Electrical Power Engineering with Industrial Project

MEng Honours

A world-class university in a world-famous city

UCAS code H622
4 years

www.ncl.ac.uk/ug/H622
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Electrical Power Engineering with Industrial Project

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This four-year MEng degree in electrical power engineering integrates a year of Master's-level study and an industrial placement.

Your first three years mirror those of our Electrical Power Engineering BEng degree. You study a common curriculum providing core electronic engineering skills, followed by specialist topics such as:

- electrical machines
- renewable energy
- power electronics

In the fourth year, you complete an industrial placement in the UK or abroad, helping you boost your CV and develop industry contacts. You’ll expand your skills in areas such as:

- the design of modern electrical machines and drives
- distributed control systems

You complete design projects to showcase your skills to future employers. For example, developing a solar tracking system.

**Highlights of this degree**

**Professional accreditation**

We have a policy of seeking professional accreditation from the Institution of Engineering and Technology (IET). This means you can be assured of graduating with a degree that meets the standards set by the electrical and engineering profession.

**BEng or MEng?**

Both our BEng and MEng degrees provide a pathway to becoming a Chartered Engineer (CEng). This is one of the most recognised international engineering qualifications. Our Master of Engineering (MEng) degrees are considered a more direct route to becoming chartered as they completely satisfy the academic requirements to achieve this professional qualification. You do not undertake any further study on the route to chartered status. Our three-year BEng degrees can also lead to Chartered Engineer status later in your career, though you will need to undertake a further period of study, for example an accredited or approved Master’s degree, or appropriate further learning to Master’s level. A BEng is also suitable for international students who don’t need British Chartered Engineer status.

**Find out more**

Find out more about the benefits of becoming a Chartered Engineer on the Engineering Council’s website.

**Quality and Ranking**

Newcastle is ranked in the top 20 in the UK in *The Times/Sunday Times Good University Guide 2018 (Electrical and Electronic Engineering category)*.

We are in the top 10 for world-leading research in the UK with 90% of our research classed as world-leading or internationally excellent (Research Excellence Framework 2014).

**What you will study**

We cover core topics to enable you to understand the operation of simple electrical machines and electronic communications systems, such as:

- current flow in semiconductor devices
- electromagnetism
- digital electronics
- linear control theory

We complement this with teaching in how to analyse, design and construct electrical and electronic circuits to meet specific criteria.

We help you to develop your computing skills and engineering mathematics knowledge, with topics covering:

- extended C and assembly language programming techniques
- the design and testing of microprocessor systems
- the application of differential equations and linear algebra to describe complex engineering systems

You also take part in a series of group projects to develop your skills in soldering, wiring, circuit board construction and project planning such as a simple digital voltmeter, a power amplifier, a radio transmitter and receiver, and a mini-racing car that can find its own way round a track. You race the car and create a crowdfunding video on how the technology can be utilised in industry.

**Industrial project**

A major element of Stage 4 for MEng students is an industrial project.

This gives you valuable experience of:

- finding a job in a competitive market
- working on a real engineering project set by your host business
- developing your CV
- developing valuable industry contacts

Many students choose to do this at a local company, but you may undertake the project anywhere in the UK or in Europe.

Recent participating companies include:

- Tridonic
- Dyson
- Siemens
- Imagination Technologies

Find out more at www.ncl.ac.uk/tour
Recent projects have included:

- satellite electronic communication systems for mobile phones and navigation
- protocols for electronic drive control
- an electric bike
- underwater autonomous vehicle control
- connections for low carbon technology to the power grid

**Flexible degree structure**

We understand that you may not yet know which area of electrical and electronic engineering you want to specialise in.

We have designed our degrees so that all of our students study a common syllabus for the first two years. This gives you the chance to see where your interests lie.

It also means that you may transfer between any of our Electrical and Electronic Engineering degrees up to the end of the second year should your ideas change as your skills and knowledge develop.

Transfer from a BEng degree to a MEng degree is subject to you achieving the appropriate academic standard.

**Sponsorship / DTUS**

**Company sponsorship**

Our students are so sought after that many leading companies offer sponsorship and scholarships to our students (on a competitive basis) via the E3 Academy and UK Electronics Skills Foundation (UKESF).

We are one of only three university members of the E3 Academy, which provides scholarships and work experience placements to students of electrical engineering.

