Earth and Environmental Sciences @ Manchester

Extensive field and practical training, with UK and overseas field courses in every year of study. Costs are included in your fees.

One of the largest schools of Earth and Environmental Science, giving access to a wide range of specialisms.

Excellent environment equipped with the latest facilities and teaching from leading scientists in their field.

Industry input into development of our cutting-edge course content ensures real-world relevance.

Ranked within the top 10 in the UK (QS World University Rankings 2018).

"Where better to study the Earth, planetary and environmental sciences than at one of the oldest and most established Earth Science departments in the world? Our new Earth and Planetary Science and Environmental Science degrees offer a modern approach to studying Earth System Science, with flexibility to allow you to specialise and tailor your studies to your interests."

Prof Kevin Taylor
Head of School, Earth and Environmental Sciences
Women in Science

Dr Vicky Coker

Dr Vicky Coker is a Lecturer in Environmental Mineralogy in the Molecular Environmental Science Group. Vicky joined the lecturing staff in 2013 and has strong links to our national synchrotron radiation facility – the Diamond Light Source for her research. Vicky has previously held the L’Oreal For Women in Science Fellowship for her work investigating arsenic and uranium mobilisation in the subsurface by bacteria using X-ray microscopy.

Vicky’s current focus is the security of supply of cobalt and how naturally occurring bacteria can affect potential metal deposits. An active member of the teaching staff, Vicky uses her research to guide her teaching of the undergraduate students in Earth’s resources and more specifically metal resources in both the first and second year.

Dr Katherine Joy

Dr Katherine Joy is a Royal Society University Research Fellow and Reader in Isotope Geochemistry and Cosmochemistry, and she joined the University of Manchester in 2012. Katherine’s work is at the front line of current planetary science research, and is focused on studying the geological history of the Moon by analysing the chemistry, mineralogy and age of lunar samples that were returned by the Apollo astronauts as well as lunar meteorites found on Earth.

Katherine is involved in a science team for an upcoming robotic mission to the Moon, and is helping to lead a scientific expedition to Antarctica to collect meteorite samples. Undergraduates supervised by Dr Joy study samples of the Moon, Mars and asteroids in the lab using a range of analytical techniques. Dr Joy also leads an undergraduate field trip to Germany, where planetary science students apply their taught knowledge of comparative planetary scale processes to a field example of an impact crater.

Professor Ann Webb

Ann Webb is a Professor of Atmospheric Radiation. As ‘Professor Sunshine’, she studies the interaction of solar radiation and the atmosphere. This has included a decade as the pilot of a small research aircraft, exploring, for example, the scattering of radiation by clouds, and mapping the surface temperatures of Manchester’s urban heat island. Ozone and the ultraviolet part of the sun’s spectrum are a particular interest and Professor Webb has held leading roles at the World Meteorological Organisation and the International Commission on Illumination (CIE) for this work. The impacts of solar radiation at the Earth’s surface are explored through interdisciplinary research into the effects of UV radiation on humans; in particular the beneficial effect of vitamin D synthesis. Professor Webb brings her wealth of experiences into her teaching and has taught and supervised students from a wide range of disciplines.

The School of Earth and Environmental Science actively works towards generating an inclusive environment for all of our students and has been awarded an Athena Swan Bronze award for its commitment to the advancement and promotion of the careers of women in STEM in higher education and research.

Read about our Women of Wonder and watch the stories of some of the women in our Faculty:

www.se.manchester.ac.uk/people/women-of-wonder

www.mub.eps.manchester.ac.uk/science-engineering/2017/03/06/women-of-wonder

www.se.manchester.ac.uk/people/women-of-wonder
Facilities and resources

Field and laboratory work lies at the core of our research and teaching in the Earth, Planetary and Environmental Sciences.

