment, enable technology in sectors including pharmaceuticals, health care, finance, transport and energy. They join companies including Goldman Sachs, Mozilla, GlaxoSmithKline, Intel and Delphi Automotive.



POWER ENGINEERING

Birmingham and the West Midlands is considered the UK's – as well as Europe's – 'energy valley', where the Third Industrial Revolution is well under way. Our department is at the heart of this, leading advances in electrical power systems that are key to developing a sustainable energy supply, enabling efficient integration of renewable energy generation into smart grids.

Computer aided modelling, of power flow, market models and system operation builds on the principles you would have learned during your first three years.

Our focus is on fundamental engineering and the economic challenges facing electrical power systems, energy systems and future cities. These include advanced control methods and decision-making tools for infrastructures such as energy, environmental, technological, defence and telecommunications systems; energy system modelling, economics and policy; the operation, control and planning of power grids and smart grids, and cyber security and privacy of infrastructure systems. Globally, there is a big shortage of power systems engineers, which means plentiful job opportunities with the likes of Alstom, EON and National Grid, with whom we have strong collaborative links.

FACT

You have the flexibility to change to the MEng programme once you are here, subject to academic progression requirements.

Mechatronic and Robotic Engineering

Year 2 onwards

In space or underwater, in the home or at work, on or in the human body, electromechanical systems that sense and interact with their environment are an integral part of life in the 21st century. Such systems can act autonomously or under the supervision of human operators, which creates new opportunities to engineer the intelligent technologies around us.

The Department of Electronic, Electrical and Systems Engineering at the University of Birmingham is offering new and exciting degree programmes in Mechatronic and Robotic Engineering, driven by our breadth of research expertise and industrial collaboration.

The programmes combine mechanical, computer and electronic and electrical engineering to address the challenges of designing and deploying intelligent technologies.

You will gain skills in computer engineering, covering topics such as machine learning and data mining, which enable mechatronic systems to make decisions, to be autonomous and to be effective. You will study human-computer interaction and virtual and augmented reality, to understand how people can co-operate successfully with intelligent technologies. You will learn how to supply, manage and control electrical power and how to transfer power between the electrical and mechanical domains.

You will learn how to make your systems aware of the situation they are working in, combining computer engineering with capabilities in sensor devices, signal analysis and analogue and digital electronics.

YEAR 2

The second enables you to focus on combining computing, electrical and mechanical technologies. You will study mechanics alongside courses covering embedded computing, electronics and control theory and develop your learning in problem-based laboratory classes and a robot design project.



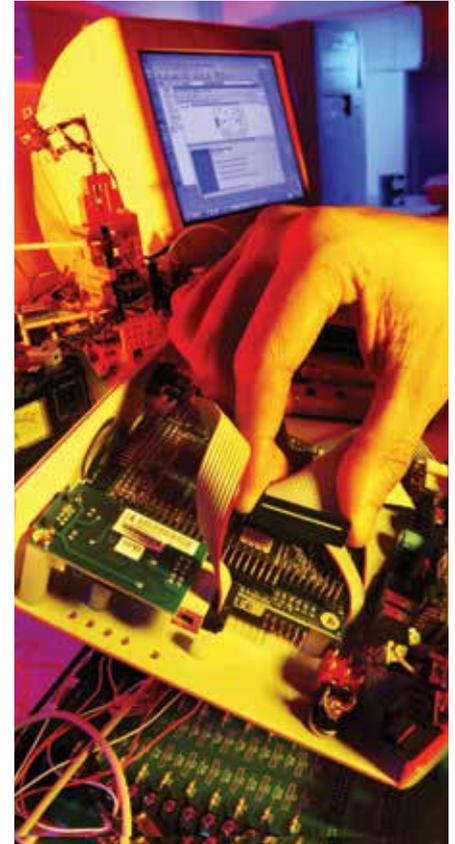
YEAR 3 AND 4

For BEng students in your final year, you will get to carry out a Project and the chance to specialise in options of your choosing.

MEng students will spend their third year studying a range of subjects including Mechatronic Design and Power Electronics and Power Systems as well as specialist options such as The Internet of Things and Telerobotics, Telepresence and Augmented Reality. For the final year, MEng students take part in an Individual Research Project and a range of modules that will strengthen their Mechatronic and Robotic Engineering skills.

