School of Physics and Astronomy
FACULTY OF MATHEMATICS AND PHYSICAL SCIENCES

UNIVERSITY OF LEEDS

PHYSICS AND ASTRONOMY
UNDERGRADUATE DEGREES 2018

Come and find your place
CONTENTS

3 SCHOOL OF PHYSICS AND ASTRONOMY

4 PHYSICS AND ASTRONOMY AT LEEDS

6 STUDENT STORY – FIONA TORZEWSKA

8 STUDENT STORY – ETHAN JULL

10 OUR COURSES

Physics BSc
Physics MPhys, BSc
Physics with Astrophysics BSc
Physics with Astrophysics MPhys, BSc
Theoretical Physics BSc
Theoretical Physics MPhys, BSc

12 STUDENT STORY – GRACE PORTER

14 CAREERS AND EMPLOYABILITY

16 LEEDS THE CITY

18 THE APPLICATION PROCESS

IMPORTANT INFORMATION

Information provided by the University such as in presentations, University brochures and the University website, is accurate at the time of first disclosure. However, courses, University services and content of publications remain subject to change. Changes may be necessary to comply with the requirements of accrediting bodies or to keep courses contemporary through updating practices or areas of study. Circumstances may arise outside the reasonable control of the University, leading to required changes. Such circumstances include, industrial action, unexpected student numbers, significant staff illness (where a course is reliant upon a person’s expertise), unexpected lack of funding, severe weather, fire, civil disorder, political unrest, government restrictions and serious concern with regard to the transmission of serious illness making a course unsafe to deliver. After a student has taken up a place with the University, the University will look to give early notification of any changes and try to minimise their impact, offering suitable alternative arrangements or forms of compensation where it believes there is a fair case to do so. Offers of a place to study at the University will provide up to date information on courses. The latest key information on courses, entry requirements and fees can be found at www.leeds.ac.uk/courses. Please check this website before making any decisions.
As a physics graduate, you’ll be recognised as an intelligent, analytical problem-solver, with wide-reaching career opportunities in areas such as research, manufacturing, aerospace, education, electronics, energy, environment, health, transport, finance, media, and many more.

At Leeds we have an active research environment that enables us to offer exciting courses taught by experts who are leaders in their fields. You’ll be directly engaged in research through project work.

Your degree from the University of Leeds and the wider experience you’ll gain while you’re studying here will help you stand out from the crowd and secure that all-important graduate job.

“We’re very proud to have been named University of the Year 2017 in The Times and The Sunday Times Good University Guide in recognition of our high-quality teaching and excellent student support.”

DR ROBERT PURDY,
SCHOOL OF PHYSICS AND ASTRONOMY
UNDERGRADUATE ADMISSIONS TUTOR
Don't just learn physics. Do physics.
We give you the opportunity to gain hands-on experience applying material from your lectures and tutorials to real-life problems.

You will undertake a project in your final year, working with one of our inspirational research groups. This might focus on astrophysics, condensed matter, nanoscale physics, soft matter, theoretical physics, or a related area.

Our third-year group industrial project optional module gives you the chance to investigate an application of physics in response to a real-life scientific problem set in an industrial, commercial or research context, making a real contribution to an industrial client.

Through our summer research placements, you could join one of our research groups. You would work alongside physics academics for a period of six weeks, be paid a salary and contribute to real research projects.
RESEARCH-BASED DEGREES
Learn specialist knowledge from leading researchers.
We study everything from the formation of stars to contact lenses to quantum computers. We’re at the forefront of developing medical applications of physics and are leaders in spintronics research.
We undertake our research alongside where you will study, which means you will have the opportunity to get involved with research during your time with us.
Our courses offer you the chance to specialise in a particular area of physics that interests you the most. By selecting specific optional modules during your degree, you could take your learning down a specialist pathway in areas such as quantum physics, spintronics, biological and nanoscale physics, stellar and planetary formation, medical imaging or environmental physics.

DISCOVERY MODULES
As well as the compulsory and optional modules that make up your course, you’ll also have the opportunity to choose discovery modules. There are many discovery modules to choose from, allowing you to pursue interests outside physics during your course.

INTEGRATED MASTERS
All our degrees are available as three-year BSc degrees, or four-year MPhys, BSc Integrated Masters degrees. An Integrated Masters is a four-year degree that extends your studies to Masters level, enhancing your career prospects or setting you up to pursue a PhD.
It is possible to transfer between BSc and MPhys, BSc variants of a course during the first two years of your studies, as long you’re meeting the required academic standards.

INDUSTRIAL PLACEMENTS AND STUDY ABROAD
All our physics courses give you the chance to do a study abroad year or an industrial placement year.

STUDENT SUPPORT
We take student support seriously. You’ll be assigned a personal tutor to guide you through your studies with us, and can receive lots of support from fellow students through our peer mentoring scheme.
Using our Virtual Learning Environment, you can access learning resources including reading lists, past exam papers, skills guides and assessment guides. You’ll also be able to play back video recordings of most of your lectures and download lecture notes.

JOIN PHYSOC
You can join Physoc, a student-run society for physics students. The society organises guest lectures and trips abroad to physics-related facilities such as CERN and ITER. It also holds social events including bowling, nights out and coffee bar socials.

STUDENT SUPPORT
We take student support seriously. You’ll be assigned a personal tutor to guide you through your studies with us, and can receive lots of support from fellow students through our peer mentoring scheme.
Using our Virtual Learning Environment, you can access learning resources including reading lists, past exam papers, skills guides and assessment guides. You’ll also be able to play back video recordings of most of your lectures and download lecture notes.

JOIN PHYSOC
You can join Physoc, a student-run society for physics students. The society organises guest lectures and trips abroad to physics-related facilities such as CERN and ITER. It also holds social events including bowling, nights out and coffee bar socials.

