UNIVERSITY OF LIVERPOOL

# Marine Biology BSc (Hons)

### COURSE DETAILS

- A level requirements: ABB
- UCAS code: C160
- Study mode: Full-time
- Length: 3 years

### KEY DATES

- Apply by: 31 January 2024
- Starts: 23 September 2024

## Course overview

From microscopic algae to giant whales, most of our planet's life is found in the oceans. As a marine biologist, you will learn about the behaviour, physiology, and ecology of marine organisms.

### INTRODUCTION

You will discover how individuals, populations and communities respond to environmental drivers such as temperature and food availability, as well as to the challenges presented by a changing climate and human interaction. You will also gain the varied skills necessary to examine the marine environment and relay your findings to audiences from the general public through to government bodies.

Contemporary marine biology requires a broad set of skills, including field work, writing and presentation, and data analysis. In your first two years of study, you will develop these core skills and, in year three, you will take advanced modules in areas of interest to you to further develop your overall understanding and growing expertise.

You can choose modules from across the School of Environmental Sciences and from the School of Life Sciences. In each year there are topics such as climate change and ocean physics, population ecology, physiology, conservation, parasitology, microbiology, molecular biology and genetics.

Our research-led teaching approach allows our students to engage with up-to-the-minute science and policy in lectures, practical work, and in their independent research projects in year three. This is an opportunity to explore fields or skills of interest, often working on unanswered questions in marine science. Recent projects include investigating physiological data on how cormorants stay warm while diving in frigid Arctic waters, building

mathematical models of coral reefs, and looking at the impacts of a wind farm on benthic communities.

A number of the School’s degree programmes involve laboratory and field work. Fieldwork is carried out in various locations, ranging from inner city to coastal and mountainous environments. We consider applications from prospective disabled students on the same basis as all other students, and reasonable adjustments will be considered to address barriers to access.

## WHAT YOU'LL LEARN

- Evolutionary processes
- Laboratory and field techniques
- Diversity of live in the marine environment
- Human threats to ecosystems
- Quantitative skills
- Coastal biodiversity
- Analysis of environmental data
- Conducting independent research

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## ACCREDITATION

Our degree is one of only a handful in the UK to be accredited by the Institute of Marine Engineering, Science and Technology (IMAREST), opening up opportunities for students and graduates of our programmes.

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# Course content

Discover what you'll learn, what you'll study, and how you'll be taught and assessed.

## YEAR ONE

Compulsory modules develop the essential skills required to be a Marine Biologist and build a foundation of knowledge on the physical and biological environments. Two optional modules allow you to focus a little more on the subjects that interest you.

## COMPULSORY MODULES

### EVOLUTION (LIFE103)

**Credits: 15 / Semester: semester 1**

This module describes the evolutionary processes that have resulted in the generation of the diverse life forms that populate the planet.

This includes the theory of evolution by natural selection, and the genetic processes that result in gene evolution and diversity.

Selected scenarios and case studies will apply evolutionary concepts, showing the fundamental importance of evolution to a broad range of the life sciences.

The module is split into two parts: the first part (A) is the same for all students, the second part (B) contains a number of parallel strands tailored to students interest.

Students will be advised by their programme director which strand to follow.

The lectures will be supplemented with a variety of on-line resources.

Students will be given guided reading, and regular formative assessment exercises will enable students to evaluate their understanding of the module.

The module will be assessed by coursework and final examination.

### LABORATORY AND FIELD TECHNIQUES FOR ECOLOGISTS (ENVS171)

**Credits: 15 / Semester: semester 2**

This varied practical module will provide training in a range of ecological skills through a series of field and lab exercises, either in person, or through online equivalent exercises, as necessary. Fieldwork will expose you to diverse and beautiful natural environments where you will learn to develop identification and sampling skills for both terrestrial and marine animals and plants. The skills used will have a wide application to many fields of environmental science including biology, ecology, and physical geography. You will learn quantitative skills in field ecology and use these to solve fundamental and applied problems. Assessments include a mix of MCQ tests and practical portfolios.

