



MSc Engineering Geology

Mode of study: Full time or part time

Duration: 1 year full time, 2 years part time

Entry requirements for 2013 entry: A 2:2 honours degree or equivalent in a relevant Earth Science or Civil Engineering field such as Geology, Earth Science Civil Engineering or a related discipline. Applicants with industrial and work experience will also be considered.

IELTS score: English language proficiency at a minimum of IELTS band 6.5 or equivalent.

Find out more:

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Department: [Earth and Environmental Sciences \(SEES\)](#)

Course overview

Engineering geology is the application of earth science to the assessment of geological ground conditions that may affect the design, construction, operation and maintenance of large scale engineering projects. An engineering geologist will provide expertise in earth-structure interactions by identifying surface and sub-surface processes and hazards that could affect engineering structures through detailed investigations of the surface and subsurface geology, identification of adverse ground conditions and the design of suitable remedial measures. Engineering geological expertise is critical to all types of civil engineering projects such as tunnels, dams, mines, quarries, offshore platforms and wind farms.

The MSc in Engineering Geology is a well established course that has been running for more than a decade. The course is a mixture of taught units and research project covering topics including site investigation, soil mechanics and rock mechanics, geotechnical engineering design, contaminated land, slope stability and rock engineering. It is one of only a few courses of its type in the UK and is taught by internationally recognised experts with extensive expertise in engineering geology and geotechnics.

Accreditation



accredited degree programme

This course has been accredited by the [Geological Society of London \(http://www.geolsoc.org.uk\)](http://www.geolsoc.org.uk). This scheme recognises those MSc programmes that offer advanced professional and scientific training and therefore provide an accelerated route for students to attain Chartered Status, such as Chartered Geologist (CGeol) and Chartered Scientist (CSci) on graduation.

Study options

The course is available as either full-time mode (12 months' duration) where teaching takes place over two days per week (Mondays and Tuesdays); or part-time mode (two years' duration) whereby teaching is timetabled over one day per week (Mondays in year one and then Tuesdays in year two). For more information on study options, please visit our [postgraduate webpage \(http://www.port.ac.uk/departments/academic/sees/mscpostgraduatestudy/\)](http://www.port.ac.uk/departments/academic/sees/mscpostgraduatestudy/) or contact the Admissions Tutor.

About us

The School has recently been rated very highly in the latest nationwide survey of research quality with the vast majority of research in the areas of earth and environmental science was deemed to be of international standard, with nearly half the research judged as internationally excellent, including some world-leading research. Teaching in the School is underpinned by active research and consultancy, with many staff members collaborating with industrial and academic partners in the UK and overseas. This creates a

unique and dynamic environment in which to learn about engineering geology and geotechnics.

Come and visit us

The School of Earth and Environmental Sciences holds regular postgraduate open days throughout the year. These provide an informal opportunity to see the range of University and department facilities and give you a chance to discuss the course with members of academic staff. For further information or to book a place on an upcoming open day, please visit our [School postgraduate webpage](http://www.port.ac.uk/departments/academic/sees/mscpostgraduatestudy/opensdays/) (<http://www.port.ac.uk/departments/academic/sees/mscpostgraduatestudy/opensdays/>). If you are unable to attend an organised open day, but would still like to visit the department, please [contact us](http://www.port.ac.uk/departments/academic/sees/mscpostgraduatestudy/contactus/) (<http://www.port.ac.uk/departments/academic/sees/mscpostgraduatestudy/contactus/>) to arrange an individual visit.

Course content

Course structure

The course comprises of two parts: firstly, the taught component of the course that runs between September and April each year and comprises the lecture, workshop and practical elements of the course; this is then followed by a five-month independent research project (May to September), supported by individual tutorials and research training sessions. The main course themes are summarised as follows:

- **Rock and soil mechanics** are integral to the role of an engineering geologist. The course provides an advanced understanding of the geo-mechanical behaviour of rocks and soils and how they behave under different geotechnical design scenarios. This unit provides key skills in the assessment, description and testing of geological materials in order to understand and quantify their behaviour, using current British and Eurocode standards.
- **Soil and rock engineering** provides an advanced understanding of engineering and design in soils and rock masses, including fundamental design principles associated with common geotechnical solutions encountered on engineering geological and civil engineering projects.
- **Contaminated land and groundwater** are important considerations in all types of construction and so an understanding of both is essential. This course provides an overview of key techniques for the identification and assessment of contaminated land and groundwater resources in an engineering geological context.
- **Ground models** are essential parts of any investigation and this course provides training in the development of geological ground models and geomorphological terrain models within the content of engineering geological practice.
- **Ground investigation techniques** are an essential part of an engineering geologist's skill base and this course provides advanced experience of ground investigation using invasive techniques, in-situ tests and geophysical methods.
- **Landslides and slope instability** are an important hazard to all types of development and this course includes a dedicated unit that provides an advanced understanding of landslide systems, types of slides in soils and rocks and methods for identification and numerical analysis.
- **Field reconnaissance and geomorphological mapping** techniques are integral to the course and an essential skill for any graduate wishing to work in this area. The course provides fieldwork training in techniques such as geomorphological mapping and walk over surveys combined with interpretation of remote sensing and aerial photography imagery.
- **Spatial analysis and remote sensing** are key tools for terrain evaluation and the course provides training in the acquisition and interpretation of aerial photography and satellite imagery and the integration and analysis of spatial datasets using GIS.
- **Independent research project** provides an opportunity to undertake an original piece of research to academic or industrial standards, typically in collaboration with research staff in the department or external industry partners. In addition to submission of a thesis report, students also present the results of their projects at the annual postgraduate conference held at the end of September.