ACCREDITATION
All our degrees are accredited by the Institute of Physics (IoP). This is a sign of quality which is recognised and valued by employers around the world. Studying an IoP-accredited degree course is the first step towards becoming a chartered physicist (CPhys).

WORLD-LEADING FACILITIES
We have all the facilities you’ll need to support and enhance your academic studies and the University is investing millions of pounds each year to ensure we maintain a first-class academic environment. From laboratories and lecture theatres to one of the largest and most impressive libraries in the UK, you’ll find everything you need for your studies right here on campus.
STUDENT STORY

FIONA TORZEWSKA
MPHYS, BSC THEORETICAL PHYSICS STUDENT

Physics at Leeds is very different from doing it in school, where the curriculum comes straight from a textbook. During my course I have been able to get involved in so much active research.

After my second year, I began my first summer research project in quantum optics with Dr Almut Beige. Working on a research project is very different from studying normal modules. I was given a lot of responsibility to research completely new topics, which no one knew the answer to, and my ideas were always listened to and taken seriously. It was great to be able to have an opportunity to study independently without the pressure of exams and my interest in the subject developed hugely as a result.

This project was mainly computation based and I was really surprised by what I was able to achieve. It showed me how much I had learnt in the first half of my degree. The material I covered that summer was closely related to a fourth-year module, which meant I was already ahead when I began that module and took some of the pressure off my fourth year.

During my summer research placement we got some very interesting and surprising results. We have since written a paper of which I am a co-author, which will hopefully be published in a scientific journal later this year. This really made it feel like I had achieved something worthwhile and led me to consider going into research following university. Already having my own paper published really makes me stand out against other applicants.
I most enjoyed the hands on experience I had while studying physics at Leeds. It was incredibly satisfying to conduct a laboratory experiment, attain results and produce a conclusion. The final-year project was by far the best part of the course, allowing me to develop my own experimental procedure to answer a question provided.

My summer research placement allowed me to be involved in real physics by researching a new method for cancer cell detection. Through the development of a microfluidic set-up, I was able to develop a method of measuring the deformation of oil droplets as they are compressed by opposing flows. This methodology could then later be applied to human cells, which deform differently depending on whether they are healthy or cancerous.

To be able to say that you’ve already done some research in your undergraduate degree, before you’ve even moved on to a PhD or further work, is invaluable.
OUR COURSES

PHYSICS

Physics BSc:
UCAS code F300 / Entry grades AAB / Duration 3 years

Physics MPhys, BSc:
UCAS code F302 / Entry grades AAA / Duration 4 years

Our BSc and MPhys, BSc Physics degrees develop your knowledge of core physics while allowing you to explore advanced, boundary-pushing topics, according to your interests. Throughout the course, we ensure that your experience goes beyond textbook learning and allow you to get involved in real, meaningful research.

In the first two years of your course, you will be given a firm grounding in core physics. You'll study quantum physics, relativity, vibrations and waves, and solid-state physics, among other topics. Through your laboratory modules, you will gain the practical and communication skills that are essential for a physics graduate. You'll also have the option to take modules offered by our research groups such as astrophysics or nanophysics, or can even study topics from other departments through discovery modules.

In year 3, your work will be closely linked to current research. We offer advanced modules in areas such as superconductivity, bionanophysics, liquid crystals, particle physics and cosmology. The breadth of topics available for you to study ensures you receive a rich physics education. Students on the Integrated Masters programme will do an Advanced Experimental Techniques and Analysis module, based in our research laboratories, which prepares you for your final-year project.

On both our Bachelor’s and Integrated Masters degrees, you will complete a project in your final year. You will work as part of an internationally recognised research team on an open-ended project. This is a wonderful opportunity to take part in and contribute to the latest physics research and join one of our research groups.

“I love studying physics as it lets me learn about the world on every scale imaginable - from the quarks that make up atoms, to the possible expansion and collapse of the universe itself.”

PREETINDER SINGH,
MPhys, BSc Physics
Theoretical Physics BSc:
UCAS code F3KO / Entry grades AAB / Duration 3 years

Theoretical Physics MPhys, BSc:
UCAS code F340 / Entry grades AAA / Duration 4 years

Theoretical physics really is about the meaning of it all. This degree will enable you to understand the revolutionary advances in theory that underpin today’s physical understanding of the world.

You will acquire a thorough knowledge and understanding of the theoretical basis of modern physics, with particular focus on the mathematical aspects. Throughout the course you will develop a firm grounding in how mathematical methods are applied to advanced topics in physics.

In the first two years of your degree, you will study core physics topics, including quantum physics, relativity and solid-state physics. Alongside this, you will explore mathematics topics such as complex numbers, vector calculus and matrices, with optional mathematics and physics modules also available. We enable you to gain an understanding of basic laboratory skills in year 1, so that you have a better sense of how experimentation and theory work together in physics.

In the third year of your degree, you can choose from a wide range of advanced optional modules from both the School of Physics and Astronomy and the School of Mathematics. In your final year, you will undertake a theory-based research project. This is your chance to work closely with a leading researcher in a current active field of research.

When you finish this programme, you will have a sound knowledge and understanding of the core observations, concepts and quantitative theoretical structures that constitute our contemporary understanding of the physical world.

Physics with Astrophysics BSc:
UCAS code F3F5 / Entry grades AAB / Duration 3 years

Physics with Astrophysics MPhys, BSc:
UCAS code F3FM / Entry grades AAA / Duration 4 years

Astrophysics encompasses study of the exciting arena of planets, stars and galaxies. On this degree, you will develop thorough knowledge of core physics while also studying a broad range of astrophysics topics, such as high energy astrophysics, stellar structure, stellar evolution and cosmology, from your very first week.

