

UNIVERSITY OF
EXETER

ENGINEERING

UNDERGRADUATE SUBJECT BROCHURE 2018



KEY INFORMATION AND ENTRY REQUIREMENTS

PENRYN CAMPUS, CORNWALL	UCAS CODE	TYPICAL OFFER	
MEng Single Honours Renewable Energy Engineering	H804	AAB-BBB; IB: 34-30	C
Renewable Energy Engineering with Industrial Experience	H805	AAB-BBB; IB: 34-30	C
Mining Engineering	J113	AAB-ABB; IB: 34-32	C
Mining Engineering with Industrial Experience	J114	AAB-ABB; IB: 34-32	C
BEng Single Honours Renewable Energy Engineering	H803	AAB-BBB; IB: 34-30	C
Mining Engineering	J110	AAB-BBB; IB: 34-30	C
BSc Single Honours Renewable Energy	F802	AAB-BBB; IB: 34-30	C

For further details on all our Renewable Energy entry requirements, please see www.exeter.ac.uk/ug/energy

For further details on all our Mining Engineering entry requirements, please see www.exeter.ac.uk/ug/mining

STREATHAM CAMPUS, EXETER	UCAS CODE	TYPICAL OFFER	
MEng Single Honours Civil Engineering	H202	AAA-ABB; IB: 36-32	E
Civil Engineering with Industrial Experience	H201	AAA-ABB; IB: 36-32	E
Civil Engineering with International Study	H207	AAA-ABB; IB: 36-32	E
Civil and Environmental Engineering	H290	AAA-ABB; IB: 36-32	E
Civil and Environmental Engineering with Industrial Experience	H291	AAA-ABB; IB: 36-32	E
Civil and Environmental Engineering with International Study	H292	AAA-ABB; IB: 36-32	E
Electronic Engineering	H601	AAA-ABB; IB: 36-32	E
Electronic Engineering with Industrial Experience	HPD0	AAA-ABB; IB: 36-32	E
Electronic Engineering with International Study	H1C0	AAA-ABB; IB: 36-32	E
Electronic Engineering and Computer Science	HG64	AAA-ABB; IB: 36-32	E
Electronic Engineering and Computer Science with Industrial Experience	IH61	AAA-ABB; IB: 36-32	E
Electronic Engineering and Computer Science with International Study	IH16	AAA-ABB; IB: 36-32	E
Engineering and Management	H704	AAA-ABB; IB: 36-32	E

STREATHAM CAMPUS, EXETER	UCAS CODE	TYPICAL OFFER	
Engineering and Management with Industrial Experience	NH12	AAA-ABB; IB: 36-32	E
Engineering and Management with International Study	HN1F	AAA-ABB; IB: 36-32	E
Materials Engineering	H191	AAA-ABB; IB: 36-32	E
Materials Engineering with Industrial Experience	H196	AAA-ABB; IB: 36-32	E
Materials Engineering with International Study	H198	AAA-ABB; IB: 36-32	E
Mechanical Engineering	H302	AAA-ABB; IB: 36-32	E
Mechanical Engineering with Industrial Experience	H303	AAA-ABB; IB: 36-32	E
Mechanical Engineering with International Study	H309	AAA-ABB; IB: 36-32	E
Engineering	H104	AAA-ABB; IB: 36-32	E
BEng Single Honours Civil Engineering	H200	AAA-ABB; IB: 36-32	E
Electronic Engineering	H610	AAA-ABB; IB: 36-32	E
Electronic Engineering and Computer Science	HG6K	AAA-ABB; IB: 36-32	E
Engineering and Management	HN12	AAA-ABB; IB: 36-32	E
Materials Engineering	H190	AAA-ABB; IB: 36-32	E
Mechanical Engineering	H300	AAA-ABB; IB: 36-32	E
Engineering	H101	AAA-ABB; IB: 36-32	E

For further details on all our entry requirements, please see www.exeter.ac.uk/ug/engineering

We strongly advise that you check the full entry requirements before attending an Open Day or making your application. Some programmes require prior study of specific subjects and may also have minimum grade requirements at GCSE or equivalent, particularly in English Language and Mathematics.



PENRYN CAMPUS, CORNWALL

Website: www.exeter.ac.uk/ug/mining

Website: www.exeter.ac.uk/ug/energy

Email: cornwall@exeter.ac.uk

Phone: +44 (0)1326 371801



STREATHAM CAMPUS, EXETER

Website: www.exeter.ac.uk/ug/engineering

Email: engineering@exeter.ac.uk

Phone: +44 (0)1392 724061

WHICH ENGINEERING PROGRAMME IS FOR YOU?

International students

If you are an international student you should consult our general and subject-specific entry requirements information for A levels and the International Baccalaureate, but the University also recognises a wide range of international qualifications. You can find further information about academic and English language entry requirements at www.exeter.ac.uk/ug/international

For information on the application, decision, offer and confirmation process, please visit www.exeter.ac.uk/ug/applications



The Athena SWAN Charter recognises and celebrates good employment practice for women working in Science, Technology, Engineering, Mathematics and Medicine (STEMM) in higher education and research. We believe it is vitally important that women are adequately represented in what has traditionally been a male-dominated area and we strive for equality. The University is proud to have held a Bronze institutional award since 2011, and we were awarded a Bronze award at departmental level in 2015. Find out more at www.exeter.ac.uk/engineering/about/swan

At the University of Exeter, we have exceptional expertise in a wide range of engineering disciplines and our degree programmes offer a substantial amount of choice, so they can easily be tailored to meet your needs, engineering interests and career aspirations. We offer Engineering degrees in the following subject areas:

- Civil Engineering
- Electronic Engineering
- Renewable Energy
- Engineering and Management
- General Engineering
- Materials Engineering
- Mechanical Engineering
- Mining Engineering

Our Renewable Energy and Mining Engineering courses are taught at our Penryn Campus, near Falmouth in Cornwall. Being based in such a beautiful part of the country means our students are able to take advantage of opportunities the Cornish landscape provides for the detailed study of these fascinating subjects. For example, Cornwall has invested significantly in exploring and promoting renewable energy resources and has a rich mining history and culture.

Our Mining Engineering programmes are taught by the University's Camborne School of Mines (CSM), which has 130 years' experience in training mining engineers and an excellent international reputation, with graduates working all around the world. Meanwhile, our Renewable Energy programmes are designed for individuals seeking a professional role in the rapidly expanding and strategically important energy sector.

Our Civil Engineering, Electronic Engineering, Engineering and Management, General Engineering, Materials Engineering and Mechanical Engineering programmes are taught at our Streatham Campus in Exeter. These degrees provide you with a thorough grounding in the principles

underlying all branches of engineering and then train you in specialist disciplines, depending on your personal interests and aspirations.

Core first year

During the first year of each of our Streatham Campus based Engineering programmes, you will study a range of subjects fundamental to all branches of engineering, providing a broad-based introduction to the programmes on offer. This will give you experience of the multidisciplinary nature of engineering practice and the confidence to work across the various engineering disciplines, while offering the flexibility to choose between the specialist disciplines from the second year.

Industrial experience and international study

Engineering is an international profession and many graduates will work overseas for part of their careers. Many of our programmes provide you with the opportunity to spend half a year during your third year at one of our partner institutions in Europe under the Erasmus exchange scheme, or spend a year further afield via international exchange agreements as a part of one of our MEng programmes.

Another option is to take an industrial placement in the vacation prior to the start of your third year (six to 10 weeks, subject to suitable arrangements), which will be followed by an extended individual project during your third year, specifically designed around your industrial placement. The combined placement and project allows you to undertake paid vacation work while gaining highly relevant industrial experience. We support our students through this process, however you will be encouraged to use your own initiative to secure work for future practice.

You can take either the international study version or the industrial experience version on selected MEng programmes.

RENEWABLE ENERGY IN CORNWALL

92% of research classified as world-leading or internationally excellent¹

Strong emphasis on fieldwork within professional context

Our degrees are accredited for progression to Chartered Engineer (CEng) and Incorporated Engineer (IEng) by the Energy Institute

Expertise in energy policy, marine renewables, bio-fuels, electrical power and networks, wind, photovoltaic and thermal technologies

Industrial engagement from many of the key companies in the business



Renewable energy is produced from sources that are replenished as they are used, such as the wind, the sun, sustainably grown crops, and water flowing in streams, rivers and seas. In order to harness these sources and reduce dependency on finite reserves of oil, coal and gas, renewable energy professionals need to understand the scientific principles of renewable energy technology and have the management skills to ensure that UK and international carbon emission reduction targets are met. It is also of great importance that they embody core engineering knowledge, as this underpins construction and operation in industry. Understanding the environments relationship with society, business and technology is also of paramount importance as this has a direct influence on the advancement of the renewable energy sector.

The BEng/MEng programmes are tailored to students who want to focus on an engineering career meeting the needs of the renewable energy sector, whilst providing essential business and managerial skills.

The BSc programme remains centred in engineering but has a broader remit tailored towards consultancy or policy opportunities.

Cornwall has significant and diverse renewable energy resources and has led the UK in the development and exploitation of wind and solar power. At the Penryn Campus, we have an internationally leading marine energy department, a new solar energy group and an internationally active energy policy group.

Our Renewable Energy degree programmes are designed to ensure that our students have the correct skills, knowledge and system requirements for a prosperous career in renewable energy sector. We have collaborated with a variety of companies on research projects, which in turn have influenced our programmes as not only are they industry-relevant, but they also have a substantial backing for the sector.

Our facilities and student resources include an engineering teaching laboratory, and industry standard IT and software. Local commercial renewable energy developments are plentiful – recent developments include new wind farms, repowered and scaled-up older wind farms, the UK's first solar PV farms and a world-leading marine energy development. Our new Environment and Sustainability Institute and Science and Engineering Support Facility buildings are amongst the most sustainable in the country meeting the highest of BREEAM standards. This environment, together with day field trips in Year 1 and 2 and a two to three month work placement, provides a practical and an engaging context that complements the taught material.

We have well established links with industry leading companies, including E-On, DNV or GL, Bill Dunster Architects, Wardell Armstrong International, REG Windpower Ltd and Mojo Maritime. Exemplifying this, the majority of research projects are in collaboration with industry partners and many student projects tackle industry issues. The teaching features real-world applications such as energy management solutions for businesses, direct access to wind data acquisition systems for two 850kW wind turbines just 500 metres from the campus and numerous company visits.

¹ Research Excellence Framework 2014 based on the percentage of research categorised as 4* and 3*. Energy Engineering is returned to the General Engineering Unit of Assessment

Single Honours

MEng/BEng Renewable Energy Engineering

This is a practical, vocational programme, focusing on clean and renewable energy technologies, for individuals seeking a professional technical and engineering role in the rapidly expanding and strategically important energy sector. You will gain a high level of technical and ethical competence, extend your understanding of commercial, economic and business issues and develop a professional outlook.

Year 1 The initial focus is on engineering fundamentals including mathematics, mechanical and electrical engineering modules as well as physics and thermodynamics. Specific computer skills are covered as well as a broad introduction to renewable energy systems and environmental management in preparation for more advanced modules later in the programme.

Year 2 Core engineering modules continue the development of the key disciplines with further development of essential computational skills and additional modules on clean energy systems. Local field trips and practical experience give students an applied knowledge in clean and renewable energy techniques as well as developing report writing and team working skills.

Year 3 An undergraduate dissertation forms an important element of the work in this year, allowing students to explore areas of particular interest and develop research, analytical and writing skills. The *Third Year Field Trip* and a design module will allow students to obtain practical engineering skills. During this year students also have the opportunity to choose a minimum of four engineering modules relevant to their career development.

Building on the core engineering of Years 1 and 2, this year offers the opportunity to dive into specialist renewable energy modules such as solar and wind power, marine renewables, renewable heat technologies and energy storage. A further two optional modules can be chosen from our wider selection to allow students to shape learning to their specific interests across a range of topics, including environmental impact, energy policy, ethics and life cycle analysis subjects or engineering subjects.

