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# Electrical and Railway Engineering MEng

## Undergraduate degree course in Electrical and Railway Engineering MEng 52H1:

**Electronic, Electrical and Computer Engineers (http://www.birmingham.ac.uk/schools/eece/index.aspx)** are involved in the design and development of technology that has become essential to all areas of the modern world; from satellites and mobile 'phones keeping our telecommunications networks connected day and night, to computers and digital networks storing and releasing, as required, the billions of bits of data that stream around the globe.

At Birmingham, we have been at the forefront of teaching and research in this area for over 100 years, engaging in each era of new technological advance and helping it to evolve into what we see around us today. We are a friendly, confident and all-embracing School, welcoming people from all over the world.

Our graduates have recently rated their satisfaction levels with us at 94% in the National Student Survey; and 80% of our graduates were employed six months after graduating with 90% of those finding graduate-level jobs.

In Railway Engineering, the School of Electronic, Electrical and Computer Engineering plays a major role in the Birmingham Centre for Railway Research and Education, with research in condition monitoring, power and energy systems, data acquisition and analysis, railway capacity and systems engineering.

The MEng in Electrical and Railway Engineering aims to produce highly qualified graduates who will go on to become Chartered Engineers, with a specialism in railway engineering, to meet the growing demands for engineers within the railway and other sectors.

**Study here and find out why the University of Birmingham has been awarded The Times and The Sunday Times University of the Year 2013-14 (http://www.birmingham.ac.uk/news/latest/2013/09/20-sep-Birmingham-announced-as-University-of-the-Year.aspx)**

### Course fact file

**UCAS code:** 52H1

**Duration:** 4 years

**Places Available:** 42 (across all programmes)

**Applications in 2013:** 317

**Typical Offer:** AAA (**More detailed entry requirements and the international qualifications accepted can be found in the course details (?OpenSection=EntryRequirements)** )

**Start date:** September

### Related courses

**Undergraduate degree programmes - Electronic, Electrical and Computer Engineering (/schools/eece/undergraduate/index.aspx)**

### Contact

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**Follow us on Twitter (http://twitter.com/eps_unibham)**

## Details

Technological systems invented, designed and managed by Electronic and Electrical engineers have a huge influence on our daily lives, our environment and our social interaction. If you've enjoyed maths and physical sciences at school, studying at Birmingham will give you an exciting 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 generation, and distribution infrastructure.

The Electrical and Railway Engineering 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. Whilst studying all the major electrical engineering subjects, you will also gain experience in a range of railway system issues and disciplines.

For the first two years of the degree, all of our undergraduates follow an integrated BEng or MEng route. Once you've finished your second year, you'll then choose whether to complete the**Electrical Engineering and Railway Engineering BEng (71H9) (/undergraduate/courses/eece/electrical-railway-engineering.aspx)** or go on to study for an MEng degree (52H1). Progression to the MEng will require excellent second year examination results

### First year

You'll learn the theoretical and practical skills you need to design, construct, program and test circuit building blocks and complex systems. You'll study in depth the underlying mathematical and physical principles of electronic engineering, and develop skills in computer programming and computer-aided design. You will also be given a broad introduction to Railway System Engineering, which will involve working with students from other engineering disciplines.

### Second year

You'll extend your technical understanding and learn how to apply your knowledge and creativity to solving electrical and railway engineering problems. You'll focus on designing real control systems and embedded systems. You will come to understand power transmission, railway infrastructure and traction systems.

### Third year

During your third year you solve real-world problems through a challenging design project in the railway sector. You work in teams and individually to engineer appropriate and creative design solutions. You will study railway operations and management and train control.

### Fourth Year

The highlight of the fourth year is a challenging individual research project. You will in addition study a range of advanced railway engineering topics, with significant input from practicing railway engineers.

### Related links

- **Undergraduate programmes in railway engineering (pdf 362 KB) (/Documents/college-eps/eece/brochures/railway-engineering-brochure.pdf)**
- **Undergraduate degree programmes - Electronic, Electrical and Computer Engineering (/schools/eece/undergraduate/index.aspx)**
- **Scholarships and awards - Electronic, Electrical and Computer Engineering (/schools/eece/undergraduate/scholarships.aspx)**
- **Birmingham Centre for Railway Research and Education (/research/activity/railway/index.aspx)**

## Fees and funding

**Standard fees (http://www.birmingham.ac.uk/students/ug/courses/fees/standard)** apply
Learn more about **fees and funding (/undergraduate/fees/loans.aspx)**

**Scholarships**
A number of College / University scholarships will be available for this programme as for other programmes within Electronic, Electrical and Computer Engineering. In addition it is possible that scholarships funded by major Railway Industry partners will become available over the next few months. Applicants to the programme will be kept informed of any such developments.