Graduates of the programme will have the blend of the mechatronic and software integration skills required for successful careers in robotics, in all forms of transport, in medical technologies, in advanced manufacturing, space technologies, research and development and in product design.





Year 1	Year 2	Year 3	Year 4 (MEng only)
Electrical Engineering 1	Electronic Circuits, Devices and Electromagnetics	Mechatronic Design	Advanced Mechatronic Design
Integrated Design Project 1	Integrated Design Project 2	Integrated Design Project 3	Individual Research Project (Mechatronics)
Year 1 Computing for Engineers	Digital Systems and Embedded Computing	BEng only: ■ Individual Research Project	Data Mining and Machine Learning
Engineering Materials	Electrical Energy Systems and Control	MEng only: ■ Electronic Engineering ■ Power Electronics and Power Systems	Sensing and Control for Autonomous Systems
Mechanics 1	Mechanics 2	BEng only options: ■ Engineering Mathematics 3 ■ Virtual and Real World Telepresence ■ Power Electronics and Power Systems ■ Electronic Engineering	Options: ■ Human Factors and Interactive System Design ■ Small Embedded Systems ■ Computer and Communication Networks
Engineering Mathematics 1	Engineering Mathematics 2	MEng only options: ■ Virtual and Real World Telepresence ■ Engineering Mathematics 3 ■ The Internet of Things	
Fluid Mechanics and Energy Transfer			

Electrical and Railway Engineering

Year 2 onwards

Building on the global reputation of the Birmingham Centre for Railway Research and Education (BCRRE), you will obtain a thorough Electrical Engineering education alongside a specific focus on the railway industry. Unique in the UK, this programme ensures that upon graduation you will have the skills and knowledge to benefit from the excellent career prospects in an industry experiencing significant growth.

The rail industry around the world is growing with more journeys than ever before being made, meaning new and improved railway lines, systems and services introduced. In the UK alone, passenger numbers are expected to grow by around 50% in the next ten years. New and upgraded lines, new urban services and significant investments in maintenance all mean that electrical engineers who understand railway infrastructure and railway systems are in high demand.

The Birmingham degrees in Electrical and Railway Engineering are the first of their kind in the UK. They have been put together in close collaboration with the railway industry; making them immediately relevant, ensuring graduates have the knowledge, experience and capability needed to have successful careers. Your studies will include core electrical engineering as well as specialised study on railway infrastructure, traction and energy, railway management, timetabling and control, and your design and research projects will all have a railway focus.

The opportunities in Birmingham for extra-curricular railway-related activities include the RailSoc student society and the chance to take part in the annual Railway Challenge event. Each year a team of students (and sometimes staff from a selected company) get together to build and run a small-scale locomotive. At Birmingham, this is the UK's first hydrogen-powered loco, which means not only can you put your studies into practice, you can also take part in a unique project: the Hydrogen Hero train has regularly been one of the top-rated entries for this competition.

You can study to BEng or MEng level and add an industrial placement year to give yourself that all-important work experience. The railway theme will develop your understanding of the complex railway system, which means you will be in demand by engineering companies, vehicle and communication systems manufacturers, network operators and non-engineering organisations alike.

HS2 and the University of Birmingham

The headquarters of HS2 construction and of the National College for High Speed Rail are based in Birmingham and the Birmingham Centre for Railway Research and Education (BCRRE) is engaging strongly with these organisations to ensure it plays an integral role in the development of HS2. BCRRE is the largest university-based railway research group in Europe and will be involved in educating the engineers that will work on the HS2 rail link. Relying on our internationally leading expertise, we have a hand in the training and continuing development of the College's teachers, we are also advising on best practice providing access to a wide range of high-quality educational and testing facilities. BCRRE's work is at the heart of plans to transform railways across the globe over the coming years, and our multidisciplinary team delivers world-class research and leadership within railways, as well as high-quality teaching to our students.

