Welcome

As the Director of Natural Sciences I see the tremendous career opportunities that are open to students with a Natural Sciences degree. As the Covid-19 crisis demonstrated, those with a strong interdisciplinary science skill set are highly sought after. Areas like molecular biology, data science and statistics and even engineering have featured heavily in combating the pandemic. Pursuing a range of science subjects, often across discipline boundaries, provides you with a wide skill set and a level of independence that makes you very attractive to employers.

Why study Natural Sciences?

Coming to university does not necessarily mean specialising in one subject. A Natural Sciences degree will allow you to maintain an interest in two or three scientific disciplines where you will learn and integrate knowledge from a range of subjects.

Here at Lancaster there are no ‘Natural Sciences’ modules. You will take the same modules as the single honours students and be taught to the same depth of understanding. What differentiates our Natural Sciences programme from other universities is the wide choice of subject pathways and flexibility. We have 21 pathways (a pathway is a selection of modules taken from single honours programmes) and in first year you will choose three, giving you many possible combinations. Such open-minded scientists are in great demand with employers and your job prospects are excellent. Your personal and professional development are of the utmost importance to us and by studying a Natural Sciences degree you are telling a prospective employer that you are the sort of person who is prepared to think and work across the conventional boundaries of science.

You are sure to make lasting friendships, create special memories and develop life skills that will stay with you long after you leave us.

So welcome to Lancaster and welcome to Natural Sciences.
Lancaster was a bit of a hidden gem for me, having only ever seen it driving to the Lake District. That’s actually what convinced me to put Lancaster University as my first choice, the location. I love being outdoors so the proximity to the Lake District, Yorkshire Dales and the beach was unbeatable.

I had a mixture of A-Levels at school, Biology, Chemistry and Spanish, and I didn’t want to give any up for a single subject at university. When I found out that I could take several subjects to degree level with Natural Sciences, I knew it was something I wanted to pursue. I’m very glad I did because whilst I started out with Biology, Chemistry and Ecology I moved more into molecular Biology for my masters. I couldn’t have done this without the flexibility of this degree scheme, as I’ve been able to move exclusively into my areas of interest.

The other side of Lancaster I love is the societies and sports clubs. I never enjoyed sport at school, yet since coming to Lancaster I joined the University cycling club and now when I’m not in the lab or a lecture, I’ll be out on my bike. I’ve made so many great friends through the club, and other societies I’ve been a part of – everyone has been so friendly.

For my masters project, I’m helping design a CRISPR/Cas9 edit screening assay. I felt I had the skills and knowledge to take this on because of the wide range of study I’d done in both molecular biology and ecology, which put me in a much stronger position than I would have been had I studied either subject individually. I’ve been working really closely with my supervisor, the research staff and some of the PhD students and I really feel like I’m making valuable contributions to an active research lab. I’ve found it so rewarding, it’s been the highlight of my course so far.
A Natural Sciences degree gives you a unique opportunity to mix scientific subjects to form your own hand-picked degree. If you are interested in more than one science subject or are interested in where traditional disciplines overlap, Natural Sciences is the choice for you.

We provide the following degrees:

<table>
<thead>
<tr>
<th>Degree</th>
<th>Duration</th>
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<tbody>
<tr>
<td>BSc Hons Natural Sciences – 3 Years</td>
<td>3 Years</td>
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<tr>
<td>BSc Hons Natural Sciences (Study Abroad) – 3 Years</td>
<td>3 Years</td>
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<tr>
<td>BSc Hons Natural Sciences (Placement Year) – 4 Years</td>
<td>4 Years</td>
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<tr>
<td>MSci Hons Natural Sciences – 4 Years</td>
<td>4 Years</td>
</tr>
<tr>
<td>MSci Hons Natural Sciences (Study Abroad) – 4 Years</td>
<td>4 Years</td>
</tr>
</tbody>
</table>

**Design your own degree**

Lancaster University offers one of the most flexible Natural Sciences degree schemes in the country. Unlike other institutions which package disciplines together, at Lancaster you choose your own combinations. The Natural Sciences degrees at Lancaster are accredited by the Society of Natural Sciences. They meet the benchmarks for offering interdisciplinary science as well as sufficient practical, mathematical and transferable skill sets in all Pathways.

**Our degree programme was established in 1987**

It is one of the longest running Natural Sciences programmes in the country.

### Making the grade

The standard entry requirements for all of our courses are AAA at A level with at least two of these being in science subjects from the following: Biology, Chemistry, Computing, Environmental Science, Geography, Geology, Information Technology, Mathematics, Physics or Psychology.

You must also have GCSE Mathematics grade B or 6 and English Language grade C or 4.

We welcome applications from students with a range of alternative UK and international qualifications, including combinations of qualifications, provided a comparable level of science has been studied.

Further guidance on admission to the University, including other qualifications that we accept, frequently asked questions and information on applying, can be found on our general admissions webpage at lancaster.ac.uk/ug-apply/

All applications must be made through the UCAS scheme.

In addition, entry to some first year Pathways requires A level qualifications in particular subjects. Please see the list below:

<table>
<thead>
<tr>
<th>Pathway</th>
<th>A level Requirements</th>
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</thead>
<tbody>
<tr>
<td>Biochemistry, Cell Biology and Genetics</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>Mathematics and Chemistry</td>
</tr>
<tr>
<td>Chemical Measurement and Analysis</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Chemical Synthesis and Structure</td>
<td>Mathematics and Physics</td>
</tr>
<tr>
<td>Electronic Engineering</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Environmental Chemistry</td>
<td>Mathematics and Physics</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Mathematics and Physics</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>Mathematics and Physics</td>
</tr>
<tr>
<td>Physics</td>
<td>Mathematics and Physics</td>
</tr>
</tbody>
</table>

In your personal statement, we understand that the pandemic has changed everyone’s life. You therefore won’t be disadvantaged if you cannot include extracurricular activities in your personal statement.