Our teaching resources provide students with the very best opportunities:

- A well-equipped, dedicated undergraduate study providing a place for relaxation and somewhere to work with your fellow students within the School.
- Computer visualisation suite for studying seismic data sets from the oil and gas industry.
- Innovative, research-led, eLearning tools to enhance your understanding are being developed in our School, such as the Build Your Own Earth app (www.buildyourownearth.com) which was shortlisted for the Global Reimagine Education Awards 2018.
- Close supervision and pastoral care by an academic member during the whole degree course.

Students in their final year work alongside research groups and use our world-leading research facilities, such as:

- Analytical geochemistry unit—for analysing water and solid geological matter.
- Environmental Scanning Electron Microscope - for imaging a wide range of samples, from polished rock sections to bacteria to Egyptian mummies.
- Cameca electron probe - used for the quantitative analysis of a wide variety of geological samples.
- In-situ and remote sensing instrumentation for the study of clouds, aerosols, radiation and dynamics.
- Advanced isotope geochemistry and cosmochemistry suite.

Field work is an essential part of all our courses and provides a unique learning experience.

- Field work gives you the chance to apply knowledge learnt in lectures and practical classes to real settings, allowing you to develop the skills of a professional earth and environmental scientist, such as observing, collecting, recording and interpreting a range of data.
- Venues vary from classic areas of the British Isles to locations across the globe.
- Field courses are tailored to meet the needs of each pathway.
- Most field courses are residential and provide a great chance to form friendships with staff and your fellow students in an informal setting, and to travel and experience different cultures.
Apply

How to apply

www.manchester.ac.uk/study/undergraduate/applications

Please note that the course units listed in this brochure only represent a sample of the full breadth of available units for each course. Units are reviewed on an annual basis and as such may vary slightly to those advertised.

For up-to-date course information, including unit detail and entry requirements in full, visit our course finder:

www.manchester.ac.uk/undergraduate

Typical offer

A-level AAA-AAB which should include at least one science subject.

IB 35-36 points overall with 6,6,5-6,6,6 at Higher Level including one science subject.

For full details of our entry requirements:

www.manchester.ac.uk/ugcourses

Peer support scheme

Our peer support scheme is one of the largest in Europe. Peer mentors are higher-year students on the same degree programme as you, who will help you find your feet when you arrive here and adjust to student life. As they’ll have already been a student at Manchester for at least a year, they should be able to help you with anything you might be worried or unsure about.

PASS (Peer Assisted Study Sessions)

Led by volunteer students, PASS sessions will often be based around a specific area of study. You’ll have the opportunity to consolidate and build on your existing knowledge through discussion with other students in an informal and supportive environment, where you can compare notes, analyse, ask questions and talk through ideas.

Academic advisers

Study with us and you’ll be assigned an academic adviser who is there to give advice about any academic or personal issues throughout the duration of your course. Your adviser will be able to help you with the transition from school/college to university and can help you get to grips with studying and learning more independently.

Disability support

If you have additional needs arising from a medical condition, a physical or sensory disability, a specific learning disability such as dyslexia, or a mental health difficulty that affects your study, we can provide support. Contact or visit our Disability Advisory and Support Office before you apply, to discuss your needs and support available.

www.manchester.ac.uk/dass

Find out more about the personal and academic support available to you throughout your studies:

www.manchester.ac.uk/study/experience/student-life/university/student-support

Earth and Environmental Sciences
Study options

Overview
The Earth is a dynamic, natural system that has evolved as a result of physical and chemical processes which have influenced the growth and demise of ecosystems for over 4.5 billion years. It continues to evolve both naturally and as a result of the impact of humans.

We are a School of geologists, chemists, mathematicians, biologists, physicists and computer scientists, who work together to study the Earth and planets. Our courses cover the full breadth of the Earth, planetary and environmental sciences, reflecting the main research themes that are fundamental to the work we do in the School of Earth and Environmental Sciences.

The close alignment between our teaching and research ensures that units are delivered by scholars who are at the forefront of their disciplines.

Flexible options
We offer a choice of two degree courses, one in Earth and Planetary Sciences, and the other in Environmental Science. Within each, there are several different pathways through the subject. Both degree courses may be extended to four years to give you significant extra research or vocational experience that will make you more attractive to future employers in both academia and industry.