Year 1	Year 2	Year 3		Year 4 (MEng only)
Electrical Engineering 1	Railway Infrastructure Engineering	Railway Management and Control		Advanced Topics in Railway Engineering
Integrated Design Project 1	Railway Traction	Railway Design Projects		Sensing and Control for Autonomous Systems
Computing for Engineers	Digital Systems and Embedded Computing	Individual Research Project		Individual Research Project
Engineering Materials	Electrical Energy Systems and Control	Power Electronics and Power Systems		Optional course from: <ul style="list-style-type: none"> ■ Power System Economics ■ Power System Operation and Control ■ Renewable Energy Systems Integration ■ Power Systems Stability Control and Protection
Mechanics 1	Electronic Circuits, Devices and Electromagnetics	BEng option: <ul style="list-style-type: none"> ■ Electronic Engineering ■ Engineering Mathematics 3 	MEng compulsory: <ul style="list-style-type: none"> ■ Electronic Engineering ■ Engineering Mathematics 3 ■ The Internet of Things 	
Engineering Mathematics 1	Engineering Mathematics 2			
Fluid Mechanics and Energy Transfer				

These are current modules and may be subject to change. For the most up-to-date list, please visit: www.birmingham.ac.uk/eese

Degree Apprenticeships

BEng Electrical and Railway Engineering – four years (Rail and Rail Systems Senior Engineer)

Do you want a traditional university degree, but would like to start earning a salary while studying?
Do you want to start your career with a leading employer in the rail sector?
If you answered ‘yes’ to any of these questions, then this new and exciting degree could be right for you.

Our four-year Rail and Rail Systems Senior Engineer Level 6 Degree Apprenticeship programme has been designed in partnership with a number of organisations within the Rail sector, allowing you to gain a BEng in Electrical and Railway Engineering with our Department for Electronic, Electrical and Systems Engineering funded by an employer’s Apprenticeship Levy. You will spend your first and second years at University, undertaking placements with your employer outside of term-time, whilst your third year will be spent working for the employer partner. In Year 4, you will return to University for your final year of study.

Unique

Our programmes are one of a kind – be one of the first to take this opportunity to study and work at the same time, whilst specialising in railway engineering.

Earn while you learn

All your University tuition fees are fully funded, as well as receiving a salary alongside the usual employee benefits.

Support

You will be fully supported both at University and within your employment.

Additional entry requirements

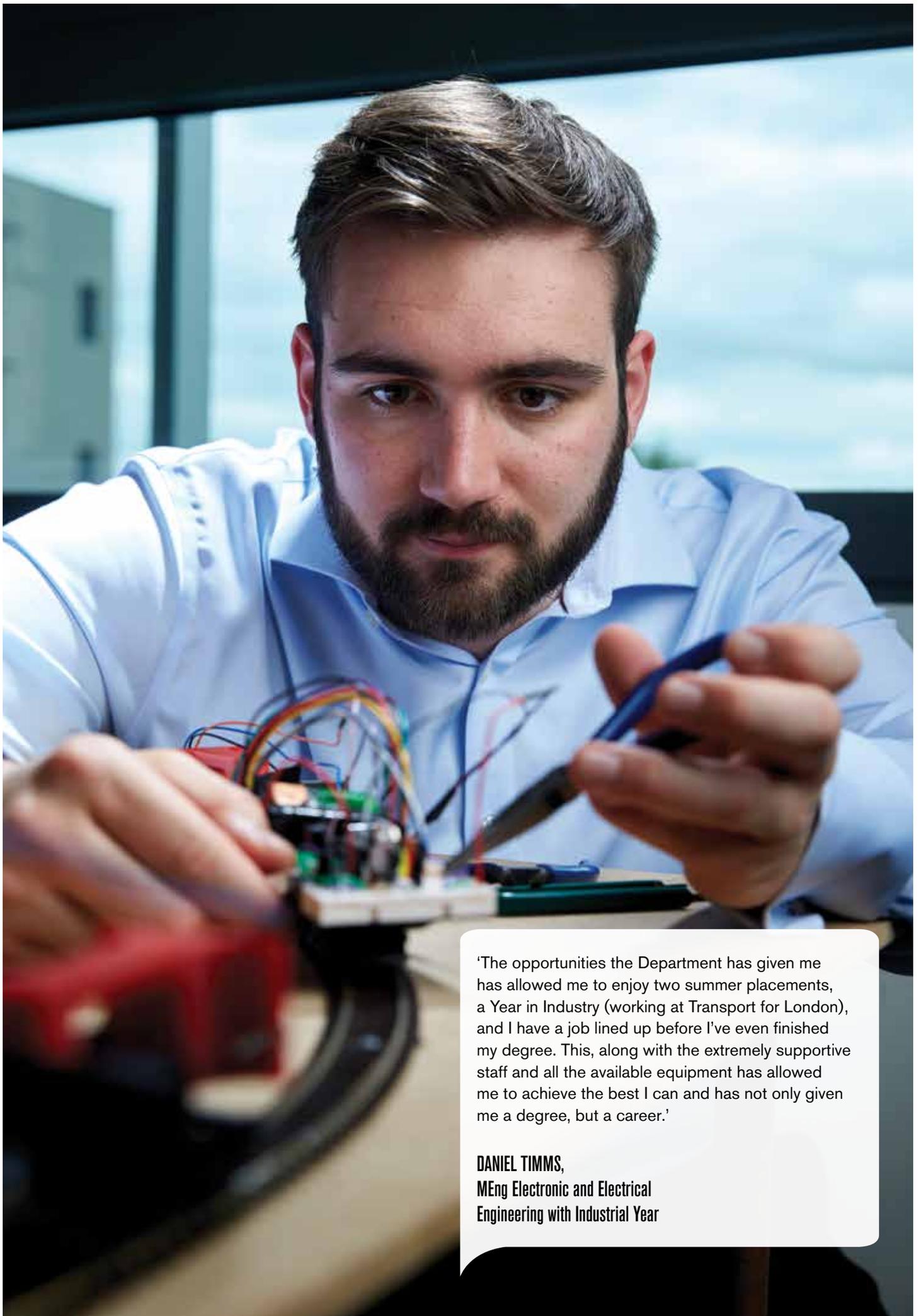
As part of our recruitment process, academically suitable applicants will be invited to complete assessment activities in line with the employer partners’ industrial placement requirements.