**LIFE IN THE SEAS AND OCEANS (ENVS121)**

**Credits: 15 / Semester: semester 1**

This module is designed to deliver an introduction to the diversity of life in the marine environment. You will be introduced to the range of living organisms in the oceans from microscopic plants and bacteria to whales through a blended learning approach that combines e-lectures with a series of interactive workshops, practical activities and field visits. You will have the opportunity to examine marine organisms in our award-winning teaching facilities and during field visits, which will allow you to explore some of the diverse adaptations marine organisms have adopted to meet the challenge of survival in the marine environment. Your knowledge and understanding will be assessed via online tests, a group project in which you will create a guide to a specific group of marine organisms, and a practical workbook.

**MARINE ECOSYSTEMS: DIVERSITY, PROCESSES AND THREATS (ENVS122)**

**Credits: 15 / Semester: semester 2**

This module is designed to deliver an introduction to the diversity of marine ecosystems across the globe. Each week during in person lectures you will be introduced to a new ecosystem and will learn about this habitat, specifically the main organisms, key processes, and human threats to each ecosystem described and explored. Central to this module are interactive discussion sessions (workshops) that will build an understanding of how marine ecosystems are expected to respond to the human-induced changes of the anthropocene. During these workshops you will learn to critique a piece of scientific research in small group discussions guided by academics. Your knowledge and understanding will be assessed via open-book online tests, and a group project in which you will create an infographic outlining the threats a particular ecosystem faces.

**QUANTITATIVE SKILLS FOR ECOLOGY AND MARINE BIOLOGY (ENVS128)**

**Credits: 15 / Semester: semester 1**

This module will help students to develop the quantitative skills needed for ecology, marine biology and related subjects, including basic mathematics, statistics and computing. It will be delivered via a series of lectures, practical classes and problem-solving sessions. No mathematical knowledge above GCSE level will be assumed.

**STUDY SKILLS (ECOLOGY AND MARINE BIOLOGY) (ENVS104)**

**Credits: 15 / Semester: whole session**

This module helps students of Ecology & Marine Biology to develop essential study skills through a combination of tutorials, workshops, and field experience. Students will learn how to write scientific essays, how to design posters and how to give oral presentations. The University's academic integrity policy will be introduced. An academic advisor will help every student to adjust to the demands of university study. Students will be encouraged to think about their career, how they can obtain relevant skills and experience, and how to write an appropriate CV. It is recommended that students bring/purchase waterproof clothing and boots.

## OPTIONAL MODULES

### LIVING WITH ENVIRONMENTAL CHANGE (ENVS119)

**Credits: 15 / Semester: semester 1**

This module examines a number of global 'grand challenges' facing humans on the planet earth related to climate and environmental change. It will introduce students to core concepts of sustainability and human impacts upon the environment, as well as exploring the range of proposed solutions and mitigation strategies which are available to understand climate and environmental change. The module thus provides a core knowledge base for social and natural scientists who wish to understand environmental change.

### CLIMATE, ATMOSPHERE AND OCEANS (ENVS111)

**Credits: 15 / Semester: semester 1**

Climate, Atmosphere and Oceans provides an understanding of how the climate system operates. The module draws on basic scientific principles to understand how climate has evolved over the history of the planet and how the climate system is operating now. Attention is particularly paid to the structure and circulation of the atmosphere and ocean, and how they both interact. The course emphasises acquiring mechanistic insight and drawing upon order of magnitude calculations. By the end of the module students will understand how the oceans and atmosphere combine to shape Earth's climate. Students gain quantitative skills by completing a series of coursework exercises and a final exam. Students address the Net Zero carbon goal via group work involving digital storytelling.

### MOLECULES AND CELLS (LIFE101)

**Credits: 15 / Semester: semester 1**

This module describes the detailed composition of cells and the processes by which they obtain and generate energy, grow, replicate and eventually die.
The lectures will be supplemented with on-line resources and illustrated with some of the latest research methods that are used to study cell structure and function.
Students will be given guided reading, and regular formative assessment exercises will enable students to evaluate their understanding of the module.
The module will be assessed by coursework and final examination.

**ECOLOGY AND CONSERVATION (ENVS157)**

**Credits: 15 / Semester: semester 2**

The zone of life on earth, or the 'biosphere', is a highly dynamic system responding to external pressures including changing human activities. The biosphere obeys a numbers of simple natural principles, but these often interact to create complex and sometimes unexpected responses. Using a wide range of examples we will explore these interactions between organisms and the environment. We will examine how species organise into communities, and how energy and other resources flow through ecosystems. We will explore how ecosystems respond to change, including gradual environmental shifts, sudden disturbance events and the effects of human activities. We will also learn how the key principles of ecology can be applied to conservation. We will assess the current state of the biosphere, and evaluate the major current threats. We will also look towards the future of ecosystems, including whether we can restore degraded habitats, and recreate "natural" landscapes.