The first year introduces you to the basics of the sun, stars, galaxies and the universe, illustrated with images from the world’s top telescopes. In your second year, you’ll really get to grips with the physical and mathematical descriptions of what makes stars tick and, in the end, explode. You will also learn about some of the most energetic and enigmatic phenomena in the universe such as pulsars, gamma ray bursts and active galactic nuclei. As part of your laboratory modules, you will choose an object to observe and use the School’s observatory and state-of-the-art equipment to produce a colour image.

The astrophysics modules in year three cover such exciting topics as star and planet formation, cosmology and the evolution of the universe. There is also a broad range of optional modules available to you to allow you to explore other areas of physics.

The final year of the Bachelor’s and Integrated Masters degrees involves undertaking a project where you’ll work with leading academics and contribute to current astrophysics research.

For full course details, including module information, visit www.leeds.ac.uk/courses
Whether it is in modules or through summer and outreach work, there is always something to get involved in when studying physics at Leeds.

I didn’t want to commit a year to an industrial placement, and so instead I took the group industrial project module. This module was a great way to experience a different type of research. The industrial contact gave my group a question that they wanted to answer, and we got together to research the subject and to plan a way to answer this question. Our academic contacts were really helpful in guiding our thinking towards feasible solutions, and we were able to give some interesting results to our industrial contact!

I really enjoyed being able to use the science I was taught during my degree. Doing research throughout your degree is a great way to understand that some of the most obscure concepts you learn can be applied to real-world problems.

On this course, you really get a sense that the degree is yours and the research you are undertaking is your responsibility. Whether it is through a summer project, the group industrial project module, or in your final year research project, the academic staff help you to find out what kind of research interests you and gain the skills to pursue those interests.
REWARDING CAREERS

A degree in physics opens the door to many exciting and rewarding career choices.

Physics graduates secure jobs that are among the most highly-paid and intellectually challenging available. Many of our students go on to pursue a PhD, leading to careers in both academia and exciting relevant industries. Others choose to use their skills to diversify and follow graduate schemes in engineering, finance, IT or teaching.

CAREERS AND EMPLOYABILITY SUPPORT

Throughout your time with us, our dedicated Faculty Employability Team will be there to support, guide and advise you.

We support you from your first year through to your final year with a series of employability and careers activities.

We’ll help you through the career decision-making process, support you in your applications for work experience and graduate jobs, and bridge the gap between you and employers.

Our specialist, qualified staff are here to help you succeed on the path to your perfect career so you feel supported along the way.

You’ll benefit from:

- Accredited careers skills development modules in second-year, to give you an insight into industrial product development or business start-up
- Timetabled employability sessions at all stages of your course
- Ongoing support to find internships and placements
- Practical help with developing a CV, making applications, and preparing for interviews and assessment centres
- One-to-one guidance or coaching appointments to focus on you and your future
- Presentations and workshops delivered by a wide variety of employers
- Events and workshops to futureproof your skills
- Institute of Physics (IoP) accreditation for all of our courses, which makes your degree more valuable in the eyes of future employers, and sets you on the path to becoming a chartered physicist.

Our Careers Centre and Employability Team organise an annual STEM Careers Fair, giving you many opportunities to meet graduate recruiters, gain an insight into graduate jobs and explore work experience, graduate and further study opportunities, giving you the best start to your career.

The University of Leeds is a top-five university targeted by employers (High Fliers 2017). Some recent employers on campus targeting physics students have included CERN, TTP, BAE Systems, The Royal Navy and Imagination Technologies.

We are also part of WRIPA (the White Rose Industrial Physics Academy) who organise collaborations between companies and physics students. Their flagship event is the annual careers fair which includes sector specific panel discussions, talks, workshops and CV clinics. Some recent employers present at the fair include IBM, CHERSOFT and National Instruments.
INDUSTRIAL PLACEMENT

All of our degree programmes include the option to complete a placement year in industry, which would be the third year of your course.

We offer flexibility, so if you’re not yet sure if a placement year is for you, you can always make your mind up when you are here, normally at the start of your second year.

Either way, from year one, you will be able to access support to enable you to make the most well-informed decision regarding your placement year search and applications.

A placement year is a great opportunity to learn new skills and knowledge, whilst putting those that you have already developed at university into practice. This is a great way to enhance your employability while getting a real understanding of what a career in industry will be like, ultimately helping you decide what kind of career you might like to follow after university.

We have a dedicated Employability and Placements Officer who will work with you during a series of placement information and preparation sessions. These sessions will inform you of the wide variety of options available to you, what to expect from the application process, and how to apply. There will also be opportunities to book one-to-one appointments to help with your placement search, as well as access to a range of placements on the University’s vacancy system.

We successfully place physics students with a range of employers. Recent examples include Siemens, Virgin Media, GSK, SP Energy Network and Xoserve Limited.

SUMMER RESEARCH PLACEMENTS

As well as external work placements, we offer you the opportunity to work on real physics projects in our research teams during the summer break.

You would work alongside physics academics for a period of six weeks, be paid a salary, and contribute to real research.

“During a summer research placement, you have the opportunity to contribute towards original, cutting-edge research. Working within the research groups on something new and exciting is a great experience for anyone who is enjoying their physics studies and can give you a real insight as to what a job in scientific research can be like.”

JAMES MILEY, MPHYS, BSC PHYSICS WITH ASTROPHYSICS

STUDY ABROAD

All our courses give you the chance to study abroad as part of your degree.

You would typically spend your third year studying physics at a partner institution and then return to Leeds for your final year. Spending a year living and studying abroad is a unique prospect. You’ll have the chance to immerse yourself in another culture and gain unforgettable experiences.

You’ll also gain an overseas education and develop new skills that will impress future employers.