We also recognise that you may be applying to universities to study one subject, as well as Natural Sciences. As long as we see your commitment to widening your knowledge in the sciences in general, (e.g. through reading, work experience and attending lectures etc.), then you would not be disadvantaged by us for making your personal statement concentrate on one subject.

If you achieve an A grade in your EPQ, then you are eligible for an offer that is one grade boundary lower than we would usually make, e.g. AAA going to AAB.

#### Getting to know the Department

We will invite you to one of our offer holder events, if you are offered a place on one of our degrees. Attendance is not compulsory, but we highly recommend you attend.

#### On-campus offer holder events

The structure of these events provides the opportunity for you to find out more about us and what it’s like to live and study here as a Natural Sciences student. You will be given a detailed presentation about our degree programmes and receive a tour of some of our departments. You will also have the opportunity to meet with our subject academics and current students to have your questions answered. Refreshments are provided throughout the day.

#### Digital offer holder events

If you are unable to visit us in person, then we will also be providing digital opportunities. These will be in the same format as the on-campus events, except the presentations and academic and student Q&A will be delivered live digitally. Tours of the departments will be given as virtual tours.
Design your own degree

MSc or BSc?

You can enrol on either the three year BSc honours degree or the four year MSci honours degree. Both programmes are identical in years one to three. You are able to transfer between the MSci and the BSc up until the end of third year, providing you achieve at least an upper second class honours mark at the end of the three year BSc.

Flexible options

In first year you will normally study three subjects, two of which must come from the following disciplines:
- Biology
- Chemistry
- Computing and Communications
- Engineering
- Environmental and Earth Science
- Geography
- Mathematics
- Medical School
- Physics
- Psychology

Non-science subjects

The third subject may be another science or non-science subject. It is possible to take up to 25% of your studies in a non-science subject.

Almost any subject taught at Lancaster University is available to you as long as you meet the pre-requisites, it fits with your timetable and the module has the capacity.

Your first year (Part I)

During your first year you will complete 15 modules, five in each of your chosen subjects, though other variations are possible.

Each module covers a particular aspect of a subject and is typically 12 to 20 lectures in length and incorporates a large amount of laboratory-based practical work. Successful completion of the first year allows you to progress to second year.

After a broad-based first year, you will specialise in particular areas within each discipline, allowing you to study where your interest really lies. At the end of the first year, the possible options available to you are:
- Continue to study your original three subjects
- Drop one of the original subjects and continue with a two subject degree

Years 2 and 3 (Part II)

From your second year you will have the opportunity to specialise by choosing areas within a discipline. Your choices will be influenced by the subjects you selected in first year.

Your choices will be influenced by
- Your first year studies
- Your interests
- The pre-requisites from the previous year’s modules. Once you have decided on your Pathways and modules these will be discussed at the start of October during Welcome Week.

Sample timetable for first year students

<table>
<thead>
<tr>
<th>Time</th>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
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<tbody>
<tr>
<td>9am</td>
<td>Environmental Science (lecture)</td>
<td>Biology (lecture)</td>
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<td>Environmental Science (lecture)</td>
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<tr>
<td>10am</td>
<td>Chemistry (lecture)</td>
<td>Chemistry (lecture)</td>
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<td>Environmental Science (lecture)</td>
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<tr>
<td>11am</td>
<td>Chemistry (lecture)</td>
<td>Physics (lecture)</td>
<td></td>
<td>Environmental Science (lecture)</td>
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<tr>
<td>12pm</td>
<td>Biology (lecture)</td>
<td>Environmental Science (lecture)</td>
<td></td>
<td>Chemistry (lecture)</td>
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<tr>
<td>1pm</td>
<td>Environmental Science (lecture)</td>
<td>Environmental Science (lecture)</td>
<td></td>
<td>Chemistry (lecture)</td>
<td></td>
</tr>
<tr>
<td>2pm</td>
<td>Environmental Science (lecture)</td>
<td>Chemistry (lecture)</td>
<td></td>
<td>Biology (lecture)</td>
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<td>3pm</td>
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<td>5pm</td>
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For more information, please visit lancaster.ac.uk/natural-sciences

Pathways made easy

It is not possible to study the entire content of two or three single-honours degree courses simultaneously. To help with your course selection, each science department has created one or more coherent collections of ‘modules’ called Pathways.

You choose which Pathways you would like to do – either two or three. By following a Pathway through a particular subject you are guaranteed to have the necessary pre-requisites for each subsequent year. You can only choose one Pathway subject to pre-requisite entry requirements (see page 7).

Double weighted Pathways

Please note, due to the complexity of subject content, some of our Pathways are double weighted. This means you can only take one other Pathway with these Pathway choices. Double weighted Pathways are shown by an asterix in the table below.

At the point of application you do not have to specify which three Pathways you intend to pursue in your Natural Sciences degree programme. After results day in August, you will be asked for your three Pathway choices and if you’re not sure, these can be discussed at the start of October during Welcome Week.

Discover our modules

Each Pathway contains a set of core and optional modules. These are subjects within your broader Pathway area.

