

GO BEYOND BOUNDARIES



Physics

UNDERGRADUATE GUIDE



For me, the study of Physics is looking at the natural world in a very precise, systematic way and trying to understand it. I have always been curious about the world and how it works, and studying Physics made me appreciate even more how beautiful and complicated everything around us is.

WOUTER GRÜNEWALD
BSc PHYSICS

→ **6TH IN THE UK**
FOR PHYSICS

The Guardian University Guide 2024

Welcome to Physics

Physics at Aberdeen takes you on a fascinating journey of understanding through every level of the physical world, from quarks, atoms and molecules to solar systems, galaxies and the universe.

We will explore questions as vast as how the universe has evolved into its present state and cover topics such as the quantum nature of reality and other fascinating topics like thermodynamics and entropy.

We offer a stimulating environment for learning, with small class sizes and friendly staff that you will truly get to know well as you study here.

Our overall aim is to build a solid foundation of physics knowledge and use that to teach you how to think differently about the world and learn the widely applicable problem-solving skills of a physicist.

Here, you will be taught by experts in both experimental and theoretical areas of physics. Our highly research-active staff's work also interfaces strongly with other disciplines, so you will learn how to apply your physics skills and knowledge to understanding problems in multiple fields, including the environment, the economy and medicine.

We have laboratory physics available at all four years of the degree, with a solid introduction to the skills required for experimental physics in our first year labs, leading to ever more complex experiments and more freedom to pursue your own interests in second and third year. In fourth year, you may choose to undertake an experimental physics project – this year, this has included designing an in-vitro chip for studying heart disease, or constructing an optical tweezers.

Thanks to our connections with other disciplines we have offered other fourth year projects in medical physics, including MRI, and solid state chemistry and the study of anti-matter. We also have extremely strong expertise in computational modelling, and have projects modelling topics as diverse as patient flow through a hospital, the effects of chaos on network communications and the spread of disease.

Degree programmes

Our undergraduate programmes are designed to challenge your imagination with concepts like relativity and string theory and to lead you to great discoveries about how the world works, from the technological innovations that are transforming our everyday lives to our deep understanding of the universe.

Single Honours Programmes:

- BSc Physics
- BSc Physics with Astrophysics
- BSc Physical Sciences
- MA Natural Philosophy

Joint Honours Programmes:

- BSc Computing Science and Physics
- BSc Geology and Physics
- BSc Mathematics and Physics
- MA Philosophy and Physics
- Minor-Major Honours Programmes
- BSc Physics with Geology
- BSc Physics with Philosophy

What you will study?

BSc Physics Degree Structure Example

Year 1

- The Physical Universe
- Calculus
- Algebra

Year 2

- Light Science
- Dynamical Phenomena
- Practical Optics and Electronics
- Relativity and Quantum Mechanics
- Computational Methods in Physics

Year 3

- Energy and Matter
- Introduction to the Solid State
- Advanced Practical Skills
- Quantum Mechanics
- Electricity and Magnetism
- Mathematical Methods in Physics
- Structure of Matter and the Universe

Year 4

- Project
- Nuclear and Semiconductor Physics
- Case Studies in the Physical Sciences
- Statistical Physics and Stochastic Systems
- Modelling Theory
- Optics and Photonics

For full details of compulsory and elective courses, please see abdn.ac.uk/ug/physics

Physics careers

Physics is widely seen as a highly numerate and technical degree, so general employment prospects are excellent. The comprehensive expertise of the Physics staff at Aberdeen means you will be in an excellent position to pursue postgraduate opportunities in a huge variety of fields.

We have graduates working in particle physics at CERN, in the business and finance sectors, teaching, and even generating weather forecasts. Many graduates become professional scientists in industry, research institutes and universities.

The skills you learn here in quantitative and data analysis are highly valued in numerous sectors outside of science, including banking and finance, where such graduates are highly valued and remunerated.

According to the What Do Graduates Do? 2023 survey, Physics graduates had the highest level of employment in graduate jobs (85%) and also commanded the highest salaries for science graduates (£28,116).