Year 4 (MEng only) The fourth year of study is focused on deepening acquired skills through a series of advanced modules and project work. We will provide support for you to find an industrial placement or academic project. The placement will enable you to

work within a company or a structured research environment which is active in renewable or clean energy. The group design project will provide an opportunity to help you further develop team-working and R&D skills. Alongside these activities, optional modules will deepen your understanding of advanced engineering aspects of Advanced Wind Turbine Design; Offshore Energy Engineering; Solar Energy Research and Development; Future Energy Storage and Distribution; and Advanced Electronics and Electrical Engineering. The fourth year is the exciting culmination and application of the full range of the engineering principles and energy technology specialities studied in the previous years.

Industrial Experience

The Renewable Energy with Industrial Experience programme includes an industrial placement prior to the start of your third year, followed by a research project based on your placement experience. Your placement will be spent working in an appropriate business or industry related to energy engineering, and you will benefit from our established connections with local, national and multinational organisations.

We find that our students gain valuable experience from working in industry. As well as increasing their first-hand knowledge, they also improve personal and transferable skills, make new contacts and enhance their employability.

BSc Renewable Energy

Linked to the BEng Renewable Energy Engineering programme, the BSc Renewable Energy is tailored to students who wish to have more of a focus on energy policy or the environmental and socio-economic impacts of clean and renewable technologies. For example you may aspire to work in a professional consultancy or management role in the rapidly expanding and strategically important renewable energy sector.

Year 1 First term modules concentrate on developing your core engineering and mathematical skills while introducing the diverse range of renewable energy sources, their extents and exploitation methods. In the second term you will study the engineering sciences governing both natural processes and power conversion technology, as well as project management and accounting.

Year 2 Second year modules provide greater depth of training in the socio-economic subjects and wider climate issues. Study of essential engineering disciplines that underlie the application of renewable energy technology continues along with energy

policy and management. In the summer vacation you may carry out a minimum six week industrial placement.

Year 3 Third year modules are designed to build on the previous two years to enable study of specialist areas in order to gain deep knowledge, understanding and ability. Students have the opportunity to choose three or four modules from a range of options designed to develop the skills for a broader socio-economic renewable energy career. Topics include environmental impact, low carbon heat and life cycle analysis subjects. A further three or four modules are selected from a wider range of technically orientated modules which include resource assessment, power conversion design, and performance monitoring. In addition, a design module will be offered to students to allow them to obtain practical engineering skills.

Throughout the third year you will work on an individual research project in your area of interest, under the supervision of a member of academic staff. Through your selection of options, choice of dissertation topic and choice of vacation placement, you are in control of the content of over half of your third year programme.

Programme accreditation

The current programmes have been accredited by the Energy Institute for progression to Incorporated Engineer (BEng and BSc) or Chartered Engineer (MEng) status.

Module choices made during the third year of the BSc Renewable Energy will determine whether the criteria for progression towards Incorporated Engineer or Chartered Energy Manager has been met.

LEARNING AND TEACHING

Formal teaching and learning methods vary between modules but typically include lectures, small group laboratory classes, practical work, seminars, tutorials, computer-based learning packages and residential or one day field-based activities. You will typically have 18–20 hours of formal contact time per week. You will be expected to spend roughly the same amount of time in independent learning and some work will be expected during the vacations.

All modules are also supported by interactive computer-based approaches to learning through our virtual learning environment where the details of all modules are stored in an easily navigable website. Students can access detailed information about modules and learning outcomes and interact through activities such as the discussion forums.

Facilities

The campus is equipped with the latest facilities for teaching and research. Our teaching laboratory contains technology for the study of biomass heating; water flows; hydroelectric turbines; photovoltaics; solar thermal; fuel cells; hydraulic systems; wind power and electronics; and electrical power systems.

The lab is also equipped with industry-standard software for the analysis of flows of liquids, gases (Ansys), computer aided design (Solidworks and AutoCAD), Geographical Information Systems (Mapinfo and ArcGIS), wind energy resource assessment (Windfarmer, Wind Farm), and wind turbine design (Bladed) and photovoltaic system modelling (PVsyst). As an undergraduate student, you will be taught to use all of these programmes and facilities.

A variety of devices producing renewable energy exist around the campus including three solar powered buildings: Daphne du Maurier; Science and Engineering Research Support Facility; and the Performance Centre, plus a 3 x 1MW fully condensing gas boiler and a ground source heat pump system. As part of the continuing expansion of the campus, the University has recently developed the Environment and Sustainability Institute (ESI). The ESI opened in late 2012 and employs both solar and wind energy technology as well as benefiting from state-of-the-art energy efficiency. The new Science and Engineering

Research Support Facility (SERSF) is home to laboratories for offshore renewables and will enable an expansion of the research led by the Marine Renewables team. The campus is 500m from the Roskrow Barton commercial wind development that comprises 2 x 850kW, V52-850 Vestas wind turbines.

Research-inspired teaching

We believe that every student benefits from being part of a culture that is inspired by research and taught by experts. With groups focusing on offshore renewable energy, solar technologies, energy storage, and power electronics, we participate in numerous UK, EU and international projects. We are a lead institution in PRIMaRE (Peninsula Research in Marine Renewable Energy), a multi-centre research organisation, specialising in all elements of research concerning marine renewable energy sources. This includes their operation, technology development, their environmental and ecological impacts and their socio-economic impacts. Policy research aims to develop methods through which the growth of renewable energy can be enhanced further, as well as methods to ensure that it is properly regulated. We actively collaborate with other universities within the UK and overseas, notably to examine the potential and cost of increased use of renewable heat sources. We are committed to a focus on examining the development of industrial capacity related to new clean energy technologies.

Fieldwork, tours and placements

Throughout the programmes you will experience a range of renewable energy technologies. This will include trips to renewable energy facilities such as Goonhilly wind farm, local solar PV farms, micro and large hydro, landfill gas production, large-scale gas generation and other relevant installations and may include events like public planning meetings or energy use assessments of public or private buildings as opportunities become available. Our aim is to get out and see real world technology or events whenever we can.

In the summer vacation between your second and third year, you may carry out a minimum six-week industrial placement. The onus is on

you to select the area in which you wish to work and to find a placement, although we can help by providing contact details and suggesting companies which suit your interests. Companies with close ties to the department also provide placements for a number of students.

In the third year, the residential field trip will entail a field-based renewable energy technical resource assessment exercise. Working as a project team you will focus on assessing the technical and economic potential of appropriate renewable energy technologies. Student teams have carried out assessments in Jersey, Guernsey, Tenerife, Gran Canaria and other locations, and presented to expert teams of academics and civil servants, including an Energy Minister.

Assessment

Assessment methods vary between modules, but usually combine exams and coursework (which might include practical laboratory work, professional posters, group exercises, essays or verbal presentations). Your first year does not count towards your final degree classification, but you do have to pass it in order to progress. If you study a three-year programme, assessments in the final two years both count towards your classification, and if you study a four-year programme then the final three years all contribute.

Academic support

The Penryn Campus offers a friendly, supportive community, where staff and students get to know each other well. All students have a personal tutor who is a member of academic staff with whom you can discuss personal and academic issues. There are also a number of services on campus where you can get additional advice and information. You can find further information about all these services in the University's undergraduate prospectus or online at www.exeter.ac.uk/undergraduate

Scholarships

For the latest information about our undergraduate scholarships, please visit www.exeter.ac.uk/emps/undergraduate/funding



My decision to study at the Penryn Campus was based entirely on my choice of course. I knew I wanted to study renewable energy from year one, rather than it be an additional module to a degree in a specific engineering discipline. The Renewable Energy department is full of very knowledgeable staff, all of whom have either worked or conducted research in the field. We go on a number of field trips each year to local (and not so local) wind farms, solar farms and power stations, which help to solidify what we have learnt in lectures. We also do hands-on projects, such as building a hydro turbine from scrap materials with prizes for whoever generates the most power!



Rosie Stewart,
MEng Renewable Energy, Penryn Campus

CAREERS

These degrees have been designed and influenced by working professionals within the renewable energy sector, ensuring you will have the best possible knowledge and skills to enjoy a successful career in your chosen field. A very high proportion of our graduates find employment in the renewable energy sector or are studying for a higher degree.

All students receive free membership of the Energy Institute for their period of study and graduates are encouraged to upgrade their membership of the Energy Institute from Student to Graduate, which is the first step in working towards formal recognition of their professional status as a Chartered Engineer (CEng) or Incorporated Engineer (IEng).

Many students from the department take part in the Exeter Award and the Exeter Leaders Award. These schemes encourage you to participate in employability related workshops, skills events, volunteering and employment which will contribute to your career decision-making skills and success in the employment market.

Examples of the destinations of our recent graduates:

Employers

EDF Energy // Mott MacDonald // Grontmij // Photon Design // Clean Earth Energy // Babcock International // Ecotricity // Cornwall Council // Rame Energy // LessCO2 Ltd // B9 Design // Kiwi Power Ltd // Earthstream

Occupations

Graduate Carbon Management Consultant // Graduate Energy Analyst // Engineer // Technical Consultant // Solar Installer // Energy and Compliance Analyst // Renewables Development Officer // Wind Turbine Field Service Engineer

Examples of further study followed by our graduates:

- Masters by Research Renewable Energy
- MPhil Renewable Energy
- PhD Renewable Energy
- EngD Offshore Renewable Energy

I decided to study renewable energy at the Penryn Campus because the course here is very diverse and industry-based. There are a lot of fascinating modules and very good post-graduation employability rates. The small size of the community here means that lecturers know all of the students' faces and they always have time to clarify any aspects of a module that may be confusing us. There are also a lot of research-based teaching staff and we often have the chance to attend seminars where they give presentations on how their work is progressing.

Jason Rive,
MEng Renewable Energy, Penryn Campus



RENEWABLE ENERGY MODULES

For up-to-date details of all our modules, please see www.exeter.ac.uk/ug/energy

Please note that modules are subject to change and timetabling constraints and that not all modules are available every year.

MEng/BEng Renewable Energy Engineering

Year 1

Applied Computing for Energy Studies	An introduction to programming, computational analysis and design is provided using a number of industry standard software packages.
Electrical and Electronic Principles	An overview to the key elements of understanding electrical and electronic systems.
Mathematics for Energy Systems	A mathematics module tailored to support engineering topics including advanced calculus, matrix methods, vector algebra and differential equations.
Engineering Mechanics	An introduction to the fundamentals of mechanical engineering.
Energy Policy, Markets and Law	Understanding the rules which govern all elements of renewable energy development, including planning, construction and generation, is essential to operating within the industry. This module provides an overview of UK, European and global energy legislation and regulation and its implications for renewable energy.
Renewable Energy Systems 1	Your first introduction to core renewable energy technologies including solar power, biomass, hydroelectricity, tidal, wind, wave and geothermal.
Science for Energy Engineering	This module develops a practical understanding of key principles from physics and chemistry that are fundamental to a number of clean energy generation technologies.
Thermodynamics and Fluid Mechanics	An introduction to the fundamentals of thermodynamics and fluid mechanics.

Year 2

Applied Thermodynamics	A more advanced look into thermodynamics which considers how the subject is applied in a wide range of clean energy technologies.
Data, Signals and Systems	Specific application of mathematics to a range of renewable energy and energy distribution technologies.
Electrical Energy Conversion and Transport	Further development of the key concepts relating to electrical and electronic power systems.
Energy Management	This module will enable you to understand the need to manage energy as a resource and to learn the basis of energy management techniques as well as introducing the legal, social and administrative framework within which the industry operates. You'll learn of the opportunities that exist for improving energy conversion efficiency and waste avoidance and be able to conduct energy-use audits in commercial and domestic premises.
Fluid Dynamics	The science of fluid motion relevant to energy harvesting, structural loading and its response behaviour.

Mechanics of Materials	A more advanced mechanical engineering module, building on year one work to provide a deeper understanding of further key concepts.
Project Management and Accounting	A detailed introduction to quantitative project management techniques. This module also provides you with experience of computer simulations used in project management.
Renewable Energy Systems 2	Further discussion of core renewable energy technologies including solar power, biomass, hydroelectricity, tidal, wind, wave and geothermal.