Core modules represent the key areas required as part of your Natural Sciences degree and the optional modules provide you with extra skills and knowledge.

You will notice that in most cases, modules in the first year are fixed and more options open up in subsequent years. This is intentional as our Pathways have been expertly selected so that your first year covers as much ground as possible to keep your later options open.

Many Year 2 and Year 3 optional modules have pre-requisites from the previous year’s modules. Once you have decided on your Pathways and modules these will be discussed in detail at a one-to-one meeting at the start of your course where timetable flexibility and course capacity will also be taken into consideration.

Kick start your career with a placement year

For more information, please visit lancaster.ac.uk/natural-sciences

BSc Hons (Placement Year) - 4 Years

Our brand new Placement Year provides a wonderful opportunity for you to increase your attractiveness to employers and to add a distinctive element to your CV.

Working in a science or non-science related role at graduate level, you will deepen your understanding of the workplace and how to apply your skills and knowledge. This will greatly increase your confidence and broaden your horizons.

Throughout your first and second year we will support you to find a graduate level role for your placement in Year 3.

As this year does not contribute to the final degree classification, you only pay 20% of your year’s tuition fee.

Whilst on placement you will be expected to update a reflective work diary and you will be supported in your role by a Lancaster University academic and a company employee.

I started working for the Environment Agency in the Flood and Coastal Defence Team. My work involves modelling coastal flooding and data quality assurance.

If you choose to do a Placement Year you will study an extra curricular provision, which will provide information on a range of subjects such as LinkedIn, psychometric tests and help finding a placement. You’re very well supported by the University placement team during your year as they work closely with your line manager. There’s quite a lot of flexibility of where you can work.

A Placement Year has definitely given me the experience to grow in confidence, develop my knowledge and really helped with my time management skills. It’s also given me the chance to earn the same amount of money that I would do on a graduate scheme. By doing this year, I have increased my employability and gained invaluable skills in the environmental sector.”

Bethan Hobson
BSc Hons Natural Sciences (Placement Year)
I went to study at the University of Calgary in Canada. I had a good time because around Calgary there is the Rockies so you can go and explore and it’s really, really pretty. I think studying abroad has made me a lot more independent than I was before. University is all about learning to live on your own and learning to manage yourself but going on a study abroad year is on another level because you’re in a completely different country all by yourself. You also learn how to make time for yourself and your studies as well as time to explore the country, because you’re not just there to learn. It’s pretty easy to find something that you are doing in another country that also relates to your degree when you come back. The Natural Sciences department works in conjunction with the global experience office to find universities that do the course that you are doing, and then do similar modules as well. I would highly recommend it!

Esther Ansah-Asamoah
MSci Hons Natural Sciences (Study Abroad)
Hello Future

A multidisciplinary degree, such as Natural Sciences, opens up a wide range of career opportunities. You will be highly sought after for your technical and practical skills that can be transferred across a range of industries.

Many of our students have progressed on to postgraduate studies at Lancaster and universities around the UK in the following areas:
- Advanced computing
- Astrobiology
- Chemistry
- Clinical research
- Energy storage applications
- Particle physics
- Information technology
- Management and organisational change
- Mathematics
- Medical statistics
- Molecular medicine
- Medical physics
- Teacher training
- Theoretical modelling in science

Others have gained full-time work in a variety of sectors in roles such as:
- Application support specialist
- Audit associate
- Civil service
- Football analyst
- Graduate consultant enterprise
- Market survey officer
- Project co-ordinator
- Recruitment consultant
- Risk and hazard management
- Science media production
- System operations analyst
- Tax consultant

Preparing for your future

We also believe that relevant work experience while you are at university is crucial to achieving a good graduate job. Not only that, our comprehensive careers service provides advice and guidance on writing CVs and job applications, and preparing for interviews.

Discover internships

We have an extensive network of businesses providing a range of full and part-time paid for internship opportunities. You get to apply your knowledge in the real-world and businesses get the skills they need. Honing the skills that are much sought after by employers, such as team working, commercial awareness and time management will give you an edge in the job market.

For more information, please visit lancaster.ac.uk/natural-sciences

Hannah Rudd
BSc Hons Natural Sciences
and is now working in MSc Marine Environmental Management

The course is incredibly diverse and enabled me to combine my love for the biosciences with human geography. The facilities offered at Lancaster are second to none and the staff are always willing to assist you.

I believe Lancaster better equipped me to tackle the competitive job market through the available workshops and volunteering opportunities, which proved to be invaluable.

Since leaving Lancaster in 2018, I have gone on to study whale sharks in the Maldives with the Maldives Whale Shark Research Programme and great white sharks in South Africa with White Shark Projects, as part of the MSc Marine Environmental Management course with the University of York. I was also selected as a 2019 Women in Shark Science Scholar with the South African Shark Conservancy and have been researching the role of ecotourism in shaping public perceptions of sharks. Today I am the campaigns officer for the Angling Trust and a freelance science communicator and marine conservationist working with New Nature Magazine and the UK Youth for Nature coalition, as well as the founder of the Leading Women in Marine Science platform and an ambassador for the Ocean Conservation Trust.

I would recommend the Natural Sciences course, and Lancaster University, to anyone who is interested in pursuing a multi-disciplinary degree at a university that is at the cutting-edge of scientific research.

