

Course Summary: June 23, 2025

# **Physics with Astrophysics BSc Honours**

- UCAS code: F3F5
- Full time
- 3 years

Explore the mysteries of the universe with our Physics and Astrophysics BSc degree.

You are currently viewing course information for entry year: 2025

Next start date:

• September 2025

Tuition fees (Year 1)

- Home: **£9,535**
- International: **£30600**

Entry requirements and offers

- A-Level: AAB
- IB: 34 points

View contextual offers

#### UCAS Institution name and code:

• NEWC / N21

## **Course overview**

Apply physics, mathematics, and computation to understand the origin and evolution of the universe.

During your three-year Physics with Astrophysics BSc, you'll specialise in astrophysics and study:

- advanced astronomy
- stellar structure and evolution
- cosmology
- radiative transfer and high-energy astrophysics

These modules are unique to our Physics with Astrophysics degrees. But you'll also study a set of physics modules which are common across our Physics BSc courses.

You'll also get hands-on experience, and improve your practical skills, by working in our high-spec facilities. By the end of your degree, you'll have a strong understanding of physics and advanced mathematics.

#### **BSc or MPhys?**

Physics with Astrophysics is offered at two levels:

- three-year Bachelor of Science (BSc)
- four-year Master of Physics (MPhys)

Our MPhys degree has an extra year of advanced study at Master's level. You'll study more advanced topics and work on an extended project. You'll learn about research methodology and work with experts in their field.

#### Your course and study experience - disclaimers and terms and conditions

Please rest assured we make all reasonable efforts to provide you with the programmes, services and facilities described. However, it may be necessary to make changes due to significant disruption, for example in response to Covid-19.

View our Academic experience page, which gives information about your Newcastle University study experience for the academic year 2024-25.

See our terms and conditions and student complaints information, which gives details of circumstances that may lead to changes to programmes, modules or University services.

## **Quality and ranking**

## Professional accreditation and recognition

All professional accreditations are reviewed regularly by their professional body.

## Modules and learning

### Modules

The information below is intended to provide an example of what you will study.

Most degrees are divided into stages. Each stage lasts for one academic year, and you'll complete modules totalling 120 credits by the end of each stage.

Our teaching is informed by research. Course content may change periodically to reflect developments in the discipline, the requirements of external bodies and partners, and student feedback.

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Student demand for optional modules may affect availability.

Full details of the modules on offer will be published through the Programme Regulations and Specifications ahead of each academic year. This usually happens in May.

To find out more please see our terms and conditions

During your first year, you'll study introductory modules in physics and mathematics. We'll also spend some time in the lab working on experiments and projects.

### Modules

Compulsory Modules	Credits
Introductory Algebra	10
Introductory Calculus and Differential Equations	20
Multivariable Calculus	10
Dynamics	10
Introductory Astrophysics	10
Introductory Electromagnetism	10
Introductory Quantum Mechanics	10
Laboratory Physics 1	20
States of Matter, Waves & AC Theory	20

You'll continue learning about the core concepts of physics, including quantum mechanics and electromagnetism. We'll also study modules in fluid dynamics, and computational methods and professional skills for theoretical physics.

#### Modules

Compulsory Modules	Credits
Principles of Quantum Mechanics	10
Vector Calculus	10
Differential Equations, Transforms and Waves	10
Fluid Dynamics I	10
Principles of Electromagnetism	10
Principles of Materials and Solid-State Physics	10
Computational Methods and Professional Skills for Theoretical Physics	10
Thermodynamics & Statistical Mechanics	20
Scientific Computation with Python	10
Astronomy with Data	20

During your final year, you'll study more advanced modules and work on two different projects.

You must choose one optional module.

#### Modules

Compulsory Modules	Credits
Advanced Quantum Mechanics	10

Relativity and Fundamental Particles	10
Advanced Materials and Solid-State Physics	10
Atoms, Molecules, and Nuclei	10
Team Project	10
Individual Project	20
Advanced Astronomy	10
Stellar Structure and Evolution	10
Cosmology	10
High Energy Astrophysics and Black Holes	10
Optional Modules	Credits
Mathematical Biology	10
Variational Methods and Lagrangian Dynamics	10
Classical Fields	10

### Information about these graphs

We base these figures and graphs on the most up-to-date information available to us. They are based on the modules chosen by our students in 2024-25.

