Physics with Geophysics BSc (Hons)

COURSE DETAILS

- A level requirements: ABB
- UCAS code: F365
- Study mode: Full-time
- Length: 3 years

KEY DATES

- Apply by: 29 January 2025
- Starts: 22 September 2025

Course overview

Study this programme and gain a range of transferable skills that will put you at the forefront of modern physics while discovering how planet Earth works and how we use physics to image its static and dynamic subsurface, from inner core to crust.

INTRODUCTION

There has never been a better time to study physics and geophysics as we seek to provide sustainable resources for the world's population. On our Physics with Geophysics BSc you will learn fundamental Physics principles that govern the behaviour of matter and energy, which are essential for understanding a wide range of natural phenomena, and then apply these principles within Geophysics to study the Earth's physical properties and processes. This integration helps in comprehensively understanding the Earth's structure and behaviour. As a geophysicist, you'll study the physical aspects of the earth using a range of methods, including gravity, magnetic, electrical and seismic. By collecting data on seismic waves, which move through and around the earth, you'll create a picture of what lies below the earth's surface. This information is vitally important to many industries and governments.

As part of the Department of Physics, you will be taught by academics involved in cutting-edge research across various fields in physics. We are very proud of our research achievements and major international collaborations, such as the Large Hadron Collider at CERN in Switzerland, STFC's Diamond Light Source and Daresbury Laboratory in the UK, ESRF and GANIL in France, GSI and DESY in Germany, and TRIUMF in Canada. During your studies you will use our award-winning Central Teaching Laboratories with state-of-the-art, superbly equipped and purpose-built teaching spaces that host research-grade equipment. Geophysics students at Liverpool also benefit from extensive fieldwork opportunities. The fieldwork is an integral part of the curriculum, as practical experiences allow students to apply theoretical knowledge in real-world settings, enhancing their understanding of geophysical processes and techniques. Fieldwork in the Physics with Geophysics programme currently involves a residential course. You will also work within one of our research groups to undertake a significant geophysical research project in your final year, which has the possibility to include a fieldwork component. Our students have opportunities to study abroad or take a year in industry. We also have strong connections with industry and governmental agencies who can provide opportunities for collaborative projects, and employment after graduation.

WHAT YOU'LL LEARN

- Explore and apply the fundamental principles of physics
- Numeracy and problem-solving skills
- Ability to reason clearly and communicate well
- Apply the principles of Physics and Geophysics to study, explore and understand the Earth's structure, atmosphere and space environment.
- Study the Earth's physical properties and processes, including seismic activity, gravitational fields, and magnetic fields

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ACCREDITATION

As a new programme, our Physics with Geophysics BSc is pending accreditation by the Institution of Physics (IoP). The programme has been designed to deliver and fulfil the IoP accreditation requirements and it will be fully accredited (subject to approval), as soon as students from the first cohort graduate (approx. in 2028).

Course content

Discover what you'll learn, what you'll study, and how you'll be taught and assessed.

YEAR ONE

The first year starts with a one-week project to familiarise you with the staff and other students. There will be three maths modules in across the first and second years; these are designed to provide the mathematical skills required by physics students.

Geophysics – A strong feature of year one is the acquisition of fundamental skills in maths, geology and geoscience, supported by an integrated approach to transferable skills conveyed through the tutorial system.

COMPULSORY MODULES

PHYSICS ICEBREAKER PROJECT (PHYS100)

Credits: / Semester: semester 1

Human missions to The Red Planet are increasingly coming into the focus of government and now privately funded initiatives. In Liverpool we channel this excitement into an award-winning student driven icebreaker project, the "Mission to Mars".

Mission to Mars is a week-long project that takes all physics and astrophysics students and tasks them with developing a detailed and feasible plan for a human Mission to Mars. The project takes place during the first week of the first semester (every day, all day), replacing all other teaching activities for that week. Students work in teams on four competing missions, each under the guidance of a member of staff acting as "flight director", and they cover all aspects of such a trip, including the scope and scientific purpose, life support, trajectory, mass management, radiation shielding, communication, and ethics. Students hold a midweek press conference and present their missions to academic staff who choose the winning mission.

DYNAMICS AND RELATIVITY (PHYS101)

Credits: 15 / Semester: semester 1

The module provides an overview of Newtonian mechanics, continuing on from A-level courses. This includes: Newton's laws of motion in linear and rotational circumstances, gravitation and Kepler's laws of planetary motion. The theory of Relativity is then introduced, starting from a historical context, through Einstein's postulates, leading to the Lorentz transformations.

