

Natural Sciences
Undergraduate Degrees 2024

Welcome



Dr Fabrice Andrieux
Associate Dean for Undergraduate Recruitment

Natural Sciences offers tremendous career opportunities. As the Covid-19 crisis demonstrated, those with a strong interdisciplinary science skill set are highly sought! 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.

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Important information

The information in this brochure relates primarily to 2024/2025 entry to the University and every effort has been taken to ensure the information is correct at the time of printing in June 2023. The University will use all reasonable effort to deliver the course as described but the University reserves the right to make changes after going to print. You are advised to consult our website at lancaster.ac.uk/study for up-to-date information before you submit your application.

Please see lancaster.ac.uk/compliance/legalnotice for further information.

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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 Master's. 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 Master's 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.

Watch Liam's day in the life as a Natural Sciences student by scanning the QR code below



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Liam Boot-Handford



For the lover of science



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:

BSc Hons Natural Sciences – 3 Years

BSc Hons Natural Sciences (Study Abroad) – 3 Years

BSc Hons Natural Sciences (Placement Year) – 4 Years

MSci Hons Natural Sciences – 4 Years

MSci Hons Natural Sciences (Study Abroad) – 4 Years

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:

Pathway	A level Requirements
Biochemistry, Cell Biology and Genetics	Chemistry
Chemical Engineering	Mathematics and Chemistry
Chemical Measurement and Analysis	Chemistry
Chemical Synthesis and Structure	Chemistry
Electronic Engineering	Mathematics and Physics
Environmental Chemistry	Chemistry and Mathematics
Mathematics	Mathematics
Mechanical Engineering	Mathematics and Physics
Physics	Physics and Mathematics

We 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

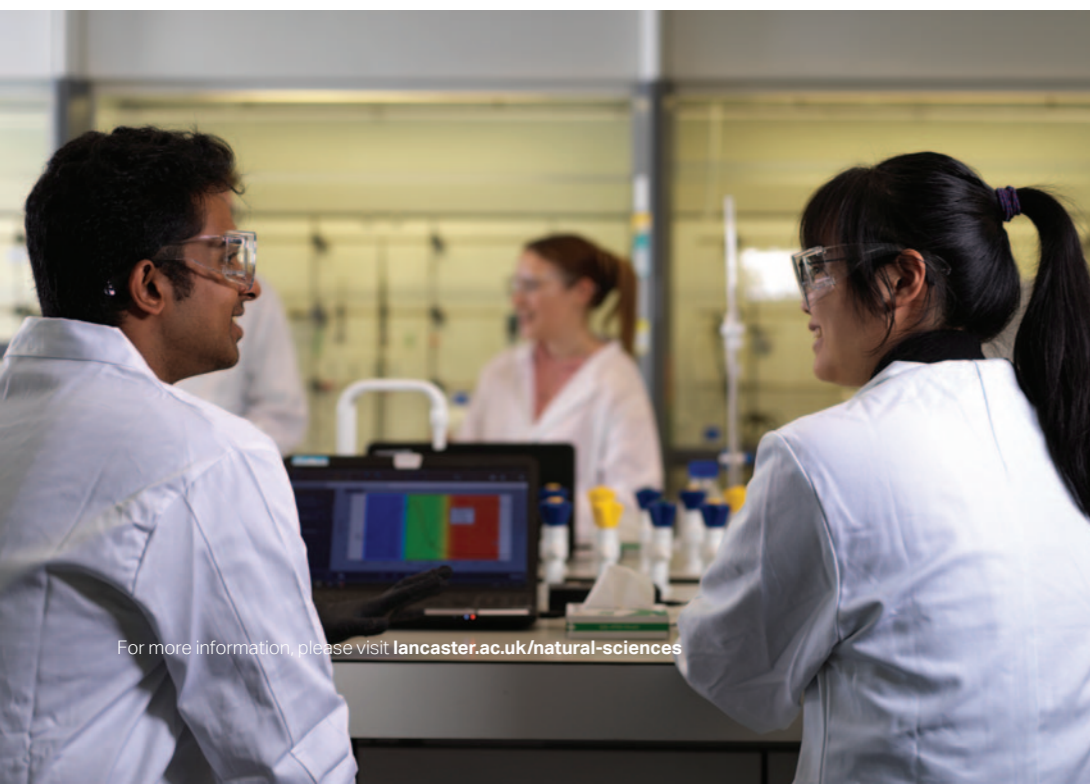
We will invite you to one of our offer holder events, if you are offered a place on one of our degrees. Attendance is not compulsory, but we highly recommend you attend.

