MINING ENGINEERING
UNDERGRADUATE STUDY 2014 ENTRY
CORNWALL CAMPUS
Key information

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<th>UCAS CODE</th>
<th>TYPICAL OFFER</th>
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<tr>
<td>BEng Single Honours</td>
<td>J110</td>
<td>AAB-BBB; IB: 34-30</td>
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For further details on all our entry requirements, please see our Mining pages at: [www.exeter.ac.uk/undergraduate/degrees/mining](http://www.exeter.ac.uk/undergraduate/degrees/mining)

CORNWALL CAMPUS, NEAR FALMOUTH
Website: [www.exeter.ac.uk/mining-minerals-engineering](http://www.exeter.ac.uk/mining-minerals-engineering)
Email: cornwall@exeter.ac.uk
Phone: +44 (0)1326 371801

Our graduate mining engineers are sought after the world over in the extractive industries as well as in exploration, tunnelling and civil engineering. We are one of the best equipped departments of our kind in Europe, with exceptional links with industry. Our students benefit from our leading edge research, extensive placement scheme and our global reputation in industry.

DR ANDY WETHERELT, MINING ENGINEERING PROGRAMME LEADER
Why study Mining Engineering at the University of Exeter?

The Mining Engineering degree is taught by the University’s Camborne School of Mines (CSM), which has over 120 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.

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.

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 programme 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.

What is Mining Engineering?
The demand for minerals will continue to grow as the world’s population doubles over the next 40 years. 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 needed by the minerals industry now and in the future. 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.

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

5th for Materials and Minerals Technology in the National Student Survey (2012)

Closed links with industry and paid placement opportunities around the world

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

Superb facilities include an underground test mine and world-class analytical mineralogy labs

Emphasis on field-based training

destination of Leavers from Higher Education Survey (DLHE) of 2010/11 undergraduates

based on the average percentage of positive responses across all survey categories for full service universities

accreditation pending for MEng
Programme overview

How your degree is structured

Our programmes are modular and you progress through your degree by studying modules and accumulating credits as you successfully complete them. Individual modules are worth 15 credits each. Full-time undergraduates need to take 120 credits in each year. Details of some of the modules you’ll study are shown at the back of this brochure.

For up-to-date details of all our programmes and modules, please check www.exeter.ac.uk/mining-minerals-engineering

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 two 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, we undertake a week long industrial tour.

Year 3 In the third year all subjects are very closely connected with mining. Mine design, geotechnical engineering, mining geology and minerals management 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. Previous research projects have included:

• Blast vibration analysis
• Gyrotheodolite surveys
• Orebody modelling
• Computer modelling of rock slope failure
• Health and safety in mines and quarries
• Mine and tunnel design
• Quarry product evaluation

Year 4 (MEng only) If you take the four-year MEng programme you’ll undertake a group design project along with additional independent study. You’ll also take modules covering advanced mine design and prepare an industrial focused thesis following a project undertaken with a mining company as part of your summer vacation.
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 operation of 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

We believe that 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.

Across all our undergraduate programmes, teaching is strongly informed by the research expertise of academic staff who are internationally-recognised experts in their field.

Camborne School of Mines 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

We offer state-of-the-art equipment for teaching and research on campus and at our test mine nearby. Laboratory classes, using our extensive teaching equipment enables you to fully appreciate the theoretical elements of the programme via practical examples.

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.

Field work 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 Cornwall 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 Cornwall Campus, the new 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 second and third-year assessments. These draw on coursework, guided project work and exams.

Scholarships
Through the generous support of The Camborne School of Mines Trust, industrial sponsors and past students and staff we are able to offer scholarships each year to new students who register on degree programmes run by Camborne School of Mines.

The scholarships are awarded primarily on the basis of academic merit and are payable for the duration of your degree programme, subject to continued satisfactory academic performance. Further information can be found on our website at www.exeter.ac.uk/mining-minerals-engineering
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).

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

Examples of the destinations of our recent graduates:
- Tunnel Engineer, Leighton Asia, Hong Kong
- Mining Engineer, Newport Goldmining, Western Australia
- Mining Engineer, MMD Sizers, UK
- Chemical Engineer, Rimex Metals Ltd, UK
- Graduate Mining Engineer, Rio Tinto, Australia
- Trainee Mining Engineer, Grinaker Ltd, South Africa
- Graduate Mining Engineer, Xstrata, Australia
- Management Trainee in Mining Engineering, Sibelco, UK
- Mine Ventilation Engineer, Anglo American, Ireland
- Graduate Mining Engineer, The Lisheen Mine, Ireland
- Engineer, First Quantum Minerals, Australia
- MSc: Mining Engineering, University of Exeter

Entry requirements and applying

You can find a summary of our typical entry requirements on the inside front cover of this brochure.