Teaching time is made up of:

- scheduled learning and teaching activities. These are timetabled activities with a member of staff present.
- structured guided learning. These are activities developed by staff to support engagement with module learning. Students or groups of students undertake these activities without direct staff participation or supervision

## **Teaching and assessment**

### **Teaching methods**

You'll be taught via a range of approaches, including:

- lectures and seminars
- small group tutorials
- problem classes
- laboratory sessions
- practical computing sessions

In Stage 1, you'll work on experiments and projects in our labs. These practical sessions will be about 45 hours in total.

#### Assessment methods

You'll be assessed through a combination of:

- Assessments
- Examinations practical or online
- Group work
- Projects
- Reports

### Skills and experience

#### Practical experience

This degree will give you the skills employers are looking for.

Using our high-spec facilities, and working alongside our expert staff, you'll:

- learn how physics is used in modern technology and advanced engineering
- develop practical skills and expertise in experimental techniques
- conduct research at a leading Russell Group university
- showcase your research and presentation skills
- work on lab-based and project-based modules
- improve your skills in experiments, analysis, computing, and research

#### Business skills

In Stage 3 you'll work on a group project, helping you improve your teamwork and practical skills.

You'll also work on your own theoretical project. You'll explore an aspect of physics under the guidance of our expert staff. The project will help you develop your research, practical and presentation skills.

### Research skills

We have an interdisciplinary approach to research. Our academic staff are experts in their field, with a diverse range of research strengths.

We have research expertise in:

- planetary dynamos
- geomagnetic field reversals
- magnetic torques in accretion discs binary stars
- galactic dynamos
- interstellar turbulence
- magnetic Taylor–Couette flow

Research areas in the School of Mathematics, Statistics and Physics

## **Opportunities**

## Study abroad year

Experience life in another country by choosing to study abroad as part of your degree. You'll be encouraged to embrace fun and challenging experiences, make connections with new communities and graduate as a globally aware professional, ready for your future.

You can choose to spend up to a year studying at a partner institution overseas. Our overseas partner institutions include:

- Universiteit Leiden, Netherlands
- L-Universta ta' Malta, Malta

- Universitat Politècnica de Catalunya, Barcelona
- Technisches Universitat Munchen, Munich

There are also lots of options in North America, Australia and Asia, including:

- Buffalo, New York State
- McGill, Montreal
- University of New South Wales, Sydney
- Hong Kong
- Singapore

During your time studying abroad, you will select from a range of modules offered by your host university. Alongside taking some subject-relevant modules, you will be given greater flexibility to choose modules from different disciplines (eg Languages, Business)

If you choose to study abroad, it will extend your degree by a year.

Find out more about study abroad

## Short-term global opportunities

During your degree, you can take part in short-term global opportunities in countries such as:

- USA
- Cyprus
- Hong Kong
- Singapore
- Sri Lanka

The activities range from four days to eight+ weeks, and include:

- summer schools
- internships
- volunteering
- experiential learning

Funding is available to support students who want to participate.

## Work placement

Apply your practical skills, increase your confidence and gain real-life work experience to accelerate your career. Take a 9-12-month industrial placement in the UK or abroad. Work placements usually take place in stage 3 of your studies and extend your degree by one year.

Find out more about work placements.

## **Facilities and environment**

## **Facilities**

As a physics student at Newcastle University, you'll be based at our city-centre campus in the School of Mathematics, Statistics and Physics' Herschel Building.

The School has high-specification laboratory facilities equipped with leading experimental and computational physics capabilities, such as:

• cryogenics labs

- semiconductor labs
- High-Performance Computing
- data from the Large Synoptic Survey Telescope

The Herschel Building also has dedicated study and social spaces, and a computing area.

### Find out more about our facilities, including a 360 tour

## Support

We take your health and wellbeing seriously and are committed to supporting you throughout your studies so you can fulfil your potential at university. This support includes:

- a personal tutor who is an academic member of staff who can help you with academic and personal issues throughout your degree
- a peer mentor scheme which pairs you with a current student from your course to help you navigate your first year at university
- a staff-student committee, to give you an opportunity to have a say in how your degree works
- Student Wellbeing Advisors who can offer comprehensive listening and support and signpost you to other University support services or external support agencies

## **Transition Officer**

A dedicated staff member is here to support you in transitioning from school to university study.