Hannah Rudd
BSc Hons Natural Sciences
and is now working in MSc Marine Environmental Management

Alice Gibbs
BSc Hons Natural Sciences
and is now working as an Environmental Consultant

I started first year doing Environmental Science, Biology and Spanish. I finished my third year having done primarily Environmental Science, with a couple of Environmental Biology and Geography modules, with a plan to get an MSc (after a gap year) to give me the best chance of getting a job as an environmental consultant.

I really enjoyed the range of topics I learnt about at Lancaster, as well as all the societies that were on offer. I also took part in the Career Mentoring Scheme, which led me to apply for a 6 month internship at Stopford in my second year and ultimately helped me decide that I wanted to give environmental consultancy a try.

I'm an Environmental Consultant within the Permitting & Compliance team at RPS, a multi-disciplinary consultancy. All developments that could potentially cause pollution during their operational life (to the air, land or water) need to have an environmental permit in order to operate. The main part of my job involves preparing the necessary documents and assessments that are needed to apply for an environmental permit or to change or surrender an existing one.

Lancaster is a great university with a campus that contains all you need.
**Biology Pathways**

**Biology**

 Fundamental biological mechanisms are related to the environmental challenges of the 21st century, such as food security, environmental pollution, ecosystem functioning, sustainable resource management, and biodiversity conservation. You will be trained in the scientific study of interactions between organisms and the environment, and how these are modified by human activities.

<table>
<thead>
<tr>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CORE MODULES</strong></td>
<td><strong>CORE MODULES</strong></td>
<td><strong>CORE MODULES</strong></td>
</tr>
<tr>
<td>Aquatic Ecology</td>
<td>Environmental Physiology</td>
<td>Animal Behaviour</td>
</tr>
<tr>
<td>Evolutionary Biology</td>
<td>Evolution</td>
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<tr>
<td>Global Change Biology</td>
<td>Field Ecology</td>
<td></td>
</tr>
<tr>
<td>Marine and Estuarine Biology</td>
<td>Dissertation</td>
<td></td>
</tr>
<tr>
<td>Ecology</td>
<td>Introduction to Eco-Innovation</td>
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<tr>
<td><strong>OPTIONAL MODULES</strong></td>
<td>Dissertation with Work Placement</td>
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</tr>
<tr>
<td>Biodiversity and Conservation</td>
<td>Environmental Plant Biology</td>
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<tr>
<td><em>Field Course in the Eden Project, Cornwall</em></td>
<td><em>Field Course in the Spanish-Doñana</em></td>
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<tr>
<td><em>Field Course in the Eden Project, Cornwall</em></td>
<td><em>Field Course in the Spanish-Doñana</em></td>
<td>Host-Parasite Interactions</td>
</tr>
<tr>
<td>(One of these modules can be taken in place of either Aquatic Ecology or Marine and Estuarine Biology)</td>
<td>(One of these modules can be taken in place of Aquatic Ecology or Marine and Estuarine Biology)</td>
<td>Issues in Conservation Biology</td>
</tr>
<tr>
<td><strong>CORE MODULES</strong></td>
<td><strong>OPTIONAL MODULES</strong></td>
<td><strong>CORE MODULES</strong></td>
</tr>
<tr>
<td>Core Ecology</td>
<td>Coral Reef Ecology</td>
<td>Coral Reef Ecology</td>
</tr>
<tr>
<td>Evolution</td>
<td>Dissertation</td>
<td>Dissertation with Work Placement</td>
</tr>
<tr>
<td><strong>OPTIONAL MODULES</strong></td>
<td>Environmental Plant Biology</td>
<td>Environmental Plant Biology</td>
</tr>
<tr>
<td>Experimental Design and Analysis</td>
<td><em>Field Course in Kenya – Tropical Biology and Conservation</em></td>
<td><em>Field Course in the Scottish Highlands</em></td>
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<tr>
<td>Field Ecology</td>
<td><em>Field Course in Kenya – Tropical Biology and Conservation</em></td>
<td>Host-Parasite Interactions</td>
</tr>
<tr>
<td>Introduction to Eco-Innovation</td>
<td><em>Field Course in the Scottish Highlands</em></td>
<td>Issues in Conservation Biology</td>
</tr>
<tr>
<td>Populations to Ecosystems</td>
<td>Host-Parasite Interactions</td>
<td>Sustainable Agriculture</td>
</tr>
<tr>
<td>Research Design and Delivery</td>
<td>(One of these modules can be taken in place of Aquatic Ecology or Marine and Estuarine Biology)</td>
<td>Sustainable Agriculture</td>
</tr>
<tr>
<td>Vertebrate Ecology</td>
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</tr>
<tr>
<td><strong>Biochemistry, Cell Biology and Genetics</strong></td>
<td><strong>Microbiology and Biomedicine</strong></td>
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</tbody>
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**A Level Requirements:** Chemistry

Cellular biochemistry examines the macromolecular structure and the relationship of cellular organisation to the central pathways of intermediary metabolism and the physical processes underlying cellular functions. Cell biology covers the interactions within and between cells which allow them to perform their function in the whole organism. Genetics examines the mechanisms of heredity moving through Mendelian genetics and its extension to molecular genetics.