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

MSci 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 Sciences
Geography
Mathematics
Health and Medicine
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.

Year 4

The MSci year comes with a mandatory research project selected from a department of your choice and often linked to an array of partner organisations. A wide selection of Master's-level modules are open to you.

Sample timetable for first year students

	Mon	Tues	Wed	Thurs	Fri
9am	Environmental Science (lecture)	Biology (lecture)			Environmental Science (lecture)
10am		Chemistry (seminar)		Chemistry (lecture)	
11am	Chemistry (lecture)				Environmental Science (seminar)
12pm			Biology (lecture)		
1pm	Biology (lecture)	Environmental Science (lecture)			Chemistry (lecture)
2pm		Environmental Science (practical)		Chemistry (practical)	Biology (practical)
3pm					
4pm					
5pm					

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 follow any 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 asterisk 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, then these can be discussed at the start of October during Welcome Week.

Subject Area	Pathways			
Biology	Biology	Biochemistry, Cell Biology and Genetics	Ecology and Conservation	Microbiology and Biomedicine
Chemistry	Chemical Measurement and Analysis	Chemical Synthesis and Structure	Environmental Chemistry*	
Computing and Communications	Computing and Communications			
Engineering	Chemical Engineering*	Electronic Engineering*	Mechanical Engineering*	
Environmental and Earth Sciences	Earth Science	Environmental Science		
Geography	Human Geography	Physical Geography		
Mathematics	Single Mathematics	Double Mathematics*		
Health and Medicine	Human Physiology and Exercise Science			
Physics	Physics*			
Psychology	Psychology	Psychology with British Psychological Society Accreditation*		

* Double weighted Pathways

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

BSc Hons (Placement Year) - 4 Years

Our 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.

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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)

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Scan the QR code to watch Bethan talk about her placement year.





Broaden your horizons and study abroad

Experience the world around you by spending a year studying in North America or Australasia. Your studies abroad count towards your final degree classification and so you take modules which fit into Lancaster's scheme of study.

You will benefit greatly from your overseas experiences and our students often find it life changing. You will grow in confidence and become more mature and independent. It's a great opportunity to broaden your horizons and develop an understanding of different cultures and values.

An overseas experience can add a distinctive element to your CV. Employers may be looking for graduates who demonstrate flexibility and have a richer outlook on life.

If you're not sure whether this is the degree for you, our advice is to apply for the Study Abroad scheme - it's easier to drop out of it, than to apply for it once you're here.

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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 county 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)

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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

Scan the QR code to watch current student Ella talk about the careers in Natural Sciences



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.

Scan the QR code for more information on internships



Angus Hitchmough MSci Natural Sciences (Study Abroad) and is now working as a statistician for the UK Government

I applied to the Civil Service Fast Stream before Christmas in my final year. I was able to get a place in the Government Statistical Service scheme, which I chose because of my interest in statistics. I studied maths modules during my degree, focusing on probability and statistics. Formal statistical training was a requirement for my job. I was also able to pick up many statistical techniques while studying modules in Environmental Science. I was fortunate to have introductions to R Studio, Matlab, SPSS, and ArcGIS during my degree. Having transferrable coding skills and the ability to learn more code in other languages has been vital. Skills in Excel, gained during my degree, have also been useful.

I enjoyed the flexibility of the module choice and the wide range of skills I was able to pick up. I found that studying abroad whilst being able to contribute credits to my degree was a huge positive. I also enjoyed being able to pursue my interest in Economics as a non-science within the degree scheme.