**MICROBIOLOGY (LIFE110)**

**Credits: 15 / Semester: semester 2**

This module provides a comprehensive introduction to microbiology. It covers theoretical aspects of microbial physiology, microbial disease mechanisms, food microbiology, the microbiology of water safety, the role of microbes in biogeochemical cycling, recycling and biodegradation, control and treatment of microbial infections and modern techniques in the study of microbes. In addition, throughout the module, there are case studies that bring these concepts together in real world scenarios that highlight the hazards and benefits of microbes.

**ECOLOGY AND THE GLOBAL ENVIRONMENT (LIFE120)**

**Credits: 15 / Semester: semester 2**

This module will introduce students to the physical and chemical contexts of the biosphere, the cycling of important elements at different scales, the distribution of biomes and the ecosystem concept.

Ecological concepts such as succession, niche, food web theory and ecosystem stability will be introduced, and how these are impacted by human activities.

The module will also consider the conservation of biodiversity over a range of biological scales using UK and global case studies. The lectures will be supplemented with on-line resources.

Students will be given guided reading, and regular formative assessment exercises will enable students to evaluate their understanding of the module.

The module will be assessed by coursework, including online test.

#### INTRODUCTION TO GENETICS AND DEVELOPMENT (LIFE128)

**Credits: 15 / Semester: semester 2**

This module introduces students to modern genetics and developmental biology at an introductory level. Using examples taken from across the biosciences and medicine, students will develop their understanding of the inheritance of genetic traits, how mutation can lead to disease and the molecular techniques used to study genes. They will also be introduced to development from meiosis and germ cell formation through to organogenesis, emphasising both the underlying genetic and molecular mechanisms involved and the embryological processes. Students will explore current advances in both fields including current and potential use of gene editing techniques and stem cells in therapeutics, and will consider the ethical implications of these advances.
The module is taught through a combination of lectures and workshops incorporating problem solving and discussion, with an emphasis on an appreciation of the techniques and experimental evidence underpinning the material. Assessment is by a combination of a written examination and a group ethics poster presentation.

*Programme details and modules listed are illustrative only and subject to change.*

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## YEAR TWO

Year two develops more specialist knowledge of Marine Biology, while allowing you to take a wide range of options in areas that interest you. You choose three optional modules.

## COMPULSORY MODULES

#### STUDYING UK COASTAL MARINE BIODIVERSITY (ENVS241)

**Credits: 15 / Semester: semester 1**

This module is a fieldwork-based module which will be co-taught with the Marine Biological Association (the UK's learned society for Marine Biologists) in Devon prior to the start of semester one. You will learn about the diversity of coastal marine taxa and techniques used for sampling marine taxa, both at sea on a research vessel and in the field on the rocky shore. In the lab you will learn how to identify marine species, and you will conduct your own research to enhance your knowledge on the coastal marine taxa sampled. This will include information on their distribution, taxonomy, habitats, and key features. Your knowledge and understanding will be assessed via an online exam covering the materials taught on the field course and via a group project in which students will research a particular group of common UK marine taxa and produce an accessible guide that can be used by the public.

**MARINE ECOLOGY FIELD STUDIES (ENVS278)**

**Credits: 15 / Semester: semester 2**

This module introduces the ecology of coastal marine ecosystems and the techniques for studying them through staff-led field visits, seminars, laboratory practicals and computer analysis sessions. It will explore the diversity, occurrence, distribution and energy flow of the plant and animal communities in these ecosystems. We will also consider the morphological, physiological and behavioural adaptations of marine organisms to coastal environments. Students are introduced to key skills required for coastal ecology, including learning how to employ classic field techniques, making use of traditional, e.g. corers, and more modern, e.g. video surveying with a remote operated vehicle, equipment. Our focal study area will be the Mersey and Dee estuaries with their range of physical conditions and habitats.