In the first year both degrees take the same course units. These span the breadth of the natural sciences and allow you to change between any of our degree pathways up until the end of your first year.

After the first year you select one from nine possible pathways through the subject (six in the Earth and Planetary Sciences and three in the Environmental Sciences). You may also switch (grades permitting) to the four year variants of your course (MEarthSci and MEnvSci) at any time through to the end of the third year.

You will graduate with a degree either in Earth and Planetary Science or in Environmental Science, with your chosen pathway named in brackets after this title.

Industrial experience
Competition in the graduate job market has risen dramatically over the last ten years, and students are increasingly looking for ways to differentiate themselves. An excellent way to do this is by choosing an industrial placement or to spend a year studying abroad, in your third year of study.

A year in industry is available on the following courses and pathways:

**MEarthSci Earth and Planetary Science:**
- Geochemistry
- Energy and Resources
- Geology and Physical Geography

**MEnvSci Environmental Science:**
- Pollution and Environmental Processes
- Ecology, Evolution and Conservation Biology
- Atmospheric Science

Study abroad
Our courses also give you the opportunity to spend a year studying at one of our partner universities in the third year; an experience that can boost your prospects in the job market and give you a new perspective on your subject area.

A year studying abroad is available on the following courses and pathways:

**MEarthSci Earth and Planetary Science:**
- Geochemistry
- Energy and Resources
- Geology and Physical Geography
- Planetary Science
- Palaeobiology

**MEnvSci Environmental Science:**
- Pollution and Environmental Processes
- Ecology, Evolution and Conservation Biology
- Atmospheric Science
First year overview

Our first year will introduce you to the modern way we study the Earth. The content of the first year is divided into three major themes: Earth System Science, Earth and the Planets, and Life on Earth. The emphasis in the first year is on building foundational knowledge in the natural sciences, and on developing practical and transferrable skills. Practical classes and fieldwork make up a large part of the course.

- Integrated natural science first year tailored to the Earth, planets and their environments
- Studies the principles that underlie all our pathways
- Every first year student will be supported by our peer mentoring schemes and small group work with an academic tutor
- One-on-one advice to help you choose your preferred pathway

The building blocks of the first year

Earth System Science
The fundamentals of chemistry, physics and biology to study the Earth and planets as integrated systems

Earth and the Planets
The geology of the Earth and other planets

Life on Earth
The modern biosphere and the history of life on Earth

Fieldwork
Regular field days throughout semester 1 covering the breadth of the course, for example, explore planetary science at Jodrell bank, biodiversity at Chester zoo, and geology in the Derbyshire Peak District that is on our door step. A residential field course in semester 2 focussed on a research question relevant to your interests

Professional development tutorial
- You will develop your skills in academic writing and other transferrable skills vital for future employment

The Earth Scientists Toolkit
- Develop skills in numeracy and scientific problem solving, apply numerical models to analyse the Earth and its environment

Our Courses

Earth and Planetary Sciences (3 years) [BSc]
Earth and Planetary Sciences (4 years) [MEarthSci]
Earth and Planetary Sciences (year abroad) (4 years) [MEarthSci]
Earth and Planetary Sciences (year in industry) (4 years) [MEarthSci]

Environmental Science (3 years) [BSc]
Environmental Science (4 years) [MEnvSci]
Environmental Science (year abroad) (4 years) [MEnvSci]
Environmental Science (year in industry) (4 years) [MEnvSci]
Overview

- Flexible course allowing you to specialise and tailor your studies to your interests, following one of six pathways.
- Option to spend a year of your studies either at Manchester or at a University overseas, or in industry and be awarded an MEarthSci.
- A large diverse School with an excellent staff to student ratio of 1:6.

Pathways

- Geology
- Planetary Science
- Geochemistry
- Energy and Resources
- Geology and Physical Geography
- Palaeobiology

Earth Science is at the core of our everyday lives. The Earth’s crust and atmosphere support our water and energy needs whilst mineral resources supply the raw materials necessary for the success of many industries, including transportation, communication systems, chemicals and pharmaceuticals.