The Transition Officer works with Stage 1 undergraduates to provide:

- Stage 1 pastoral and academic support
- attendance and academic performance monitoring
- Stage 1 induction
- weekly drop-ins

You'll also benefit from our:

- induction programme, including social events, to help you settle in quickly
- activities and events run by our student-run society, PhysSoc
- peer supported academic drop-in sessions to help with assignments

## Your future

## Graduating with a degree in physics

Our graduates have gone on to work as:

- power systems engineers
- research software engineers
- programmers
- tax associates
- consultants

Employability is embedded throughout your degree, with opportunities to connect with alumni and employers each year. All physics students are invited to attend the annual WRIPA Physics Careers Fair, a major event that brings together employers actively seeking physics graduates.

Our graduates are well-prepared for careers in research and academia, but many

also move into fast-growing and diverse sectors in the North East and beyond, including:

- advanced materials and semiconductors
- defence
- energy transition, infrastructure and electrification
- fibre-optics and communications
- space, satellite technology, and earth observation

In addition, physics graduates are highly valued in a range of other fields such as:

- accounting
- banking and financial services
- data analytics
- energy: nuclear and offshore
- engineering: consulting and manufacturing
- IT and software development
- management consultancy
- NHS medical physics
- teaching
- telecommunications
- traffic and transport management
- utilities, including the water sector

Many of our students also go on to further study, including teacher training or PhD programmes in physics and related disciplines.

### Our links with industry

The Department of Physics has extensive research and alumni links with leading companies and external organisations. These connections help inform our teaching and support student networking and career development opportunities.

Our industry links include:

- BBC
- Cosm (Digistar)

- De Beers
- Engineering and Physical Sciences Research Council (EPSRC)
- European Southern Observatory (ESO)
- European Space Agency (EUCLID Space Observatory)
- FreeAgent
- Intel
- Johnson Matthey
- Jumping Rivers
- James Webb Space Telescope (JWST)
- Met Office
- Mind Foundry
- National Audit Office
- National Space Centre
- NICD
- Northern Gas Networks
- Oliver Wyman
- Phase Photonics
- Science and Technology Facilities Council (STFC)
- Vera C. Rubin Observatory (LSST)

### Make a difference

### **Careers support**

Our Careers Service is one of the largest and best in the country, and we have strong links with employers. We provide an extensive range of opportunities to all students through our ncl+ initiative.

Visit our Careers Service website

## Recognition of professional qualifications outside of the UK

From 1 January 2021 there is an update to the way professional qualifications are recognised by countries outside of the UK

Check the government's website for more information.

## **Additional information**

## Advice on maths and science requirements

If you don't think you will have the exact mathematics and science qualifications referred to in our entry requirements by the time you need them, you may not be sure what to do.

- If you have a maths qualification but will not have it at A Level (or equivalent) when you start your degree, you should apply for the relevant degree with Foundation Year. We may give you the opportunity to take the Newcastle University Pre-Entry Maths Course\* and the option to start in Year 1 if we think that this will be the best route for you.
- If you have A Level Maths (or equivalent) already but not at the required grade, you should contact us for advice. We may decide that you could be considered for Foundation Year entry, or it may be that this course is not the best option for you.
- If you will not have the equivalent of an A Level in the science subject (if any) required, you should apply for the relevant degree with Foundation Year.

If you are still not sure, don't worry. Whatever you apply for, our Admissions Tutors will help you decide which is the best route for you. They may, therefore, make you an offer for a different course from the one you apply for (eg Foundation Year entry instead of Year 1 entry).

\*The Newcastle University Pre-Entry Maths Course aims to provide the requisite mathematical skills and concepts needed on our engineering, maths and physics degree courses and to prepare students for the modes of learning they will encounter. The materials for the course are delivered electronically and include opportunities to practise your skills. You study the materials in your own time and, when you are ready, you book your exam with the Engineering School to which you have applied. A fee of £150 is payable at the time of booking the exam or shortly before the date set for examination.

## Find out more...

- Go online for information about our full range of degrees:
  www.ncl.ac.uk/undergraduate
- To watch videos about student life in Newcastle, visit
  www.ncl.ac.uk/lovenewcastle
- Visit **www.ncl.ac.uk/tour** to take virtual tours of the campus and city
- Book for an Open Day to come and see us in person www.ncl.ac.uk/openday
- Contact us online at www.ncl.ac.uk/enquiries or phone +44 (0)191 208
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