**MARINE ECOPHYSIOLOGY, ECOLOGY AND EXPLOITATION (ENVS251)**

**Credits: 15 / Semester: semester 2**

The marine environment presents a particular set of challenges for the organisms which inhabit it and these conditions are constantly changing as a result of human interventions. This module will provide a solid grounding in a number of topics, concepts and issues in the marine environment relating to the physiology and ecology of marine organisms and how they are affected by the activities of humans. Module content will be delivered primarily through interactive lectures supported by computer-based practical exercises and assessed by examination and coursework. Students will be guided to specific sections of textbooks, online resources and scientific papers to shape their learning.

**RESEARCH AND CAREER SKILLS (ENVS204)**

**Credits: 15 / Semester: whole session**

This module aims to develop research and careers skills required by marine biologists, ocean scientists and environmental scientists as they prepare for their final year of study. These aims are achieved through blended learning approach including: interactive tutorials, workshops, and the School of Environmental Sciences careers week. Students will focus on developing skills in critiquing and reading the scientific literature, assessed through a literature review essay. Students will also be introduced to the process of scientific research, learning how to analyse and synthesise real scientific data, create professional display items and write a research report, which is assessed, in standard scientific format. Students will develop knowledge of careers in their field and enhance their employability taking part in an assessment centre exercise and job video interview, which is assessed.

### STATISTICS FOR ENVIRONMENTAL SCIENTISTS (ENVS222)

**Credits: 15 / Semester: semester 1**

This module provides training in statistics for environmental scientists. We provide training in industry-standard software – R and RStudio – to allow students to explore, present, and analyse data, and we ensure that the practical training is fully supported by explanations of the underlying theory. The practical work is focused on real environmental data, often generated by the students themselves so that they understand where the data have come from and have access to the full context as they learn how to describe and explain the findings of their analyses. Students will leave with the tools to collect, work with, and present data necessary for scientific writing.

## OPTIONAL MODULES

### ANIMAL BEHAVIOUR (LIFE211)

**Credits: 15 / Semester: semester 1**

This module provides an introduction to the fundamental evolutionary principles that explain a wide range of animal behaviours. These include sexual selection and animal mating behaviours, the evolution of co-operative societies, as well as conflict and conflict resolution. The lectures will be supplemented with on-line resources. Students will be given guided reading, and regular formative assessment exercises will enable students to evaluate their understanding of the module. The module will be assessed by continuous assessments.

### COMPARATIVE ANIMAL PHYSIOLOGY (LIFE212)

**Credits: 15 / Semester: semester 2**

This module describes the physiological problems encountered by animals in their natural environments, and how these problems are overcome.

The setting is environmental, relating lifestyle and physiology to habitat and to the rigours of a potentially hostile environment.

The module will explain how the lifestyles of animals and the independence of animals from environmental disturbance are critically linked to the management of energy flow through their bodies. Physiological mechanisms will be described at all levels of organisation in relation to energetics, temperature, respiration, osmoregulation, and nitrogen excretion. Emphasis will be placed on differentiating the molecular, cellular and system levels of organisation and their integrated role in optimising animal-environmental interactions.

The module is taught through a mixture of asynchronous and synchronous sessions. The former consist of pre-recorded videos, the latter are interactive online sessions to promote student engagement and active learning. Students will also be given guided reading, and regular formative assessment exercises will enable students to evaluate their understanding of the module.

The module will be assessed by Coursework

**OCEANOGRAPHY, PLANKTON AND CLIMATE (ENVS245)**

**Credits: 15 / Semester: semester 1**

The tiny plankton are the base of marine food chains and also affect the Earth's climate. If you want to understand how and where these organisms live in the ocean, you need to step out of your own experience as a terrestrial animal and learn how the physics, biology and chemistry of the ocean come together to control the lives of plankton. In this module we will get you to think about how turbulence and stratification in the ocean control the growth of different sizes of plants and animals by determining how they can acquire light, nutrients and food. You will learn how plankton play a key role in shaping Earth's climate, but that this depends on the plankton species and plankton size. We will also consider how plankton respond to changes in Earth's climate, with important shifts in species distributions currently being caused by our warming climate. In this module we take you from the micron scales of the tiniest plankton up to the scale of the global ocean to illustrate the fundamental links between the ocean's physical and biogeochemical processes, plankton communities and Earth's climate. Teaching is structured around a series of short videos on key topics and concepts, with class work then looking at relevant case studies, discussing some of the important implications of our changing climate on plankton, and gaining practice in quantifying plankton responses to changes in their ocean environment. Assessment is by one coursework assignment halfway through the semester, and an online open-book exam.