The full and most up-to-date information about Mining Engineering is on the undergraduate website at www.exeter.ac.uk/undergraduate/degrees/mining and we strongly advise that you check this 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/or Mathematics.

We make every effort to ensure that the entry requirements are as up-to-date as possible in our printed literature. However, since this is printed well in advance of the start of the admissions cycle, in some cases our entry requirements and offers will change.

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/undergraduate/international.

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

We are currently reviewing all our modules; for up-to-date details for 2014 entry, please check [www.exeter.ac.uk/mining-minerals-engineering](http://www.exeter.ac.uk/mining-minerals-engineering)

### Year 1 Modules
- Mathematics
- Surveying and CAD
- Mining and Minerals Engineering
- Geology
- Engineering Mechanics
- Thermodynamics and Fluid Mechanics
- Electrical and Electronic Principles

During the year you’ll undertake a five day Industrial Experience course where you’ll use mining equipment and explosives. You will also attend a three-week Survey Field course between the first and second years.

### Year 2 Modules
- Fluid Mechanics
- Mathematics 2
- Project Management and Accounting
- Mechanics of Materials
- Surface Mining and Mine Transport
- Electrical Energy Conversion and Transport
- Geotechnics
- Mining and Surveying

Between the second and third years you’ll spend your summer vacation working in the mining industry gaining suitable industrial experience.

### Year 3 Modules
- Minerals Engineering
- Surface Excavation Design
- Safety and Sustainable Development
- Tunnel and Underground Excavation Design
- Working Environment and Ventilation
- Feasibility Study
- Mining Project
- Mineral Economics and Feasibility Studies

### Year 4 Modules
- Individual Research Thesis
- Group Design Project
- Mine Automation
- Advanced Mine Design
- Advanced Mine Ventilation and Modelling
- Advanced Minerals Engineering
Mining Engineering modules

Please note that availability of all modules is subject to timetabling constraints and that not all modules are available every year. For up-to-date details of all our programmes and modules, please check www.exeter.ac.uk/mining-minerals-engineering

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<th>Year 1</th>
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<td><strong>Mathematics</strong></td>
<td><strong>Fluid Mechanics</strong></td>
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<tr>
<td>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.</td>
<td>Extends the basic principles covered in the Thermodynamics and Fluid Mechanics module and their practical application to real engineering situations.</td>
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<tr>
<td><strong>Surveying and CAD</strong></td>
<td><strong>Mathematics 2</strong></td>
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<tr>
<td>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.</td>
<td>You will take two mathematics modules in the second year: one covering advanced algebra and calculus; and the other covering advanced mathematics for engineering.</td>
</tr>
<tr>
<td><strong>Mining and Minerals Engineering</strong></td>
<td><strong>Project Management and Accounting</strong></td>
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<tr>
<td>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.</td>
<td>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.</td>
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<tr>
<td><strong>Geology</strong></td>
<td><strong>Mechanics of Materials</strong></td>
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<tr>
<td>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.</td>
<td>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.</td>
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<tr>
<td><strong>Engineering Mechanics</strong></td>
<td><strong>Surface Mining and Mine Transport</strong></td>
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<tr>
<td>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.</td>
<td>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.</td>
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<tr>
<td><strong>Thermodynamics and Fluid Mechanics</strong></td>
<td><strong>Electrical Energy Conversion and Transport</strong></td>
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<tr>
<td>Designed to develop your knowledge of fluid mechanics and of energy transfer and storage in thermal systems.</td>
<td>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.</td>
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<tr>
<td><strong>Electrical and Electronic Principles</strong></td>
<td><strong>Geotechnics</strong></td>
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<tr>
<td>An introductory module covering the fundamental electrical principles including a complete range of semiconductor devices and electronic systems.</td>
<td>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.</td>
</tr>
<tr>
<td><strong>Mining and Surveying</strong></td>
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<tr>
<td>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.</td>
<td>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.</td>
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### Year 3