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

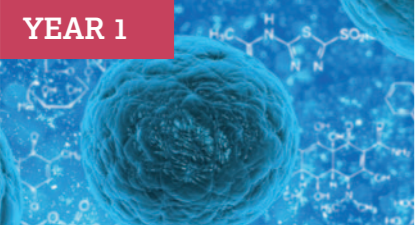

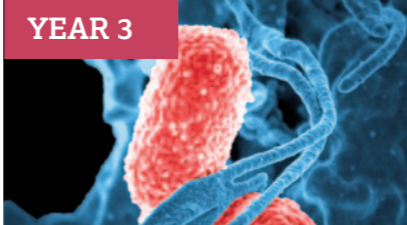
Fundamental biological mechanisms are related to the environmental challenges of the 21st century, such as food security, environmental pollution, ecosystem functioning, sustainable resource management and biodiversity conservation. You will be trained in the scientific study of interactions between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

YEAR 1	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <ul style="list-style-type: none"> Aquatic Ecology Evolutionary Biology Global Change Biology Marine and Estuarine Biology Zoology <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Biodiversity and Conservation *Field Course in the Eden Project, Cornwall *Field Course in the Spanish-Doñana (One of these modules can be taken in place of either Aquatic Ecology or Marine and Estuarine Biology) 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Environmental Physiology Evolution <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Experimental Design and Analysis Field Biology Introduction to Eco-Innovation Populations to Ecosystems Research Design and Delivery Vertebrate Biology 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Animal Behaviour Host-Parasite Interactions <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Coral Reef Ecology Dissertation Dissertation with Work Placement Environmental Plant Biology *Field Course in the Scottish Highlands Issues in Conservation Biology Sustainable Agriculture

Biochemistry, Cell Biology and Genetics

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 extensions to molecular genetics.

YEAR 1	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <ul style="list-style-type: none"> Biotechnology Cell Structure and Function Genetics Molecules of Life Protein Biochemistry <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Atoms and Molecules Chemical Reaction Kinetics 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Biochemical Techniques Biochemistry Bioinformatics Cell Biology Cell Biology Techniques DNA Technology Genetics 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Biology of Ageing Cancer Cell Signalling Cell Signalling, Transport and Disease Genetics Medical Genetics Proteins: Structure, Function and Evolution


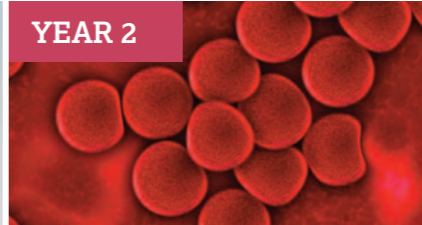

Ecology and Conservation

Interactions between organisms, the environment and humanity are often complex. You will receive a thorough grounding in ecological theory and how these biological principles relate to the conservation of wildlife and ecological habitats. The pathway also concerns the practice of ecology and has a strong fieldwork component designed to encourage you to develop your practical skills.

YEAR 1	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <ul style="list-style-type: none"> Aquatic Ecology Biodiversity and Conservation Evolutionary Biology Global Change Biology Zoology <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> *Field Course in the Eden Project, Cornwall *Field Course in the Spanish-Doñana (One of these modules can be taken in place of Aquatic Ecology, Global Change Biology or Zoology) 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Populations to Ecosystems Principles of Biodiversity Conservation <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Environmental Physiology Evolution Experimental Design and Analysis Field Biology Introduction to Eco-Innovation Research Design and Delivery 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Coral Reef Ecology Issues in Conservation Biology <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Animal Behaviour Dissertation Dissertation with Work Placement Environmental Plant Biology *Field Course in the Scottish Highlands Host-Parasite Interactions Sustainable Agriculture

Microbiology and Biomedicine

This pathway contains a balanced mixture of biochemistry, microbiology and physiology. It attempts to demonstrate the relevance of microbiology to human affairs, whether the connection is direct, e.g. diseases of humans, or indirect, e.g. the control of diseases of food crops. Although some lectures deal specifically with one group of microbes, i.e. bacteria, fungi or protozoa, entire modules emphasise ecological and functional relationships between different groups of microbes.