INTRODUCTION TO COMPUTATIONAL PHYSICS (PHYS105)

Credits: 7.5 / Semester: semester 1

The "Introduction to computational physics" (Phys105) module is designed to introduce physics students to the use of computational techniques appropriate to the solution of physical problems. No previous computing experience is assumed. During the course of the module, students are guided through a series of structured exercises which introduce them to the Python programming language and help them acquire a range of skills including: plotting data in a variety of ways; simple Monte Carlo techniques; algorithm development; and basic symbolic manipulations. The exercises are based around the content of the first year physics modules, both encouraging students to recognise the relevance of computing to their physics studies and enabling them to develop a deeper understanding of aspects of their first year course.

MATHEMATICS FOR PHYSICISTS I (PHYS107)

Credits: 15 / Semester: semester 1

This module aims to provide all students with a common foundation in mathematics, necessary for studying the physical sciences and maths courses in later semesters. All topics will begin "from the ground up" by revising ideas which may be familiar from A-level before building on these concepts. In particular, the basic principles of differentiation and integration will be practised, before extending to functions of more than one variable. Basic matrix manipulation will be covered as well as vector algebra and an understanding of eigenvectors and eigenvalues.

THERMAL PHYSICS AND PROPERTIES OF MATTER (PHYS102)

Credits: 15 / Semester: semester 1

Einstein said in 1949 that "Thermodynamics is the only physical theory of universal content which I am convinced, within the areas of applicability of its basic concepts, will never be overthrown." In this module, different aspects of thermal physics are addressed: (i) classical thermodynamics which deals with macroscopic properties, such as pressure, volume and temperature – the underlying microscopic physics is not included; (ii) kinetic theory of gases describes the properties of gases in terms of probability distributions associated with the motions of individual molecules; and (iii) statistical mechanics which starts from a microscopic description and then employs statistical methods to derive macroscopic properties. The laws of thermodynamics are introduced and applied.

PRACTICAL PHYSICS I (PHYS106)

Credits: 15 / Semester: whole session

This module teaches the laboratory side of physics to complement the taught material from lectures and to introduce key concepts of experimental physics.

ELECTRICITY, MAGNETISM AND WAVES (PHYS103)

Credits: 15 / Semester: semester 2

Electricity, Magnetism and Waves lie at the heart of physics, being phenomena associated with almost every branch of physics including quantum physics, nuclear physics, condensed matter physics and accelerator physics, as well as numerous applied aspects of physics such as communications science. The course is roughly divided into two sections. The first part introduces the fundamental concepts and principles of electricity and magnetism at an elementary level and develops the integral form of Maxwell's equations. The second part involves the study of oscillations and waves and focuses on solutions of the wave equation, the principles of superposition, and examples of wave phenomena.

FOUNDATIONS OF QUANTUM PHYSICS (PHYS104)

Credits: 15 / Semester: semester 2

This module illustrates how a series of fascinating experiments, some of which physics students will carry out in their laboratory courses, led to the realisation that Newtonian mechanics does not provide an accurate description of physical reality. As is described in the module, this failure was first seen in interactions at the atomic scale and was first seen in experiments involving atoms and electrons. The module shows how Newton's ideas were replaced by Quantum mechanics, which has been critical to explaining phenomena ranging from the photo-electric effect to the fluctuations in the energy of the Cosmic Microwave Background. The module also explains how this revolution in physicist's thinking paved the way for developments such as the laser.

INTRODUCTION TO GEOPHYSICS (PHYS175)

Credits: 7.5 / Semester: semester 2

Geophysics is the study of the Earth using physics – applying a broad range of physics (along with geology and chemistry) to both understand our planet and our place on it, while improving our understanding of the underlying physics. In this module you will be introduced to the Earth as a physical system. The module will teach students about the structure and composition of the Earth, its gravitational and magnetic fields, and deep dynamics; the physics of Earth materials and the geological time scale; and plate tectonics.

MATHEMATICS FOR PHYSICISTS II (PHYS108)

Credits: 15 / Semester: semester 2

This module introduces some of the mathematical techniques used in physics. For example, differential equations, PDE's, integral vector calculus and series are discussed. The ideas are first presented in lectures and then put into practice in problems classes, with support from demonstrators and the module lecturer. When you have finished this module, you should: Be familiar with methods for solving first and second order differential equations in one variable. Be familiar with methods for solving partial differential equations and applications. Have a basic knowledge of integral vector calculus. Have a basic understanding of Fourier series and transforms.

Any optional modules listed above are illustrative only and may vary from year to year. Modules may be subject to minimum student numbers being achieved and staff availability. This means that the availability of specific optional modules cannot be guaranteed.