## Entry requirements

**Number of A levels required:** 3

**Typical offer:** AAA

**Required subjects and grades:** Mathematics A level grade B and at least one physical science A level

**General Studies:** not normally accepted as one of the three A levels, but a good performance may be taken into account if you fail to meet the conditions of an offer marginally

**Additional information:**

Other qualifications are considered – learn more about **entry requirements (http://www.birmingham.ac.uk/students/ug/requirements)**

**International students:**

International Baccalaureate students must have both Mathematics and at least one physical science at HL. Typical offer 36-38 points.

**Standard English language requirements apply (/undergraduate/requirements/international/index.aspx)**
Learn more about **international entry requirements (http://www.birmingham.ac.uk/students/ug/requirements/international)**
Depending on your chosen course of study, you may also be interested in the Birmingham Foundation Academy, a specially structured programme for international students whose qualifications are not accepted for direct entry to UK universities. Further details can be found on the **foundation academy web pages (http://www.birmingham.ac.uk/students/foundation-academy/Pathways/index.aspx)** .

## How to apply

Apply through UCAS at **www.ucas.com (http://www.ucas.com/)**
Learn more about **applying (http://www.birmingham.ac.uk/students/ug/courses/apply)**

## Key Information Set (KIS)

Key Information Sets (KIS) are comparable sets of information about full- or part-time undergraduate courses and are designed to meet the information needs of prospective students.

All KIS information has been published on the Unistats website and can also be accessed via the small advert, or 'widget', below. On the **Unistats website (http://unistats.direct.gov.uk)** you are able to compare all the KIS data for each course with data for other courses.

The development of Key Information Sets (KIS) formed part of HEFCE's work to enhance the information that is available about higher education. They give you access to reliable and comparable information in order to help you make informed decisions about what and where to study.

The KIS contains information which prospective students have identified as useful, such as student satisfaction, graduate outcomes, learning and teaching activities, assessment methods, tuition fees and student finance, accommodation and professional accreditation.


### Related links

**Undergraduate programmes in railway engineering (pdf 362 KB) (/Documents/college-eps/eece/brochures/railway-engineering-brochure.pdf)**

**Undergraduate degree programmes - Electronic, Electrical and Computer Engineering (/schools/eece/undergraduate/index.aspx)**

**Scholarships and awards - Electronic, Electrical and Computer Engineering (/schools/eece/undergraduate/scholarships.aspx)**

**Birmingham Centre for Railway Research and Education (/research/activity/railway/index.aspx)**


## Learning and teaching

The learning and teaching methods adopted in the Electrical and Railway Engineering programme will include large group lectures, tutorial classes, small group tutorials, laboratory classes, design classes and supervised self study for design and research projects. In the fourth year of the programme, many of the lectures will be delivered by engineers working within the railway industry.

As a Birmingham student you are part of an academic elite and will learn from world-leading experts. At Birmingham we advocate an enquiry based learning approach, from the outset you will be encouraged to become an independent and self-motivated learner, qualities that are highly sought after by employers. We want you to be challenged and will encourage you to think for yourself.

Your learning will take place in a range of different settings, from scheduled teaching in lectures and small group tutorials, to self-study and peer group learning (for example preparing and delivering presentations with your classmates).

To begin with you may find this way of working challenging, but rest assured that we?ll enable you to make this transition. You will have access to a comprehensive support system that will assist and encourage you, including personal tutors and welfare tutors who can help with both academic and welfare issues, and a formal **transition review (https://intranet.birmingham.ac.uk/student/transitionreview/index.aspx)** during your first year to check on your progress and offer you help for any particular areas where you need support.

**How will I be taught?**
As a Birmingham student, you are joining the academic elite and have the privilege of learning from world-leading experts in the field of computer science. Throughout your studies, you'll be encouraged to become an independent and self-motivated learner, thriving on challenge and opportunities to think for yourself.

**Personal tutor**
At the start of your degree, you'll be assigned a Personal Tutor who will remain with you throughout your studies to help you in three important areas: supporting your academic progress, developing transferable skills and dealing with any welfare issues.

**Contact hours**
In your first year the course is delivered via lectures, tutorials, workshops and laboratory classes. As you proceed through your course the number of structured hours decreases and there's a strong emphasis on project work in your final year.

**Learning settings:**

**Laboratory-based work** is an integral part of our Electronic & Electrical Engineering degree programme, vital not only to develop your experimental practical skills, but also to reinforce concepts introduced in lectures. Practical sessions typically last two to three hours, although more advanced experiments and activities may span over several sessions.