YEAR 1	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <ul style="list-style-type: none"> Anatomy and Tissue Structure Hormones and Development Human Physiology Impact of Microbes Infection and Immunity <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Cell Structure and Function Genetics Biotechnology 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Cell Biology Cell Biology Techniques Genetics Medical Microbiology Microbiological Techniques 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Biology of Ageing Cancer Cell Signalling Cell Signalling, Transport and Disease Clinical Immunology Molecular and Biochemical Parasitology New and Emerging Microbial Pathogens

Chemistry Pathways

Chemical Theory 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	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <ul style="list-style-type: none"> Atoms and Molecules Chemical Reaction Kinetics Physical Foundations of Chemistry Skills for Chemists Spectroscopy and Analytical Chemistry Thermodynamics of Chemical Processes 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Electrochemistry Quantum Chemistry, Symmetry and Group Theory The Physical Principles of Spectroscopy Thermodynamics and Statistical Mechanics 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Advanced Kinetics, Reaction Dynamics, and Surfaces Advanced Spectroscopy: Theory and Applications Advanced Techniques for Analytical Separations Biological Chemistry and Chemical Biology Chemistry Practical Research Skills Computational Chemistry Computational Electronic Structure Theory Research Project (BSc only)
<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Organic Structure Coordination Chemistry 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Molecular Structure Determination Solids, Soft Matter and Surfaces 	

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	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <ul style="list-style-type: none"> Atoms and Molecules Chemistry of the Elements Coordination Chemistry Organic Reactivity and Mechanism Organic Structure 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Alkene and Aromatic Chemistry Inorganic Chemistry Organometallics Catalysis and Mechanism Strategies for Chemical Synthesis 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> 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: f-block and Metals in Biology Investigating Mechanism in Sustainable Polymer Chemistry Investigation of Chemical Mechanisms and Experimental Design Research Project (BSc only) The Chemistry of Biomedical Imaging
<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Spectroscopy and Analytical Chemistry 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Molecular Structure Determination Principles of Spectroscopy for Biological Sciences Solids and Soft Matter 	

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

Environmental Chemistry

A Level Requirements: Chemistry and Mathematics

Environmental chemistry specifically relates to the chemistry of the aqueous, 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	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <ul style="list-style-type: none"> Atmosphere, Weather and Climate Atoms and Molecules Biogeochemical Cycles Chemical Reaction Kinetics Geology Hydrology: Water in the Environment Numerical Skills II Physical Foundations of Chemistry Skills for Chemists Spectroscopy and Analytical Chemistry The Earth's Interior Thermodynamics of Chemical Processes 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Aquatic Biogeochemistry Atmospheric Science Electrochemistry Thermodynamics and Statistical Mechanics 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> 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
<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Organic Structure Coordination Chemistry 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Experimental Design and Analysis *Environmental Field Course Molecular Structure Determination Quantum Chemistry, Symmetry and Group Theory Soil Science Solids and Soft Matter The Physical Principles of Spectroscopy 	




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



Computing Pathways

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.

YEAR 1	YEAR 2	YEAR 3
		
CORE MODULES Fundamentals of Computer Science Software Development	OPTIONAL MODULES AI Concepts Algorithms Applied Security Methods Data Engineering Extended Reality Group Project Internet Applications Operating Systems Secure Cyber Systems Software Design Sustainable Computing	OPTIONAL MODULES Advanced Cyber Security Computer Graphics Computer Science Education Computer Vision Cyber Security Analytics Deep Learning Digital Health Internet Applications Engineering Natural Language Processing Security and Risk Secure Artificial Intelligence Secure Physical Systems Third Year Project




Engineering Pathways

Chemical Engineering

A Level Requirements: Chemistry and Mathematics

Chemical Engineering influences numerous areas of technology. These Pathways will help you to develop the skills needed to conceive and design processes for the production, transformation and transportation of materials.