Attending an assessment day will give you the opportunity to find out more about the programme, placements and prospects with the employer partners that are involved in our degree apprenticeship. You will also be able to tour the campus, meet current students and speak to staff.

Applicants will be notified of the decision on their degree apprenticeship application after attending an assessment day. Those that are not successful in gaining a place with the employer partners will be automatically offered a place on the BEng Electrical and Railway Engineering.

Programme is only available for UK/EU students.

Year 1	Year 2	Year 3	Year 4
Electrical Engineering 1	Railway Infrastructure Engineering	Industrial Placement Year	Railway Management and Control
Integrated Design Project 1	Railway Traction		Railway Design Projects
Computing for Engineers	Digital Systems and Embedded Computing		Individual Research Project
Engineering Materials	Electrical Energy Systems and Control		Power Electronics and Power Systems
Mechanics 1	Electronic Circuits, Devices and Electromagnetics		Engineering Practice Portfolio
Engineering Mathematics 1	Engineering Mathematics 2		
Fluid Mechanics and Energy Transfer			



'The opportunities the Department has given me has allowed me to enjoy two summer placements, a Year in Industry (working at Transport for London), and I have a job lined up before I've even finished my degree. This, along with the extremely supportive staff and all the available equipment has allowed me to achieve the best I can and has not only given me a degree, but a career.'

DANIEL TIMMS,
**MEng Electronic and Electrical
Engineering with Industrial Year**

Where will your degree take you?

Do you know where you'll be in five, ten, 20 years' time? Your degree will equip you with the creative, professional and technical skills to lead change and innovation in a future that we know little about for certain, other than that the technologies and systems we use will not be the same as they are today.

Some improvements will be game-changing and disruptive, some will be evolutionary. The reputation Birmingham has worldwide for the impact and quality of its research means that the people you meet will value your qualification as much as you do. That we have been an academic partner of the Institution of Engineering and Technology (IET) for over a quarter of a century provides employers with assurances that our graduates have the qualities they seek. You may be running your own business and recruiting graduates and partners yourself in the not too distant future.

An industrial year

Whether you have applied for the 'with Industrial Year' degree from the outset or decide to join the scheme once you are here, a year

in industry is an invaluable addition you can choose for your degree. You will be involved in serious projects at the core of the company's business, with training and support. We'll be in touch with you throughout the year too. You'll gain experience of applying what you've learned in the early years of your degree to real engineering challenges.

You'll come away with a clearer idea of what you want to do. We have strong links with industry, many of the companies we work with will regularly recruit our students. Opportunities are promoted throughout the year and we'll help you through the application process. You will be awarded a Certificate of Industrial Studies, which will be shown on your degree transcript.



