BSc PHYSICS OF THE ENVIRONMENT
A physics degree with an emphasis on the Earth system
The natural world around us is a fascinating environment for the study of physics. The atmosphere, oceans, ice sheets and the space environment are all constrained by the relevant scientific principles and many of today’s most pressing environmental issues such as atmospheric pollution and climate change can be understood and tackled through an understanding of the relevant physics.

Our Physics of the Environment degree is designed to appeal to those with a strong interest in applying their knowledge of physics and mathematics to the Earth system, and in particular to environmental issues which are affecting us now and will continue to do so into the future.

At Reading the School of Mathematical, Physical and Computational Sciences comprises a large group of scientific experts in many different fields of Physics of the Environment, including space weather and its impact on the Earth’s electric and magnetic fields, the global atmosphere and oceans, ice sheets, hydrology, climate and weather, atmospheric chemistry and pollution and the impact of urban areas on their local climate.

The Physics of the Environment degree will equip you with the knowledge, confidence and skills to become a professional scientist in a wide range of environmentally related careers, from practical field-work using scientific instruments, through computer modelling of environmental systems to research and teaching.
WHY READING?

- Our teaching staff of about 45 academics includes many scientists recognised as world experts in their subjects, including three honoured as Fellows of the Royal Society.
- The degree course is truly interdisciplinary, studying the fundamental physics and interactions of many elements of the Earth system including the atmosphere, oceans, ice sheets, lakes and rivers, the biosphere and space.
- The breadth of our research covers virtually every aspect of environmental and climate science, from small scale weather patterns and pollution associated with urban areas right up to global climate change and even the weather in space. This means that whatever topics you cover on your course you will be taught by experts in the field.
- Large staff numbers give our department a staff to student ratio of about 1:2, guaranteeing a high level of academic support. Most of your teaching will be in small groups and our staff members are able to get to know all our students well.
- Our unrivalled atmospheric observatory, fluid dynamics laboratory and instruments workshop give us excellent facilities for the practical elements of the course.

A SCIENTIFIC APPROACH TO STUDYING THE ENVIRONMENT

At Reading we believe that the study of the Earth’s environment should be firmly based upon a sound knowledge of the underpinning scientific principles. It is only by fully understanding the science that we are then able to make predictions about how the environment may change on a wide range of different time and space scales. From forecasting whether an individual river catchment may flood in response to heavy rain, up to projecting how human-induced climate change may affect the human and natural worlds, a rigorous scientific understanding is the only way to make advances in our capabilities. This is why the Physics of the Environment degree sits within the School of Mathematical, Physical and Computational Sciences.
Because the Physics of the Environment degree covers a wide range of disciplines in Earth and space science, the range of potential careers for our graduates is also very wide. Understanding, modelling and predicting environmental change in a varied range of different areas, from water resource management, river and coastal flooding, food production, pollution and its impacts on health and changes to natural ecosystems are all underpinned by a sound understanding of the underlying physical principles. Whilst the Met Office is the biggest single employer of climate and climate change related scientists in the UK, there are several major interdisciplinary research centres which employ environmental scientists to develop our knowledge of various aspects of the earth system and make predictions of how environmental change will affect life on Earth in the future. With a strong emphasis on scientific research in the final year we regard our undergraduate degrees as ideal training for a PhD degree where you would work closely with a small group of academics on a specific research project, either at Reading or elsewhere.

With a sound foundation in fundamental physics and mathematics, the Physics of the Environment degree will also prepare you for a number of careers outside of academia and research, where scientific and technical knowledge and mathematical skills are important. Numerical modelling of dynamical systems, designing and building scientific instruments for Earth and space observation or teaching maths and physics are all potential career routes. The financial industry is increasingly interested in environmental issues, the costs of which may have to be borne by multi-national insurance companies. Moves towards a greener economy also present employment opportunities as power and utility companies look towards alternative sources of power or consider how water and agricultural resources need to be managed in a changing climate.

The University of Reading also plays host to the Walker Institute for Climate System Research – an interdisciplinary group of scientists working in a wide range of climate and environment related areas such as how climate change in the past has affected the development of human civilisations, and how future changes in climate may affect global food production and even the way that we design buildings and plan cities.

The University of Reading has built its reputation for the scientific study of the environment on the quality and interdisciplinary nature of its research work. Staff members from Reading have research links with a number of national and international organisations such as the UK Met Office, the Centre for Ecology and Hydrology, the Institute of Environmental Analytics, the Rutherford Appleton Laboratory and various commercial companies. Reading scientists regularly participate in multi-national field campaigns making meteorological observations from aircraft, setting up pollution monitoring equipment in urban areas or launching specially designed instruments on balloons to measure atmospheric electrification or microscopic particles of volcanic ash.