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	YEAR 2	YEAR 3
		
CORE MODULES Design, Innovation and 3D Thinking Engineering Mathematics I-IV Fundamentals of Chemistry for Engineers Heat Transfer Introduction to Engineering Thermodynamics Manufacturing Fundamentals Mechanics of Material Process Engineering Fundamentals	CORE MODULES Chemical Engineering Laboratory Projects I Fluid Mechanics and Chemical Engineering Thermodynamics Particle Technology and Separation	OPTIONAL MODULES Advanced Process Transfers Catalytic and Bio-reaction Engineering Chemical Engineering Design and Process Safety Computer Applications in Process Engineering Energy Conversion
OPTIONAL MODULES Electrical and Electronics Fundamentals Fundamentals of Digital Electronics Fundamentals of Electronic Instrumentation Programming Fundamentals	OPTIONAL MODULES Business Development Project Engineering Analysis Mass Transfer Reactors and Equipment	

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.




YEAR 1	YEAR 2	YEAR 3
		
CORE MODULES Electrical and Electronic Fundamentals Engineering Mathematics I-IV Fundamentals of Digital Electronics Fundamentals of Electronic Instrumentation Programming Fundamentals	CORE MODULES Digital Electronics Electromagnetics and RF Engineering	OPTIONAL MODULES Analogue Electronics Digital Signal Processing Integrated Circuit Engineering Optoelectronics and Wireless Communications Power Electronics and Applications Research Project (BEng only)
OPTIONAL MODULES Design, Innovation and 3D Thinking Fundamentals of Chemistry for Engineers Heat Transfer Introduction to Engineering Thermodynamics Mechanics of Material Manufacturing Fundamentals Process Engineering Fundamentals	OPTIONAL MODULES Business Development Project Electrical Circuits and Power Systems Engineering Analysis Instrumentation and Control Power Engineering	

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.

YEAR 1	YEAR 2	YEAR 3
		
CORE MODULES Design, Innovation and 3D Thinking Engineering Mathematics I-IV Heat Transfer Introduction to Engineering Thermodynamics Manufacturing Fundamentals Mechanics of Materials	CORE MODULES Engineering Mechanics Fluid Mechanics and Thermodynamics Materials and Design	OPTIONAL MODULES Design and Manufacturing Energy Conversion Engineering Composites Engineering Materials Machine Elements Research Project (BEng only) Vibration Analysis and Application
OPTIONAL MODULES Electrical and Electronics Fundamentals Fundamentals of Chemistry for Engineers Fundamentals of Digital Electronics Fundamentals of Electronic Instrumentation Process Engineering Fundamentals Programming Fundamentals	OPTIONAL MODULES Business Development Project Engineering Analysis Instrumentation and Control Power Engineering	

Environmental and Earth Sciences 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 2 billion years. This Pathway provides the basic skills needed to read 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.

YEAR 1	YEAR 2	YEAR 3
<p>CORE MODULES</p> <ul style="list-style-type: none"> Biogeochemical Cycles Geology Hydrology: Water in the Environment Natural Hazards The Earth's Interior <p>OPTIONAL MODULES</p> <p>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:</p> <ul style="list-style-type: none"> Introduction to Environmental Chemistry Numerical Skills I Numerical Skills II 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Experimental Design and Analysis Geoscience in Practice <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Aquatic Biogeochemistry Catchment Hydrology *Field Course in the Lake District - Environmental *Field Course in Scotland - Geological Mapping Soil Science 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Introduction to Geophysical Techniques <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> *Alpine Environmental Processes Field Course Dissertation Dissertation with Work Placement Extended Essay *Field Course in Devon - Hydrological Processes *Hydrological Processes Field Course (Slapton) Geological Hazards Hydrogeology Physical Volcanology *Volcanic Process Field Course (Italy) Water Resources Management

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, rivers, lakes, oceans and the atmosphere, as well as Earth's internal processes, against the backdrop of environmental change.