We have relationships with many international universities, representing some of the best places to study abroad across the world.

“There are loads of opportunities available both inside and outside the department. This summer I went to Korea for a Leeds study abroad summer school and had a really amazing time.”

ROSIE SUMPTER, STUDY ABROAD SUMMER SCHOOL IN KOREA
Leeds the city

Leeds is a large city which offers the best of both worlds. As well as being a vibrant, affordable and multicultural city, it’s also surrounded by some of the most beautiful, accessible countryside in the UK.

At the University of Leeds we guarantee an offer of accommodation for your first year, providing you apply by the deadline.

We offer a wide variety of quality accommodation, from modern, purpose-built developments to more traditional residences in a variety of locations from the heart of campus and city centre to leafy suburbs.
ARTS AND CULTURE

Leeds has been described as a ‘hotbed of creative cultural talent’ and enjoys a reputation for producing spectacular and innovative shows. It’s the only UK city outside London to have its own opera and ballet companies and boasts several theatres.

SPORT

Leeds has a great sporting tradition and was chosen as the host city for Le Grand Départ, the start of the 2014 Tour de France. The city is home to some great sporting teams, including Leeds United Football Club and Leeds Rhinos rugby league and Yorkshire Carnegie rugby union teams. Leeds is also home to Yorkshire County Cricket Club and international Test Match cricket.

SHOPPING

The opening of the new Victoria Gate shopping centre makes Leeds one of the largest shopping destinations in the UK outside London. From the beautiful architecture of the Victoria Quarter and the Grand Arcade to the stunning domed roof of Leeds Corn Exchange, Leeds is a true haven for anyone who wants to shop.

FOOD AND DRINK

You’re never far from a fantastic restaurant, café or pub, whether you’re in the city centre or one of the popular student suburbs. Many have special deals for students or early-bird menus, ideal for a student budget.

NIGHTLIFE AND MUSIC

Leeds’ nightlife is legendary, with clubs and bars offering music to suit all tastes. There are lots of live music venues in the city, including the 13,500 capacity First Direct Arena, the O2 Academy and Brudenell Social Club.

EXPLORING YORKSHIRE

At the heart of Yorkshire, Leeds is one of the greenest cities in Britain and within easy reach of traditional towns and cities such as York, Ilkley, Harrogate and Saltaire, as well as Yorkshire’s stunning coastline. The spectacular countryside surrounding Leeds – including the Lake District, the Peak District, the Yorkshire Dales and the North York Moors – provides the ideal environment for University groups and societies taking part in everything from caving and kayaking to cycling and walking.

CONTACT US

If you require any more information about our courses, modules, or any other aspect of studying physics at Leeds, please contact our Undergraduate Admissions Team.

Tel: +44 (0)113 343 3881
Email: physics.admissions@leeds.ac.uk
www.physics.leeds.ac.uk
**THE APPLICATION PROCESS**

**ENTRY REQUIREMENTS**

Our entry requirements range from AAA to AAB at A-level, depending on which course you choose. Physics and mathematics must be among your A-level subjects. Where an A-level science subject is taken, we require a pass in the practical science element, alongside the achievement of the A-level at the stated grade. Excludes A-level General Studies or Critical Thinking.

We also accept a variety of alternative qualifications (check our website for details).

**ENGLISH LANGUAGE REQUIREMENTS**

GCSE English language grade C (or above) or an equivalent recognised English language qualification, eg IELTS 6.0 overall with no less than 5.5 in each element.

**ACCESS TO LEEDS**

We’re committed to identifying the best possible applicants, regardless of personal circumstances or background.

Access to Leeds is an alternative admissions scheme which accepts applications from individuals who might be from low income households, in the first generation of their immediate family to apply to higher education or have had their studies disrupted.

For more details visit www.leeds.ac.uk/a2l

**HOW TO APPLY**

All undergraduate applications should be made through the Universities and Colleges Admissions Service (UCAS).

Full instructions on how to apply are available at www.ucas.com

**OFFER PROCESS**

Suitable applicants will be invited to an applicant day, which gives you the opportunity to meet our academic staff and students, enjoy a tour of our facilities, view student accommodation and find out more about your course.

We like to interview applicants before making an offer, so the day will also include an interview with one of our academics. This will give you the chance to discuss your application in more detail, check that it’s the right course for you and your career plans, have your questions answered and find out more about studying at Leeds.

**SCHOLARSHIPS**

The University of Leeds has a long-standing history of helping students to manage their finances while at University, with a comprehensive range of bursaries and scholarships available.

For more information, visit www.physics.leeds.ac.uk/undergraduate/scholarships.html

**CONTACT US**

If you require any more information about our courses, modules, or any other aspect of studying physics at Leeds, you can contact our Undergraduate Admissions Team, go online or follow us on twitter (@scienceleeds)

Tel: +44 (0)113 343 3881
Email: physics.admissions@leeds.ac.uk
www.physics.leeds.ac.uk
CONTENTS

3 NATURAL SCIENCES

4 NATURAL SCIENCES AT LEEDS

6 STUDENT STORY – ASIF FAZAL

8 OUR NATURAL SCIENCES COURSE

10 STAFF SPOTLIGHT – DR MEGAN WRIGHT

12 COURSE THEMES
   Chemistry, Biochemistry, Biology
   Maths, Biochemistry, Biology
   Maths, Chemistry, Environmental Science
   Physics, Maths and Biochemistry or Biology
   Physics, Maths, Chemistry
   Physics, Maths, Food Science