<table>
<thead>
<tr>
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<th>YEAR 3</th>
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<tbody>
<tr>
<td><strong>CORE MODULES</strong></td>
<td><strong>OPTIONAL MODULES</strong></td>
<td><strong>CORE MODULES</strong></td>
</tr>
<tr>
<td>Biochemistry</td>
<td>Biochemical Techniques</td>
<td>Coral Reef Ecology</td>
</tr>
<tr>
<td>Cell Biology</td>
<td>Biochemistry</td>
<td>Dissertation</td>
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<tr>
<td>Genomics</td>
<td>Bioinformatics</td>
<td>Environmental Plant Biology</td>
</tr>
<tr>
<td>Molecular of Life</td>
<td>Cell Biology</td>
<td><em>Field Course in Kenya – Tropical Biology and Conservation</em></td>
</tr>
<tr>
<td>Protein Biochemistry</td>
<td>Cell Biology Techniques</td>
<td><em>Field Course in the Scottish Highlands</em></td>
</tr>
<tr>
<td><strong>OPTIONAL MODULES</strong></td>
<td>DNA Technology</td>
<td>Host-Parasite Interactions</td>
</tr>
<tr>
<td>Atoms and Molecules</td>
<td>Genetics</td>
<td>Issues in Conservation Biology</td>
</tr>
<tr>
<td>Chemical Reaction Kinetics</td>
<td></td>
<td>Sustainable Agriculture</td>
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<tr>
<td><strong>CORE MODULES</strong></td>
<td><strong>OPTIONAL MODULES</strong></td>
<td><strong>CORE MODULES</strong></td>
</tr>
<tr>
<td>Anatomy and Tissue Structure</td>
<td>Biochemistry of Aging</td>
<td>Anatomy and Tissue Structure</td>
</tr>
<tr>
<td>Hormones and Development</td>
<td>Cancer</td>
<td>Hormones and Development</td>
</tr>
<tr>
<td>Human Physiology</td>
<td>Cell Signalling</td>
<td>Human Physiology</td>
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<tr>
<td>Impact of Microbes</td>
<td>Cell Signalling</td>
<td>Impact of Microbes</td>
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<td>Infection and Immunity</td>
<td>Transport and Disease</td>
<td>Infection and Immunity</td>
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<tr>
<td><strong>OPTIONAL MODULES</strong></td>
<td>Genetics</td>
<td>Genetics</td>
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<tr>
<td>Cell Structure and Function</td>
<td>Cell Biology</td>
<td>Cell Biology Techniques</td>
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<td>Genetics</td>
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<td>Genetics</td>
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<tr>
<td>Biotechnology</td>
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<td>Biotechnology</td>
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</table>

For more information, please visit lancaster.ac.uk/natural-sciences

*Please note: some field courses will incur additional costs and are subject to availability.*
Chemistry Pathways

Chemical Measurement and Analysis

**A Level Requirements:** Chemistry

Chemical theory and analysis relates to the measurement, rationalisation, and prediction of the chemical and physical properties of individual molecules and bulk materials. This pathway covers the theory and practical application of techniques in physical, analytical, and computational chemistry. It also prepares you for potential research projects in physical and computational chemistry in your final year.

**YEAR 1**
- **CORE MODULES**
  - Atoms and Molecules
  - Chemical Reaction Kinetics
  - Physical Foundations of Chemistry
  - Spectroscopy and Analytical Chemistry
  - Thermodynamics of Chemical Processes

- **OPTIONAL MODULES**
  - Organic Structure
  - Coordination Chemistry

**YEAR 2**
- **CORE MODULES**
  - Electrochemistry
  - Quantum Chemistry, Symmetry and Group Theory
  - The Physical Principles of Spectroscopy
  - Thermodynamics and Statistical Mechanics

- **OPTIONAL MODULES**
  - Advanced Kinetics, Reaction Dynamics, and Surfaces
  - Advanced Spectroscopy: Theory and Applications
  - Advanced Techniques for Analytical Separations
  - Biological Chemistry and Chemical Biology
  - Computational Chemistry
  - Electronic Structure Theory Research Project (BSc only)

**YEAR 3**
- **CORE MODULES**
  - Advanced Chemistry Practical
  - Advanced Chemistry Practical Research Skills
  - Advanced Kinetics, Reaction Dynamics, and Surfaces
  - Advanced Synthetic Chemistry
  - Biological Chemistry and Chemical Biology
  - Further Inorganic Chemistry: 1-block and Mates in Biology
  - Investigating Mechanisms in Sustainable Polymers
  - Investigating Chemical Mechanisms and Experimental Design
  - Research Project (BSc only)
  - The Chemistry of Biomedical Imaging

- **OPTIONAL MODULES**
  - Organic Structure
  - Coordination Chemistry

---

Chemical Synthesis and Structure

**A Level Requirements:** Chemistry

Chemical synthesis concerns the creation of new molecules. Key to this is understanding molecular reactivity and mechanism techniques to design and synthesise molecules, and how we can characterise and measure their properties. This pathway develops knowledge and practical skills across all of synthetic chemistry and prepares you for potential research projects in chemical synthesis in your final year.