YEAR TWO

In year two you will broaden your understanding of physics, with modules designed to ensure you have mastered the full range of physics concepts. You will also broaden your skillset through modules in applied and computational geophysics.

Fieldwork involves:

- 4 days using industry-standard geophysical survey equipment in the local Liverpool area.

COMPULSORY MODULES

APPLIED GEOPHYSICS (ENVS216)

Credits: 15 / Semester: semester 1

This module provides an introduction to the principles and application of all the main geophysical methods used for exploration purposes. These methods include seismic refraction, seismic reflection, electrical methods, ground penetrating radar, gravity and magnetics. Case studies will be used to highlight the application of these methods at a range of scales from shallow to deep to small to large, highlighting their uses within archaeology, engineering and geology. The module concludes with a synthesis of methods and how to approach site investigation. The module is delivered through lectures and problem sessions and is based on continuous assessment from set homework assignments or problem sheets and a final exam.

ELECTROMAGNETISM I (PHYS201)

Credits: 15 / Semester: semester 2

The study of classical electromagnetism, one of the fundamental physical theories. Several simple and idealised systems will be studied in detail, developing an understanding of the principles underpinning several applications, and setting the foundations for the understanding of more complex systems. Mathematical methods shall be developed and exercised for the study of physical systems.

MATHEMATICS FOR PHYSICISTS III (PHYS207)

Credits: 15 / Semester: semester 1

This module introduces differential vector calculus and extends the treatment of linear algebra. It provides essential mathematical tools for electrodynamics in Semester 2.

QUANTUM AND ATOMIC PHYSICS I (PHYS203)

Credits: 15 / Semester: semester 1

The course aims to introduce 2nd year students to the concepts and formalism of quantum mechanics. The Schrodinger equation is used to describe the physics of quantum systems in bound states (infinite and finite well potentials, harmonic oscillator, hydrogen atoms, multi-electron atoms) or scattering (potential steps and barriers). Basis of atomic spectroscopy are also introduced.

CONDENSED MATTER PHYSICS (PHYS202)

Credits: 15 / Semester: semester 2

Condensed matter physics (CMP) is the study of the structure and behaviour of matter that makes up most of the things that surround us in our daily lives, including the screen on which you are reading this material. It is not the study of the very small (particle and nuclear physics) or the very large (astrophysics and cosmology) but of the things in between. CMP is concerned with the “condensed” phases of real materials that arise from electromagnetic forces between the constituent atoms, and at its heart is the necessity to understand the behaviour of these phases by using physical laws that include quantum mechanics, electromagnetism and statistical mechanics. Understanding such behaviour leads to the design of novel materials for advanced technological devices that address the challenges that face modern civilization, such as climate change.

EARTH AND ENVIRONMENTAL DATA SCIENCE (ENVS229)

Credits: 15 / Semester: semester 2

This module introduces students to fundamentals of Earth and environmental data science. Students will become familiar with methods used to collate and computationally analyse a variety of Earth Science data. After introducing programming basics, students will then start to write code to analyse and simulate Earth processes that model their datasets. By the end of the module, students are expected to have a broad overview of the ways in which data science is applied in the study of the Earth and environment.

ENVIRONMENTAL GEOPHYSICS (ENVS258)

Credits: 15 / Semester: semester 2

This module builds on the theory taught in Exploration Geophysics (ENVS216) by introducing practical experience, data analysis and interpretation of field data. The module will introduce the principles of environmental surveying using a range of geophysical techniques. Attention will be paid to how these different methods can be integrated to provide a thorough interpretation of survey data. The module will be assessed through a combination of continuous assessment, including short technical reports.

NUCLEAR AND PARTICLE PHYSICS (PHYS204)

Credits: 15 / Semester: semester 1

This module introduces the basic properties of particles and nuclei, their stability, modes of decay, reactions and conservation laws. Recent research in particle physics is highlighted, and for nuclear physics some of the applications (such as nuclear power) are given. This module leads on to more specialist optional modules in Year 3, in particle physics, nuclear physics and nuclear power.

Any optional modules listed above are illustrative only and may vary from year to year. Modules may be subject to minimum student numbers being achieved and staff availability. This means that the availability of specific optional modules cannot be guaranteed.

YEAR THREE

The third year comprises a mix of core physics and geophysics modules along with many optional modules in advanced topics. Building on your applied geophysics knowledge, you will undertake an industry-style geophysical survey in the south of Spain. Supported by a supervisor, you will undertake a field, laboratory or computer-based geophysics research project over the duration of your final year.

Fieldwork:

- One week in southern Spain.