14 STUDENT STORY – KIM SPIJKERS-SHAH

16 CAREERS AND EMPLOYABILITY

18 STAFF SPOTLIGHT – DR SANDRO AZAELE

20 LEEDS THE CITY

22 THE APPLICATION PROCESS

IMPORTANT INFORMATION

Information provided by the University such as in presentations, University brochures and the University website, is accurate at the time of first disclosure. However, courses, University services and content of publications remain subject to change. Changes may be necessary to comply with the requirements of accrediting bodies or to keep courses contemporary through updating practices or areas of study. Circumstances may arise outside the reasonable control of the University, leading to required changes. Such circumstances include, industrial action, unexpected student numbers, significant staff illness (where a course is reliant upon a person’s expertise), unexpected lack of funding, severe weather, fire, civil disorder, political unrest, government restrictions and serious concern with regard to the transmission of serious illness making a course unsafe to deliver. After a student has taken up a place with the University, the University will look to give early notification of any changes and try to minimise their impact, offering suitable alternative arrangements or forms of compensation where it believes there is a fair case to do so. Offers of a place to study at the University will provide up to date information on courses. The latest key information on courses, entry requirements and fees can be found at www.leeds.ac.uk/courses. Please check this website before making any decisions.
As a natural scientist, you will be uniquely positioned to tackle this next generation of scientific challenges because the concepts and language of multiple scientific disciplines are taught to you from day one of your degree.

At Leeds we have an active research environment which enables us to offer exciting courses taught by experts who are leaders in their fields. You’ll be directly engaged in research through project work.

Your degree from the University of Leeds and the wider experience you’ll gain while you’re studying here will help you stand out from the crowd and secure that all-important graduate job.

“Leeds has always been at the forefront of interdisciplinary research and being named University of the Year 2017 in The Times and The Sunday Times Good University Guide also shows how we translate these skills to deliver an outstanding education and exceptional student experience.”

DR PAUL BEALES
NATURAL SCIENCES PROGRAMME MANAGER
The future is interdisciplinary.
Be a part of it.

The major scientific breakthroughs of the future will be interdisciplinary, with scientists from across different disciplines working together to solve the world’s biggest problems.

At Leeds, we’re at the forefront of those breakthroughs.

That’s why, for example, we established the Astbury Centre for Structural Molecular Biology. This research centre brings together scientists from across physics, biology and chemistry to explore the molecular basis of life.

Our approach to interdisciplinary research feeds into our teaching. Whether you want to understand more about how to combine physics and maths to study the quantum world, model the growth of biological populations or understand biochemistry at the atomic level, we have the perfect team to guide you.

Be a part of the future by studying Natural Sciences at Leeds.
INTERDISCIPLINARY RESEARCH AT LEEDS

Interdisciplinary research is the future which is why at Leeds we have founded several international centres where scientists can collaborate and use the best ideas and methods to give new insight into the natural world.

The Astbury Centre is known internationally for its work to understand life in molecular detail by using the latest state-of-the-art facilities in life and physical sciences. Just last year, the University further strengthened research in this field with a £17m investment in the Astbury Biostructure Laboratory, purchasing the very latest in high-field NMR machines and electron microscopes that can give atomic-level views of how biological molecules function.

The Priestley International Centre for Climate is unique in bringing together world-leading expertise in all the key strands of climate change research. The focus is on new interdisciplinary research partnerships that better link our physical, technological, economic and social understanding of climate change with strategies for mitigation and adaptation.

Advanced materials are changing all of our lives and a major new £96m international centre for engineering and physical sciences will help to foster a culture of interdisciplinary working in the development of novel materials to address 21st-century challenges.

MORE CHOICE THAN EVER BEFORE

A Natural Sciences degree is one of the most flexible courses you can study.

You choose which sciences you want to study and how much to study of each. This gives you the freedom to build your own course and become the scientist that you want to be.

We’re constantly developing our Natural Sciences course to give you even more choice.

There are now seven sciences for you to choose from, including biology, biochemistry, chemistry, environmental science, food science and nutrition, mathematics, and physics.

You also have the opportunity to spend a year studying abroad or undertaking an industrial placement. If you decide to do this, your degree will extend to five years. You can choose to do a study abroad or industrial year after the second or third year of your course.

And the great thing is that you don’t have to decide anything now. You don’t even have to tell us which sciences you want to study until you arrive at Leeds.

WORLD-LEADING FACILITIES

We have all the facilities you’ll need to support and enhance your academic studies. The University is investing millions of pounds each year to ensure we maintain a first-class academic environment. From laboratories and lecture theatres to one of the largest and most impressive libraries in the UK, you’ll find everything you need for your studies right here on campus.

STUDENT SUPPORT

We take fantastic care of our students. You’ll be assigned a personal tutor to guide you through your studies with us, and can receive lots of support from fellow students through our peer mentor scheme.

Using our Virtual Learning Environment, you can access learning resources including reading lists, past exam papers, skills guides and assessment guides. You’ll also be able to play back video recordings of your lectures and download lecture notes.
STUDENT STORY

ASIF FAZAL
Asif used his first-class Natural Sciences degree as a springboard for further study. He is currently a first year PhD student on an interdisciplinary programme funded by the Wellcome Trust.

I chose to study chemistry and biochemistry for my Natural Sciences degree, with the major focus on chemistry. These two subjects interlink especially well and the teaching provided many examples of chemistry in a biological context and vice versa.

The Natural Sciences degree course at Leeds is taught as a four-year Integrated Masters, which means that a practical based research project forms a large part of the final year. Working on live research projects during the Masters year gave me a great insight into the workings of a research group and the types of research that occur, while also being fun and exciting.

I am currently a first year PhD student in the Astbury Centre at Leeds and my PhD research so far has been a continuation of the two scientific disciplines I studied during my Natural Sciences degree.