Year 3

Core modules:

Dissertation	An opportunity to pick your own area of interest in the energy field and carry out a supervised individual research project. Project titles may involve any aspect of the course and possibly include the support of an industrial partner. This project begins in the first term and continues throughout the second term with eight full weeks of the timetable allocated to it.
Engineering Design and Innovation	Develops your understanding of engineering design and the key stages of a successful design process. It builds competence in each of these stages and provides a gateway towards complex engineering design within your subsequent career.
Network Engineering, Modeling and Management	In the future, the grid will see more integration of renewable energy sources (RES) and, thus, it is vital to understand power electronics, which is the enabling technology for integrating RES to the Grid. This module is essential for Renewable Energy students.
Third Year Field Trip	A field trip which encourages you to work in groups to produce a renewable energy resource assessment, typically at an international location. It brings together key elements of subjects studied in a practical exercise to assess a real world location to a professional standard.
<i>Core optional modules: (A minimum of four modules need to be chosen from this selection)</i>	
Data Acquisition and Control	A practical module involving the use of sensors to measure live data, programming to process the data and then driving motors, actuators or loads to control the device.
Energy Generation from Biomass and Waste	An in-depth, practitioner-driven module which considers the technical issues underlying the use of biomass and waste for electrical generation and heat.
Energy Storage Technologies	Storage technologies are a key enabling technology for renewables. This module considers the problems of intermittent supply and peak loading on grid systems as well as solutions.
Marine Renewable Energy	An in-depth module covering aspects of resource estimation, turbine and wave device design, deployment, economics and environmental impact with a focus on wave and tidal energy technologies.

RENEWABLE ENERGY MODULES CONTINUED

Low Carbon Heat	Study key technologies deployed or being developed to reduce the carbon emissions of heating or the use of renewable heat for power generation.
Solar Power	An in-depth module considering all elements of solar power exploitation, from assessment of resource to the potential effects of climate change on available resource. You will study the different kinds of PV technology available, including fabrication methods, installation and performance as well as issues such as connection and integration, environmental impact, financial appraisal and PV in developing countries.
Sustainable Architecture	An introduction to key elements of architectural practice with sustainability in mind. With input from leading UK practitioners the module covers a broad area.
Wind Energy	Builds on introductory material to deliver a detailed view of turbine design, site assessment and resource modelling.
<i>Optional modules:</i>	
GIS and CAD for Renewable Energy	The application of GIS tools is a key discipline within the sector, particularly in the development of new capacity. This module employs expert industrial practitioners to familiarise you with key concepts and their application.
Life Cycle Analysis	Introduces the concept of life cycle analysis (LCA) as applied to generation technologies.
Work Placement Report	An industrial placement allows you to gain practical experience, a relevant reference and build your confidence. Students work on an approved industrial or commercial placement for not less than six weeks during the long vacation between the second and third years.

Year 4 (MEng only)

<i>Core modules:</i>	
Group Design Project	The group design project provides experience of working as part of a project team of four to six in a situation close to that which might be found in an industrial or commercial setting. You will apply knowledge and skills, at the forefront of the renewable energy discipline, obtained from taught modules and independent learning to a real engineering situation at a professional level and as part of a team effort.
Industry Placement Project	For this module, you'll obtain work experience during the summer vacation within a business or other concern operating within the energy sector, UK or worldwide. You'll work on a real industrial project, aiming to meet all requirements associated with working to a defined project brief. This will be established during the summer placement stage, but its execution will extend through the academic year.
Professional Ethics, Competence and Commercial Awareness	Today's energy professionals demonstrate a personal and professional commitment to society, to their profession and to the environment. These principles are embedded in professional codes of conduct and mechanisms for self-regulation. This module encourages understanding of these ideas and develops understanding of business practice and business governance.

Core optional modules:

(A minimum of four modules need to be chosen from this selection)

Advanced Marine Renewable Energy	In this module, you will develop an advanced understanding of design and installation requirements within the sector of Marine Renewable Energy within the fields of i) Hydrodynamics, ii) Offshore Structure Design, iii) Risk and Project Management and iv) Resource Characterisation and Consenting.
Further Electronics and Electrical Engineering	You will further your understanding of electrical and electronics engineering through developing competence with computational design tools that are routinely adopted in industry for analysis and design tasks.
Advanced Wind Energy	You will develop your understanding of the principles of design of horizontal axis wind turbines to a state of detailed knowledge, to the extent that you could develop and establish new designs for wind turbines or individual components that meet recognised design codes.
Solar Energy Research and Development	Extends the understanding of the principles of solar power exploring some of the latest product developments as well as details regarding the deployment of the current generation of photovoltaic systems.
Themes in Climate Change	An introduction to climate change, covering important aspects of the process and approaches to managing climate change. You will delve into the history of climate reconstructions, analyse evidence and study the impacts in detail.

BSc Renewable Energy

Year 1

Applied Computing for Energy Studies	During this programme, and in your future career, you will need a knowledge of computing skills. This module will provide you with a broad understanding of the application to renewable energy projects of two industry-standard technical software tools for spatial analysis and engineering design.
Electrical and Electronic Principles	An introduction to the key elements of understanding electrical and electronic systems.
Energy Policy, Markets and Law	Understanding the rules which govern all elements of renewable energy development, including planning, construction and generation, is essential to operating within the industry. This module provides an overview of UK, European and global energy legislation and regulation and its implications for renewable energy.
Engineering Mechanics	An introduction to the fundamentals of mechanical engineering.
Mathematics 1A	Gets you up to speed on some basic principles, methods and techniques in algebra, trigonometry, calculus and statistics.
Mathematics 1B	Further extends the topics introduced in <i>Mathematics 1A</i> and adds vector and matrix algebra and basic statistics to support your development and allow progress across your other modules.
Renewable Energy Systems 1	Your first introduction to core renewable energy technologies including solar power, biomass, hydroelectricity, tidal, wind, wave and geothermal.
Science for Energy Engineering	This module develops a practical understanding of key principles from physics and chemistry that are fundamental to a number of clean energy generation technologies.

Year 2

Electrical Energy Conversion and Transport	Further development of the key concepts relating to electrical and electronic power systems.
Energy Management	This module will enable you to understand the need to manage energy as a resource and to learn the basis of energy management techniques as well as introducing the legal, social and administrative framework within which the industry operates. You'll learn of the opportunities that exist for improving energy conversion efficiency and waste avoidance and be able to conduct energy-use audits in commercial and domestic premises.
Project Management and Accounting	A detailed introduction to quantitative project management techniques. This module also provides you with experience of computer simulations used in project management.
Sustainable Enterprise Economy	In addition to providing you with an understanding of business activity, the aim of this module is also to give a rigorous and honest insight into the realities of new business ventures by focusing on the requirements necessary for turning an idea into a feasible and attractive new enterprise.
Engineering for Energy Professionals	Essential elements of a number of engineering, mathematics and material science subjects are covered in this module.
The Politics of Climate Change and Energy	During this module you will learn about the key concepts in climate science and policy, climate change science and the debate over its reliability and climate policy and action at the international and national levels. We will also cover the role of different energy options in mitigating climate change, the strengths and weaknesses of UK energy policy and the possible ways forward for UK energy systems.
Renewable Energy Systems 2	Further discussion of core renewable energy technologies including solar power, biomass, hydroelectricity, tidal, wind, wave and geothermal.

Year 3

Core modules:

Dissertation	An opportunity to pick your own area of interest in the energy field and carry out a supervised individual research project. Project titles may involve any aspect of the course and possibly include the support of an industrial partner. This project begins in the first term and continues throughout second term with eight full weeks of the timetable allocated to it.
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Third Year Field Trip	A field trip which encourages you to work in groups to produce a renewable energy resource assessment at an overseas location. It brings together key elements of subjects studied in a practical exercise to assess a real world location to a professional standard.
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Core optional modules: (A minimum of three modules need to be chosen from this selection)

Data Acquisition and Control	An advanced, practical-based course covering aspects of Data Acquisition and Control (DAC/DAQ), using popular micro-controllers to demonstrate the principles and gain experience in the use of sensors and actuators. This will lead into learning how to design DAC systems to perform straightforward practical tasks.
Environmental Permitting and Management	You will gain a comprehensive, appropriate level, understanding of the main facets of environmental permitting and management as they apply to renewable energy in the UK and the wider environment. Particular emphasis is placed on the planning process, the environmental impact assessment regime, sustainability, and management methods.

GIS and CAD for Renewable Energy	The application of GIS tools is a key discipline within the sector, particularly in the development of new capacity. This module employs expert industrial practitioners to familiarise you with key concepts and their application.
Low Carbon Heat	Study key technologies deployed or being developed to reduce the carbon emissions of heating or the use of renewable heat for power generation.
Smart Energy and Energy Storage Technologies	Storage technologies are a key enabling technology for renewables. This module considers the problems of intermittent supply and peak loading on grid systems as well as solutions.
Socio-Economic and Environmental Impact Studies	Develop a deeper understanding of the key social, economic and environmental issues which affect the planning, development and operation of renewable energy technologies.
Sustainable Architecture	An introduction to key elements of architectural practice with sustainability in mind. With input from leading UK practitioners the module covers a broad area.
Work Placement Report	An industrial placement allows you to gain practical experience, a relevant reference and build your confidence. Students work on an approved industrial or commercial placement for not less than six weeks during the long vacation between the second and third years.

Optional modules:

Energy Generation from Biomass and Waste	An in-depth, practitioner-driven module which considers the technical issues underlying the use of biomass and waste for electrical generation and heat.
Energy Storage Technology	Renewable energy is expected to provide a central solution to our need for a sustainable fuel. However, major challenges presented by renewable energies, such as fluctuations in output, unavailability, and unpredictability, limit their popularity. As a solution to these problems, energy storage technology (EST) is growing in significance.
Life Cycle Analysis	Introduces the concept of life cycle analysis (LCA) as applied to generation technologies.
Marine Renewable Energy	An in-depth module covering aspects of resource estimation, turbine or wave device design, deployment, economics and environmental impact with a focus on wave and tidal energy technologies.
Network Engineering, Monitoring and Management	This specialist third year option extends the knowledge gained in previous electrical modules to address more deeply integration of the electrical output from renewable energy generation into the network. (Optional for BEng students.)
Solar Power	An in-depth module considering all elements of solar power exploitation, from assessment of resource to the potential effects of climate change on available resource. You will study the different kinds of PV technology available, including fabrication methods, installation and performance as well as issues such as connection and integration, environmental impact, financial appraisal and PV in developing countries.
Wind Energy	Builds on introductory material to deliver a detailed view of turbine design, site assessment and resource modelling.



MINING ENGINEERING IN CORNWALL

89% of Mining Engineering students in graduate level employment or further study within six months of graduating¹

7th for Materials and Mineral Engineering in *The Guardian University Guide 2017*

Taught by the internationally renowned Camborne School of Mines, ranked 43rd in the QS World University Rankings 2017 (Engineering – Minerals and Mining)

Accredited by the Institute of Materials, Minerals and Mining (IOM³)

Paid placement opportunities around the world

Our degree programmes are truly multidisciplinary, including elements of civil and mechanical engineering, geology, metallurgy, economics, environmental management, and health and safety. They are also highly vocational, so in addition to lecture-based study, the programmes include field trips, tours, a summer industrial placement and practical classes in surveying and in our test mine. You will generally spend your second year summer vacation gaining work experience anywhere from Australia to the UK and will often be paid for doing so.

The BEng Mining Engineering degree is professionally accredited by the Institute of Materials, Minerals and Mining (IOM³), providing the opportunity for you to work towards Chartered Engineer status after you graduate. An application is in progress for accreditation of the MEng programme.

Mining Engineering is taught by the University's Camborne School of Mines (CSM), which has 130 years' experience in training mining engineers and an excellent international reputation. Many extractive industry operations around the world will have a CSM mining engineer somewhere within their staff, meaning you will never be far from a fellow CSM alumni.