COMPULSORY MODULES

EARTH SCIENCE PROJECT (ENVS300)

Credits: 30 / Semester: whole session

A pinnacle of your degree, this module will embed you within an active research group where you will undertake an individual and unique Earth Science research project over the course of an academic year. Under the supervision of an academic member of staff, you will plan and undertake an independent (field-, lab- or desk-based) research project in an area of Earth Science that interests you. In addition to developing specific and general research skills, you will gain invaluable experience in communicating your topic and findings in both oral and written formats.

ELECTROMAGNETISM II (PHYS370)

Credits: 15 / Semester: semester 2

The module builds on first and second year modules on electricity, magnetism and waves to show how a wide variety of physical phenomena can be explained in terms of the properties of electromagnetic radiation. The module will also explore how these properties follow from the relationships between electric and magnetic fields (and their interactions with matter) expressed by Maxwell’s equations, and how electromagnetism fits into the theory of Special Relativity.

GEOPHYSICAL DATA MODELLING (ENVS386)

Credits: 15 / Semester: semester 1

Geophysics talks are full of exciting colour figures showing the interior of the Earth. But are these pictures real? At best, they are only a simplified mathematical parameterisation of the true Earth; at worst they can be misleading or plain wrong. This module provides the tools to construct such models by mathematical modelling of geophysical observations, but perhaps even more importantly, shows how such models can be interpreted, and provides understanding of their limitations. Mathematical foundations are given with sections on matrix analysis, optimisation theory and statistics, with application to geophysical problems. Error estimation is considered in detail, in particular the reasons why most error estimates are close to worthless! Detailed examples are presented from all areas of geophysics, with a project to generate a model of the magnetic field of the planet Neptune. Examples also extend to modern developments, including links to Big Data and Machine Learning.

GEOPHYSICS FIELD SCHOOL (ENVS362)

Credits: 15 / Semester: semester 2

This module is a practical introduction to a range of techniques in exploration and environmental geophysics, and their application in industry and research. The students receive field-based (or online, where necessary) training in geophysical techniques, including seismic, gravity, magnetic, and electrical methods. During the entire duration of the field class the students will work in teams and will be required to undertake a geophysical survey. The students will benefit from being exposed to problem solving and a workflow analogous to working for a major exploration or geophysical engineering company.

PLANETARY PHYSICS (PHYS355)

Credits: 7.5 / Semester: semester 2

This course considers the application of physics to the study of planets, with a focus on the application of fundamental physical principles rather than providing detailed planetary descriptions. The first four weeks address the planets of our solar system, including what constraint is provided on their physics from studies of our own planet, Earth. We consider particularly insights from observations of orbits, gravitational field, rotation, thermal properties and magnetic field, with brief coverage of formation,composition, and seismology. The focus is on application of basic physical principles rather than detailed observational descriptions, and on methods that might (eventually) be of use in the study of exoplanets. The final two weeks considers exoplanets specifically, particularly the methods of their detection,and our current understanding of planetary systems in general.

SIGNAL PROCESSING AND SEISMIC ANALYSIS (ENVS343)

Credits: 15 / Semester: semester 1

This module will provide an introduction the fundamentals of signal processing and seismic interpretation. The module is taught through a combination of Lectures, practical examples during computer-based practical sessions, and self-directed learning. Assessment for the module includes a conference style presentation on the analysis and interpretation of a real-world seismic dataset and a final exam. Successful students will develop understanding of the fundamental concepts and theory of signal processing. They will become familiar with modern seismic data analysis workflows, including correcting and enhancing data, leading to a final geologic interpretation.

STATISTICAL THERMODYNAMICS (PHYS393)

Credits: 7.5 / Semester: semester 2

The problem to understand blackbody radiation opened the door to modern physics. In this module an understanding of thermodynamics is developed from a quantum mechanical and statistical description of the three fundamental gases: The Maxwell-Boltzmann ideal gas in the classical limit, and the Fermi-Dirac and Bose-Einstein gases in the quantum limits for fermions and bosons, respectively. A statistical understanding of thermodynamic quantities will be developed together with a method of deriving thermodynamic potentials from the properties of the quantum system. Applications are shown in solid state physics and the Planck blackbody radiation spectrum.

OPTIONAL MODULES

MATERIALS PHYSICS AND CHARACTERISATION (PHYS387)

Credits: 7.5 / Semester: semester 1

Preparation and characterisation of a range of materials of scientific and technological importance.

NUCLEAR PHYSICS (PHYS375)

Credits: 15 / Semester: semester 2

This module gives an introduction to nuclear physics. Starting from the bulk properties of atomic nuclei different modes of radioactivity are discussed, before a closer look at the nucleon-nucleon interaction leads to the development of the shell model. Collective models of the nucleus leading to a quantitative understanding of rotational and vibrational excitations are developed. Finally, electromagnetic decays between excited states are introduced as spectroscopic tools to probe and understand nuclear structure.