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### Year One

**Compulsory modules**
- Atomic and nuclear physics
- Calculus
- Global environmental chemistry
- Linear algebra
- Physics of the natural world
- Skills for environmental science
- Weather and climate fundamentals

### Year Two

**Compulsory modules**
- Vector Calculus
- Mathematical Physics
- Numerical Methods for Environmental Science
- Statistics for Weather and Climate Science
- Surface Energy Exchange
- Instrumentation for Environmental Measurements
- Atmospheric Physics
- Atmospheric Chemistry and Transport

**Optional Modules**
Optional Modules subject to pre-requisites stated in the Module Descriptions. Students must select one or more Level 5 modules to the value of 20 credits, subject to pre-requisites in some cases. Choice is subject to timetable constraints and discussion with personal tutor and programme director.
- Sustainable Resource Management
- Transport Processes in the Environment
- Global Quaternary Climate Change
- Monitoring the Earth from Space
- Practical French/ German/ Italian/ Spanish
- Practise of Entrepreneurship
- Atmosphere and Ocean Dynamics
- Hyrological processes
- Economics of climate change

### Year Three

**Compulsory modules**
- Year Three Project
- General Studies

**Optional Modules**
Students must select level 6 modules from the following list to the value of 80 credits, subject to pre-requisites in some cases. Alternatively, students may select a Level 5 module in management. Choice is subject to timetable constraints, module availability and discussion with personal tutor and programme director.
- Ecosystems Modelling
- Organisational behaviour
- Atmospheric Spectroscopy
- Space Weather
- Remote Sensing Methods and Applications
- Oceanography
- Atmospheric Science Field Course (Isle of Arran)
- Boundary Layer Meteorology
- Climate Change
- Atmospheric Electricity

This degree covers all the fundamental and applied physics you need to understand the Earth system. You have the opportunity to learn the physics of the atmosphere, the oceans, ice sheets and sea-ice, and the Earth’s crust, together with the physics of the Sun and space weather. The first year consists of a range of modules including fundamental physics and mathematics as well as more applied topics. In the second year you will move on to further develop your understanding of fundamental physics, as well as choose from a wide range of optional modules. In your final year you will choose from another wide set of optional modules that allow you to specialise in earth sciences, oceanography, hydrology, space weather or atmospheric science.

A major part of your final year will be the completion of an independent research project where you will work closely with a member of academic staff to study a particular topic in detail, choosing from a range of subjects across all the areas of Physics of the Environment.
STUDYING AT READING

Our magnificent setting is one of the University’s greatest attractions. Our main Whiteknights site is set in 130 hectares of beautiful parkland. This is the heart of University life and provides a special sense of community. With its green open spaces, lakes, rare trees and wildlife it is an exceptional environment in which to study, live and relax.

Visit us

We are home to a diverse and thriving community, which provides a unique and rewarding environment in which to live and study. To appreciate the University of Reading’s distinctive atmosphere and world-class facilities you need to come and look around. You can take advantage of one of the University Open Days or pay us an informal visit.

We invite all prospective students holding offers to visit our department. The day offers a chance to meet lecturers and current students, talk about our programmes and take a close look at our campus and departmental facilities.

We hold Open Days every June, September and October for prospective undergraduate students, their family and friends. For forthcoming dates and details of events visit www.reading.ac.uk/opendays

PLACEMENT OPPORTUNITIES

The Physics of the Environment degree offers the option to apply to a year in industry*, building on the knowledge and skills gained in the first two years of the degree through direct application in the workplace. Our dedicated placements team will work with you to identify and contact a company or government laboratory working in your chosen scientific area. Shorter, summer placement options are also supported.

* Programmes with a Professional Placement Year (also known as ‘Year in Industry’ or ‘Placement Year’) are fully dependent on students securing their own placement opportunity, normally through a competitive recruitment process. The University provides dedicated career and application support for placement year students. Students who do not secure a placement or who are unable to complete the placement year due to extenuating circumstances, have the option to transfer to a three-year variant of their programme with agreement from their school/department.
When it came to interviews, my time at Reading stood me in very good stead. Employers were impressed not only with the very varied work in my portfolio but also with my ability to talk through ideas and think on my feet.

Fleur Richards
BA Typography & Graphic Communication Designer, BBC Sport Online