A degree in the Earth and Planetary Sciences at The University of Manchester is focused on a holistic understanding of Earth systems in order to learn from the past, understand the present and influence the future. As Earth Science is at the cross-roads of the natural sciences, it provides an enriching alternative to a single honours degree in maths, physics, chemistry, geography or biology and can open the door to an exciting range of career options.

Our course will equip you with an armoury of skills to take into the world of work, including the ability to analyse problems, to work collaboratively as part of a team, and to develop field, laboratory, numeracy and communication skills.

At the end of year 1 you will choose the pathway you wish to study through years 2 and 3, based on your experience of the first year. Each pathway is defined to ensure that you develop core knowledge alongside a choice of optional units.

Geology

The Earth’s rocks and minerals preserve a 4.5 billion year record of global change. In this pathway you will learn how to read that rock record and develop an understanding of the physical processes responsible for it. For geologists our primary lab is the great outdoors and so this pathway has a strong fieldwork emphasis, with particular attention given to making and recording field observations and measurements that can be interpreted in terms of active geological and environmental processes.

You will also develop skills in laboratory-based analyses to add a richer level of detail to those interpretations. For those with an interest in a geotechnical career, we offer the opportunity to specialize in engineering geology and hydrogeology.

Planetary Science

It is an exciting time to study planetary science, as missions to the other planetary bodies in our solar system and our newfound ability to study planets orbiting other stars are allowing us to consider whether planets like the Earth are widespread or rare in the Universe. In this pathway you will gain the skills of a professional geologist while pursuing a broader interest in planetary science, developing an understanding of how the Earth and other planets have been shaped by the prehistory, formation and evolution of our solar system. You will also have the opportunity to study aspects of astronomy and astrophysics to complement your understanding of geology and Earth system science.

Geochemistry

Understanding the chemistry of the Earth is fundamental to challenges such as managing resources like precious minerals and oil, understanding climate change at the molecular level, and the control of pollution. In this pathway you will study the composition and evolution of the planets, melting and mineral reactions in Earth’s interior, and Earth’s (bio)geochemical cycles. You will acquire the laboratory and practical skills of a professional geochemist whilst having frequent opportunities to practice and apply what you learn on field trips and by undertaking a laboratory-based independent project.

Energy and Resources

Earth’s energy and resources have shaped human development and societies for millennia. In this pathway you’ll study units that are focussed on resource formation, ranging from metal and hydrocarbon resources, to nuclear energy and groundwater resources. You will also study sustainable and efficient extraction of resources, while acquiring the skills suitable for a thriving energy and resources job market.

Geology and Physical Geography

Geology and Physical Geography have always been closely related. In this pathway you will study the processes that have shaped the Earth’s surface and its landforms, and how humans and societies have learned to exploit and protect themselves from these phenomena. Focusing on the geologically recent past (2.6 million years of the Quaternary), and predictions of, and future planning for, environmental change, you will be able to choose from units taught by Geographers from the School of Environment, Education and Development as well as units taught by geologists in the School of Earth and Environmental Sciences.

Palaeobiology

Palaeobiology addresses major questions relating to the Earth’s living systems, their interplay over geological time, and the genesis and evolution of today’s living world. This pathway takes an interdisciplinary approach, combining the study of the biodiversity and ecology of modern and ancient life, with training in the geological processes that shape the history and future of Earth. You will gain a broad range of essential geological and biological skills, while studying cutting edge techniques and the latest research in palaeobiology and evolution, from the origins of life, and the age of dinosaurs, to the rise of modern humans.

UCAS code

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Earth and Environmental Sciences

Course content by year

1
In the first year you’ll focus on understanding the evolution of the Earth in terms of its atmosphere, biosphere and geosphere. During this year you’ll gain a thorough grounding in the physical, chemical and biological processes that have shaped the Earth and other planets through geological time. You’ll also be introduced to the key observational, laboratory and field skills that you’ll need as an Earth scientist.