QUANTUM AND ATOMIC PHYSICS II (PHYS361)

Credits: 15 / Semester: semester 1

This module concerns the study of quantum mechanics and its application to atomic systems. The description of simple systems will be covered before extending to real systems. Perturbation theory will be used to determine the detailed physical effects seen in atomic systems.

SEMICONDUCTOR APPLICATIONS (PHYS389)

Credits: 7.5 / Semester: semester 1

This module develops the physics concepts describing semiconductors in sufficient details for the purpose of understanding the construction and operation of common semiconductor devices.

SOLID STATE PHYSICS (PHYS363)

Credits: 7.5 / Semester: semester 1

Condensed Matter Physics (CMP) is the largest subfield of physics with practical applications that has changed our everyday life such as semiconductor devices, magnetic recording disks, Magnetic resonance imaging. It deals with the study of the structure and physical properties of large collection of atoms that compose materials, which are found in nature or synthesized in laboratory. This particular module aims to advance and extend the concepts on solids introduced in Year 1 and Year 2 modules. Especially, it focuses on the atomic structure and behaviour of electrons in crystalline materials, which are essential for understanding of physical phenomena in complex systems.

APPLIED EARTHQUAKE AND VOLCANO SEISMOLOGY (ENVS388)

Credits: 15 / Semester: semester 2

This module provides introduction to the fundamentals of applied seismology and essential training for students interested in academic or government careers in seismology. The course mainly deals with the analysis and interpretation of seismic data using arrays and networks of seismometers to constrain complex geological processes in tectonic and volcanic settings, and to evaluate earthquake and volcanic hazards. The course is research-led and provides a learning experience that reflects the process of creating knowledge through activities that mirrors modern research practices. Content will be delivered through a combination of traditional class-based lectures, research seminars and computer-based sessions. The students will have an opportunity to work with real-world seismic data and will learn and apply state-of-the-art techniques used in operational settings for seismic and volcano monitoring.

ENERGY GENERATION AND STORAGE (PHYS372)

Credits: 7.5 / Semester: semester 2

Producing sufficient energy to meet the demands of an expanding and increasingly power-hungry society, whilst striving not to exacerbate the impacts of climate change, is a significant challenge. This module looks at the key physical concepts which underpin a range of energy generation sources, from traditional fossil fuel fired turbine generation to photovoltaic solar cells. This builds on prior knowledge of thermodynamics, fluid behaviour and semiconductors to show how these concepts can be practically applied to power generation and storage systems.

GLOBAL GEOPHYSICS AND GEODYNAMICS (ENVS398)

Credits: 15 / Semester: semester 2

This module returns to the broad subject areas of Earth structure and plate tectonics, building a stronger quantitative and research skills focus together with an extended requirement to synthesise broad topics into coherent arguments concerning global and topical geodynamical problems. It will cover advanced topics in plate tectonics, global mantle and core geodynamics, Earth and planetary history and lithospheric-scale processes. A strong emphasis is placed on physical interactions between the primary layers of Earth leading to an integrational understanding of Earth’s dynamics and evolution.

MAGNETIC PROPERTIES OF SOLIDS (PHYS399)

Credits: 7.5 / Semester: semester 2

The magnetic properties of solids are exploited extensively in a wide range of technologies, from hard disk drives, to sensors, to magnetic resonance imaging, and the development of magnetic materials is a multi-billion pound industry. Fundamentally, magnetism in condensed matter also represents one of the best examples of quantum mechanics in action, even at room temperature and on a macroscopically observable scale. In this module we will explore how the interactions between electrons in solids can result in the magnetic moment, and how this relates to the quantum mechanical property of spin. We will use these tools to probe the complicated processes that allow spontaneous magnetism to exist within certain select materials, and their implications for future technologies and our theoretical understanding of the nature of solids.

NUCLEAR POWER (PHYS376)

Credits: 15 / Semester: semester 1

This module focuses on nuclear reactors as a source of energy for use by society. After reviewing the underlying physics principles, the design and operation and nuclear fission reactors is introduced. The possibility of energy from nuclear fusion is then discussed, with the present status and outlook given.

PARTICLE PHYSICS (PHYS377)

Credits: 15 / Semester: semester 1

Introduction to Particle Physics. To build on the second year module involving Nuclear and Particle Physics. To develop an understanding of the modern view of particles, of their interactions and the Standard Model.