**YEAR 1**
- **CORE MODULES**
  - Atoms and Molecules
  - Coordination Chemistry
  - Organic Reactivity and Mechanism
  - Organic Structure

- **OPTIONAL MODULES**
  - Spectroscopy and Analytical Chemistry

**YEAR 2**
- **CORE MODULES**
  - Alkenes and Aromatic Chemistry
  - Inorganic Chemistry
  - Organometallics Catalysis and Mechanism
  - Strategies for Chemical Synthesis

- **OPTIONAL MODULES**
  - Molecular Structure Determination
  - Principles of Spectroscopy for Biological Sciences
  - Change to Solids and Soft Matter

**YEAR 3**
- **CORE MODULES**
  - Advanced Chemistry Practical
  - Advanced Chemistry Practical Research Skills
  - Advanced Kinetics, Reaction Dynamics, and Surfaces
  - Advanced Synthetic Chemistry
  - Biological Chemistry and Chemical Biology
  - Further Inorganic Chemistry: 1-block and Mates in Biology
  - Investigating Mechanisms in Sustainable Polymers
  - Investigating Chemical Mechanisms and Experimental Design
  - Research Project (BSc only)
  - The Chemistry of Biomedical Imaging

- **OPTIONAL MODULES**
  - Organic Structure
  - Coordination Chemistry

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Environmental Chemistry

**A Level Requirements:** Chemistry and Mathematics

Environmental chemistry specifically relates to the chemistry of the aquatic, atmospheric and terrestrial environments. This Pathway is designed to give a thorough grounding in chemistry whilst covering the techniques and methodology of environmental chemical analysis, together with an introduction to environmental planning and assessment.

**Double Weighted Pathway:** Due to the complexity of this subject and the background knowledge it requires in later years, this Pathway is double weighted. As such you can only take one other Pathway with this option.

**YEAR 1**
- **CORE MODULES**
  - Atmospheres, Weather and Climate
  - Atoms and Molecules
  - Biogeochemical Cycles
  - Chemical Reaction Kinetics
  - Hydrology: Water in the Environment
  - Numerical Skills I
  - Physical Foundations of Chemistry
  - Spectroscopy and Analytical Chemistry
  - The Earth's Interior
  - Thermodynamics of Chemical Processes

- **OPTIONAL MODULES**
  - Organic Structure
  - Coordination Chemistry

**YEAR 2**
- **CORE MODULES**
  - Environmental Science
  - Electrochemistry
  - Thermodynamics and Statistical Mechanics

- **OPTIONAL MODULES**
  - Aquatic Biogeochemistry
  - Experimental Design and Analysis
  - *Field Course in the Lake District - Environmental*
  - Molecular Structure Determination
  - Quantum Chemistry, Symmetry and Group Theory
  - Soil Science
  - Solids and Soft Matter
  - The Physical Principles of Spectroscopy

**YEAR 3**
- **CORE MODULES**
  - Advanced Chemistry Practical Research
  - Advanced Kinetics, Reaction Dynamics, and Surfaces
  - Advanced Spectroscopy
  - Advanced Techniques for Analytical Separations
  - Biological Chemistry and Chemical Biology
  - Climate and Society
  - Computational Chemistry
  - Dissertation
  - Global Change and the Earth System
  - Research Project (BSc only)
  - The Causes and Consequences of Environmental Radioactivity
  - Water Resources Management

*Please note: some field courses will incur additional costs and are subject to availability.*

For more information, please visit [lancaster.ac.uk/natural-sciences](lancaster.ac.uk/natural-sciences)
Computing and Communications
This Pathway explores the theory and practice of innovative and experimental computing, allowing you to develop well-rounded professional and technical skills. Areas covered include programming and software development, the theory of computation, human-computer interaction, digital media and its applications.

For more information, please visit lancaster.ac.uk/natural-sciences

Electronic Engineering
A Level Requirements: Mathematics and Physics
This Pathway will help you develop a sound foundation in all aspects of Electronic and Electrical Engineering that is crucial to the design and manufacture of future systems in the medical, environmental, energy, transport and ICT markets. You will also have the opportunity to specialise in areas including wireless communications, silicon chip design, nanotechnology, green technologies and power generation.

Double Weighted Pathway: Due to the complexity of this subject and the background knowledge it requires in later years, this Pathway is double weighted. As such you can only take one other Pathway with this option.

Mechanical Engineering
A Level Requirements: Mathematics and Physics
Mechanical Engineering is a field covering any industry that uses moving parts, from construction to transport, medicine to manufacturing, renewable energy to consumer technology. Our programme gives you the skills necessary for the subject, with an applied focus on mechanical system designs.

Double Weighted Pathway: Due to the complexity of this subject and the background knowledge it requires in later years, this Pathway is double weighted. As such you can only take one other Pathway with this option.
### Environmental and Earth Science Pathways

#### Earth Science
The solid rocks that comprise Earth's upper crust contain a record of change driven by processes originating from the core to the atmosphere over a period exceeding 3 billion years. This Pathway provides the basic skills needed to reach this record and understand how Earth has evolved over both long and short periods of time. You will have the opportunity to take a number of field-based modules in both the UK and abroad.

<table>
<thead>
<tr>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
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<tbody>
<tr>
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<tr>
<td>Biogeochemical Cycles</td>
<td>Experimental Design and Analysis</td>
<td>Introduction to Geophysical Techniques</td>
</tr>
<tr>
<td>Geology</td>
<td>Geoscience in Practice</td>
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<tr>
<td>Hydrology: Water in the Environment</td>
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<tr>
<td>The Earth’s Interior</td>
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</tbody>
</table>

**OPTIONAL MODULES**
- Subject to A level portfolio, you may be required to replace one or more of the above modules with one or more of the following:
- Introduction to Environmental Chemistry
- Numerical Skills I
- Numerical Skills II

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#### Environmental Science
This Pathway aims to train you in those areas of natural science (including chemistry, physics, biology, mathematics, geology, physical geography) that are used to understand natural and anthropogenic processes on the surface of the Earth, its seas, lakes, oceans and the atmosphere, as well as Earth’s internal processes, against the backdrop of environmental change.