We are also a partner university in the UKESF, which also provides bursaries, work placements and mentoring.

**Defence Technical Undergraduate Scheme (DTUS)**

This degree is also approved by DTUS for entry to all technical corps.

DTUS is a Ministry of Defence sponsorship programme for students who wish to join the Royal Navy, British Army, RAF, or Defence Engineering and Science Group (DESG) as technical officers after graduation.

Find out more on the DTUS programme.

**Support**

You’ll have access to a personal tutor throughout your degree – an academic member of staff who can help with academic and personal issues.

**Peer mentors** will help you in your first year. They are fellow students who can help you settle in and answer any questions you have.

**Social activities**

There’s a highly active student-led society, ShockSoc, which organises regular social events.

You will have access to state-of-the-art teaching laboratories. These include teaching laboratories for electronics, electrical power/motors, an Intelligent Sensing Lab and smart grids.

You will also benefit from machines laboratory and class 100 clean rooms for the fabrication of semiconductor devices.

**Facilities and support**

The School of Engineering is located in Merz Court in the heart of our city-centre campus.

Continued investment in our undergraduate teaching laboratories means that you can learn in excellent facilities – described as the best in Europe by leading industrial visitors.

We have dedicated computing facilities with industrially relevant software and hardware. These are refreshed every two years so you are always working with the most up-to-date equipment available.
Course Details

Modules for 2017 entry

Please note
The module and/or programme information below is for 2017 entry. Modules may be amended on an annual basis to take account of changing staff expertise, developments in the discipline, the requirements of external bodies and partners, and student feedback. Modules/programme information for 2018 entry will be published here as soon as it is available (end of May 2018).

Our degrees are divided into Stages. Each Stage lasts for an academic year and you need to complete modules totalling 120 credits by the end of each Stage.

Stage 1
Compulsory modules
EEE1001 Fields, Materials and Devices
EEE1002 Electronics I
EEE1003 Circuit Theory
EEE1005 Signals and Communications I
EEE1008 C Programming
EEE1009 Communication Skills and Innovation
ENG1001 Engineering Mathematics I

Stage 2
Compulsory modules
EEE2007 Computer Systems and Microprocessors
EEE2008 Project and Professional Issues
EEE2009 Signals and Communications II
EEE2012 Control and Electrical Machines
EEE2013 Digital Electronics
EEE2014 Semiconductor Devices and Analogue Electronics
EEE2015 Electromagnetic Fields and Waves

Stage 3
Compulsory modules
ENG2001 Accounting, Finance and Law for Engineers

Stage 3

EEE3001 Linear Controller Design and State Space Analysis
EEE3002 Electrical Machines
EEE3011 Electric Drives
EEE3021 Renewable Energy Systems and Smart Grids

Optional modules
You will take one of the following modules:
EEE8108 Individual Project and Dissertation (MEng)
EEE8109 Individual Project and Dissertation (MEng)
EEE8110 Individual Project and Dissertation (MEng)
And also one of these modules:
EEE8111 Study Project
EEE8112 Study Project

You also take 20 credits from the following list:
EEE3003 Introduction to the Basics of Modern Power Electronics*
EEE3004 Digital Signal Processing
EEE3005 Analogue Systems
EEE3006 RF Engineering
EEE3007 Design and Test of Digital Systems
EEE3008 Industrial Automation and Robotics*
EEE3009 Real Time and Embedded Systems
EEE3012 Integrated Circuit Design
EEE3013 Image Processing and Machine Vision
EEE3014 Power System Operation*
EEE3015 Telecommunication Networks
EEE3016 Photonics
EEE3018 Digital Control Systems*
EEE3020 Electronic Devices

*indicates recommended modules

Work placement (optional)
You can apply to spend 9 to 12 months on an optional work placement between Stages 3 and 4. You can apply to spend your placement year with any organisation and will receive University support to do so. It will extend your degree by a year and is subject to availability. Find out more about Work Placements.