PHYSICS OF SOUND AND MUSIC (PHYS321)

Credits: 7.5 / Semester: semester 2

Musical instruments are made up of a variety of simple physical systems: vibrating strings, membranes and shells. When combined, these simple systems generate the rich and varied spectra of the Stradivarius violin, a kettle drum, or a clarinet. This module looks at the physics underpinning the generation of the unique sounds of a variety of instruments (stringed, wind, percussion) and develops the tools needed to analyse sound. It builds on an understanding of Newtonian dynamics and waves, and explores how complexity emerges from simple building blocks.

RELATIVITY AND COSMOLOGY (PHYS374)

Credits: 15 / Semester: semester 2

The course covers the concepts required to connect special relativity, Newtonian gravity, general relativity, and the cosmological metrics and dynamical equations. The main part of the course is focussed on cosmology, which is study of the content of the universe, structure on the largest scales, and its dynamical evolution. This is covered from both a theoretical and observational perspective.

SURFACES AND INTERFACES (PHYS381)

Credits: 7.5 / Semester: semester 2

This module gives a brief introduction into the physics of solid surfaces their experimental study. Surfaces and interfaces are everywhere and many surface-related phenomena are common in daily life (texture, friction, surface-tension, corrosion, heterogeneous catalysis). Here we are concerned with understanding the microscopic properties of surfaces, asking questions like: what is the atomic structure of the surface compared to that of the bulk? What happens to the electronic properties and vibrational properties upon creating a surface? What happens in detail when we adsorb an atom or a molecule on a surface? This module will mostly concentrate on simple model systems like the clean and defect-free surface of a single-crystal substrate.

Any optional modules listed above are illustrative only and may vary from year to year. Modules may be subject to minimum student numbers being achieved and staff availability. This means that the availability of specific optional modules cannot be guaranteed.

HOW YOU'LL LEARN

Our research-led teaching ensures you are taught the latest advances in cutting-edge physics research. Lectures introduce and provide the details of the various areas of physics and related subjects. You will be working in tutorials and problem-solving workshops, which are another crucial element in the learning process, where you put your knowledge into practice. They help you to develop a working knowledge and understanding of physics. All of the lecturers also perform world class research and use this to enhance their teaching.

Most work takes place in small groups with a tutor or in a larger class where staff provide help as needed. Practical work is an integral part of the programmes, and ranges from training in basic laboratory skills in the first two years to a research project in the third or fourth year. You will undertake an extended project on a research topic with a member of staff who will mentor you. By the end of the degree you will be well prepared to tackle problems in any area and present yourself and your work both in writing and in person. In the first two years students take maths modules which provide the support all students need to understand the physics topics.

HOW YOU'RE ASSESSED

Physics modules – The main modes of assessment are coursework and examination. Depending on the modules taken you may encounter project work, presentations (individual or group), and specific tests or tasks focused on solidifying learning outcomes.

Geophysics modules – Assessment matches the learning objectives for each module and may take the form of written exams, practical laboratory and computer examinations, coursework submissions in the form of essays, scientific papers, briefing notes or lab/field notebooks, reports and portfolios, oral and poster presentations and contributions to group projects, and problem-solving exercises.

LIVERPOOL HALLMARKS

We have a distinctive approach to education, the Liverpool Curriculum Framework, which focuses on research-connected teaching, active learning, and authentic assessment to ensure our students graduate as digitally fluent and confident global citizens.

Careers and employability

All Physics degrees are highly valued in today's labour market and our graduates have excellent career opportunities in academic & industrial research and development, computing, teaching, business and finance. In addition, the understanding and knowledge that Geophysicists have of the physical processes of the earth, are sought after and employed by environmental agencies, governments, geophysical exploration companies, as well as carbon capture, oil and gas industries.

Studying physics with geophysics opens up a range of diverse and rewarding career opportunities. The combination of these fields equips graduates with strong analytical, quantitative, and problem-solving skills, which are highly valued in various industries.

Most of our recent graduates have gained employment within a degree-related field or continued within further education after graduation.

The knowledge, skills and experience that our you'll develop during your degree are in high demand by employers. Graduates have gone on to explore careers in areas as diverse as:

- Nuclear power
- Instrumentation
- Cryogenics
- Astronomy
- Geophysics
- Medical physics
- Materials science
- Telecommunications
- Microelectronics
- Computing
- Software engineer
- Teaching
- Business
- Finance

- Management

Geophysicists also have expanded job opportunities in sectors including:

- Geoscience Energy consultant
- Meteorologist
- Petroleum engineer
- Engineering geologist
- Hazard prediction
- Risk Management
- Oceanographer

Progressing to research The Department of Physics attracts considerable research income, creating excellent opportunities to progress to a research degree, particularly in the fields of condensed matter physics, nuclear physics, particle physics, nanoscience and energy.