**Lectures** take place in our theatres which, as well as the traditional whiteboard and pen, are equipped with the latest technology, including facilities to show movies, animations and graphics, to record lectures and to interact with 'ask the audience' style electronic voting systems.

**Small-group tutorials/personal tutorials** run alongside the lecture course, addressing any individual problems you may have and allowing you to consolidate lecture material, as well as test your understanding through problem-solving exercises.

**Project Work.** All of our undergraduate programmes feature a significant level of project working in each year of study, with individual and group projects designed to prepare our graduates for teamworking, problem solving and project management. To support this the entire second year goes on a team-building weekend in the Lake District before starting their group project, and those who take an MEng degree programme do the same again before starting their major group project in the third year. For many of our students these weekends help to build skills and friendships which last long beyond their project work.

**Enquiry Based Learning (EBL)** is a group activity which requires you to work in a team, with a variety of assessment methods; in either a group or individually, by written reports and sometimes as a presentation. Based on techniques used in research-led organisations like the University of Birmingham, EBL gives you a research-orientated approach to a problem and helps you to gain essential skills that are highly valued by employers.

## Assessment methods

The course modules are taught through lectures, tutorial problem classes, and laboratory and/or project work, and you'll be assessed through a mixture of written exams and continually assessed coursework. As your degree progresses, you will attend fewer lectures and perform more practical work in preparation for your final-year project. Around half of the total course marks are assessed through formal examination, and half through coursework or continuous assessment.

During your first year you will undergo a formal 'transition' review, mentioned above, to see how you are getting on and whether there are particular areas where you need support. This is in addition to the personal tutor who is based in your School or Department and can help with any academic issues you encounter. Our Academic Skills Centre also offers you support with your learning. The centre is a place where you can develop your mathematical, academic writing and general academic skills. It is the centre?s aim to help you to become a more effective and independent learner through the use of a range of high-quality and appropriate learning support services. These range from drop-in sessions with support with mathematics and statistics based problems provided by experienced mathematicians, to workshops on a range of topics including note taking, reading, writing and presentation skills.

Feedback is an essential part of learning and we use a wide range of methods, such as written feedback on your assessments, class feedback sessions and discussions with your tutor. You'll receive feedback on each assessment within four weeks, highlighting the positives of your work as well as any areas that need more attention. You will also be given feedback on any exams that you take; if you fail an exam we will ensure that you receive particularly detailed feedback to enable you to learn for the future.

## Related research

- **Birmingham Centre for Railway Research and Education (/research/activity/railway/index.aspx)**

## Employability

The railway sector is extremely buoyant, with a wide range of significant projects underway or planned. The degree programme will give students an insight into the railway industry and knowledge of the technical disciplines that are involved, ensuring that all students will be very employable within the industry. However, graduates will also have a solid grounding in Electrical Engineering and will be able to find employment in organizations across the Electrical Engineering industry.

Feedback from the National Student Survey shows that 95% of our students go on to work or further study after graduation and that 95% of them are in professional/managerial jobs six months after graduation, earning salaries in the range of ?23-?27,000 per annum.

Preparing for your career is one of the first things you need to think about when you start university. There is a great demand for trained engineers, and armed with a good degree from a world-renowned university like Birmingham, our graduates have the opportunity to get involved in all sorts of exciting projects close to home or further

away. Our accredited degree programmes provide an excellent preparation for rewarding professional careers in the electronics, computing, telecommunications and energy industries. But the skills you'll gain, such as technical engineering, applied science and mathematical, computing, teamworking, and project and management skills, also open up career opportunities in the fields of financial services and consultancy.

At the University of Birmingham, we enhance your employability with superb opportunities to gain industry experience, assiting you to secure mentoring opportunities, global internships and placements. Spending a whole year in industry between your second and final study years is a chance to earn money and gain real-life experience, allowing you to get involved in serious projects and put into practice the skills and knowledge gained from your degree. It's a great chance to prove your worth and placements often lead to sponsorship and/or the offer of a graduate job.

We also offer voluntary work which complements your studies by helping you gain practical experiences in occupational settings while contributing back to society. This can bring new skills that will be useful throughout your future and can make a positive impact on your learning whilst at university. Volunteering enables you to develop skills such as communication, interpersonal skills, teamwork, self-confidence and self-discipline all of which can be transferred into your studies.

Whether you have a clear idea of where your future aspirations lie or want to consider the broad range of opportunities available once you have a Birmingham degree, our Careers Network can help you achieve your goal.