CSM is one of the best equipped departments of its kind in Europe. Our staff are actively involved in research and you will benefit from their cutting-edge knowledge and our research facilities. We are also the only university in the UK to have its own test mine for teaching and research.



¹ Destination of Leavers from Higher Education Survey (DLHE) of 2014/15 undergraduates

DEGREE PROGRAMMES

What is Mining Engineering?

The demand for minerals will continue to grow as the world's population continues to dramatically increase. Mineral development and production must be managed in a responsible manner if we are to obtain these minerals without great damage to our environment. Highly trained engineers and scientists are sought after by the minerals industry. Mining applies many different branches of science and engineering to understand how minerals can be extracted from the earth.

Mining engineers are primarily responsible for the safe and economic production of the Earth's minerals. They work with metal ores, diamonds, coal, oil and industrial minerals such as clays, granites and limestone. Many mines involve deep underground excavations with high temperatures and very large stresses in the rock. Others involve surface working in quarries, open pits and strip mines.

Mining engineers often manage teams of engineers and others from many different disciplines. Because of this, mining engineering degrees are very wide ranging and ideal for careers in engineering management.

Mining engineers must be able to understand the nature of the rocks with which they work. They apply sound engineering principles to design safe and economic methods of extraction.

Knowledge of geology, engineering, rock mechanics, economics, surveying and management is necessary for anyone involved in the design and management of mines.

Recycling and reclamation are of growing international importance within the mining industry. Improvements in extraction technology now allow the treatment of

secondary sources, such as the waste from previously mined deposits, industrial and domestic waste and contaminated land. In many cases it is possible to develop processes which allow a range of materials, including metals, plastics and glass, to be recovered from waste streams offering the potential for increased recycling.

Single Honours

MEng/BEng Mining Engineering

Year 1 The first year of the programmes are mainly devoted to general engineering principles together with geology and surveying, and an introduction to mining and minerals engineering. You will attend a one-week induction course at our test mine during the Easter vacation and learn to use mining equipment and explosives safely. At the end of the first year a three-week surface surveying field course is held on campus.

Year 2 In Year 2 more emphasis is placed on mining subjects and management whilst the engineering and geology topics from the first year are further developed. In the summer vacation between the second and third years you will work in the extractive industry for at least eight weeks. Most students work overseas during this period. Although the onus is on you to find a placement, the department can help by providing contact details and suggesting companies which suit your interests. Companies with close ties to the department also provide placements for a number of students. Most students receive a wage during their placement and some companies provide other support such as accommodation and travel allowances.

Following the work placement and prior to the beginning of your final year, you will undertake a week long industrial tour.

Year 3 In the third year all subjects are very closely connected with mining. Mine economics and design, geotechnical engineering, ventilation, safety and sustainability and minerals engineering are developed further.

You will also carry out a mining feasibility study where you will work in small groups to design and cost a mining project. Throughout the third year you will work on an individual research project in your area of interest, under the supervision of a member of academic staff.

Year 4 (MEng only) If you take the four year MEng programme you'll undertake a group design project along with an individual research thesis. You'll also take modules covering advanced mine design, mine automation, advanced mine ventilation and modelling and mineral process design.

Industrial experience

The MEng Mining Engineering with Industrial Experience includes an industrial placement prior to the start of your third year, followed by a research project based on your placement experience. Your placement will be spent working in an appropriate business or industry related to mining engineering, to develop solutions to real world problems and you will benefit from our established connections with local, national and multinational organisations.

We find that our students gain valuable experience from working in industry. As well as increasing their first-hand knowledge, they also improve personal and transferable skills, make new contacts and enhance their employability.

I'd advise current students to really become part of the CSM family, continue the traditions and when you need it, reach out for older CSM students and graduates. We are a large network and we always try to help each other. I feel very lucky to be part of this network; we often find summer placements and graduate opportunities just because we are CSM graduates or students. Being part of CSM has definitely helped me.

Laura Lopez Martinez, BEng Mining Engineering graduate

LEARNING AND TEACHING

Our teaching is carried out through a number of methods including lectures, tutorials, laboratory work, field courses, feasibility studies and projects. On average you will spend 20 hours per week in taught activities at the University and will be expected to carry out a further 20 hours per week in independent study.

During your degree you will undertake blasting trials, ventilation surveys, surface and underground surveying exercises, and operate mining equipment. The CSM underground test mine works as a purpose-built testing facility where both teaching and research can be conducted in an authentic setting.

Other facilities include a sensor-based materials sorting and characterisation facility, mineral processing laboratory and a geomechanics rock and soil testing facility. We are also fortunate to have some of the most up-to-date surveying equipment which is available for both surface and underground surveying techniques. You will have access to the research facilities in the department throughout your degree.

We're actively engaged in introducing new methods of learning and teaching, including increasing use of interactive computer-based approaches to learning through our virtual learning environment, where the details of all modules are stored in an easily navigable website. Students can access detailed information about modules and learning outcomes and interact through activities such as the discussion forums.

Research-inspired teaching

Our academic staff are recognised internationally as experts within their respective fields. Across all our undergraduate programmes, teaching is strongly informed by their interests and we believe that every student benefits from being a part of this research-led culture.

CSM is recognised as a centre for research related to the formation, discovery, extraction and utilisation of the Earth's natural resources and subsequent remediation. The applied nature of much of the research is indicated by significant international industrial collaboration. Research within CSM is coordinated by two multidisciplinary groups. These draw upon the department's research expertise in mining and minerals engineering and geology.

In mining and minerals engineering we have very active research interests in blast vibration analysis, surveying, ore sorting, health and safety management, geotechnical analysis of slopes and excavations and resource modelling.

Facilities

CSM is one of the best equipped departments of its kind in Europe. We offer state-of-the-art equipment for teaching and research on campus and at our underground test mine nearby. Laboratory classes, using our extensive teaching equipment enable you to fully appreciate the theoretical elements of the programme via practical examples.

Our test mine allows students to learn how to drill, charge, and fire explosive rounds as well as learning how to survey the mine using both traditional and cutting-edge methods, such as using laser 3D scanning equipment.

Our research facilities include world-class analytical geochemical and mineral analysis laboratories complete with QEMSCAN®, a sophisticated scanning electron microscope-based mineralogical assessment system which is a unique facility amongst UK universities.

Our analytical suite comprises an electron microprobe, low vacuum scanning electron microscope, X-ray diffraction, X-ray fluorescence, atomic absorption spectroscopy and high quality microscope and imaging facilities.

Fieldwork and tours

An industrial tour takes place during mid-September preceding the final year. Visits are also made to mine sites both on the surface and underground, along with mill visits and visits to waste treatment/recycling plants. These visits develop additional learning skills and awareness of the minerals/extraction industry.

Academic support

The Penryn Campus offers a friendly, supportive community, where staff and students get to know each other well. As a student you will have a personal tutor who is a member of academic staff with whom you can discuss personal and academic issues. There are also a number of services on campus where you can get additional

advice and information. You can find further information about all these services in the University's undergraduate prospectus or online at www.exeter.ac.uk/undergraduate

The environment and sustainability

At the University of Exeter, we are committed to producing graduates who have an understanding of both the scientific and the human/social issues which are involved in the vital field of environment and sustainability.

At our Penryn Campus, the Environment and Sustainability Institute (ESI) is at the forefront of scientific and technological research in this field. We aim to develop further opportunities for Mining Engineering students to develop their knowledge, understanding and interest in sustainability.

Assessment

Assessment methods vary between modules, and may include essays, practical write-ups, surveying exercises, presentations and project work. You will have to pass the assessment in the first year, but the mark does not contribute to your degree classification. The overall mark for your degree is calculated from your assessments in subsequent years. These draw on coursework, guided project work and exams.

CAREERS

A very high proportion of graduates of Mining Engineering enter employment directly related to their studies in the minerals industry, either in the UK or overseas. Other graduates move into areas such as tunnelling, civil engineering design or the oil and gas industry. However, recent graduates are working in fields as diverse as sales and marketing and operations management for major UK minerals providers. Alternatively, some graduates opt to continue their training by undertaking taught postgraduate (MSc) courses in geotechnical engineering or computing or undertake research degrees (MPhil/PhD).

Examples of the destinations of our recent graduates:

Employers

Leighton Asia // Newport Goldmining // MMD Sizers // Rimex Metals Ltd // Rio Tinto // Grinaker Ltd // Glencore // Sibelco // Anglo American // Cleveland Potash // Vedenta // First Quantum Minerals // Wolf Minerals

Occupations

Tunnel Engineer // Mining Engineer // Chemical Engineer // Graduate Mining Engineer // Trainee Mining Engineer // Management Trainee in Mining Engineering // Mine Ventilation Engineer // Engineer

Examples of further study followed by our graduates:

- MSc Mining Engineering, University of Exeter
- MSc Petroleum Engineering, University of Aberdeen

Information about the careers entered by graduates can be found at www.exeter.ac.uk/ug/careers

MINING ENGINEERING MODULES

Please be aware that modules are subject to change, please check www.exeter.ac.uk/ug/mining for latest details.

Year 1

Electrical and Electronic Principles	An introduction to the key elements of understanding electrical and electronic systems.
Engineering Mechanics	Ensures a full understanding of engineering mechanics for students with differing backgrounds in applied mathematics and mechanics. This module will enable you to understand later aspects of study and to make a first assessment of a mechanical or structural project.
Geology	Provides an elementary training in the principal geological disciplines and their applied significance, plus an overview of the structure of the Earth and the processes by which it has evolved.
Mathematics 1A and 1B	You will take two mathematics modules in the first year. The first consolidates key mathematical principles and methods in the areas of algebra, trigonometry, calculus and basic statistics. The second extends these areas, covers a range of engineering maths topics and includes an introduction to the software package MathCad.
Mining and Minerals Engineering	An overview of the minerals industry starting with a historical perspective and leading up to the current day implications of financial, political and energy constraints. A basic introduction to mining and minerals engineering then follows, as well as sustainability and the effects of mining on the environment. Blasting practicals are also undertaken during the term.

Surveying and CAD

Takes you through fundamental surveying techniques and associated computation. Examines other methods of survey control and detailed data capture along with the computational skills required for these methods.

Thermodynamics and Fluid Mechanics

Designed to develop your knowledge of fluid mechanics and of energy transfer and storage in thermal systems.

Year 2

Electrical Energy Conversion and Transport

Covers the supply and utilisation of electrical energy on a large scale and the use of a wide range of electrical machines. Also covers the fundamentals of data transmission, the practical interfacing of microprocessors to working plant and control engineering.

Fluid Mechanics

Extends the basic principles covered in the *Thermodynamics and Fluid Mechanics* module and their practical application to real engineering situations.

Geotechnics

A general introduction to rotary drilling, basic applied hydrology and rock engineering. Provides an insight into specific design applications of geotechnical engineering in civil and mining practice.

Mathematics 2

You will take two mathematics modules in the second year, one covering advanced algebra and calculus and the other covering advanced mathematics for engineering.

Mechanics of Materials

Provides an appreciation of the strength and safety of the structural components you'll find in industry. It also serves as an introduction to later work on the analysis of stress and non-elastic behaviour of materials.

Mining and Surveying	Provides a general introduction to the safe use of explosives, the selection of suitable drilling methods and underground excavation support, and an overview of mine development techniques and mine drainage. In the first semester, an underground survey is conducted at our test mine. During the last three weeks of term, you will take part in a major practical surface surveying exercise on campus.
Project Management and Accounting	A detailed introduction to quantitative project management techniques. This module also provides you with experience of computer simulations used in project management along with accounting techniques.
Surface Mining and Mine Transport	Provides an overview of surface mining methods and the equipment used. Extends your understanding of engineering principles in relation to the handling and transport of bulk materials and people.