YEAR 1	YEAR 2	YEAR 3
<p>CORE MODULES</p> <ul style="list-style-type: none"> Atmosphere, Weather and Climate Biogeochemical Cycles Earth's Interior Geology Hydrology: Water in the Environment <p>OPTIONAL MODULES</p> <p>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:</p> <ul style="list-style-type: none"> Introduction to Environmental Chemistry Numerical Skills I Numerical Skills II 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Experimental Design and Analysis <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Aquatic Biogeochemistry Atmospheric Science Catchment Hydrology Energy, Economy and the Environment Environmental Data Visualisation and Analysis *Field Course in the Lake District - Environmental Soil Science 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Climate and Society Dissertation Dissertation with Work Placement Extended Essay Global Change and the Earth System Hydrogeology *Hydrological Processes Field Course (Slapton) The Causes and Consequences of Environmental Radioactivity Water Resources Management

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

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.

YEAR 1	YEAR 2	YEAR 3
<p>CORE MODULES</p> <ul style="list-style-type: none"> Geographical Skills in a Changing World Society and Space - Human Geography 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Being a Geographer: Issues, Ethics and Skills Research Methods in Human Geography <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Being a Geographer: Issues, Ethics and Skills Children's Geographies Cultural Geography Development Geography and the Majority World Economic Geography Geosocial Spaces Introduction to Eco-Innovation People and the Sea Political Geography Spatial Analysis and GIS 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Africa: Geographies of Transformation Cities and Globalisation Climate and Society Dissertation Dissertation with External Partner Environment, Politics and Society in Amazonia *Field Course in Croatia - Water, Society and the Istrian Landscape Food and Agriculture in the 21st Century GIS: Principles and Practice *Globalizing Food: A Field Course of Food Politics and Culture Independent Research Perspectives on Technology and Environment Urban Infrastructure in a Changing World *The Politics of Urban Futures: Field course to Glasgow and Edinburgh

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.

YEAR 1	YEAR 2	YEAR 3
<p>CORE MODULES</p> <ul style="list-style-type: none"> Environmental Process and Systems Geographical Skills in a Changing World 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Being a Geographer: Issues, Ethics and Skills Research Methods in Physical Geography <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Aquatic Biogeochemistry Atmospheric Science Catchment Hydrology Environmental Data Visualization and Analysis Glacial and Fluvial Landscape Processes Introduction to Eco-Innovation Soil Science Spatial Analysis and GIS 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Alpine Environmental Processes Field Course Coastal Processes Dissertation Dissertation with External Partner Environmental Remote Sensing and Image Processing Field Course *Field Course in Croatia - Water, Society and the Istrian Landscape GIS: Principles and Practice Glacial Systems Independent Research Lakes, Rivers and Estuaries

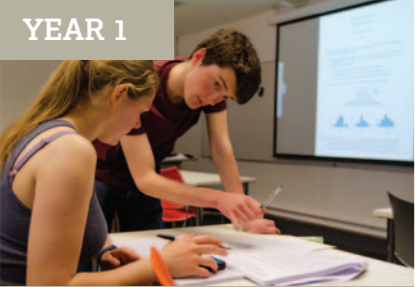
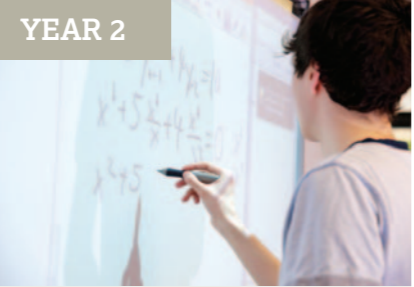

*Please note: some field courses will incur additional costs and are subject to availability

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	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <ul style="list-style-type: none"> Calculus Further Calculus Linear Algebra Probability Statistics 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Abstract Algebra Computational Mathematics Linear Algebra II Probability II Statistics II 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> 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 Statistical Models 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 in the Single Mathematics pathway 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	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <p>Single Pathway Core, plus:</p> <ul style="list-style-type: none"> Convergence and Continuity Discrete Mathematics Geometry and Calculus Integration and Differentiation Numbers and Relations 	<p>OPTIONAL MODULES</p> <p>Single Pathway Core, plus:</p> <ul style="list-style-type: none"> Complex Analysis Project Skills Real Analysis 	<p>OPTIONAL MODULES</p> <p>Single Pathway Core, plus:</p> <ul style="list-style-type: none"> Differential Equations Hilbert Spaces Lebesgue Integration Linear Systems Metric Spaces Probability Theory