Graduate employees have included: Deloitte, IBM, Bosch, PWC, NHS, Jaguar, Sony, Unilever, BMW.

Physics graduates also move into careers outside of science. Popular options include banking and finance, as well as the software, computing and consultancy industries. Other areas include accountancy, law and transport.

88% **OF PHYSICS STUDENTS FIND THEIR MAIN ACTIVITY AFTER GRADUATION MEANINGFUL.**

Graduate Outcomes, 2018-19.

Fees and funding

Your tuition fees, funding your studies, and other costs to consider.

TUITION FEES

UK fees (applies to Channel Islands, Isle of Man and Republic of Ireland)	
Full-time place, per year	£9,535
Year abroad fee	£1,385

International fees	
Full-time place, per year	£29,100
Year abroad fee	£14,550

The UK full-time tuition fee, international course fee and fee for the year abroad for international students shown are correct for 2025/26 entry. We are currently awaiting confirmation of whether the year abroad fee for UK students will change, so the fee shown is for 2024/25. Please note that the year abroad fee also applies to the year in China.

Tuition fees cover the cost of your teaching and assessment, operating facilities such as libraries, IT equipment, and access to academic and personal support. Learn more about fees and funding.

ADDITIONAL COSTS

Additional costs for this course could include travel to placements and fieldwork expenses.

Find out more about the additional study costs that may apply to this course.

SCHOLARSHIPS AND BURSARIES

We offer a range of scholarships and bursaries that could help pay your tuition and living expenses.

We've set the country or region your qualifications are from as United Kingdom. Change it here

- ## UNDERGRADUATE GLOBAL ADVANCEMENT SCHOLARSHIP

  - International students

  If you're a high-achieving international student starting an undergraduate degree with us from September 2024, you could be eligible to receive a fee discount of up to £5,000. You'll need to achieve grades equivalent to AAA in A levels. Most of our undergraduate degrees are eligible, with the exception of clinical programmes in Medicine and Dental Surgery.

- ## THE LIVERPOOL BURSARY

  - Home students

  If you're a UK student joining an undergraduate degree and have a household income below £35,000, you could be eligible for a Liverpool Bursary worth up to £2,000 for each year of undergraduate study.

- ## ASYLUM SEEKERS SCHOLARSHIP

  - Home students

  Apply for an Asylum Seekers Scholarship and you could have your tuition fees paid in full and receive help with study costs. You'll need to have applied for asylum in the UK, or be the dependant of an asylum seeker, and be joining an eligible undergraduate degree.

- ## CARE LEAVERS' OPPORTUNITY BURSARY

  - Home students

  If you've spent 13 or more weeks in Local Authority care since age 14, you could be eligible for a bursary of £3,000 per year of study. You'll need to be a UK student joining an eligible undergraduate degree and be aged 28 or above on 1 September in the year you start.

- ## COWRIE FOUNDATION SCHOLARSHIP

  - Home students

  Are you a UK student with a Black African or Caribbean heritage and a household income of £25,000 or less? You could be eligible to apply for a Cowrie Foundation Scholarship worth up to £8,000 for each year of undergraduate study.

- ## ESTRANGED STUDENTS BURSARY

  - Home students

  If you're a UK student identified as estranged by Student Finance England (or the equivalent UK funding body), you could be eligible for a bursary of £1,000 for each year of undergraduate study.

- ## [GENESYS LIFE SCIENCES SCHOLARSHIP]
  - Home students

  Joining a School of Biosciences degree and have a household income of less than £25,000? If you're a UK student, you could apply to receive £4,500 per year for three years of your undergraduate course.
- ## GRADUATE ASSOCIATION HONG KONG & TUNG UNDERGRADUATE SCHOLARSHIPS
  - International students
  - Hong Kong

  If you're an undergraduate student from Hong Kong who can demonstrate academic excellence, you may be eligible to apply for a scholarship worth £10,000 in partnership with the Tung Foundation.
- ## KAPLAN DIGITAL PATHWAYS EXCELLENCE SCHOLARSHIP
  - International students

  Completed a Kaplan Digital Pathways Foundation Certificate? We're offering a £5,000 fee discount off the first year of undergraduate study for a maximum of two high achieving students joining one of our non-clinical degrees from an online Kaplan Foundation Certificate.
- ## NOLAN SCHOLARSHIPS
  - Home students

  Do you live in the Liverpool City Region with a household income of £25,000 or less? Did neither of your parents attend University? You could be eligible to apply for a Nolan Scholarship worth £5,000 per year for three years of undergraduate study.
- ## RIGBY ENTERPRISE AWARD
  - Home students

  Are you a UK student with a household income of £25,000 or less? If you've participated in an eligible outreach programme, you could be eligible to apply for a Rigby Enterprise Award worth £5,000 per year for three years of your undergraduate degree.
- ## ROLABOTIC SCHOLARSHIP
  - Home students

  Are you a UK student with a household income of £25,000 or less? Did neither of your parents attend University? You could be eligible to apply for a ROLABOTIC Scholarship worth £4,500 for each year of your undergraduate degree.