Year 3

Feasibility Study	In the second term you'll carry out a feasibility study of a mining project. You'll work in a group and take a potential mining project from the initial geological information, through the mine and environmental planning stage, to an economic evaluation and request for capital.
Industrial Placement and Project	You will gain relevant work experience during the summer vacation period between years two and three; undertaking an industrial placement at a surface or underground mine or within a mining-related discipline. Research, data analysis and technical report writing skills are then tested in this module.
Minerals Engineering	Provides an overview of minerals engineering which includes both mineral processing and extractive metallurgy.
Mining Economics and Design	Examine the various components and inputs to the financial appraisal of mines. Discuss the key drivers behind metal prices, input costs and production trends.

Safety and Sustainable Development	Acquaints you with health and safety legislation relating to mining and quarrying, including the sustainable development methods that are being adopted by mining companies across the world to address the issues of mining legacies.
Surface Excavation Design	A design-based module, where you will consider major aspects of geotechnical engineering found in civil and mining engineering practice.
Tunnelling and Excavation Design	Provides design-based consideration of some major aspects of geotechnical engineering found in civil and mining engineering practice. Includes an introduction to tunnelling methods and machine selection.
Working Environment and Ventilation	Extends your understanding of engineering principles in relation to the environmental conditions encountered in the workplace in relation to the ventilation of underground mines and surface buildings and plant.

Year 4

Advance Mine Ventilation and Modelling	Continued on from the third year module on ventilation you will be required to undertake ventilation airway modelling using the latest software packages.
Advanced Mine Design	This module takes mines design to an advanced level of study, using some of the latest mine design software packages.
Group Design Project	You will be placed into groups and will produce a critical design project directly related to an aspect of the course. Emphasis is given to an integrated approach where unique solutions can be generated.
Individual Research Thesis	An independent study at M-level where students conduct independent research into a topic of their choice which is directly related to the programme.
Mine Automation	Explore the various ways in which mine automation is being used to make the industry both more profitable, safer and easier to manage.
Mineral Process Design	A variety of equipment and design and optimisation of process circuits is covered, involving the application of empirical models and of specialist software packages such as JKSimMet.



ENGINEERING IN EXETER

9th in the UK and 94th globally in The Times Higher Education World Rankings for Engineering and Technology

86% of Engineering students in graduate level employment or further study within six months of graduating¹

9th in the UK for General Engineering in *The Complete University Guide 2017*

10th for Materials Technology in *The Complete University Guide 2017*

All specialist MEng/BEng programmes professionally accredited²

Industrial placements available as part of all programmes

Engineering challenges lie at the heart of many of the most significant problems facing society in the 21st century, ranging from responding to climate change through developing sustainable energy sources and making efficient use of scarce natural resources.

To be a successful engineer in the present fast-moving technological world you will require an education with the broadest possible interdisciplinary base.

As tomorrow's engineer, you will find that your career will involve not only bringing your own specialist knowledge to a project, but also problem solving, collaborating with engineers from other disciplines and the management of interdisciplinary teams.

We offer a range of exciting, rewarding and professionally accredited specialist degrees covering the major engineering disciplines. We recognise that professional engineers often work together within multidisciplinary teams, solving problems collectively, and this underpins how we teach. Our degrees offer professional and academic rigour within specialist engineering disciplines combined with a strong multidisciplinary thread throughout.

Our programmes allow you to explore a variety of engineering disciplines, enabling you to identify an inspiring area of interest. Your chosen area of interest will then form the basis of your studies as you delve into the subject in great depth, leading to a specialist degree at MEng or BEng level. You can transfer from the BEng to MEng at the end of your second year and have the opportunity to experience an industrial placement or a period of overseas study as part of our MEng programmes.

We collaborate with numerous major UK and international industrial organisations, as well as smaller companies, ensuring our programmes are relevant to the industrial and commercial imperatives of today and tomorrow. We research projects crossing engineering borders, collaborating with scientists from across our integrated College including physicists, mathematicians and computer scientists. This unique environment provides an inspirational learning platform, consisting of state-of-the-art facilities, readily available personal support and academic excellence. This combination provides the perfect launch pad for our graduates as they become the engineers of tomorrow.

Degree structure

We are committed to providing you with an engineering education that contains specialist depth, as well as a broad-based foundation. We aim to produce adaptable graduates capable of working constructively within interdisciplinary teams. This can be seen in our programme structures, which all start with a common first year.

All our specialist MEng and BEng programmes are accredited by an appropriate professional engineering institution, under licence from the Engineering Council, to enable progression to chartered engineer status following further learning and/or professional experience. This does not include the MEng/BEng Engineering programmes. Full accreditation details are available at www.exeter.ac.uk/engineering/ug/accreditation

¹ Destination of Leavers from Higher Education Survey (DLHE) 2014/2015 undergraduates

² the MEng/BEng Engineering programmes are not accredited. Most students transfer onto a specialist programme following the first year of study

Industrial Experience and international study

All of our specialised MEng engineering programmes provide you with the opportunity to study abroad as part of your degree programme*. If you choose to take this option, you will spend half of your third year at one of our partner institutions in Europe under the Erasmus exchange scheme, or you can spend a year further afield via an international exchange agreement.

Alternatively, you could choose to study one of our MEng with Industrial Experience programmes which include an industrial placement in the vacation prior to the start of your third year (six to 10 weeks, subject to suitable arrangements). This is followed by an individual project during your third year, specifically designed around your industrial placement. Your placement will be spent working in an appropriate business or industry and you will benefit from our established connections with local, national and multinational organisations. The combined placement and project allows you to undertake paid vacation work while gaining highly relevant industrial experience.

We find that our students gain valuable experience from working in industry. As well as increasing their first-hand knowledge, they also improve personal and transferable skills, make new contacts and enhance their employability.

* please note: the 'with Industrial Experience' and 'with International Study' pathways are not available on the general MEng Engineering programme.

Core first year

Study a wide range of engineering specialisms, so you get a broad overview of the multidisciplinary nature of the subject. It provides the skills and adaptability to work and communicate effectively across

the spectrum of disciplines, as well as a foundation for training in a specialist branch. Half a day a week is devoted to engineering design activities where you will work in small groups in the labs and workshops. You will also take part in a Team Development Project to build a renewable electricity generator. The project is run as a competition and introduces team-working, an essential skill for engineers.

You then have the flexibility to study any of our specialist engineering disciplines at the end of your first year, while at the end of your second year you can also transfer between the BEng and MEng versions of the programmes, subject to appropriate performance.

Civil and Environmental Engineering

Developments in the construction industry and more broadly in how we deal with various issues in urban areas and in the natural environment, are driven by the ever increasing demand for energy-efficient and sustainable use of limited resources, technological progress in other engineering disciplines, socio-economic activities and climate change. We will provide you with a broad and sufficiently specialised knowledge in a range of civil and environmental engineering subjects including geotechnics, structures and water engineering.



The Joint Board of Moderators from four professional bodies (ICE, IStructE, IHE and CIHT) accredit our Civil Engineering programmes.

MEng/BEng Civil Engineering

Civil engineering is essentially about creating and managing the infrastructure and environment in which we live. As a civil engineer you will play a key role in the future prospects and health of society. Civil engineering interfaces with electrical, mechanical, chemical and managerial processes. People skills are vitally important to civil engineers, who work alongside a broad section of society in order to bring plans to fruition. Our programmes combines scientific knowledge with personal and management skills developed through practical application and direct study.

Year 1 See 'Core first year'.

Year 2 You will start to specialise in your subject discipline but will still maintain some common engineering modules. You will have the opportunity to investigate some project ideas of your own, and at the end of the year you'll take part in a civil engineering residential field course.

Year 3 By the third year you will have selected two key areas in which to specialise, from structural engineering, CAD, geotechnical engineering or water engineering. You will carry out an individual project under the supervision of a member of academic staff with expertise in your chosen area.

Year 4 (MEng only) In your final year you will specialise even more, thereby strengthening your understanding of either civil, structural, geotechnical, water or environmental engineering. You will study *Lean Thinking and Sustainability in Industry* and work on a major interdisciplinary group project which will further develop your engineering and project management skills.

MEng Civil and Environmental Engineering

Water-related problems and various other environmental issues are increasingly becoming key challenges at local and national levels as well as globally. There is great and growing demand for engineers with specialised knowledge in civil and environmental engineering who are able to work efficiently in multidisciplinary teams. This programme offers highly professional training in civil engineering with special relevance to environmental engineering. By linking our expertise in civil engineering, water systems and climate systems, we offer an exciting and highly relevant programme that will prepare you for work in civil and environmental engineering.

Year 1 See 'Core first year'.

Year 2 From the second year onwards the core and optional modules start to take a more specialised pathway with a focus on civil engineering and its applications to large scale water systems and the impact of climate change.

Year 3 The latter part of the programme puts special emphasis on working in a world where a changing climate has implications on planning, design, construction and operation of civil engineering projects. For example, changing rainfall patterns will bring significant new challenges to the design and maintenance of urban water supplies around the globe. You will carry out a substantial individual project with an environmental theme, as well as study important aspects of civil engineering.

Year 4 You'll undertake a substantial interdisciplinary group project, industrial case studies and study advanced aspects of civil and environmental engineering such as urban drainage design, water management, hydroinformatics and *Lean Thinking and Sustainability in Industry*.

Electronic Engineering

Electronics shape our world – from mobile phones to hybrid cars, medical instrumentation, renewable energy devices, aerospace systems and a host of other technologies essential to our everyday life and future well-being. Our degrees equip you with the skills and knowledge not only to understand the fundamentals of modern-day electronic and computer technology, but more importantly to help design, install and operate future technologies in a rewarding and interesting professional career.



A new Institution from the IEE and IIE

Our Electronic Engineering programmes are accredited by the IET.

MEng/BEng Electronic Engineering

There have been remarkable advances in electronics over recent years and electronic engineers are at the forefront of this fast-moving world. A professional electronic engineer can have an exciting and diverse career designing and manufacturing new technological developments in electronics, computer engineering, communications systems and control engineering in all branches of industry.

Our programmes emphasise the need for technical competence combined with flexibility of mind. They recognise the fact that modern professional engineers need to be multi-skilled and familiar with concepts and techniques from other related areas of study.

Year 1 See 'Core first year'.

Year 2 You will start to specialise in your programme area while still maintaining some common modules with the Mechanical

Engineering and Engineering and Management programmes. You will have the opportunity to investigate some project ideas of your own and work on an analogue or digital design for your case study. You will learn about how modern communication networks function and understand the principles of electronic design in cars and aeroplanes.

Year 3 By Year 3, you will have narrowed down your specialisms to two of the following areas: communications engineering, electromagnetics, CAD and consumer electronics engineering. You will carry out an individual project under the supervision of a member of academic staff with expertise in your chosen area.

Year 4 (MEng only) In your final year you will specialise further, strengthening your understanding in either computer electronics, consumer electronics, software systems or operational systems engineering. You will study *Lean Thinking and Sustainability in Industry* and work on a major group project which will further develop your engineering and project management skills.

MEng/BEng Electronic Engineering and Computer Science

The combination of electronic engineering and computer science is a complementing and natural one. Both subjects are concerned with enhancing our experience with the world, and seek to provide solutions to complex problems via developing products or systems that advance our use and knowledge of something. These disciplines are closely linked and specifically interweave in the manufacture of equipment such as smart watches, mobile phones and e-books.

Electronic engineering and computer science provides an in-depth training in both the hardware and software aspects of modern electronic systems and computers,

from the fundamentals of electronics and microprocessors and manufacturing for electronic systems, to object-oriented programming and artificial intelligence and engineering management.

Year 1 See 'Core first year'.

Year 2 From this point on you begin to specialise in electronics and computer science modules giving you the freedom to choose your own degree path. This allows you to research and further your knowledge in particular interest areas such as software engineering or machine learning.

Year 3 Further specialisation allows you to choose modules that offer advanced courses in a wide range of topics. Industry-linked projects also take place and work placement opportunities such as the Commercial and Industrial Experience module are recommended. This variety of learning gives you advanced knowledge, practical work experience and the confidence to conduct individual research, applying your expertise to solve real engineering problems and find computing solutions.