**MARINE POLLUTION (ENVS232)**

**Credits: 15 / Semester: semester 2**

Students are taught how marine systems are changing due to globally increasing water temperatures and increasing carbon dioxide concentrations in the atmosphere, which are affecting the chemistry, physics and ultimately biology of the marine systems at unprecedented rates. These changes are expected to accelerate in the coming decades. Localised anthropogenic stressors such as excess nutrients, plastic debris, trace metals (e.g. mercury, copper), marine heatwaves and/or other emerging contaminants affecting coastal and open ocean waters are covered. Students will gain an understanding of the causes and processes that drive marine pollution issues as well as techniques used to monitor, remediate and/or regulate those issues. Assessment is done through group work, coursework and a final in-person exam.

**UNDERSTANDING MARINE AND TERRESTRIAL SPATIAL ECOLOGY USING GIS (ENVS255)**

**Credits: 15 / Semester: semester 2**

This module explores the concepts and applications of Geographical Information Systems (GIS) to solve contemporary questions in spatial ecology. The module involves applied case studies and practical work designed to develop both an understanding of GIS principles and concepts, such as data acquisition, integration and spatial analyses. The hands-on workshops allow students to learn the basic skills before applying them to a real world authentic assessment.

**EVOLUTIONARY BIOLOGY (LIFE213)**

**Credits: 15 / Semester: semester 1**

This module seeks to explain how the process of natural selection underpins the origins of biodiversity.

The module will address the origins of phenotypic diversity, focussing on where heritable phenotypic variation comes from and how it shapes the evolutionary process within species (microevolution).

Having established a basic model for understanding how evolution works, the second part of the module will explain the link between microevolution and evolution above the species level (macroevolution), overviewing the major evolutionary transitions.

The lectures will be supplemented with online resources. Students will be given guided reading.

The module will be assessed by two coursework assessments in semester 1.

**POPULATION AND COMMUNITY ECOLOGY (LIFE214)**

**Credits: 15 / Semester: semester 2**

This module aims to introduce students to the concepts and principles underlying the dynamic interactions within populations and between species within communities. It will draw upon examples taken from across the globe: pressures on fish stocks; use of natural predators for biological control processes; how mutualistic interactions benefit communities, such as coral reefs and leguminous plants. It will also explore how knowledge and understanding of these species and community interactions can help plan for ecological mitigation and restoration. The lectures will be supplemented with on-line resources. Students will begiven guided reading, and regular formative assessment exercises will enable students to evaluate their understanding of the module. The module will be assessed by coursework.

*Programme details and modules listed are illustrative only and subject to change.*

## YEAR THREE

The core compulsory modules focus on research skills and include your independent research project. A wide choice of specialist research-led modules from right across the University allows you to focus on the subjects which interest you the most. You choose four optional modules.

## COMPULSORY MODULES

### CONTEMPORARY ISSUES IN ECOLOGY AND MARINE BIOLOGY (ENVS301)

**Credits: 15 / Semester: whole session**

This module aims to develop a number of skills, attributes and experiences required by graduates in ecology and marine biology with a focus on careers, an appreciation of the current state of their field and an international perspective. This is achieved through a programme of interactive tutorials and associated activities, directed via the virtual learning environment. In doing so, students will engage with up to date reasearch and scientific communication in the fields of ecology, conservation, biodiversity and marine biology. To complement this, students will undertake a series of activities to boost their employability, tailored to their specific needs, to prepare students for life after graduation.

### MARINE BIOLOGY HONOURS FIELD CLASS (ENVS303)

**Credits: 15 / Semester: semester 1**

This module aims to further develop students' experience of the variety of UK biota and the ability to carry out a research project, both achieved through group work on a field class. Working closely with a member of staff, small groups of students will conduct small-scale projects in the laboratory or field. Our hosts are FSC Millport, who provide an outstanding diversity of research opportunities in this historic location for marine biology. Assessed via a group presentation during the field class and a group report submitted later in Semester One, this module provides exceptional preparation for students' Honours year.