3rd

MOST TARGETED UNIVERSITY BY LEADING EMPLOYERS

*The Graduate Market in 2019,
High Fliers Report*



We have a great success rate of our students securing bursaries and placements from the UK Electronic Skills Foundation providing these students with the opportunity to gain experience in the electronics industry.



Where will your degree take you?

Continued

Support from the School

We have staff engaged in industrial liaison as well as academic staff with a wealth of connections to industry. We help you to meet employers, to gain an insider-view of the application process and to find career opportunities. From the very beginning of your degree, we will provide guidance in giving presentations, technical writing, preparing your CV and gaining the professional skills expected of a graduate engineer. As well as helping you find your graduate job, we'll also help you with summer placements and year in industry.

CAREERS

Tailored careers support from Careers Network

We provide a wealth of opportunities to develop your career. From your first day at Birmingham to after you graduate, Careers Network is here to help you identify and achieve your individual career aspirations through its wide range of services.

Our dedicated careers team brings you information, advice and guidance tailored to your specific needs. Careers advisers offer one-to-one advice appointments where you can discuss your career plans and explore your options.

Our multi-award-winning work experience team has dedicated internship officers to help find the right work experience for you. Make the most of these opportunities and apply for our Work Experience Bursary Scheme, the Birmingham Undergraduate Internship Programme or one of our successful mentoring schemes.



'Whilst at university I did a placement year at IBM. This gave me great exposure to working life and allowed me to see how IT is used in the workplace. These experiences were very useful when applying for graduate roles as it gave me a lot more to talk about and discuss in interviews. It also gave me the confidence to go through this recruitment process.'

**SAMUEL HISCOCK, MEng Graduate
ITDP Associate, GlaxoSmithKline**



'My job certainly makes use of the subjects I studied at university, in particular digital design and hardware description languages.'

**NAOMI DIXON, MEng Graduate
Hardware Design Engineer, Phabrix**



LEARN MORE

See a video from Shifath Nafis, talking about why he chose to study at the University of Birmingham and how the degree programme prepared him for life post-graduation: www.youtube.com/watch?v=A8p_T6JHqo8

Outside of your degree

There are a number of extra-curricular activities that you can get involved in outside of your degree to enhance your skills, knowledge and overall student experience.



Formula Student Competitions

UBRacing is the official Formula Student team at the University of Birmingham. This student-run project takes place each year to design, fund and build a single-seater racing car from scratch, in order to compete in a series of tests against other universities. In 2017, UBR20, the team's 20th car, finished second overall and won the endurance race and overall dynamics, which is the team's best ever performance.



UBRobotics

The University of Birmingham Robotics Club is a student-run club where you will design, manufacture and program autonomous robots and actuators to compete in competitions in the UK and further afield. The club has won several funding campaigns and works with key sponsors such as National Instruments, SMC and ParetoWorks.



UBeRacing

UBeRacing is the University's new electric Formula Student team. Formed in October 2017, UBeRacing produces electric cars to race in the prestigious annual IMechE Formula Student competition. The team is a blend of electrical, mechanical and software engineers, perfectly combining the skills needed for this exciting new project.



EESE Soc

The Department has a dedicated society run entirely by students in Electronic and Electrical Engineering. The Society provides a fantastic opportunity to meet with students from all years and levels of study within the Department and could include anything from film nights, paintballing and trips to sports fixtures and careers events.



FACT

The Hydrogen Locomotive is a yearly project that gives undergraduate students the chance to work with PhD students to develop and improve a unique hydrogen-hybrid locomotive to meet set specifications. The locomotive is entered into an international competition, with students able to demonstrate their work publicly.



LEARN MORE

These are just some of the active and successful student societies offered across the College of Engineering and Physical Sciences (EPS), and there are many more you can get involved in. For the latest information on our societies, visit our EPS society pages at www.birmingham.ac.uk/eps-societies



How to apply

You have the flexibility to tailor the course you study to your needs and interests, and are not committed to the degree pathway at the point of entry. You have the opportunity to transfer from the BEng to the MEng programme if you meet the relevant progression requirements at the end of your second year or to join the year in industry programmes.

How do I apply?