<table>
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<td>Atmosphere, Weather and Climate</td>
<td>Experimental Design and Analysis</td>
<td>Climate and Society</td>
</tr>
<tr>
<td>Biogeochemical Cycles</td>
<td>Environmental Process and Systems</td>
<td>Geographical Skills in a Changing World</td>
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<tr>
<td>Earth’s Interior</td>
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</tbody>
</table>

**OPTIONAL MODULES**
- Subject to A level portfolio, you may be required to replace one or more of the above modules with one or more of the following:
- Introduction to Environmental Chemistry
- Numerical Skills I
- Numerical Skills II

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### Geography Pathways

#### Human Geography
This Pathway provides you with an understanding of society, culture, development and issues of globalisation within a framework of environmental issues in the 21st century.

<table>
<thead>
<tr>
<th>YEAR 1</th>
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<th>YEAR 3</th>
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</thead>
<tbody>
<tr>
<td><strong>CORE MODULES</strong></td>
<td><strong>CORE MODULES</strong></td>
<td><strong>OPTIONAL MODULES</strong></td>
</tr>
<tr>
<td>Geographical Skills in a Changing World</td>
<td>Being a Geographer: Issues, Ethics and Skills</td>
<td>Africa Geographies of Transformation</td>
</tr>
<tr>
<td>Society and Space - Human Geography</td>
<td>Research Methods in Human Geography</td>
<td>Cities and Globalisation</td>
</tr>
</tbody>
</table>

**OPTIONAL MODULES**
- Climate and Society
- Dissertation
- Dissertation with Work Placement

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#### Physical Geography
You will learn about the main components of our ‘Earth-system’, how environments have changed in the past, what controls the dynamics of environments in the present, and how we can predict changes in the future. All this is studied in the context of an interconnected planet.

<table>
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</tr>
<tr>
<td>Environmental Process and Systems</td>
<td>Being a Geographer: Issues, Ethics and Skills</td>
<td>Alpine Environmental Processes</td>
</tr>
<tr>
<td>Geographical Skills in a Changing World</td>
<td>Research Methods in Physical Geography</td>
<td>Coastal Processes</td>
</tr>
</tbody>
</table>

**OPTIONAL MODULES**
- Climate and Society
- Dissertation
- Dissertation with Work Placement

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*Please note: some field courses will incur additional costs and are subject to availability.*
Mathematics Pathways

Single Mathematics
A Level Requirements: Mathematics
This Pathway allows you to continue your study of maths at degree level in a top ranking department. You’ll focus on both pure mathematics and statistics with an emphasis on solving practical mathematical problems.

YEAR 1
- CORE MODULES
  - Calculus
  - Further Calculus
  - Linear Algebra
  - Probability
  - Statistics
- OPTIONAL MODULES
  - Abstract Algebra
  - Computational Mathematics
  - Linear Algebra II
  - Probability II
  - Statistics II

YEAR 2
- OPTIONAL MODULES
  - Algebraic Curves
  - Bayesian Inference
  - Combinatorics
  - Commutative Algebra
  - Financial Mathematics
  - Geometry of Curves and Surfaces
  - Generalised Linear Models
  - Graph Theory
  - Groups and Symmetry
  - Likelihood Inference
  - Machine Learning
  - Mathematical Education
  - Medical Statistics
  - Number Theory
  - Representation Theory of Finite Groups
  - Stochastic Processes

YEAR 3
- OPTIONAL MODULES
  - Algebraic Curves
  - Bayesian Inference
  - Combinatorics
  - Commutative Algebra
  - Financial Mathematics
  - Geometry of Curves and Surfaces
  - Generalised Linear Models
  - Graph Theory
  - Groups and Symmetry
  - Likelihood Inference
  - Machine Learning
  - Mathematical Education
  - Medical Statistics
  - Number Theory
  - Representation Theory of Finite Groups
  - Stochastic Processes

Double Mathematics
A Level Requirements: Mathematics
Double Weighted Pathway: If you prefer to focus your studies on maths, we also offer a double-weighted Pathway that allows you to study the subject in greater detail. This incorporates the maths modules listed above and gives you the opportunity to concentrate on theoretical problems. As a double-weighted Pathway you can only take one other Pathway with this option.

YEAR 1
- CORE MODULES
  - As above, plus:
    - Convergent and Continuity
    - Discrete Mathematics
    - Geometry and Calculus
    - Integration and Differentiation
    - Numbers and Relations
- OPTIONAL MODULES
  - As above, plus:
    - Complex Analysis
    - Project Skills
    - Real Analysis

YEAR 2
- OPTIONAL MODULES
  - As above, plus:
    - Differential Equations
    - Hilbert Spaces
    - Lebesgue Integration
    - Linear Systems
    - Metric Spaces
    - Probability Theory

YEAR 3
- OPTIONAL MODULES
  - As above, plus:
    - Differential Equations
    - Hilbert Spaces
    - Lebesgue Integration
    - Linear Systems
    - Metric Spaces
    - Probability Theory

Medical School Pathways

Human Physiology and Exercise Science
If you are interested in science and physical education, this Pathway provides a solid foundation in application and performance modules. These will help to increase your understanding of the functions and regulations of the human body and physiological integration of the systems.