Year 4 (MEng only) The final year of study for MEng students offers a wide range of advanced modules. Many of these offer advanced practical project work with modules such as Lean Thinking as Sustainability giving you the opportunity to visit companies as well as learning hands-on skills from top-class manufacturing experts, such as Alcoa Howmet, Hymid Ltd, Jaguar/Land Rover and BD Diagnostics.

Engineering and Management

The commercial exploitation of technology in fields from energy to mobile communications or from aerospace systems and biomedical instruments to Formula 1 racing cars depends on professional engineering managers. As leaders of the engineering profession, engineering managers direct the development of new and profitable technology businesses and shape the future of industry. Our Engineering and Management programme combines our leading edge Mechanical or Electronic Engineering degree with the enhanced theory and practice in engineering management that enables our graduates to take a fast track to a management career in the most successful and dynamic enterprises.

NEW FOR 2018

MEng Engineering and Entrepreneurship. See page 22.



A new Institution from the IEE and IIE



Our Engineering and Management (Electronic) programmes are accredited by the IET and the Engineering and Management (Mechanical) programmes are accredited by the IMechE and IET.

MEng/BEng Engineering and Management

These degree programmes combine technical engineering training with management and are designed for those who will become managers in a wide range of careers such as manufacturing or technical service industries,

for example transport, communication, environment or leisure; general managers who need a background in engineering; or management consultants or accountants who require further specialised training.

You will benefit from a series of visits to manufacturing and service industry companies and industry case studies. These act as an integrating medium, challenging you to apply your academic knowledge in solving practical problems. In addition, the final-year group project takes the form of an industrial systems analysis and is usually run in close collaboration with a company.

Year 1 See 'Core first year'.

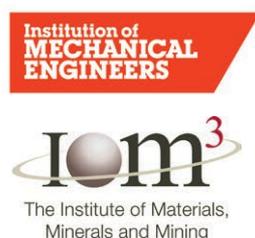
Year 2 After the common first year, you will begin to specialise in your programme area while still maintaining some common modules with mechanical engineering and electronic engineering. You will have the opportunity to investigate some project ideas of your own and work on the management aspects of designing a product or a project. You will learn about how modern manufacturing systems work while maintaining a broad view of electronics design, civil engineering project methods and control engineering.

Year 3 By Year 3, you will have narrowed down your specialisms to two of the following areas: mechanical engineering, manufacturing engineering or electronics engineering. You will have a broad choice of subjects within these disciplines and will carry out an individual project under the supervision of a member of academic staff with expertise in your chosen area.

Year 4 (MEng only) You will specialise further and study the module *Lean Thinking and Sustainability in Industry*. Additionally, you will work on a major group project which will further develop your engineering and project management skills.

Mechanical and Materials Engineering

The Mechanical Engineering and Materials Engineering programmes offer a stimulating mixture of theoretical study and hands-on practical work, all informed by recent advances in the engineering industry. You'll study topics such as fluid dynamics, mechanics of solids and structures, and dynamics, all of which are relevant to a wide range of industries including aerospace, renewable energy, automotive, marine and many others.



ACCREDITED PROGRAMME

The Mechanical programmes are accredited by the Institution of Mechanical Engineers and the Materials programmes by the Institute of Materials, Minerals and Mining.

MEng/BEng Mechanical Engineering

Mechanical engineering is a challenging and exciting subject that affects nearly all aspects of our lives. Topics covered include materials, manufacturing, aerodynamics and thermodynamics. However, a great deal of emphasis is also placed on essential transferable skills such as communication, teamwork, information technology and computer skills.

These programmes are suitable for those who wish to pursue careers as professional engineers employed by industry or research laboratories requiring electro/mechanical engineering or manufacturing engineering expertise. The programmes are also well suited for those who aim to become managers in industry and commerce and wish to start with a sound background in modern engineering.

Year 1 See 'Core first year'.

Year 2 You will start to specialise in mechanical engineering while still maintaining some common modules with civil engineering and materials engineering. You will have the opportunity to investigate some project ideas of your own and work on the appropriate structural forms and stress analysis methods in your chosen case study. You will learn about what it takes to design, manufacture and test a device and product in a competitive environment.

Year 3 You will focus your study on the complementary areas of thermofluids, manufacturing and computational engineering. You will learn about ways to model fluid flows and compute the energy efficiencies of designs and processes, theoretical and numerical approaches in analysing mechanical systems and also the use of software such as finite element packages.

Year 4 (MEng only) In your final year you will specialise further, thereby strengthening your understanding of state-of-the-art designs in computer aided engineering, stress analysis and simulation models. You will work on a major group project which will further develop your engineering and project management skills, as well as studying the module *Lean Thinking and Sustainability in Industry*.

MEng/BEng Materials Engineering

Materials engineering is a discipline at the interface between materials science and engineering. It involves not only the understanding of materials and their properties, their internal microstructure or the particular manufacturing processes used in their production, but also how to use these in the design of real world applications. All branches of engineering rely on solid materials to carry mechanical or electrical loads, but materials engineering explores in much greater depth the link between what we can make materials do and how to use them in the design of new technologies.

Many of the most exciting current developments in the technological world are in materials engineering, such as nanotechnology, artificial replacement organs and tissues, and smart composites for aerospace applications. These and other

topics are covered in these programmes including manufacturing, CAD/CAM, elasticity and solid mechanics. These programmes would suit those who aim to work in any technology field or in a management role in related industries.

Year 1 See 'Core first year'.

Year 2 You will start to specialise in materials engineering while still maintaining some common modules with mechanical engineering. You will have the opportunity to investigate some project ideas of your own and will learn about what it takes to design, manufacture, and test a device and product in a competitive environment.

Year 3 In Year 3 you will focus on materials engineering and computational engineering which are complementary to each other. You will learn ways to calculate the failure mode of materials, theoretical and numerical approaches in analysing mechanical systems and also the use of software packages to design products.

Year 4 (MEng only) In your final year you will specialise further, thereby strengthening your understanding of state-of-the-art designs in materials engineering and stress analysis. You will work on a major group project which will further develop your engineering and project management skills, as well as studying the module *Lean Thinking and Sustainability in Industry*.

General Engineering

MEng/BEng Engineering

These programmes are general in that you may choose to study modules across any of the disciplines, allowing for timetable constraints. These programmes are not accredited by any of the engineering institutions and are primarily intended for those students who are undecided as to which discipline to study and wish to keep their options open for the first year. Normally students on the MEng/BEng Engineering degrees change to one of the accredited, specialist discipline programmes at the end of the first year, though it is possible to continue on these general programmes beyond the first year.



MEng ENGINEERING AND ENTREPRENEURSHIP

TYPICAL OFFER AAA-ABB; IB: 36-32

A PIONEERING PROGRAMME, designed to support innovators and entrepreneurs in the fields of mechanical and electronic engineering.

FOUR YEARS OF EXPERIENTIAL LEARNING, culminating in the launch of your own business.

AIMED AT ASPIRING ENGINEERS AND DESIGNERS with a flare for business and the uncanny ability to solve complex problems.

Transforming the way engineering is taught – combining a top 10 education with the space and time to explore, take risks and test your ideas in the real world.

As a student, you will not only study the principles of engineering but also the many factors that contribute towards the successful development of innovative products, processes or services. In addition to academic lectures, you will attend talks and seminars given by experienced entrepreneurs and business leaders. As your degree progresses, you will be encouraged to put your knowledge and ideas to practice, learning through personal experience while fully supported by your tutors and an industry mentor. Your final year will see you launching and reflecting upon your own start-up, providing the perfect springboard for a prosperous professional future.

On completion, students will graduate with a Masters-level degree as well as the knowledge and experience of setting up their own business.

Programme will be available for entry in September 2018 subject to academic approval.

LEARNING AND TEACHING

Engineering at Exeter combines a breadth of academic expertise with a caring and supportive learning environment. Our programmes make use of a variety of teaching styles with contact hours ranging from 25-32 hours each week (depending on year of programme) including:

- lectures for the presentation of new topics and class exercises;
- workshops where you have hands-on use of equipment, discussion and solution of sample problems, with experts available to answer questions and provide support;
- tutorials involving small group work on problems relating to topics covered in lectures;
- projects of longer term practical work undertaken either individually or in teams, with sessions for consultation with staff;
- Engineering Design Activities (EDAs) which provide direct experience of putting engineering design into practice while learning the underpinning principles and mathematical skills in other modules.

The single most important aspect of teaching is face-to-face sessions with members of staff, which take place in all of these formats, usually to discuss material in more detail. All members of staff deal with questions on an individual basis and it is easy to fix appointments with staff via email or during their advertised office hours.

We are actively engaged in introducing new methods of learning and teaching, including increasing use of interactive computer-based approaches to learning through our virtual learning environment, where the details of all modules are stored in an easily navigable website. Students can access detailed information about modules and learning outcomes and interact through activities such as the discussion forums.

Research-inspired teaching

We believe every student benefits from being part of a culture that is inspired by research and being taught by experts – you will discuss the very latest ideas in seminars and tutorials and become actively involved in research yourself.

All our academic staff are active in internationally-recognised scientific research across a wide range of topics. As a research-led department, there are always numerous research projects in progress, funded by industry, charities, government departments and research councils.

The majority of our Engineering research expertise fall into Materials, Manufacturing, Functional Materials, Water and Environment, and Renewable Energy. The University is home to numerous major leading academics, state-of-the-art facilities and specialist research centres. These include Exeter Technologies Group –

consisting of the Centre for Additive Layer Manufacturing (CALM), Exeter Advances Technologies (X-AT) and the Centre for Alternative Materials and Remanufacturing technologies (CALMARE), as well as individual centres for Business and Climate Solutions, Energy and the Environment, Graphene Science and Water Systems.

This combination has developed some outstanding research innovations over the years. This engaging and vibrant community is shared with our students, and you are encouraged to collaborate with your academics. New research innovations are also reflected in your programmes as we review our programmes on a regular basis, ensuring that you are always at the pinnacle of technology, research and ideas.

Student projects undertaken in the third and fourth years are often linked to our research activities and may involve working with industrial partners. Recent projects have involved the design and construction of an autonomous hovering platform, modelling of airflow around a car and 3D CAD representation of the Met Office headquarters in Exeter, which has close research links with the College of Engineering, Mathematics and Physical Sciences.

You can find out much more about our research on our website at www.exeter.ac.uk/ug/engineering



I chose Electronic Engineering because I was attracted to anything new and innovative. Everything about electronics is fascinating – you get to examine every day objects, demystify how things work even down to microscopic level, and apply your knowledge to real world applications. Engineering at Exeter is great because you get to build a rapport with lecturers rather than being just a face in the crowd. The lecturers are very passionate about what they teach which reflects in their teaching style.

I love the fact that Engineering is a way to help people by creating products, services and technologies to advance us further (and preserve the environment). I am definitely going to pursue a career in Engineering, either in the Energy or Technology industries. My plan is to become a Chartered Engineer at the forefront of emerging technologies.

Amelia Mohammed,
BEng Engineering and Management with International Studies

Assessment

Modules are assessed by a combination of continuous assessment through small practical exercises, project work, essay writing, presentations and exams.

All of our programmes are assessed in a similar way. During the first two years you will have an approximately even mix of exams and coursework. Then, in the third year, 25 per cent of the year is taken up by the individual project. For those going on to the fourth year, the group project takes up 50 per cent of the year.

Your first year doesn't count towards your final degree classification, but you do have to pass it in order to progress. If you study a three-year programme, assessments in the final two years both count towards your classification and if you study a four-year programme then the final three years all contribute.

Academic support

Each degree has a Programme Coordinator who monitors your progress, advises you on choice of pathway and generally ensures that the course runs smoothly. You will be assigned a personal tutor who will provide you with help and advice when necessary and act as a professional reference for your life after your degree.

There are also a number of services on campus where you can get advice and information, including the Students' Guild Advice Unit. You can find further information about all the services in the University's undergraduate prospectus or online at www.exeter.ac.uk/undergraduate

Scholarships

Some of our accrediting Engineering Institutions, such as the Institution of Structural Engineers and the Institution of Mechanical Engineers, offer generous scholarships for which you are eligible to apply. For details please visit the website of the relevant institution.