The Astbury Centre is home to the Astbury Biostructure Laboratory, which contains brand new cutting-edge equipment, including cryo-electron microscopes and NMR machines for the study of structures in atomic detail. During the first year of my PhD, I worked on a project to solve the structure of plant and yeast forms of an enzyme involved in the biosynthesis of the amino acid histidine. The use of the new cryo-electron microscopes led to the determination of high-resolution structures of both isoforms of the enzyme, which allowed comparison of the atomic details of the two, as well as the potential development of novel inhibitors against the enzymes as new herbicide compounds.
OUR NATURAL SCIENCES COURSE

Natural Sciences is a prestigious Integrated Masters degree, designed to prepare you for taking on the scientific challenges of the future.

The course is extremely flexible, giving you the choice of which science subjects you want to study and how much you study of each subject. You can also choose whether or not to spend a year studying abroad or working in industry.

HOW THE COURSE WORKS

The course lasts for four years, and during each year you'll study 120 credits.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Required A-level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>Biology</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Chemistry</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Environmental science</td>
<td>Any two science subjects</td>
</tr>
<tr>
<td>Food science and nutrition</td>
<td>Any two science subjects</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Physics</td>
<td>Physics and Mathematics</td>
</tr>
</tbody>
</table>

YEAR 1

In your first year you’ll study three subjects and take 40 credits from each.

You can choose your three subjects from a list of seven (see subject table), and the choice is entirely yours. However, if you choose to study physics, you must also study mathematics. You must have achieved grade A in the required A-level.

Note that you cannot choose a combination of environmental science and food science and nutrition.

YEAR 2

In your second year, you must choose to continue studying two of the three subjects that you studied in your first year. You could choose to study these two subjects equally (60 credits of each), or as a major/minor split (80 credits of one subject and 40 of the other).

Alternatively, you could choose to study 50 credits of each subject and make up the remaining 20 credits by either studying the third science subject you studied in your first year or a discovery module from an area of your choosing.

If you study physics in your second year, you must also study at least 20 credits of mathematics.

YEAR 3

In your third year, you will continue to study the two subjects that you primarily studied in your second year. You could choose to study these two subjects equally (60 credits of each) or as a major/minor split (80 credits of one subject and 40 of the other).

YEAR 4

In your final year, you will study 40 credits of each of your two main science subjects. The remaining 40 credits will come from undertaking a major research project. This could be based in one scientific area or an interdisciplinary project building on both the sciences that you’re studying.

FOR FULL COURSE DETAILS, INCLUDING MODULE INFORMATION, VISIT

www.leeds.ac.uk/courses
YEAR 1
Study three science or mathematics subjects equally

YEAR 2
Study two subjects equally or as a major/minor split
You can also choose to take a third subject. This can be another science or a discovery module such as a language course

You can insert an industrial or study abroad year here

YEAR 3
Study two subjects equally or as a major/minor split

You can insert an industrial or study abroad year here

YEAR 4
Study two subjects and perform a major research project
Interdisciplinary research is important. The big problems don’t confine themselves to one discipline. Nature doesn’t neatly subdivide itself – chemistry happens in the atmosphere of distant planets, a cell does millions of chemical reactions and lipid membranes are materials. If we’re going to understand the world and tackle the biggest problems our society faces, we need to think and work across disciplines.

Natural scientists know what the pressing questions in science are, and how to go about tackling them. They understand the language used in different disciplines and are exposed to different ways of thinking. Natural scientists can make connections across disciplines and use their knowledge in one area to enhance their ability to tackle other areas.

Recently my research has focused on working out how a human peptide signal changes the behaviour of a bacterial pathogen. It turned out that the signal triggered the bacteria to become more resistant to antibiotics. Using our chemical tools we discovered that this occurs by binding of the signal to a particular bacterial protein receptor. It’s an intriguing example of how bacteria might be ‘listening in’ on human cell communications and changing their behaviour accordingly.

The University has made a decision to support interdisciplinary research, through initiatives like the Astbury Centre, which means that there are mechanisms, resources and support to make networking easy. This explains why Leeds is so friendly – there is a culture of researchers supporting each other and working together.
Natural Sciences is a very flexible course, and you can build your skill sets up in a range of ways.

As well as the pure sciences themselves, here are some examples where combinations of subjects (interdisciplinary research) are having a major impact in modern science.
MATHS, BIOCHEMISTRY, BIOLOGY

MATHEMATICAL BIOLOGY

Biology is hugely diverse and complex – combinations of high-level mathematics and biology let us understand these systems in unprecedented detail. From the diversity of genes to evolution and population dynamics your mathematical knowledge will help you develop new insights into these key processes.

BIOINFORMATICS

The human genome contains about six billion base pairs of DNA. What is the function of the products of these genes and what does the rest of the DNA outside the genes do? These questions require us to be able to handle huge quantities of data, looking for small but significant differences. By combining advanced mathematical methods, statistical analysis and biological insight bioinformaticians are slowly revealing the subtle control mechanisms buried in the heart of our DNA.

PHYSICS, MATHS, CHEMISTRY

MATERIALS SCIENCE AND NANOTECHNOLOGY

New materials with reactive and dynamic properties influence everything, from new electronics to self-repairing polymers and new materials for biomedical applications. To control the global properties of materials correctly, you need to understand how they work at the smallest scale. By combining your knowledge of physics, chemistry and maths, you will gain new insights into the nanoscale world.

SCIENCE OF THE ATMOSPHERE

The science of the atmosphere controls our everyday lives to such a huge extent that we need to understand the reactions that take place in the atmosphere as well as how species in the atmosphere move and interact. Atmospheric scientists also study other worlds, designing models and experiments to study the atmospheres on extra-terrestrial planets and their moons.