Health and Medicine 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	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <ul style="list-style-type: none"> Sports and Exercise Science Fundamental Anatomy <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Assessing Technologies in Sports and Exercise Science Essentials of Sports and Exercise Physiology <i>or</i> Introduction to Nutrition Exercise Prescription Hormones and Metabolism <i>or</i> Public Health Challenges Principles of Biomechanics <i>or</i> Concepts in Sports and Exercise Psychology 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Biomechanics II Current Debates in Sports and Exercise Science Physiology and Metabolism Sports and Exercise Psychology Sports Medicine or Exercise Medicine 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Advanced Physiology Advanced Psychology Applied Sport, Exercise and Performance Psychology Biomechanics III Maximising Elite Performance Optimising Health Outcomes Research Project



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.

YEAR 1	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <ul style="list-style-type: none"> Classical Mechanics Electric and Magnetic Fields Quantum Physics The Physical Universe Thermal Properties of Matter <p>OPTIONAL MODULES</p> <p>Students need to take either the Physics Mathematics modules listed below or the Single Mathematics Pathway.</p> <ul style="list-style-type: none"> Complex Methods Functions and Differentiation Integration Series and Differential Equations Vector Calculus 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Introduction to Experimental Lab <p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Application of Quantum Dynamics and Entanglement Classical Fields Electromagnetism Electromagnetism, Waves and Optics Experimental Lab I Experimental Lab II Experimental Principles of Particle Detection Introduction to Astronomy & Astrophysics Maths I Maths II Mechanics and Variations Quantum Mechanics Relativity, Nuclei and Particles Scientific Programming and Modelling Project Solar System Physics The Dynamics and Content of the Universe Thermal Properties of Matter 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Advanced Stellar Astrophysics Astrophysics Group Project Astrophysics Laboratory Atomic Physics Computer Modelling Cosmology Group Project Energy Groups and Symmetries Industrial Group Project Low Temperature Physics Laboratory Particle Physics Particle Physics Group Project Physics Literature Search Physics of Fluids Physics of Living Systems Physics of Quarks and Leptons Quantum Technology Group Project Semiconductor Physics Laboratory Solid State Physics Solid State Quantum Technologies Space and Auroral Physics Statistical Physics Stellar structure and the Interstellar medium The Early Universe Theoretical Physics Group Project Theoretical Physics Independent Study



Psychology Pathways




Psychology

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

YEAR 1	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <ul style="list-style-type: none"> Introduction to Cognitive Psychology Introduction to Developmental Psychology Introduction to Neuroscience Personality and Individual Differences Social Psychology in the New Digital Age 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> Cognitive Psychology Developmental Psychology Foundations of Cognitive Neuroscience Social Psychology 	<p>OPTIONAL MODULES</p> <ul style="list-style-type: none"> 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 Prozac 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 Psychology of Cooperation Topics in Clinical Psychology

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	YEAR 2	YEAR 3
		
<p>CORE MODULES</p> <ul style="list-style-type: none"> Introduction to Cognitive Psychology Introduction to Developmental Psychology Introduction to Neuroscience Personality and Individual Differences Social Psychology in the New Digital Age Essential Skills for Psychologists Research Integrity and Open Science 1 Research Integrity and Open Science 2 Statistics for Psychologists 1 Statistics for Psychologists 2 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Cognitive Psychology Foundations of Cognitive Neuroscience Research Methods I: Experimental Methods in Psychology Research Methods II: Asking Questions and Analysing Responses Statistics for Group Comparisons Statistics from Association to Modelling Causality 	<p>CORE MODULES</p> <ul style="list-style-type: none"> Developmental Psychology Project Social Psychology

Charlotte Hirons



Msc Natural Sciences

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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 programme 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 how 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.

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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.