The course is vocational and designed to provide students with the necessary transferable skills for direct entry into employment. These

skills include field mapping, report writing, meeting deadlines, team working, presentation skills, advanced data modelling and communication.

Field courses

Field courses are an important component of all the MSc courses as they reinforce learning from lectures and practicals, and provide students with important observational and mapping skills for your independent research project. In addition, field skills are highly valued by employers and so the trips also provide students with transferable skills for entry into the geotechnical industry.

The field trips consist of a series of residential technique trips (typically two or three days in duration) undertaken in the UK. Field training undertaken includes soil and rock descriptions to current UK and EU standards, rock mass assessment, geomorphological mapping, landslide mapping and terrain evaluation. The course also includes a week-long overseas study tour to study examples of engineering in complex geological terrains.

Your learning experience

You will be part of a large postgraduate community including MSc and PhD students in a vibrant and friendly department. You will be taught by experts, who have extensive industrial and consultancy experience and strong research portfolios, and you will have the opportunity to become involved in research within the department and to work with our industrial partners during your time at Portsmouth.

You will be taught through a combination of lectures, workshops, seminars and tutorials. Each unit includes hands-on practical sessions designed to give you the skills in laboratory, computer and field techniques. This in-class teaching is supplemented by extensive use of web-based and library learning resources. The course also includes an extensive fieldwork programme designed to provide field mapping and data collection skills.

A personal tutor is assigned to each student and you will also have access to a specialist Academic Skills Unit (ASK) offering assistance on a wide range of issues, from essay writing to time management and referencing conventions. In addition, if English is not your first language, there are free courses available to help familiarise you with the use of English for academic purposes.

Studying and working abroad

Overseas trips form an integral part of the field course programme and involve field visits to study large-scale engineering geology projects and examples of current industrial practice at close quarters. Although most student engineering geology projects are based in the UK, there are still opportunities for students to undertake their research project abroad. Previous project destinations have included Ghana, France and Hong Kong. On graduation, there are significant employment opportunities abroad.

Career prospects

Engineering geology is one of the key areas in which the UK has a skills shortage; students on this course receive extensive training so that when they graduate they are able to fill this skills gap. This fact combined with the vocational nature of this course means that graduates are quickly employed in the industry where there is a huge demand for geotechnical and engineering geology specialists. Your employment prospects are not just limited to the UK; there is a global demand for engineering geology graduates that provides excellent opportunities for employment overseas. Our graduates can now be found working in many countries including Canada, Australia, New Zealand and Hong Kong. Even if you start work in the UK, you will likely be working for a large global company with significant overseas operations and so there will be plenty of opportunities for you to spend time working abroad.

If you are interested in further research, the course has strong research and analytical components, providing training for those students interested in pursuing further research at PhD level. The School provides support to students in finding employment through close industrial contacts, career events, recruitment fairs and individual advice. You will also have access to the University's careers and recruitment service while on the course and for five years after graduation.

Facilities and features

You will have access to a designated postgraduate workroom, which is fitted with a suite of computers and free colour and black and

white laser printing facilities. In addition, you will have access to industrial standard software including geotechnical applications (Oasys Suite), slope stability software (Rocscience Suite, SlopeW), Geographical Information Systems (GIS) and image processing software (ArcGIS, ERDAS Imagine, ER Mapper, ENVI).

You will also have access to the University Library, which is open from 8am until midnight every day during term-time. It offers access to thousands of books, journals and other resources to help with study and research, and has a large IT area and group study rooms. No matter where you are, you will have easy access to the University's comprehensive online resources – as if you were on campus. Our online resources include thousands of ebooks (electronic versions of key textbooks) and academic and business journals.

In addition, you will have access to an extensive range of [analytical facilities \(http://www.port.ac.uk/departments/academic/sees/mscpostgraduatestudy/facilities/\)](http://www.port.ac.uk/departments/academic/sees/mscpostgraduatestudy/facilities/) including:

- Rock and soil testing in a newly refurbished geotechnics facility including stress path cell equipment, ring shear tests, large shear box for soil testing, and triaxial test cell, Brazilian and uniaxial test rigs for rock testing.
- X-ray Fluorescence Spectrometer (XRF) for high-precision qualitative and quantitative elemental analysis of rocks and soils.
- X-ray Diffractometer (XRD) for mineral identification including clays.
- Scanning Electron Microscope (SEM) providing up to 300,000x magnification with energy-dispersive X-ray detector for sample analysis.
- Inductively-Coupled Plasma Mass Spectrometer (ICPMS) designed for sensitive elemental and isotopic analysis of geological and environmental samples.
- Atomic Absorption Spectrophotometer (AAS) elemental analysis equipment.
- Nutrient Autoanalyser for comprehensive nutrient analysis in waters and soils.
- Nuclear instrumentation including solid state gamma ray spectrometer, liquid scintillation counter, sodium iodide detectors and associated instrumentation.
- Field equipment including GPS mapping systems, geophysical instruments and in-situ soil and rock mass testing equipment.

All facilities are fully supported by dedicated technical support staff and are freely available to all postgraduate students.

Entry requirements

The entry requirements for MSc Engineering Geology are shown above, for more detailed information please contact:

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