SOFT MATTER AND FOOD FORMULATION

Complex, multiphase fluids and soft solids are highly structured forms of matter that exhibit unusual and interesting self-organising behaviours; examples include foams, emulsions, gels and liquid crystals. They have wide ranging applications including drug formulation, medical devices, soft electronics and food formulation. Understanding and predicting the properties of soft matter requires the application of fundamental concepts in applied mathematics and physics such as fluid dynamics and statistical mechanics. This, for example, can be used to optimise formulation and processing of foods to enhance their texture and mouthfeel, providing consumers with a more enjoyable gastronomic experience.

“I like how, on the Natural Sciences degree, I can keep a broad understanding and interest in wider areas of science and tie in and apply the things I learn in one subject to another.”

JAKE ALEN, MNATSC NATURAL SCIENCES
Kim is currently completing her second year of a Natural Sciences degree.

In my first year I studied physics, chemistry and maths. I have chosen to focus on physics and maths in my second year, with a 50/50 split. This means I do all of the core physics modules and have chosen an applied maths focus including fluid dynamics. It’s a time-consuming but rewarding course, with loads of freedom and control over the structure and the possibility to direct it towards exactly the content I’m interested in.

My subjects complement each other very well, so I feel like I’m just doing a course in all the little things that interest me. It is very interesting to see the different approaches each science has to similar problems and very rewarding to see how a topic overlaps with different sciences and understand all angles of it fully, where other students often don’t.

Interdisciplinary research is key to tackling the big questions in science today. Many of the most important topics in modern science research branch over more than one of the classical divisions of the sciences, so researchers require a good knowledge of more than one. I think it is very important that research scientists who are working together have at least a base understanding of other sciences besides their specialism.
REWARDING CAREERS

The knowledge, research skills and practical experience that you’ll gain whilst studying for a Natural Sciences degree will open the door to a wide range of employment opportunities.

The future of the planet will be shaped by the scientific advances made by graduates who are able to bring research to life and adapt new knowledge for the benefit of our everyday lives - this is what a Natural Sciences degree equips you to do. Whether advancing knowledge in a research role or leading economic, environmental, social or political change in a professional capacity, you’ll not only shape your own future but that of many others.

As part of your degree you will have opportunities to work in industry, in areas such as research and development, technical support, consultancy or general management, across a wide range of employment sectors, where your multidisciplinary skills are in high demand.

CAREERS AND EMPLOYABILITY SUPPORT

Throughout your time with us our dedicated Faculty Employability Team will be there to support, guide and advise you.

We support you from your first year through to your final year with a series of employability and careers activities.

We’ll help you through the career decision-making process, support you in your applications for work experience and graduate jobs, and bridge the gap between you and employers.

Our specialist, qualified staff will be there to help you succeed on the path to your perfect career so you feel supported along the way.

You’ll benefit from:

- Timetabled employability sessions at all stages of your course
- Ongoing support to find internships and placements
- Practical help with developing a CV, making applications, and preparing for interviews and assessment centres
- One-to-one guidance or coaching appointments to focus on you and your future
- Employer led events and workshops to allow you to gain industry insights whilst developing skills.

Our Careers Centre and Employability Team organise an annual STEM Careers Fair, meaning you get many opportunities to meet graduate recruiters, to gain an insight into graduate jobs and to explore work experience, graduate and further study opportunities, giving you the best start to your career.

The University of Leeds is a top-five university targeted by employers (High Fliers 2017). Some recent employers on campus targeting students have included CERN, Covance, Barclays, Johnson and Johnson, and GSK.
INDUSTRIAL PLACEMENT

Our Natural Sciences degree programme includes the option to complete a placement year in industry, which would be the third or fourth year of your course.

We offer flexibility, so if you're not sure yet if a placement year is for you, you can always make your mind up when you are here.

Either way, from year one, you will be able to access support to enable you to make the most well-informed decision regarding your placement year search and applications.

A placement year is a great opportunity to learn new skills and knowledge whilst putting those that you have already developed at university into practice. This is an excellent way to enhance your employability whilst getting a real understanding of what a career in industry will be like, ultimately helping you decide what kind of career you might like to follow after university.

We have a dedicated Employability and Placements Officer who will work with you during a series of placement information and preparation sessions. These sessions will inform you of the wide variety of options available to you, what to expect from the application process, and how to apply. There will also be opportunities to book one-to-one appointments to help with your placement search, as well as access to a range of placements on the University's vacancy system.

We successfully place Natural Sciences students with a range of employers.

“My placement was based in Utrecht in The Netherlands, at Diversey's largest European R&D facility. I think all students should gain work experience before they finish university. It will help you decide which career path you want to go down and gives you the confidence to achieve what you want in life.”

ANAIS KAHVE, INDUSTRIAL PLACEMENT YEAR AT DIVERSEY

STUDY ABROAD

This course gives you the chance to study abroad as part of your degree.

You would typically spend your third or fourth year studying at a partner institution and then return to Leeds for your final year. Spending a year living and studying abroad is a unique prospect. You'll have the chance to immerse yourself in another culture and gain unforgettable experiences.

You'll also gain an overseas education and develop new skills that will impress future employers.

We have relationships with many international universities, representing some of the best places to study abroad across the world.

“The University is part of the Russell Group, the facilities are excellent and the academic staff are beyond helpful. The course itself ticked all the boxes in that the subject choices are so flexible and you have the option to study for a year abroad or do a year in industry if you want to. It’s literally a build-your-own science degree.”

LUCY HOLLIDAY
STAFF SPOTLIGHT

DR SANDRO AZAELE

Sandro personifies interdisciplinarity uniting maths, physics and biology in his role as a lecturer in applied mathematics.

This century has seen a major expansion in interdisciplinary research, which was born to answer new and pressing topical questions. Society has an urgent demand for scientists who are problem-solvers, able to work in multidisciplinary teams tackling highly complex problems.