2
Tailor your studies to your own academic interests by choosing a set of units that allow you to focus on a particular aspect of the Earth and Planetary Sciences.

3
During the third year of your degree you’ll undertake a research project that is tailored to your degree pathway. You will collect data in the field and laboratory to answer a scientific question of your choice. You will also study advanced units on your chosen pathway.

This year may include study abroad, or experience working in a research institute or industry, depending on your choice of degree pathway.

(MEarth Sci only)
You’ll carry out an extended individual research project working alongside world-leading scientists using state-of-the-art research facilities, study subject-related units, and attend specialist lectures.

Environmental Science

Environmental Science is the study of how physical, chemical and biological processes maintain and interact with life, and includes the study of how humans affect nature.

The natural world is complex and human activity can have unexpected consequences that are hard to reverse. The study of how physical and biological processes maintain life, and how humans affect nature, requires a broad interdisciplinary perspective. This is why the dedicated study of environmental science is so important. It is only by understanding how the world works that we can begin to tackle some of our pressing problems.

Ensuring that humans needs are met in a sustainable way, so that everyone has access to clean water, clean air and the resources required for agriculture and industrial activity, make up the focus of this undergraduate course.

Our course will equip you with an armoury of skills to take into the world of work, including the ability to analyse problems, to work collaboratively as part of a team, and to develop field, laboratory, numeracy and communication skills.

At the end of year 1 you will choose the pathway you wish to study through years 2 and 3, based on your experience of the first year. Each pathway is defined to ensure you develop core knowledge alongside a choice of optional units.

Overview

- Flexible course allowing you to specialise and tailor your studies to your interests, following one of three pathways.
- Option to spend a year of your studies at a University overseas or in industry and be awarded a MEnvSci.
- A large diverse School with an excellent staff to student ratio of 1:6.

Pathways

- Pollution and Environmental Processes
- Ecology, Evolution and Conservation Biology
- Atmospheric Science

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### Environmental Science

**Pollution and Environmental Processes**
The study of pollution and environmental processes is essential as growing populations and higher standards of living place increasing pressure on our engineered and natural environment. On this pathway you will study climate change, biodiversity and environmental management, pollution and control, population dynamics, ecosystems, and urbanisation, in order to tackle some of the global grand and pressing problems which will ensure that human needs are met in a sustainable way. If you enjoy biology, chemistry and geology and have a keen interest in the environment, you can integrate your interests in these subjects within the pollution and environmental processes pathway.

**Ecology, Evolution and Conservation Biology**
The Earth is the only known planet supporting life. The history of the Earth is intertwined with the history of life, and the world is both shaped by, and shapes, the organisms alive today. This pathway focuses on understanding those relationships. You will study evolution and examine how the diverse range of organisms alive today came to exist; ecology, which looks at the interactions of organisms and their environment; and conservation which involves studying how humans impact on nature and how we can change our behaviour to reduce that impact. On this pathway you will take units shared with biological sciences to gain a truly interdisciplinary understanding of life on Earth.

**Atmospheric Science**
Understanding the atmosphere allows us to address a wide range of societal and environmental issues including weather forecasting, urban air quality, pollutant transport and climate change. On this pathway you will focus on the atmosphere and its relationship to the Earth system, as well as to society. From theoretical concepts to modern technological applications, you will explore the driving forces at work in our atmosphere and the feedback interactions between the atmosphere, oceans, solid earth and biosphere, over a range of temporal and spatial scales, from weather forecasting and urban air quality to climate change.

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### Course content by year

1. In the first year you’ll focus on understanding the evolution of the Earth’s environment in terms of its atmosphere, biosphere and geosphere. During this year you’ll gain a thorough grounding in the physical, chemical and biological processes that have shaped the Earth and other planets in the present day and though geological time. You’ll also be introduced to the key observational, laboratory and field skills that you’ll need as an Environmental scientist.

2. Tailor your studies to your own academic interests by choosing a set of units that allow you to focus on a particular aspect of the Earth’s environmental system.