YEAR 1
- CORE MODULES
  - Digital Technologies in Sports and Exercise Science
  - Fundamental Anatomy
- OPTIONAL MODULES
  - Essentials of Sports and Exercise Physiology or Introduction to Nutrition
  - Hormones and Metabolism
  - Public Health Challenges
  - Principles of Biomechanics or Concepts in Sports and Exercise Psychology

YEAR 2
- OPTIONAL MODULES
  - Biomechanics II
  - Current Debates in Sports and Exercise Science
  - Physiology and Metabolism
  - Sports and Exercise Psychology

YEAR 3
- OPTIONAL MODULES
  - Advanced Psychology
  - Applied Sport, Exercise and Performance Psychology
  - Biomechanics III
  - Maximising Elite Performance
  - Optimising Health Outcomes
  - Research Project

For more information, please visit lancaster.ac.uk/natural-sciences
Physics Pathways

Physics

**A Level Requirements:** Mathematics and Physics

You will gain a working knowledge and understanding of the physics of fluids and solids, especially their thermal and electrical properties, with an emphasis also on computing, classical mechanics and quantum physics.

**Double Weighted Pathway:** This Pathway requires a set of first-year maths-based modules, either through the Physics Department or the Mathematics and Statistics Department (under the Pathway Single Mathematics, on the previous page). As such, students taking Physics can only take one other Pathway in addition to either of the supporting Maths Pathways.

**CORE MODULES**
- Classical Mechanics
- Electric and Magnetic Fields
- Quantum Physics
- The Physical Universe
- Thermal Properties of Matter

**OPTIONAL MODULES**
- Students need to take either the Physics Mathematics modules listed below or the Single Mathematics Pathway.
- Complex Methods
- Functions and Differentiation
- Integration
- Series and Differential Equations
- Vector Calculus

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Psychology Pathways

**Psychology**

This Pathway develops your range of knowledge and skills in order to continue your study of psychology at degree level.

**CORE MODULES**
- Introduction to Cognitive Psychology
- Developmental Psychology
- Personality and Individual Differences
- Social Psychology
- Foundations of Cognitive Neuroscience
- Social Psychology

**OPTIONAL MODULES**
- Cognitive, Affective and Clinical Neuroscience
- Bewildering, Bizarre or Just Banal?
- Cognition in and out of the laboratory
- Culture in Cognition and Development
- Current Directions in Social Psychology
- Forensic and Investigative Psychology
- Piocot Nation
- Human Psychopharmacology
- Psychology of Art
- Psychology of Meditation
- The Developing Mind
- The Lying Brain: An Examination of Hallucinations and Delusions in Normal, Clinical and Pathological Populations
- The Neuroscience of Typical and Atypical Social Development
- The Psychology of Cooperation
- Topics in Clinical Psychology

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Psychology with BPS accreditation

**Double Weighted Pathway:** This double-weighted Pathway allows you to study psychology and receive accreditation from the British Psychological Society. It can only be taken alongside one other Pathway and cannot be taken by BSc students intending to study abroad due to the accreditation regulations.

**YEAR 1**
- Introduction to Cognitive Psychology
- Developmental Psychology
- Personality and Individual Differences
- Social Psychology
- Foundations of Cognitive Neuroscience
- Social Psychology

**YEAR 2**
- Cognitive, Affective and Clinical Neuroscience
- Bewildering, Bizarre or Just Banal?
- Cognition in and out of the laboratory
- Culture in Cognition and Development
- Current Directions in Social Psychology
- Forensic and Investigative Psychology
- Piocot Nation
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- The Neuroscience of Typical and Atypical Social Development
- The Psychology of Cooperation
- Topics in Clinical Psychology

**YEAR 3**
- Introduction to Cognitive Psychology
- Developmental Psychology
- Personality and Individual Differences
- Social Psychology
- Foundations of Cognitive Neuroscience
- Social Psychology

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Charlotte Hirons

I studied biology, chemistry, physics, and maths at A level and really enjoyed all 4 and I was finding it hard to pick what subject I wanted to study at university. When I came across the Natural Sciences degree, I realised I didn’t really have to decide. Lancaster’s Natural sciences program offers a lot of flexibility and has made me feel like I can be in control of my degree. On my first visit to Lancaster, I found everything I could need was right there on campus and the city is filled with pubs, cocktail bars, and cafes.

I started in my first year studying physics and medical microbiology, I was worried that I would struggle to keep up as others on straight physics or biology degrees would have more breadth of knowledge. However, because of the way the pathways are set out at Lancaster this was not the case as each pathway is self-contained. I was so glad of all the choices of modules I have had going into second and third year and have flexible the department is with last minute changes, the Natural Sciences team truly care and want to make sure your degree works for you.

During my time at Lancaster, I joined the yoga society, competed in online roses last year with the pole fitness society, and participated in the philosophy society. Roses is a big competition across all sports held between Lancaster and York universities, it brings a great atmosphere to campus especially when we win like 2022. I have loved exploring Lancaster whilst I have been here but even better have been the day trips out to Manchester or the lakes. The variety of locations that can be easily accessed has been one of the best things about Lancaster.
How to reach us

We’re easy to find!

By road
From the north or south, leave the M6 motorway at Junction 33 and take the A6 north towards Lancaster for about 2 miles. The University is on the right. For SatNav use LA1 4YW.

By rail
There are direct rail links between Lancaster and many of the UK’s major cities and airports. The single journey between London and Lancaster takes between 2.5 and 3 hours. Buses and taxis are available from just outside the station.

By coach and bus
Lancaster city is on the national coach network; National Express coaches call at the University. A number of local buses run from Lancaster bus station to the University every 5 minutes on weekdays.

Further details can be found at lancaster.ac.uk/travel

For more information, please visit lancaster.ac.uk/natural-sciences