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<tr>
<td>Minerals Engineering</td>
<td>Provides an overview of minerals engineering and includes both mineral processing and extractive metallurgy.</td>
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<tr>
<td>Surface Excavation Design</td>
<td>Provides design-based consideration of some major aspects of geotechnical engineering found in civil and mining engineering practice.</td>
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<tr>
<td>Safety and Sustainable Development</td>
<td>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 a mining legacies.</td>
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<tr>
<td>Tunnel and Underground Excavation Design</td>
<td>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 TBM selection.</td>
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<tr>
<td>Working Environment and Ventilation</td>
<td>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.</td>
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<tr>
<td>Feasibility Study</td>
<td>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.</td>
</tr>
<tr>
<td>Mining Project</td>
<td>Provides you with the opportunity to carry out an individual research project over the course of your third year. Project titles, involving any aspect of the course, are chosen from a list at the beginning of the academic year.</td>
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<tr>
<td>Mineral Economics and Feasibility Studies</td>
<td>Helps you to understand that the global minerals industry presents a unique investment environment, which needs to be mastered to ensure the successful development of a minerals venture. It prepares you for the month long Feasibility Study exercise.</td>
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### Year 4

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<tr>
<td>Individual Research Thesis</td>
<td>This module involves independent study at M-level where students conduct independent research into a topic of their choice which is directly related to the programme.</td>
</tr>
<tr>
<td>Group Design Project</td>
<td>You’ll 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.</td>
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<tr>
<td>Mine Automation</td>
<td>This module will explore the various ways in which mine automation is being used to make the industry both more profitable, safer and easier to manage.</td>
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<tr>
<td>Advanced Mine Design</td>
<td>This module takes mines design to an advanced level of study, using some of the latest mine design software packages.</td>
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<tr>
<td>Advance Mine Ventilation and Modelling</td>
<td>This module continues on from the third year module on ventilation and requires you to undertake ventilation airway modelling using the latest software packages.</td>
</tr>
<tr>
<td>Advanced Minerals Engineering</td>
<td>This module extends your knowledge beyond that of the third year module, Minerals Engineering, and focuses on the advanced facets of mineral processing.</td>
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**Academic excellence**

- The University of Exeter has been named as *The Sunday Times* University of the Year and is also ranked 7th in its UK in their University Guide 2013.
- We are also in the top one per cent of universities in the world, and a regular fixture in the top 10 league tables in *The Guardian* and *The Times*.
- University of Exeter students are among the most satisfied in the UK: we are ranked 6th in the UK in the National Student Survey 2012 amongst traditional universities.
- The Cornwall Campus beats every other university in the UK for student satisfaction: we are a relatively small campus, where everyone gets to know each other. We are an informal campus, where you will have easy access to enthusiastic academics. Students here talk about a highly personalised experience, stretching but fun. In our case, small really is beautiful.
- Our teaching is inspired by our research, nearly 90 per cent of which was ranked as internationally recognised by the 2008 Research Assessment Exercise.

**A vibrant community**

- Our students are the most engaged in the country, smashing participation records in student elections for the last two years running.
- FXU, the Cornwall Campus Students' Union, offers a fantastic selection of societies – in total there are over 80 clubs and societies to choose from.
- The Cornwall Campus Sports Centre includes an excellent gym and sports facilities, whether you want to compete at the highest level, keep fit or just have fun.
- We work with our students to continually improve the education on offer, via initiatives which put students at the heart of our decision making process.
- The Cornwall Campus has a small but vibrant international community. Across the University there are students from over 130 countries and staff of 50 different nationalities.

**Ambition for the future**

- We equip you with the skills employers need via business placements, study abroad schemes, volunteering opportunities, careers advice from successful alumni and much more.
- Despite tough economic times, we’ve improved our employment record year-on-year: more than 90 per cent of students get a job or further study place within six months of graduating.
- The Cornwall Campus is now a £200 million Higher Education hub featuring state of the art lecture theatres and library spaces, new accommodation and world-class research facilities.

**Explore the possibilities**

**Open Days**

Come and visit our beautiful campuses. We hold Open Days twice a year in June and September.

**Campus Tours**

Tours of the Cornwall Campus run on Wednesday and Friday afternoons. You’ll be shown round by a current student, who’ll give you a first-hand account of what it’s like to live and study here.

For full details and to book your place at an Open Day or campus tour, visit [www.exeter.ac.uk/opendays](http://www.exeter.ac.uk/opendays)

For enquiries contact phone: +44 (0)1326 371801, email: cornwall@exeter.ac.uk

**Offer-Holder Visit Days**

Once you receive confirmation of an offer we’ll contact you with an invitation to visit us on an Offer-Holder Visit Day, which will give you the chance to find out more about your programme and department and decide whether to accept our offer. While this opportunity to visit includes a campus tour and formal introduction to your subject of choice, much emphasis is placed on a more informal period for questions and answers. A number of our current students also take part on these days, leading tours and giving you the opportunity to ask them what studying here is really like! Offer-Holder Visit Days take place during February and March.