- ## SPORT LIVERPOOL PERFORMANCE PROGRAMME

  - Home and international students

  Apply to receive tailored training support to enhance your sporting performance. Our athlete support package includes a range of benefits, from bespoke strength and conditioning training to physiotherapy sessions and one-to-one nutritional advice.

- ## TECHNETIX BROADHURST ENGINEERING SCHOLARSHIP

  - Home students

  Joining a degree in the School of Electrical Engineering, Electronics and Computer Science? If you're a UK student with household income below £25,000, you could be eligible to apply for £5,000 a year for three years of study. Two awards will be available per academic year.

- ## UNIVERSITY OF LIVERPOOL INTERNATIONAL COLLEGE EXCELLENCE SCHOLARSHIP

  - International students

  Completed a Foundation Certificate at University of Liverpool International College (UoLIC)? We're offering a £5,000 fee discount off the first year of undergraduate study to some of the highest achieving students joining one of our non-clinical degrees from UoLIC.

- ## UNIVERSITY OF LIVERPOOL INTERNATIONAL COLLEGE FIRST CLASS SCHOLARSHIP

  - International students

  We're offering a £1,000 fee discount for years 2 and 3 of undergraduate study to eligible students progressing from University of Liverpool International College. You'll need to be studying a non-clinical subject and get an average of 70% or above in year 1 of your degree.

- ## UNIVERSITY OF LIVERPOOL INTERNATIONAL COLLEGE IMPACT PROGRESSION SCHOLARSHIPS

  - International students

  If you're a University of Liverpool International College student awarded a Kaplan Impact Scholarship, we'll also consider you for an Impact Progression Scholarship. If selected, you'll receive a £3,000 fee discount off the first year of your undergraduate degree.

- ## YOUNG ADULT CARER'S (YAC) BURSARY

  - Home students

  If you're a young adult and a registered carer in the UK, you might be eligible for a £1,000 bursary for each year of study. You'll need to be aged 18-25 on 1 September in the year you start your undergraduate degree.

Entry requirements

The qualifications and exam results you'll need to apply for this course.

Your qualification	Requirements About our typical entry requirements
A levels	ABB Narrowly missed the entry requirements on results day? If you've studied these subjects, we may take them into account. Applicants with the Extended Project Qualification (EPQ) are eligible for a reduction in grade requirements. For this course, the offer is **BBB** with **A** in the EPQ. You may automatically qualify for reduced entry requirements through our contextual offers scheme. If you don't meet the entry requirements, you may be able to complete a foundation year which would allow you to progress to this course. Available foundation years: • Physical Sciences (4 year route including a Foundation Year at Carmel College) BSc (Hons) • Earth Sciences (4 year route including a Foundation Year at Carmel College) BSc (Hons)
GCSE	4/C in English and 4/C in Mathematics
Subject requirements	For applicants from England: For science A levels that include the separately graded practical endorsement, a "Pass" is required.
BTEC Level 3 National Extended Diploma	Applications considered alongside A levels. Please contact the University for further information.
International Baccalaureate	33 points that must include 6 points each from Physics and

Your qualification	**Requirements** About our typical entry requirements
	Mathematics at Higher level.
Irish Leaving Certificate	H1, H2, H2, H2, H3, H3 including Physics and Mathematics at H2 or above.
Scottish Higher/Advanced Higher	Advanced Highers accepted at grades ABB including Physics and Mathematics.
Welsh Baccalaureate Advanced	Accepted at grade B, including Mathematics and Physics A Levels at AB.
Access	45 Level 3 credits in graded units in a relevant Diploma,including 30 at Distinction and a further 15 with at least Merit. GCSE grades 4/C in English and 4/C in Mathematics also required. 15 Distinctions are required in each of Mathematics and Physics.
International qualifications	Many countries have a different education system to that of the UK, meaning your qualifications may not meet our entry requirements. Completing your Foundation Certificate, such as that offered by the University of Liverpool International College, means you're guaranteed a place on your chosen course.

ALTERNATIVE ENTRY REQUIREMENTS

- If your qualification isn't listed here, or you're taking a combination of qualifications, contact us for advice
- Applications from mature students are welcome.