### INDEPENDENT RESEARCH PROJECT (ENVS306)

**Credits: 30 / Semester: whole session**

This module consists of a two-semester dissertation research project, carried out individually by a student with supervision by a member of academic staff. Projects can be field-, laboratory- or desk-based studies on a predefined project and the student will learn about project design, data collection, analysis and interpretation of results.

## OPTIONAL MODULES

### SURVIVING THE MARINE ENVIRONMENT: ADAPTATION, BEHAVIOUR AND CONSERVATION (ENVS310)

**Credits: 15 / Semester: semester 1**

This module aims to foster a broad understanding of contemporary theory in behavioural ecology, evolutionary biology and ecophysiology, with special reference to the marine environment. We will consider processes that operate at scales from individuals to populations and consider implications of these processes for the conservation of marine species and ecosystems. This 15 credit module builds on knowledge acquired about techniques, theory and processes acquired in Year 1 ( e.g. Marine Biology: Life in the Seas and Oceans & Marine Ecosystems: Diversity Processes & Threats) and Year 2 (e.g. Marine Ecophysiology, Ecology & Exploitation) and provides the opportunity to experience the integration of current research themes in marine biology.

### COASTAL ENVIRONMENTS: SPATIAL AND TEMPORAL CHANGE (ENVS376)

**Credits: 15 / Semester: semester 1**

This module considers the evolution and response of coastal environments to marine and riverine processes and their variations in relation to past, present and future climate change. Attention is given to physical processes and inter-relationships acting along coastlines and coastal changes in response to sea level rise, variations in storms activity, wave climate and sediment supply. Consideration is also given to coastal management and climate change adaptation and mitigation measures. Topics will be investigated through a combination of lectures, field trips and development of a project aimed at identifying optimum coastal protection schemes for real case studies.

### MARINE PLANNING THEORY AND PRACTICE (ENVS341)

**Credits: 15 / Semester: semester 1**

Marine planning is a recent endeavour, taking shape internationally as a new approach to the management of the seas and oceans, in the interests of marine nature conservation and the sustainable use of the seas for shipping, energy, fishing, minerals extraction, tourism, etc. It is developing as a means of organising the use of national sea space in a growing number of countries around the world. This module provides an introduction to the theoretical and practical foundation in marine planning for students with interests in spatial planning or marine science and management. Assessment is by two assignments: presentation and essay.

**INTEGRATIVE COMPARATIVE ANIMAL PHYSIOLOGY (LIFE339)**

**Credits: 15 / Semester: semester 1**

This module will provide students with an insight into physiological mechanisms underpinning adaptations to potentially hostile environmental conditions such as anoxia, toxic sulphide, high hydrostatic pressure and extreme temperatures.

It will also explore the physiological mechanisms related to homeostasis and the evolution of air-breathing, terrestriality and endothermy.

The module will take an integrative approach, considering physiological mechanisms from molecules to cells, tissues, whole animals and the environment.

The module is taught through a mixture of pre-recorded short online lectures and synchronous online seminars and is assessed by coursework.

**MARINE ECOLOGY: THEORY AND APPLICATIONS (ENVS383)**

**Credits: 15 / Semester: semester 2**

This module develops the connections between ecological theory and management of marine communities and ecosystems. The theory will mainly focus on mathematical models of the dynamics of populations and communities, and will include practical work with software. The second half of the module aims to give a rounded overview of the current understanding of vulnerability of marine taxa to human activities and climate change, and enable students to evaluate consequences of loss of species on ecosystem structure and functioning, as well as on human wellbeing.

**CURRENT TOPICS IN ANIMAL BEHAVIOUR (LIFE322)**

**Credits: 15 / Semester: semester 2**

This module addresses contemporary topics in animal behaviour within an evolutionary framework. It combines current experimental and field research and links behaviour to other areas including ecology, neurobiology, comparative cognition and human evolution. The module is delivered through traditional lectures and a combination of guided and self-directed reading. The module is assessed by continuous assessment.

**GLOBAL CARBON CYCLE (ENVS335)**

**Credits: 15 / Semester: semester 2**

Increasing amounts of carbon dioxide in the atmosphere are having a profound impact on our Earth system. This module will introduce students to the fundamental theory behind the global carbon cycle. Students will see how carbon is partitioned between the atmosphere, land and ocean in the contemporary and past Earth system, understand how the ocean stores 50 times more carbon than the atmosphere, and consider the impact of increasing carbon dioxide on the organisms living on land and in the ocean. Teaching is through lectures, workshops focusing on key components of the carbon cycle, and guided reading. Assessment is by two pieces of coursework.