For the latest information about our scholarships, please visit the Funding for Undergraduates page on our website at www.exeter.ac.uk/emps/undergraduate/funding

Facilities

We have benefited from a £3 million investment in academic and social facilities. This includes completely refitted lecture theatres and teaching spaces, and a major expansion and upgrade of our undergraduate computer facilities and social space.

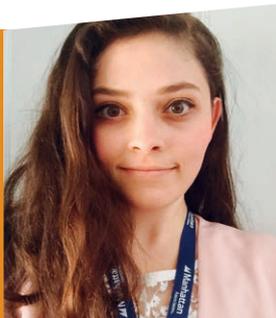
As a student you'll benefit from teaching laboratories covering most areas of

mechanical, materials, electronic and civil engineering. You will also be supported in your studies by a team of highly trained technical staff. We use two main workshops, electrical and mechanical, which provide extensive facilities to cover all areas of teaching and manufacture in the engineering disciplines.

Within Engineering we make use of a range of computer rooms and modern, purpose-built lecture facilities fitted with state-of-the-art audio-visual equipment. All of our computing facilities are updated regularly and operate under Windows or Linux and run current versions of all applicable engineering software including Solid Works and Auto CAD, Matlab and Abaqus.

The department and IT Services provide a helpdesk facility and a laptop surgery to help you with any difficulties and provide access to manuals and technical publications. Remote access to computing laboratories is available 24 hours a day, seven days a week.

Our learning resource area is a flexible learning space which holds a selection of materials and includes group meeting rooms. This area is specifically for student use and offers space and facilities for individual and group working.



Everyone at Exeter is full of ambition, passion and enthusiasm; it's an infectious atmosphere fuelling the University's achievements as a whole, as well as helping individuals achieve their personal, academic and extra-curricular goals. This left an enormous impact on my outlook on life; I want to carry on always working and living with that feeling and it pushed me to find a company with the same sort of ethos.

I kept an open mind when applying for jobs and applied for both engineering and non-engineering technical roles, but only focused on those emphasising problem solving, team work and an element of programming as I knew that would suit me well and make me a good fit for the company.

Exeter provides an exceptionally vast amount of opportunities to develop your strengths and interests through its courses, clubs and societies; I recommend that you make the most of these opportunities as I have found my experiences invaluable for analysing my next step. I have successfully secured a job that I truly enjoy by doing so.

Jo Relf, Software Implementation Consultant at Manhattan Associates
MEng Mechanical Engineering graduate 2014

CAREERS

An Engineering degree from Exeter is highly valued by employers. Our Employability Officer is active in developing aspects of our programmes and services that improve your employability. We also have a dedicated Careers Consultant who provides specific services such as careers workshops and support in matters such as applications and job interview skills. The Career Zone runs several careers fairs throughout the year and these have been particularly successful in putting major UK employers in touch with Exeter students.

We have many links to regional and national industry and student projects are usually industrially driven, often directly involving these companies. This provides an opportunity for you to undertake commercially important projects at the forefront of technology and enhance your employability. Relevant employers also visit the department to help students develop their career ideas at an early enough stage to help with module choices and placement decisions.

We provide skills development sessions in your first two years that include an induction week in the first year and a number of career related training sessions in your second year.

Many of our students take part in the Exeter Award and the Exeter Leaders Award. These schemes encourage you to participate in employability related workshops, skills events, volunteering and employment which will contribute to your career decision-making skills and success in the employment market.

This forward thinking and active attitude has given Exeter an excellent reputation with graduate recruiters and a strong employment record. Career opportunities for engineers are almost limitless, as engineers can be found working in the public sector, in health, design, communications, education, construction, defence, finance and manufacturing. Engineers have a reputation as being articulate, numerate, problem solvers, who typically claim great job satisfaction, a good salary and a huge range of career possibilities.

Further details on the destinations of our graduates can be found at: www.exeter.ac.uk/ug/careers

Examples of the destinations of our recent graduates:

Employers

National Instruments // Thales // Mott MacDonald // Jaguar Land Rover // Cobham // AECOM // Babcock International // Dyson // KPMG LLP // Balfour Beatty // Rolls Royce Plc // Consulting Engineering Centre // Red Bull // Infinity

Occupations

Production Engineer // Graduate Civil Engineer // Systems Engineer // Design Engineer // Business Systems Improvement Manager // Railway Signalling Design Engineer // Science Teacher // Research Assistant // Structures Examiner

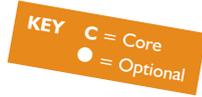
A number of our Engineering graduates choose to stay on at Exeter to continue their studies with us. A variety of subjects are studied from Masters level and PhDs in various specialist Engineering and associated fields through to professional qualifications such as teaching.

Prerequisite for chartered status

Our specialist engineering degrees are accredited by Professional Engineering Institutions under licence from the UK regulator, the Engineering Council.

Accreditation is a mark of assurance that the degrees meet the standards set by the Engineering Council in the UK Standard for Professional Engineering Competence (UK-SPEC). An accredited degree will provide you with some or all of the underpinning knowledge, understanding and skills for eventual registration as an Incorporated (IEng) or Chartered Engineer (CEng). Some employers recruit preferentially from accredited degrees, and an accredited degree is likely to be recognised by other countries that are signatories to international accords.

MODULES



For up-to-date details of all our programmes and modules, please check www.exeter.ac.uk/ug/engineering
 Years 2-4 are indicative and the actual modules offered may vary from year to year. A selection is detailed below.

Year 1 Modules

Module Name	Civil Engineering	Civil and Environmental Engineering	Electronic Engineering	Electronic Engineering and Computer Science	Engineering and Management	Materials Engineering	Mechanical Engineering
Core Engineering 1	C	C	C	C	C	C	C
Electronics for Engineers: Core Engineering 2	C	C	C	C	C	C	C
Engineering Mathematics	C	C	C	C	C	C	C
Engineering Mechanics: Core Engineering 2	C	C	C		C	C	C
Materials and Manufacturing: Core Engineering 2	C	C	C		C	C	C
Object-Oriented Programming				C			
Professional Studies and Skills Development 1	C	C	C	C	C	C	C
Programming for Science				C			

Year 2 Modules

Module Name	Civil Engineering	Civil and Environmental Engineering	Electronic Engineering	Electronic Engineering and Computer Science	Engineering and Management	Materials Engineering	Mechanical Engineering
Analogue and Digital Electronics Design			C	C	●		
Communication and Networking Technologies			C	C			
Construction Methods and Materials	C	C					
Control Engineering			C	●			C
Database Theory and Design				●			
Geotechnics I	C	C					
Introduction to Mechanical Engineering Design					●	C	C
Management and Management Science	C	C	C	●	C	C	C
Manufacturing Systems					C		
Materials Engineering						C	
Mathematical Modelling of Engineering Systems	C	C	C	C	C		C
Modelling and Control Engineering						C	
PICS, Microcontrollers and Microprocessors			C	●	●		
Professional Studies and Skills Development 2	C	C	C		C	C	C
Programming for the Web				●			
Scientific Programming in C			C		●		
Social and Professional Issues of the Information Age				C			
Software Development				C			
Software Engineering				●			
Solid Mechanics	C	C			●	C	C
Structures	C	C				C	C
The C Family				●			
Thermofluid Engineering	C	C			●	C	C

Year 3 Modules

Module Name	Civil Engineering	Civil and Environmental Engineering	Electronic Engineering	Electronic Engineering and Computer Science	Engineering and Management	Materials Engineering	Mechanical Engineering
Civil Engineering Design Studies	C	●					
Civil Engineering Hydraulics	C	C					
Commercial and Industrial Experience	●	●	●	●	●	●	●
Communications Engineering			C	●			
Computational Engineering					●	●	●
Computer Aided Engineering Drawing	●	●	●	●	●	●	●
Cryptography					●		
Digital Signal Processing			C	●	●		
Electromagnetics and Wave Propagation			C	●	●		
Electronic Engineering Design Studies			C	●	●		
Engineering in Society and Company Finance	C	C	C	●	C	C	C
Enterprise Computing				●			
Elective Module	●	●	●	●	●	●	●
Geotechnics 2	C	C					
Graphs, Networks and Algorithms	●	●			●	●	
Individual Project	C	C	C	C	C	C	C

Module Name	Civil Engineering	Civil and Environmental Engineering	Electronic Engineering	Electronic Engineering and Computer Science	Engineering and Management	Materials Engineering	Mechanical Engineering
Learning from Data				●			
Management of Processes and People					C		
Management of Product Development					C		●
Manufacturing					●	C	
Materials					●	C	●
Mechanical Engineering Design Studies					●	C	C
Nature-Inspired Computation				●			
Nonlinear Systems and Control					●	●	●
Numerics and Optimisation	●	●	●		●	●	●
Operations Management					●		●
Programming for the Web							
Structural Engineering	C	C					
Systems, Series and Transforms		●	●		●	●	●
Thermofluids and Energy Conversion							●
Water Resources and Pollution Control	●	C					

ENGINEERING IN EXETER MODULES CONTINUED

Year 4 Modules (MEng only)

Module Name	Civil Engineering	Civil and Environmental Engineering	Electronic Engineering	Electronic Engineering and Computer Science	Engineering and Management	Materials Engineering	Mechanical Engineering
Advanced Computational Fluid Dynamics					●		●
Advanced Geotechnical Engineering	●	●					
Advanced Materials Engineering						●	●
Agile, Lean and Competitive Enterprise					●		
Computation and Numerical Analysis				●			
Conceptual Design of Buildings	●						
Engineering Materials and the Environment					●	●	●
Group Project	C	C	C	C	C	C	C
Hydroinformatics Tools		●					
Lean Thinking and Sustainability in Industry	C	C	C	C	C	C	C
Linear Systems and Structural Analysis	●	●					
Machine Learning and Optimisation				●			

Module Name	Civil Engineering	Civil and Environmental Engineering	Electronic Engineering	Electronic Engineering and Computer Science	Engineering and Management	Materials Engineering	Mechanical Engineering
Manufacturing Supply Chain Management			●		●		●
Mechanics of Materials	●					●	●
Mechatronics: Sensors and Machine Automation			●	●	C		●
Metamaterials: Science, Technology and Applications			●	●	●		
Multivariable State-Space Control			●	●	●		●
Nature-Inspired Computation				●			
Programming for Engineering			●		●	●	●
Systems Analysis in Engineering	●	●	●		●		●
Water Management in Developing Countries		●					
Water Supply and Distribution Management	●	●					



Year 1

Core Engineering 1	Introduces the fundamental concepts of materials, structures, mechanics and electronics, providing a foundation for further study in these areas.
Electronics for Engineers: Core Engineering 2	Introduces fundamental concepts of electronics, electronics terminology and devices and elementary circuits. You will explore the concept of logic systems and their implementation using electronic devices.
Engineering Mathematics	Covers topics which are fundamental to engineers in their professional careers, placing an emphasis on the direct application of mathematics to engineering problems.
Engineering Mechanics: Core Engineering 2	Introduces the fundamental concepts of solid mechanics and fluid mechanics.
Materials and Manufacturing: Core Engineering 2	Through this module you will develop an awareness of principal engineering materials, their fabrication and technical and economic considerations.
Object-Oriented Programming	This module will introduce you to object-oriented problem-solving methods and provide you with object-oriented techniques for the analysis, design and implementation of solutions.
Professional Studies and Skills Development 1	Develops a range of transferable professional and personal skills that are essential to successful undergraduate study at university and in future employment.
Programming for Engineering	Provides an introductory course in computer programming and introduces the fundamental concepts of computer algorithms and programming with a strong emphasis practical implementation.