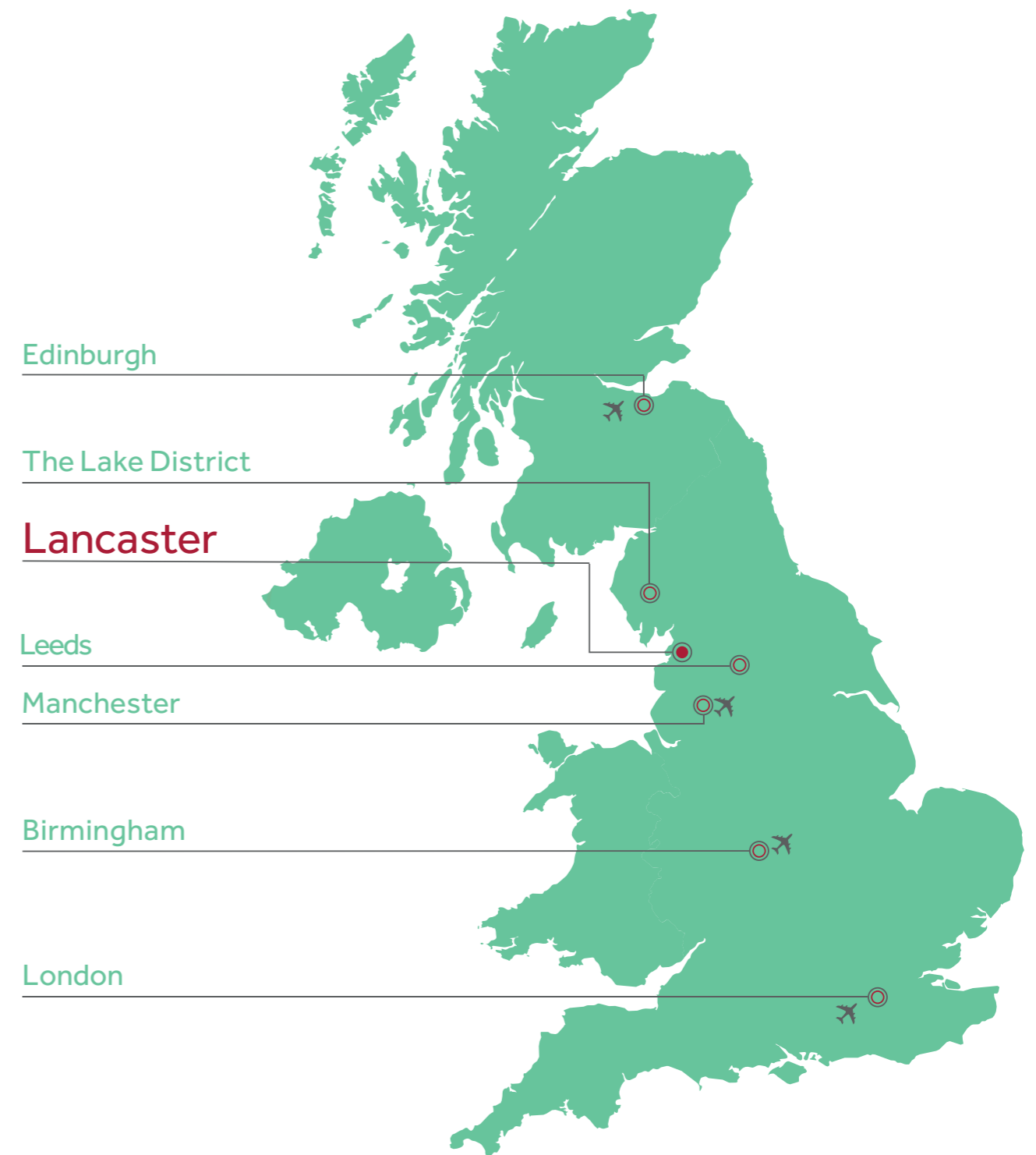
By coach and bus

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](https://www.lancaster.ac.uk/travel)



For more information, please visit [lancaster.ac.uk/natural-sciences](https://www.lancaster.ac.uk/natural-sciences)



Lancaster University is set in beautiful parkland and lies approximately three miles south of the city of Lancaster. The campus is easily accessible via road, rail and bicycle and is within 70 miles of Manchester's International Airport.



Natural Sciences

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