3. During the third year of your degree you’ll undertake a research project that is tailored to your degree pathway. You will collect data in the field and laboratory to answer a scientific question of your choice. You will also study advanced units on your chosen pathway.

   This year may include study abroad, or experience working in a research institute or industry, depending on your choice of degree pathway.

4. (MEnvSci only) You’ll carry out an extended individual research project working alongside world-leading scientists using state-of-the-art research facilities, study subject-related units, and attend specialist lectures.
I loved being able to pick from a broad range of courses spanning traditional field-based geological disciplines, as well as more lab-based, analytical activities. This allowed me to become a more well-rounded geologist, who was interested in and able to work on multi-disciplinary projects.

Prof Chris Jackson  
Graduate from BSc (Hons) Geology in 1998. Now a Professor of Basin Analysis at Imperial College London

The theory I learned at Manchester gave me a fundamental base to be able to apply in the field, as well as the very useful practical lessons and field trips that expose you to the real life of working as a geologist.

Matthew Rovardi  
Graduated from BSc (Hons) Geology in 2001 now working as an Exploration Manager in Ghana

I value my time at the University of Manchester because studying at a world-leading academic institution which also has strong ties to industry is a great way to start your career.

Rosanne Mckernan  
Graduated from MEarthSci in 2012. Now working as an Exploration Geoscientist at Shell

The two most valuable outcomes of my year in industry have been self-confidence and an accredited internal auditor qualification with a year of hands-on auditing experience. I am now much more comfortable in a professional setting, working with people I’ve never met and taking on tasks that I have never done before.

Katrina Cullen  
BSc (Hons) Environmental Science with a year in Industry  
Industrial Placement: Manchester Airport
What our graduates do

Graduate roles
- Research Geochemist
- Environmental scientist
- Exploration and Resource Geologist
- Air quality consultant
- Researcher
- Ecologist
- Mining Geologist

Employers
- Met Office
- Environment Agency
- RSK Group
- Schlumberger
- General Electric
- BP

Average starting salary £24,000

60% Graduates go straight into employment

40% Graduates go into further study

www.sees.manchester.ac.uk/study/careers-and-employability
Earth and Environmental Sciences

STELLIFY

DO MORE BE MORE

Learn without boundaries
Enjoy interdisciplinary, international and entrepreneurial study options outside your course.

Understand the issues that matter
Become ethically, socially and politically informed on some of humanity’s most pressing global issues.

Make a difference
Contribute to and learn from local and global communities through volunteering.

Step up and lead
Gain confidence and experience by assisting and inspiring your peers.

Create your future
Explore countless opportunities for professional career development.

GET STARTED >

www.stellify.manchester.ac.uk
Opportunities beyond your classes

Studying a degree with us will provide you with opportunities to pursue your passion for the subject beyond taught classes.

The Manchester Museum

The School of Earth and Environmental Sciences has close links with the Manchester Museum and its extensive geological collections. Join our Dino club and get involved in the groundbreaking work that takes place in the Manchester Museum.

Current opportunities include ‘Assembling April’: a project led by final year students who are working alongside Museum professionals to curate and conserve the bones of Tenontosaurus tilleti, an ornithopod dinosaur that resides in the School, and to create a 3D digital image of the skeleton.

Summer Internships

With our support, Manchester undergraduates successfully apply each year for highly competitive summer internships across the globe.

Prestigious destinations include summer internships with the Lunar and Planetary Institute, USA, working one-on-one with NASA scientists, participating in peer-reviewed research.

This brochure was printed in 2018 for the purposes of the 2019 intake. It has therefore been printed in advance of course starting dates and for this reason, course information may be amended prior to you applying for a place. There are a number of reasons why changes to course information and/or published term dates may need to be made prior to you applying for a place – more details can be found on our website. Prospective students are therefore reminded that they are responsible for ensuring, prior to applying to study, that they review up-to-date course information by searching for the relevant course at:

www.manchester.ac.uk/undergraduate/courses