Stage 4

Compulsory modules
EEE8113 Group Design Project
EEE8114 Industrial Project

You will also take the following specialist modules:
EEE8102 Design of Modern Electrical Machines and Drives
EEE8105 Distributed Control Systems (MEng)

Optional modules
You will take one of the following modules:
EEE8106 Extended Course Work on Applications and Design
EEE8107 Extended Course Work on Applications and Design

You will also select 20 credits of the Stage 3 optional modules listed above, and the following:
Stage 4

SPG8501  Ideas for Business Enterprise for Postgraduates in Science, Agriculture and Engineering

Teaching and assessment

Study at the cutting edge

Our degrees are informed by the research discoveries of our expert researchers - we have four leading research groups. You learn from leading experts in the field and study at the cutting-edge of the discipline. Our research-informed teaching ensures you develop knowledge of current and future breakthrough technologies.

Teaching methods

You will work on real-world engineering projects set by companies with which we have strong links, applying your skills to real challenges faced by potential employers. Contact hours are made up of lectures, laboratory sessions and tutorials. Up to 10 hours will consist of practical sessions in our laboratories where you will take part in experiments and project work.

Assessment methods

Assessment is by in-course assessment such as laboratory reports and tutorial exercises, or by examinations.

Find out more

Visit our Teaching and Learning pages to read about the outstanding learning experience available to all students at Newcastle University.

Entry Requirements

All candidates are considered on an individual basis.

If your qualifications are not listed here, please see our additional entry requirements web pages to find out which other qualifications are considered.

The entrance requirements below apply to 2018 entry.

Advice on Maths and Science requirements

If you don’t think you will have the exact Mathematics and Science qualifications referred to in our entry requirements by the time you need them, you may not be sure what to do. We hope that the following will help.

- If you already have, or are taking, the A level (or equivalent) Maths and Science qualifications specified in our entry requirements, you should apply for stage 1 (First Year) entry of the engineering degree course in which you are interested
- If you have a Maths qualification but will not have it at A level (or equivalent) when you start your degree, you should apply for the relevant degree with Foundation Year. We may give you the opportunity to take the Newcastle University Pre-Entry Maths Course* and the option to start in First Year if we think that this will be the best route for you
- If you have A level Maths (or equivalent) already but not at the required grade, you should contact us for advice. We may decide that you could be considered for Foundation Year entry, or it may be that our engineering courses are not the best options for you
- If you will not have the equivalent of an A level in the Science subject (if any) required, you should apply for the relevant degree with Foundation Year.

If you are still not sure, do not worry. Whatever you apply for, our Admissions Tutors will help you decide which is the best route for you. They may therefore make you an offer for a different course (e.g. Foundation Year entry instead of First Year entry) from the one you apply for.

("The Newcastle University Pre-Entry Maths Course aims to provide the requisite mathematical skills and concepts needed on our engineering degree courses and to prepare students for the modes of learning they will encounter. The materials for the course are delivered electronically and include opportunities to practise your skills. You study the materials in your own time and, when you are ready, you book your exam with the Engineering School to which you have applied. A fee of £150 is payable at the time of booking the exam or shortly before the date set for examination.

A Levels

AAA including Mathematics and one of Physics, Chemistry or Electronics and excluding General Studies and Critical Thinking. For Biology, Chemistry and Physics A levels, we require a pass in the practical element. GCSE Physics or Dual Award Science (minimum grade B or 6) required if Physics is not offered at a higher level.

Scottish Qualifications

AAA at Advanced Higher, including Mathematics and at least one of Physics or Chemistry. Physics required at Higher Grade B if not offered at Advanced Higher. Two Highers at the required grade (in different subjects to those offered at Advanced Higher) may replace a third Advanced Higher.

Scottish qualifications can be taken in more than one sitting.

International Baccalaureate

37 points with Mathematics at Higher Level grade 6 or above and at least one of Physics or Chemistry. Physics required at Standard Level grade 5 or above if not offered at Higher Level.

Irish Leaving Certificate

Candidates will normally only be considered for foundation year entry. All applications will be considered on an individual basis.

(*)The Newcastle University Pre-Entry Maths Course aims to provide the requisite mathematical skills and concepts needed on our engineering degree courses and to prepare students for the modes of learning they will encounter. The materials for the course are delivered electronically and include opportunities to practise your skills. You study the materials in your own time and, when you are ready, you book your exam with the Engineering School to which you have applied. A fee of £150 is payable at the time of booking the exam or shortly before the date set for examination.)
Access Qualifications
Access qualifications will only be considered for BEng registration in the first instance. Students demonstrating sufficient levels of achievement on the programme may be permitted to transfer registration to the MEng in Stage 2.