**CONSERVATION BIOLOGY (LIFE326)**

**Credits: 15 / Semester: semester 1**

This module uses research-led teaching to explore current thinking in conservation biology;

The module explores patterns of biodiversity and encourages students to critically evaluate the evidence supporting alternative explanations for the extinctions or demise of many animal and plant species;

It also enables students to critically evaluate different approaches to conserving biodiversity;

The module is taught via lectures and student led seminars, in the form of debates. To support independent learning, students will also be guided to sections of specific textbooks and expected to follow up references, primary and secondary sources, listed by staff.

**CURRENT SKILLS AND TOPICS IN EVOLUTIONARY BIOLOGY (LIFE324)**

**Credits: 15 / Semester: semester 2**

This module uses research-led teaching to critically examine a selection of contemporary themes in evolutionary biology.

In the first part, students will receive training in modern methods for reconstructing the evolutionary history of species and specific traits. In the second part, we will cover a range of up to date and exciting topics in evolutionary biology, delivered by staff who are experts in their field;

Here students will learn about and discuss the cutting edge of important and generally applicable areas of evolutionary thought;

The module is taught via lectures, seminars, structured discussions and computer practicals; and assessed by written assignments.

*Programme details and modules listed are illustrative only and subject to change.*

## HOW YOU'LL LEARN

Teaching strategies include a mix of lectures, tutorials, workshops, field classes, research vessel cruises, laboratory work, computer sessions, group projects and individual work under supervision. You will typically receive around 15 hours of formal teaching each week, as well as about 60 hours on residential field courses each year. You will study four modules per semester. A module might involve two one-hour lectures each week, and a laboratory or computer-based practical as well. Tutorials are an integral part of our approach, involving groups of 5-7 students meeting regularly with a member of academic staff to discuss study skills, careers, current research and topical issues.

As you progress through your degree, you are increasingly challenged to engage with current debates, to think critically and to study independently. You will do an 'Honours Project' throughout year three, which is a piece of independent research (field, lab or data analysis) on a topic of your choice, supervised by a member of academic staff. If you opt for the four-year integrated master's programmes, you will spend 50% of your final year on a 'master's

project' working closely within a research group on an area which may well generate publishable results.

A number of the School's degree programmes involve laboratory and field work. The field work is carried out in various locations, ranging from inner city to coastal and mountainous environments. We consider applications from prospective students with disabilities on the same basis as all other students, and reasonable adjustments will be considered to address barriers to access.

## HOW YOU'RE ASSESSED

Assessment methods are tailored to the specific needs of each module and are designed to reflect student progression from year to year. Authentic assessment is embedded in our programmes, ensuring that you are prepared for the types of problems encountered, and have the skills needed, in commercial, research and public sector jobs. Assessment methods include written exams, assessed essays, laboratory and computer practicals, field assignments including field notebooks, poster presentations, research reports, scientific papers, group work, and oral presentations. In your third year you will complete a dissertation selected from a range of topics. This is your opportunity to develop skills as an independent academic researcher, supported on a one-to-one basis by an expert in the field.

## LIVERPOOL HALLMARKS

We have a distinctive approach to education, the Liverpool Curriculum Framework, which focuses on research-connected teaching, active learning, and authentic assessment to ensure our students graduate as digitally fluent and confident global citizens.

# Careers and employability

We produce highly employable marine biologists, trained in industry-relevant skills and modern equipment and software, and who can apply their knowledge to a wide range of fields including conservation, aquaculture, pollution and environmental monitoring.

Our graduates have a diverse range of careers in the following areas which include: the media, environmental consultancy, administration, academia, teaching, local and national government and international banking.

Examples of recent graduate careers in the sector include:

- Fisheries observers
- Surveyor
- Seabird research assistant
- Turtle conservation field leader
- Field assistant on mammal surveys
- Rangers
- Conducting environmental surveys for construction work.

Many choose to continue their studies at master's or PhD level on topics such as fish assemblages in mangroves, marine ecosystem responses to climate change and carbon sequestration in soils.