Year 2

Analogue and Digital Electronics Design	Encourages you to build on your basic knowledge of electronic devices and components to specify and construct practical digital and analogue electronic designs.
Communication and Networking Technologies	Provides an in-depth introduction to the fundamental principles underlying modern communication and network technologies and their applications.
Construction Methods and Materials	Explores the design process in civil engineering and introduces procedures for systematic design.
Control Engineering	Control Engineering is about making complex systems, such as cars and aeroplanes, behave in a desirable manner without complete manual control. This module considers the basic concepts of dynamics, feedback and stability and introduces the supporting computational techniques.
Geotechnics 1	Introduces the basic concepts of engineering geology, site investigation procedures and the principles of geotechnical engineering.
Introduction to Mechanical Engineering Design	Establishes a foundation for advanced mechanical design orientated projects and modules. The module culminates in the design, manufacture and testing of a device in a competitive environment.
Management and Management Science	Explores the economic environment, the tasks carried out and elementary tools used by engineering managers. The knowledge gained on this module will be useful for modules in subsequent years, especially in quantitative business analysis.
Manufacturing Systems	Provides an understanding of modern manufacturing systems and their design and management.
Materials Engineering	Develops your understanding of material properties, how they arise from internal microstructure and how they can be manipulated for specific applications. It will also introduce rapidly advancing topics in materials.
Mathematical Modelling of Engineering Systems	Explores standard methods of systems analysis using transform methods in both continuous and discrete variable form. Mathematical modelling of systems lies at the heart of engineering and allows us to predict how systems behave and thus design them properly and safely.

ENGINEERING IN EXETER MODULES CONTINUED

Modelling and Control Engineering	Introduces mathematical models of engineering systems, standard methods of systems analysis using transform methods in both continuous and discrete variable form.
PICS, Microcontrollers and Microprocessors	Introduces the fundamental principles of the design, operation and application of PICS, microcontrollers and microprocessors. You will also be introduced to assembly language programming for the Microchip PIC16MCU series devices.
Professional Studies and Skills Development 2	Enables you to develop a wide range of transferable skills as well as the practical design skills essential to all engineers. Engineering Design Activities provide useful experience of project team working, real engineering design, practical construction skills, self-organisation and report writing.
Solid Mechanics	Shows you how to calculate the stresses and strains within a static or dynamic object, as well as giving you a thorough understanding of how these tensions arise. In addition to this you'll gain a sound knowledge of Finite Element software which is used by engineers to find these results.
Structures	Develops a deeper understanding of the mechanical behaviour of structures and their application to engineering design.
Thermofluid Engineering	Introduces the theory, principles and practice of engineering fluid mechanics, thermodynamics and heat transfer. Many things mankind does involve moving fluids or heat around; eg, engines and heat exchangers, turbines and pumps; or is influenced by fluid dynamics, such as cars, aircraft, dams and weirs.
Year 3	
Civil Engineering Design Studies	In this module you will explore the civil engineering profession and construction industry processes while enhancing your design experience.
Civil Engineering Hydraulics	Familiarises you with the essential topics in hydraulics for any civil engineering graduate. You will develop the ability to analyse and modify existing hydraulic systems and to design new systems.
Commercial and Industrial Experience	Provides practical work experience in a business or commercial setting that is of direct relevance to your degree programme. Individual placements are subject to availability and to approval by the relevant Programme Coordinator.
Communications Engineering	Develops the subject-specific knowledge, understanding and skills required to design and analyse modern-day communication systems.
Computational Engineering	This module introduces you to numerical design approaches currently used in industry to analyse systems. Computational engineering covers the numerical methods and algorithms used to analyse and solve problems in everything from aircraft, cars and racing cars to blood flow.
Computer Aided Engineering Drawing	You will investigate the use of three-dimensional Computer Aided Engineering (CAE) Design tools for a variety of engineering applications; and gain an understanding of the mathematical principles underlying the CAE Design software and its limitations.
Digital Signal Processing	Considers the fundamental principles of digital signal processing, from both theoretical and practical viewpoints. You will design digital signal processing systems for a range of important application areas.
Electromagnetics and Wave Propagation	Introduces the fundamental principles of electromagnetics and applies theory to areas of technological importance including field computation and communication systems.
Electronic Engineering Design Studies	Within this module you will relate technical subjects studied in your degree to examples of their application in electronic products or services, in particular, the design criteria of a CD/DVD system.
Engineering in Society and Company Finance	As a professional engineer you will have responsibilities to society and this module aims to raise your awareness of these. It will equip you with a working understanding of non-technical issues such as social responsibility, health and safety, sustainability, product liability and intellectual property.

Geotechnics 2	Introduces the basic concepts of engineering geology, ground investigation procedures and the basic principles of foundation design.
Graphs, Networks and Algorithms	An introduction is given to the theory of graphs and the applications of graphs and networks to applied problems. The aim is to present the central results of modern graph theory together with the algorithms that are used to solve network optimisation problems.
Individual Project	You'll apply the knowledge and skills obtained from taught modules to a real engineering problem at a professional level and integrate knowledge gained in several areas of the degree programme. The project encourages the use of initiative, imagination and creativity and allows study in greater depth. Depending on your degree you will undertake this in Exeter, or linked with an industrial summer project (with Industrial Placement degree) or at one of our European or International Partner universities (with International Study degree).
Management of Processes and People	Introduces the organisation structure, management hierarchy and business motivation of an engineering company and its workforce from a perspective of total quality management.
Management of Product Development	Introduces the new product development process and a range of concepts and techniques for managing the process.
Manufacturing	Provides examples of current practices in advanced manufacturing, concentrating on the technical issues and applications of the technologies, and considers the interrelationship between materials, applications and manufacturing technologies.
Materials	Builds on the materials science content of the core first year and equips you with a deeper understanding of the deformation, strengthening and failure of materials.
Mechanical Engineering Design Studies	You will gain experience of the practical aspects of basic mechanical engineering design, drawing on the theory taught in previous modules, plus invaluable experience of working in a design team.
Operations Management	Introduces a core operations management task and highlights the key issues involved. You will discuss the central tasks of managing functions in operations, including the tools and techniques for improving the operations function.

Structural Engineering A good knowledge of structural design and analysis are essential elements of the training of civil engineers. You will cover methods of analysis for both linear elastic and plastic modes of behaviour and gain an understanding of how these methods are applied to real structures.

Thermofluids and Energy Conversion Examines the details of external flow, in particular boundary layers and flow around bluff bodies, together with the principles and engineering of all types of engines and power generation systems, eg, wind turbines and solar panels.

Water Resources and Pollution Control Introduces the water cycle, flow and quality on natural systems, showing how the hydrologic system can be protected by proper design and how sustainable drainage designs can be achieved.

Water Supply and Distribution Management Provides a basic knowledge of classical and contemporary problems in management of water supply and distribution systems for the practising engineer.

Year 4 (MEng only)

Advanced Geotechnical Engineering Introduces advanced concepts of geotechnical engineering including models in soil mechanics, elastoplastic constitutive models for soils, critical state theory, stress paths and soil tests, and applications of elastoplastic models in geotechnical engineering.

Advanced Materials Engineering Extends the understanding of materials gained in previous modules in the context of modern technology via exposure to current developments in biomaterials, materials for energy, and nano-composites.

Advanced Computational Fluid Dynamics Extends the practical understanding of CFD packages developed in earlier modules and complements this with an understanding of numerical and modelling issues.

Agile, Lean and Competitive Enterprise Lean production concerns the creation of quality products, expending less human energy and using less equipment, time and space. Agile manufacturing, meanwhile, relates to bringing new products into changing markets and the ability to be innovative and to thrive in a changing environment.

Conceptual Design of Buildings This module discusses principles governing the conceptual design of buildings and their implementation in engineering practice. In particular, you will know about form and functionality, actions on buildings, structural design of tall buildings, sustainability and passive buildings, construction and demolition, resilience of buildings, operation and performance tracking.

ENGINEERING IN EXETER MODULES CONTINUED

Engineering Materials and the Environment	Discover and learn about recycling technologies (methods and issues), discuss reuse, remanufacturing and sustainable manufacture, waste hierarchy, legislation and directives, sustainability, and examples of evolving business models such as the circular economy.	Mechatronics: Sensors and Machine Automation	By combining major components of electronic and mechanical engineering you will explore and learn how mechanical systems are instrumented and controlled.
Group Project	The group project requires you to work together in a group of between six and eight students and undertake a significant technical challenge. All projects are supervised by academic members of staff and are normally run in conjunction with a collaborating industrial company. Recent examples have included our Formula Student team, our project work on 3-D printing, analysing the impact of climate change on building design and investigating biologically inspired materials (seashells project).	Metamaterials: Science, Technology and Applications	Explore and study the design of materials and devices with remarkable properties, such as the much-publicised invisibility cloak, but also including many other technologically important applications, such as compact and efficient mobile phone antennae, highly efficient solar panels, perfect optical imaging, new improved bio-medical sensors, etc.
Hydroinformatics Tools	Provides a basic understanding of tools in the emerging field of hydroinformatics for the practising engineer. You will gain practical experience in using these tools within the urban water management context.	Multivariable State-Space Control	This module explores control theory, which is concerned with forcing measured outputs of a system to follow a desired reference command, through the manipulation of certain input variables to the system.
Lean Thinking and Sustainability	Broaden your understanding of the operations and management of a variety of industrial organisations and provide you with a greater degree of industrial awareness. In addition, the module will broaden your knowledge of environmental and sustainability issues and health and safety.	Nature-Inspired Computation	This module will provide you with the knowledge to create and apply techniques based on evolution, the intelligence of swarms of insects and flocks of animals and the way the human brain is thought to process information.
Linear Systems and Structural Analysis	Acquire the mathematical knowledge and tools required to model and analyse the behaviour of linear structural systems. It will cover the fundamentals of linear systems theory and related mathematical topics, alongside an introduction to MATLAB programming. You will also review the essential concepts of linear structural analysis, and understand the underlying theory and concepts of finite element analysis.	Programming for Engineering	You will be introduced to the basic concepts and principles of software development resulting in the ability to write your own code and create your own executable computer applications.
Manufacturing Supply Chain Management	Study the different aspects of the tools and techniques employed within supply chain management, including forecasting, planning, inventory and distribution, together with the strategic and management aspects of supply chain management that are principally related to manufacturing industry.	Systems Analysis in Engineering	Develop an understanding of how systems analysis can support the planning, design and management of engineering systems, including water and environmental systems. The module covers a number of systems analysis tools including simulation, optimisation and decision making techniques, and enhances your theoretical and practical knowledge of their application to real world problems.
Mechanics of Materials	Introduces the more advanced aspects of the theory of elasticity as applied to solid mechanics, providing a basis for study in solid mechanics, computational engineering and materials.	Water Management in Developing Countries	This module is aimed at looking to develop your understanding of water management issues, implications and potential interventions meeting developing countries' complex needs and resources constraints.
		Water Supply and Distribution Management	Provides a basic knowledge of classical and contemporary problems in management of water supply and distribution systems for the practising engineer.



ABOUT THE UNIVERSITY OF EXETER

Top 1% of universities worldwide (*Times Higher Education*)

9th in *The Times* and *The Sunday Times Good University Guide 2017*

Six months after graduation, 94% of our first degree graduates were in employment or further study (*HESA 2014/15*)

Our teaching is inspired by our research, 98% of which is of international quality (*2014 Research Excellence Framework*)

We have 21,000 students from 181 countries, and they are the most satisfied in the Russell Group (*NSS*)

VISIT US TO FIND OUT MORE

Open Days

You can register your interest now for our Open Days and receive priority access to book your place*; visit www.exeter.ac.uk/opendays

* Pre-registration only guarantees priority access to the booking system and is not an absolute guarantee of a place at any of our Open Days. Booking is essential and is on a first-come, first served basis.

Exeter campuses:

Friday 2 June 2017

Saturday 3 June 2017

Saturday 2 September 2017

Penryn Campus, Cornwall:

Saturday 10 June 2017

Saturday 23 September 2017

Campus Tours

We run campus tours at the Streatham Campus each weekday, and at the Penryn Campus on Wednesday and Friday afternoons, during term time. You will be shown round by a current student, who will give you a first-hand account of what it's like to live and study at the University.

Exeter phone: +44 (0)1392 724043
email: visitus@exeter.ac.uk

Cornwall phone: +44 (0)1326 371801
email: cornwall@exeter.ac.uk

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