Pearson BTEC Level 3 National Extended Diploma/OCR Cambridge Technical Level 3 Extended Diploma
Candidates will normally only be considered for entry to BEng. Students demonstrating sufficient levels of achievement on the programme may be permitted to transfer registration to the MEng in Stage 2.

Cambridge Pre-U
D3, D3, D3 in Principal Subjects including Mathematics and at least one of Physics or Chemistry. GCSE Physics or Dual Award Science (minimum grade B or 6) required if Physics is not offered at a higher level.

Extended Project Qualification
If you offer the Level 3 Extended Project Qualification, we will vary our offer to recognise this. Your project can be in any topic.

PARTNERS - A Levels
ABB including Mathematics and at least one of Physics, Chemistry or Electronics and excluding General Studies and Critical Thinking. For Biology, Chemistry and Physics A levels, we require a pass in the practical element. GCSE Physics or Dual Award Science (minimum grade B or 6) required if Physics is not offered at a higher level.

The PARTNERS Programme is Newcastle University’s supported entry route for students from schools and colleges in England. Find out more about the PARTNERS Programme.

PARTNERS - Pearson BTEC Level 3 National Extended Diploma/OCR Cambridge Technical Level 3 Extended Diploma
Candidates will normally only be considered for entry to BEng. Students demonstrating sufficient levels of achievement on the programme may be permitted to transfer registration to the MEng in Stage 2.

The PARTNERS Programme is Newcastle University’s supported entry route for students from schools and colleges in England. Find out more about the PARTNERS Programme.

Foundation Year
If you don’t have the right mathematics and/or science qualifications for direct entry, you can take an Electrical and Electronic Engineering foundation year:
- Electrical and Electronic Engineering with Foundation Year BEng Honours (H604)
- Electrical and Electronic Engineering with Foundation Year MEng Honours (H606)
This will provide you with the knowledge you need to progress to one of our three- or four-year Electrical and Electronic Engineering degrees.

English Language Requirements
Applicants whose first language is not English require a minimum score of IELTS 6.5 or equivalent.

If you need help to meet our English Language requirements, we can provide support with extra tuition.

Read more about UK visas and immigration requirements.

International Foundation Programmes
If you are an international student and you do not meet the academic and English language requirements specified above, you should consider a preparation course at INTO Newcastle University, which will help to prepare you for study on this degree course.

INTO Newcastle University is based on the University campus and offers a range of courses including the International Foundation in Physical Sciences and Engineering.

Other International Qualifications
ABB at A level is typically the minimum required for entry to an undergraduate course. You can check the equivalent grades for qualifications offered in your country.

Undergraduate Admissions Policy
See our Admissions Policy 2017 Entry (PDF: 109 KB).

See further policies related to admission.

Careers

Electrical Power Engineering careers
In addition to the technical and practical expertise that you will gain from studying electrical, electronic and computer engineering, you will discover that our degrees are designed to provide you with opportunities to learn and develop transferable skills, such as analytical and problem-solving, project-working both as part of a team and on your own, communicating with others, planning and time management, and of course computer literacy, all of which are vital for the employment market.

Our recent graduates report earning between £23,000 and £26,000 per year (Destinations of Leavers from Higher Education survey, 2014–15). You can expect this to increase significantly over the course of your career. Within six months of graduating, 97% of our graduates were in employment or further study.

Electrical and electronic engineers are in demand with employers within the UK and overseas. Within electrical engineering the main employment areas include electrical supply and distribution, power systems, transport and electrical machinery.
Opportunities within electronics exist in electronic circuit design, instrumentation and control for safety on industrial plants, e.g. manufacturing, oil and gas, pharmaceutical, telecommunications, mobile technology, automotive and aviation electronics and medical systems. Some graduates enter a related field as IT professionals. Popular areas outside of engineering include commercial, industrial and public sector management.

Graduate engineering posts will usually give you the opportunity to work towards incorporated or chartered engineer status.

Electrical and electronic engineers are expected to make a quick and useful contribution at work, so it may not be enough to rely on your technical expertise. Relevant vacation work experience and industry placements will greatly increase your level of employability.

Find out more about the career options for Electrical and Electronic Engineering from Prospects: The UK’s Official Careers Website.