You will need to submit an application through UCAS to be considered for study and use the appropriate UCAS code from the table. Demand for places is high and we advise applicants to apply early. Please remember to provide full information on your education history when you apply. www.ucas.com

Essential information

- A level Mathematics is required.
- Physics and Further Maths are not required but are advantageous.
- General Studies and Critical Thinking are not considered.
- International Baccalaureate (IB) Diploma: Our standard offer is no less than 32 points

overall including Mathematics at Higher Level (HL). HL scores needed are in the table provided.

- Students who just miss the grade requirements for MEng study will be automatically considered for a place on the BEng programme.

Please visit our website for further details including entry requirements www.birmingham.ac.uk/engineering-courses

We assess all UCAS applications individually to determine your eligibility and so qualifications under other examination systems may also be acceptable.

Deferred entry and sponsorship

We value the experience gained by students who wish to take an industrial or gap year before entering university. Students who obtain industrial sponsorship may need to defer their entry for the year. If you wish to do this, simply continue with the standard UCAS admissions procedure but write to the Undergraduate Admissions Tutor once you are sure that deferment is required.

We will contact UCAS and the University administration on your behalf and make all the necessary arrangements. A place on the following year's course will be reserved for you, so you need take no further action.

Programme	UCAS code	Duration (Years)	Typical offer	Subject requirements
Electronic and Electrical Engineering MEng	H605	4	A level: AAA/IB: 6, 6, 6 with 32 points overall	A level Maths at grade A/HL Maths at grade 6
Electronic and Electrical Engineering BEng	H600	3	A level: AAB/IB: 6, 6, 5 with 32 points overall	A level Maths at grade B/HL Maths at grade 5
Electronic and Electrical Engineering with Industrial Year MEng	H607	5	A level: AAA/IB: 6, 6, 6 with 32 points overall	A level Maths at grade A/HL Maths at grade 6
Electronic and Electrical Engineering with Industrial Year BEng	H606	4	A level: AAB/IB: 6, 6, 5 with 32 points overall	A level Maths at grade B/HL Maths at grade 5
Electrical and Railway Engineering MEng	52H1	4	A level: AAA/IB: 6, 6, 6 with 32 points overall	A level Maths at grade A/HL Maths at grade 6
Electrical and Railway Engineering BEng	71H9	3	A level: AAB/IB: 6, 6, 5 with 32 points overall	A level Maths at grade B/HL Maths at grade 5
Electrical and Railway Engineering Degree Apprenticeship BEng	71HD	4	A level AAB/IB: 6, 6, 5	A level Maths at grade B/HL Maths at grade 5
Engineering Foundation Year	HFJ0	For further details visit www.birmingham.ac.uk/engineering-fy		
Mechatronic and Robotic Engineering MEng	HH63	4	A level: AAA/IB: 6, 6, 6 with 32 points overall	A level Maths at grade A/HL Maths at grade 6
Mechatronic and Robotic Engineering BEng	H6H3	3	A level: AAB/IB: 6, 6, 5 with 32 points overall	A level Maths at grade B/HL Maths at grade 5

Fees and funding

For comprehensive information on fees and funding, please visit www.birmingham.ac.uk/undergraduate/fees/index.aspx

Scholarships

The School of Engineering offers widening participation scholarships and scholarships for excellent academic performance. Eligible UK, EU and international students will be automatically considered for the scholarships offered by the School during the application process. Full details for scholarships for 2020 entry, along with their terms and conditions, can be found by visiting School webpages: www.birmingham.ac.uk/engineering-ug-scholarships

Visiting us

If you are made an offer you will be given the opportunity to join us on campus at an Offer-holder Day. You will be able to visit the Department and its facilities, meet current staff and students, and discover what it is really like to study with us. The Offer-holder Day is an ideal opportunity to ask questions about the programme and student life, and will give you a clear idea of what Birmingham has to offer.



FACT

Further details of University scholarships and funding opportunities can be found on our UG Funding Database at www.birmingham.ac.uk/undergraduate/funding/index.aspx

FACT

If you're a local student you may be eligible for the A2B Scheme. Visit www.birmingham.ac.uk/a2b for further details.



LEARN MORE

Please contact us for further details or with any questions you may have.

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This leaflet was written several months in advance of the start of the academic year. It is intended to provide prospective students with a general picture of the programmes and courses offered by the School. Please note that not all programmes or all courses are offered every year. Also, because our research is constantly exploring new areas and directions of study some courses may be discontinued and new ones offered in their place.

Please note the information in this brochure is correct at time of publication but may be subject to change (June 2019).

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