I am a physicist by training. During my PhD, I started studying biology and ecology, which showed me that there are important unsolved problems that biologists and ecologists are not able to solve, simply because they do not have the necessary tools. Physicists and mathematicians can make biology and ecology more quantitative and help turn them into more predictive sciences.

I am particularly interested in the mathematical modelling of biological systems. I have a deep interest in uncovering unifying principles which are able to explain properties and patterns emerging from the observation of biological systems. In doing so, I use tools borrowed from mathematics and physics. Mathematics and physics provide well-honed theories for shaping new concepts and structuring ideas, so that they can give us quantitative models that can be compared against empirical data.

I devised a model that is able to predict the temporal evolution of ecosystems with hundreds of interacting species which live in tropical forests. This was also useful to understand how they react when they are affected by external distresses. I also came up with a model that can predict how many species one can find in regions so large that they cannot be exhaustively sampled, like the Amazon rainforest.
Leeds is a large, cosmopolitan city which, as well as being vibrant, affordable and multicultural, is also surrounded by some of the most beautiful and accessible countryside in the UK.

At the University of Leeds we guarantee an offer of accommodation for your first year, providing you apply by the deadline.

We offer a wide variety of quality accommodation, from modern, purpose-built developments to more traditional residences in a variety of locations from the heart of campus and city centre to leafy suburbs.
CONTACT US

If you require any more information about our courses, modules, or any other aspect of studying Natural Sciences at Leeds, please contact our Undergraduate Admissions Team.

Tel: +44 (0)113 343 6440
Email: natsci@leeds.ac.uk

CULTURE

Leeds is well known for its lively arts and music scenes, offering many theatres and museums. The city is also renowned for its shopping facilities and there’s a wide range of outlets, from small boutiques to huge shopping malls. There’s also an extensive choice of places to eat and drink. All culinary tastes are catered for, from Italian to Thai, Caribbean to vegetarian. Leeds’ nightlife is legendary, with clubs and bars offering music to suit all tastes. There are lots of live music venues in the city, including the 13,500 capacity First Direct Arena, the O2 Academy and Brudenell Social Club.

EXPLORING YORKSHIRE

At the heart of Yorkshire, Leeds is one of the greenest cities in Britain and within easy reach of traditional towns and cities such as York, Ilkley, Harrogate and Saltaire, as well as Yorkshire’s stunning coastline. The spectacular countryside surrounding Leeds – including the Lake District, the Peak District, the Yorkshire Dales and the North York Moors – provides the ideal environment for University groups and societies taking part in everything from caving and kayaking to cycling and walking.

UNIVERSITY SPORT

Whether you want to play socially or compete at the highest level, Leeds Sport has a range of opportunities to suit you. The University has great sports facilities including the on-campus sports centre The Edge, which comprises a swimming pool, state-of-the art gym, squash courts and sports halls, sauna and steam room. Playing fields for hockey, cricket, football and rugby are just a short distance away.

Our social leagues are a great way to play competitively with friends against other teams each week. Or join one of our 60 plus sports clubs and become a Leeds Gryphon by representing the University of Leeds at one of several levels. Whether you’re into triathlon or prefer aikido, there’s a club for you.

MUSIC, DANCE AND PERFORMANCE

Regardless of your musical ability or taste, there are plenty of ways to get involved in music during your time at Leeds. You could join the Big Band or perform in one of the University’s many ensembles. The Students’ Union also hosts live music events for local bands to perform at where you can showcase your abilities or discover great new music. There’s a range of dance groups, from ballet to salsa to Irish dancing, offering classes for all levels. You can also get involved in theatre, be it through acting, directing, producing or writing, with Theatre Group or Pantsoc.

VOLUNTEERING

Volunteering to work with organisations or projects is a great way to broaden your experience and develop valuable skills to enhance your CV. The University has over 1,000 opportunities for student volunteers, from mentoring disadvantaged children in Leeds to helping to build school playgrounds in Africa.
**ENTRY REQUIREMENTS**

Our entry requirements are A*AA at A-level, including sciences relating to pathway. Your subject combination must enable you to fulfil the prerequisites to study three subjects in your first year (see table on page 8). Where an A-level science subject is taken, we require a pass in the practical science element, alongside the achievement of the A-level at the stated grade. Excludes A-level General Studies or Critical Thinking.

We also accept a variety of alternative qualifications (check our website for details).

**ENGLISH LANGUAGE REQUIREMENTS**

GCSE English Language grade C (or above) or an equivalent recognised English language qualification, eg IELTS 6.0 overall with no less than 5.5 in each element.

**ACCESS TO LEEDS**

We’re committed to identifying the best possible applicants, regardless of personal circumstances or background.

Access to Leeds is an alternative admissions scheme which accepts applications from individuals who might be from low income households, in the first generation of their immediate family to apply to higher education or have had their studies disrupted.

For more details visit [www.leeds.ac.uk/a2l](http://www.leeds.ac.uk/a2l)

**OFFER PROCESS**

Suitable applicants will be invited to an applicant day, which gives you the opportunity to meet our academic staff and students, enjoy a tour of our facilities, view student accommodation, and find out more about your course.

We like to interview applicants before making an offer, so the day will also include an interview with one of our academics. This will give you the chance to discuss your application in more detail, check that it’s the right course for you and your career plans, have your questions answered and find out more about studying at Leeds.

**SCHOLARSHIPS**

The University of Leeds has a long-standing history of helping students to manage their finances while at University, with a comprehensive range of bursaries and scholarships available.

**CONTACT US**

If you require any more information about our course, modules or any other aspect of studying Natural Sciences at Leeds, please contact our Undergraduate Admissions Team, go online or follow us on twitter (@scienceleeds).

Tel: +44 (0)113 343 6440
Email: natsci@leeds.ac.uk

Full instructions on how to apply are available at [www.ucas.com](http://www.ucas.com)