What our graduates go on to do: employment and further study choices

See what our recent graduates went on to do and view graduate destinations statistics. These statistics are based on what graduates were doing on a specific date, approximately six months after graduation. The most recent data available is for graduates who completed their course in 2014/15.

The destination data is available in varying levels, beginning with the University and moving through Faculty and School down to individual course reports. This final level may give you some useful ideas about possible options after your course or a course you are considering.

Careers and employability at Newcastle

Newcastle University consistently has one of the best records for graduate employment in the UK.

94% of our 2014/15 UK/EU graduates progressed to employment or further study within six months of graduating.

Of our graduates who entered employment 85% were in a professional or managerial position.

We provide an extensive range of opportunities to all students through an initiative called ncl+. This enables you to develop personal, employability and enterprise skills and to give you the edge in the employment market after you graduate.

Our award-winning Careers Service is one of the largest and best in the country, and we have strong links with employers.

Fees & Funding

Tuition Fees (UK students)
2018 entry*: Tuition fees for 2018-19 have not yet been confirmed. Some of our degrees involve additional costs which are not covered by your tuition fees.

2017 entry*: £9,250 in 2017-18 For programmes where you can spend a year on a work placement or studying abroad, you will receive a significant fee reduction for that year. Some of our degrees involve additional costs which are not covered by your tuition fees.*Please note: The maximum fee that we are permitted to charge for UK students is set by the UK government. As a general principle, you should expect the tuition fee to increase in each subsequent academic year of your course, subject to government regulations on fee increases and in line with inflation.

See more information on all aspects of student finance relating to Newcastle University.

Tuition Fees (EU students)
2018 entry*: Tuition fees for 2018-19 have not yet been confirmed. EU students starting at Newcastle in 2018 will pay the UK (Home) tuition fee for the full duration of their course. Some of our degrees involve additional costs which are not covered by your tuition fees.

2017 entry*: £9,250 in 2017-18 EU students starting at Newcastle in 2017 will pay the UK (Home) tuition fee for the full duration of their course. For programmes where you can spend a year on a work placement or studying abroad, you will receive a significant fee reduction for that year. Some of our degrees involve additional costs which are not covered by your tuition fees.

*Please note: The maximum fee that we are permitted to charge for UK (Home) students commencing studies in 2017-18 or 2018-19 is set by the UK government. As a general principle, you should expect the tuition fee to increase in each subsequent academic year of your course, subject to government regulations on fee increases and in line with inflation.

See more information on all aspects of student finance relating to Newcastle University.
Tuition Fees (International students)

2018 entry:
£21,000 per year
You will be charged tuition fees for each year of your degree programme (unless you are on a shorter exchange programme). If you spend a year on placement or studying abroad as part of your degree you may pay a reduced fee for that year.
Please note that the tuition fee amount you will pay may increase slightly year on year as a result of inflation.
See more information on all aspects of student finance relating to Newcastle University.

Scholarships and Financial Support (UK students)
You may be eligible for one of a range of Newcastle University Scholarships in addition to government financial support.
Newcastle University Scholarships
Government financial support
There are also scholarships available for particular subjects.

Scholarships and Financial Support (EU students)
You may be eligible for one of a range of Newcastle University Scholarships in addition to government financial support.
Newcastle University Scholarships
Government financial support
There are also scholarships available for particular subjects.

Scholarships and Financial Support (International students)
You may be eligible for an International Family Discount (IFD).
There are also scholarships available for particular subjects.

To apply for undergraduate study at Newcastle you must use the online application system managed by the Universities and Colleges Admissions Service (UCAS).

UCAS codes for Newcastle University
- institution name - NEWC
- institution code - N21

UCAS buzzword
Ask your teacher or adviser from your school or college for the UCAS buzzword. You need the buzzword when you register on the Apply system. This makes it clear which school or college you are applying from.
All UK schools and colleges and a small number of EU and international establishments are registered with UCAS.
If you are applying independently, or are applying from a school or college which is not registered to manage applications, you will still use the Apply system. You will not need a buzzword.

Making your application
On the UCAS website you can also find out more about:
- application deadlines and other important dates
- offers and tracking your application

Application decisions and enquiries
Find out more about our admissions process and who to contact if you need help with your application.

Applying to Newcastle University through UCAS

Newcastle's iconic bridges at night.