Our unique careers guidance service is tailored to your academic subject area, offering a specialised team (in each of the five academic colleges) who can give you expert advice. Once you have a career in your sights, one-to-one support with CVs and job applications will help give you the edge. In addition, our employer-endorsed award-winning **Personal Skills Award (PSA) (https://intranet.birmingham.ac.uk/as/employability/psa/index.aspx)** recognises your extra-curricular activities, and provides an accredited employability programme designed to improve your career prospects.

Your Birmingham degree is evidence of your ability to succeed in a demanding academic environment. Employers target Birmingham students for their drive, diversity, communication and problem-solving skills, their team-working abilities and cultural awareness, and our graduate employment statistics have continued to climb at a rate well above national trends. If you make the most of the wide range of services you will be able to develop your career from the moment you arrive.

**Career destinations of recent graduates include:**

- Engineering Officer (RAF)
- Graduate Engineer (Network Rail)
- Digital Media Assistant (Road Safety Analysis)
- Graduate Electrical Construction (National Grid)
- Design Engineer (IDX co. Ltd)
- Systems Designer (Amor Group)
- Graduate Test Engineer (Goodrich)
- Advanced Product Creation Engineer (Jaguar Landrover)
- Production Manager (Powelectrics Ltd)

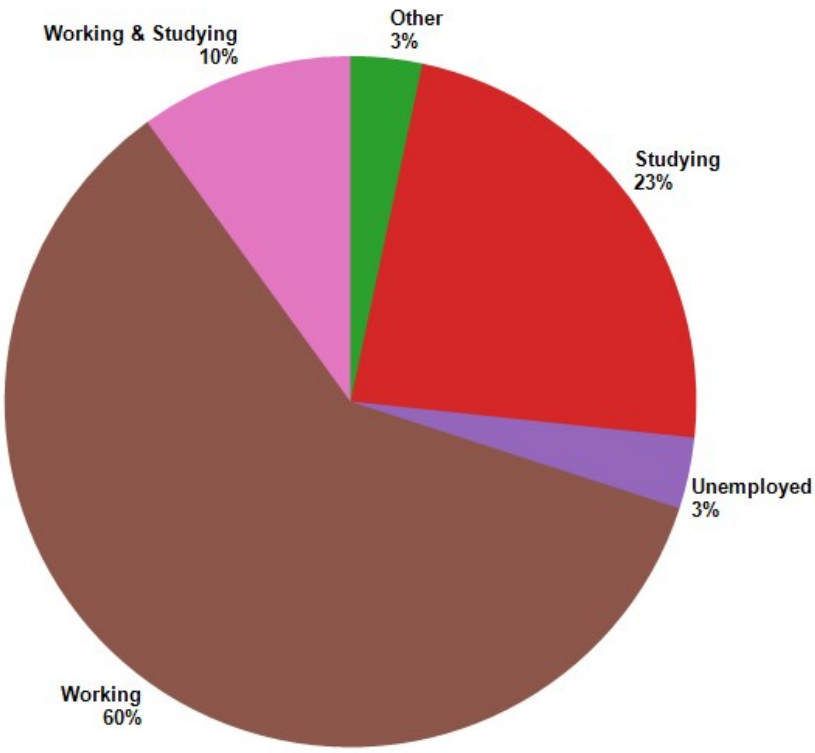
## University Careers Network

Preparation for your career should be one of the first things you think about as you start university. Whether you have a clear idea of where your future aspirations lie or want to consider the broad range of opportunities available once you have a Birmingham degree, our Careers Network can help you achieve your goal.

If you make the most of the **wide range of services (https://intranet.birmingham.ac.uk/as/employability/careers/college/eps/index.aspx)** you will be able to develop your career from the moment you arrive.

### Destinations of Leavers from Higher Education (DLHE) 2011/12

The DLHE survey is conducted 6 months after graduation.




### Examples of occupations

- Electronic Engineer
- Applications Engineer
- Communications (Electronic) Engineer - Officer
- Optimisation Consultant
- Manufacturing Engineer
- Junior Business Analyst
- Test Engineer
- Service Specialist
- IT Analyst
- Development Engineer

### Further study - examples of courses

- MSc Project Management
- MSc Radio Frequency and Microwave Engineering
- MSc Electronic and Computer Engineering
- MSc Physics and Technology
- Postgraduate Certificate in Education - teaching
- AAT accountancy

Visit the **Careers section of the University website**

**(https://intranet.birmingham.ac.uk/as/employability/careers/college/eps.aspx)** for further information.

## Professional accreditation

Application will be made to the Institute of Engineering and Technology (IET) for accreditation of the programme for the education of Chartered Engineers

Additional accreditation **No**

MEng (Hons) Electrical and Railway Engineering
Full time

To see more details and compare with other courses

Visit UNISTATS

Official data collected by HEFCE

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