Typical roles taken up by physics graduates include:

- Astronomer
- Clinical Scientist (medical physics)
- Data Scientist
- Financial Analyst
- Geophysicist
- Metallurgist
- Meteorologist
- Nanotechnologist
- Nuclear Scientist
- Researcher
- Software Engineer

IOP

Institute of Physics

IOP Accreditation

Our BSc Physics degree is accredited by the Institute of Physics (IOP) which means the programme satisfies the academic requirements for IOP membership, and provides a route to Registered Scientist (RSci), Chartered Physicist (CPhys) and Chartered Scientist (CSci).

Our Physics heritage

The Department of Physics has a long and storied history dating back to the founding of the University in 1495. Our most illustrious staff include James Clerk Maxwell, widely regarded as one of the greatest scientists of all time due to his revolutionary work on the theory of electricity and magnetism, as well as optics and numerous other fields, R. V. Jones, and G. P. Thomson, who won the Nobel Prize in Physics for his "gold foil" electron diffraction experiment.

Physics and Astronomy Society

The Physics and Astronomy Society is open to any students with an interest in physics or astronomy and organises a series of talks, experimental sessions, astronomy nights, trips, game nights, and numerous social outings.

You can connect with the Physics and Astronomy Society on Discord at <https://discord.gg/54ZVNU> or at www.facebook.com/groups/UoAPhysSoc



Nathan Fletcher
BSc Physics



Physics has been an interest of mine since I was at school; I've always had a fascination for how and why things work the way they do and so it was the natural choice for my degree subject. On top of this, I like to learn in different ways, and the mix of hands-on lab work, research, and taught courses is fantastic. I chose Aberdeen in particular because of the renowned physics department, the extracurricular opportunities and the location - right between the mountains and the sea!

I've really enjoyed Advanced Practical Physics - spending long days in the lab is tiring yet rewarding and the feeling of success after getting good results is a great feeling indeed. Not to mention there's no exam at the end!

Another thing I've really enjoyed about the degree has been the top notch lecturers. The two who stand out the most for me have been Dr Ross MacPherson and Dr Ekkehard Ullner, who are interesting and engaging in completely different ways and are always willing and able to answer questions and help students who need it.

Physics with Astrophysics

Physics with Astrophysics explores the structure of the universe to uncover the fundamental question: how did everything come to be? You will study the origins of the universe, the formation of galaxies, stars, and planets, and learn how to combine a knowledge of physics with advanced computational techniques to observe and understand the universe.

This programme will give you valuable skills in the various facets of observational, computational and theoretical astrophysics that enable the study of the cosmos. This will include the usage of telescopes for precise observation, rigorous treatment of the laws of optics and electromagnetism that have enabled our study of the unimaginably distant stars, and computational modelling techniques. You will also undertake a project that will include simulation of large scale gravitational effects.

The programme includes a field trip in the fourth year, where members of staff will take you to a Dark Sky Park in the Cairngorms National Park for a weekend of astronomical observation. We also offer a case study the preparations required for a rocket launch, informed by discussions with local launch platform companies in Shetland and western Scotland.



Scarlet Jeffers

BSc Physics,
VP of Experience at Clario



Physics is a well respected subject in all professional industries and is an amazing choice if you don't know exactly what you want to do. You develop such broad skills such as analytical and abstract thinking, coding, practical lab work and group communication. I was always interested in how things work and thinking about big, complex topics and questions, so it was a perfect fit for me

Because of the fantastic flexibility Aberdeen allow in degree credits, I was able to take business economics modules which helped to shape my degree from a pure science background, to applied technology in business.

With a Physics degree, you develop such a huge range of skills in mathematical analysis and statistics (great for financial modelling in business!) as well as practical lab skills and experiment design, which help you apply theory to the real world. It was both of these key skills that gave me the foundation to excel through business consultancy and product design and management.



abdn.ac.uk/physics

+44 (0)1224 272090
study@abdn.ac.uk

 @universityofaberdeen

 @aberdeenuni

 uniofaberdeen

 uniofaberdeen