Recent employers include:

- Joint Nature Conservation Committee (JNCC)
- United Utilities
- Fairbanks Environmental
- Wildlife Sense
- Earth and Marine Environmental Consultants
- International Pole and Line Foundation.

**87%** **OF STUDENTS ARE IN WORK AND/OR FURTHER STUDY 15 MONTHS AFTER GRADUATION.**

*Graduate Outcomes, 2018-19.*

# Fees and funding

Your tuition fees, funding your studies, and other costs to consider.

## TUITION FEES

| **UK fees (applies to Channel Islands, Isle of Man and Republic of Ireland)** | |
|---|---|
| Full-time place, per year | £9,250 |

| **International fees** | |
|---|---|
| Full-time place, per year | £27,200 |

*Fees are correct for the academic year 2024/25*
Tuition fees cover the cost of your teaching and assessment, operating facilities such as libraries, IT equipment, and access to academic and personal support. Learn more about tuition fees, funding and student finance.

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## ADDITIONAL COSTS

We understand that budgeting for your time at university is important, and we want to make sure you understand any course-related costs that are not covered by your tuition fee. This includes costs for a lab coat, geological field kit, and sustenance during compulsory field trips.

Find out more about the additional study costs that may apply to this course.

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## SCHOLARSHIPS AND BURSARIES

We offer a range of scholarships and bursaries to provide tuition fee discounts and help with living expenses while at university.

Check out our Undergraduate Global Advancement Scholarship. This offers a tuition fee discount of up to £5,000 for eligible students starting an undergraduate degree from September 2024. There's also the Liverpool Bursary which is worth £2,000 per year for eligible students.

Discover our full range of undergraduate scholarships and bursaries

# Entry requirements

The qualifications and exam results you'll need to apply for this course.

| **Your qualification** | **Requirements**<br>About our typical entry requirements |
|---|---|
| A levels | ABB<br>Applicants with the Extended Project Qualification (EPQ) are eligible for a reduction in grade requirements. For this course, the offer is **BBB** with **A** in the EPQ.<br>You may automatically qualify for reduced entry requirements through our contextual offers scheme.<br>If you don't meet the entry requirements, you may be able to complete a foundation year which would allow you to progress to this course.<br>Available foundation years:<br>• Biological Sciences (with a Foundation Year) leading to BSc (Hons)<br>• Earth Sciences entry route leading to BSc (Hons) (4 year route including a Foundation Year at Carmel College) |
| GCSE | 4/C in English and 4/C in Mathematics |
| Subject requirements | Biology and one other science (Mathematics, Further Mathematics, Economics, Physics, Chemistry, Geography, Geology, Environmental Science/Studies/Technology*, Applied Science (Double Award), Computer Science) at A level.<br>*Not in combination with each other<br>For applicants from England: For science A levels that include the separately graded practical endorsement, a "Pass" is required. |
| BTEC Level 3 National Extended Diploma | D*DD in a relevant subject.<br>Relevant subjects considered include: Animal Management, Countryside Management, Applied Science, Marine Biology, |

| **Your qualification** | **Requirements**<br>About our typical entry requirements |
|---|---|
| | and Ecology.<br>If the BTEC you are taking is not listed here, please contact us to check its acceptability for this programme.<br>Please note that BTEC Forensic Science pathway is not acceptable for this programme. |
| International Baccalaureate | 33 including 6 at higher level Biology, plus another Science at Higher Level grade 5, no score less than 4. |
| Irish Leaving Certificate | H1, H2, H2, H2, H3, H3 including H2 or above in Biology and a second science |
| Scottish Higher/Advanced Higher | Not accepted without Advanced Highers at ABB including Biology and 1 other science. |
| Welsh Baccalaureate Advanced | Accepted at Grade B with AB at A levels including Biology and 1 other science. |
| Access | 45 Level 3 credits in graded units,including 30 at Distinction and a further 15 with at least Merit. 15 Distinctions in Biology and one other science are typically required. Acceptable science subjects are Mathematics, Physics, Chemistry, Geography or Geology. GCSE Mathematics and English grade C/4 also required. |
| International qualifications | Many countries have a different education system to that of the UK, meaning your qualifications may not meet our entry requirements. Completing your Foundation Certificate, such as that offered by the University of Liverpool International College, means you're guaranteed a place on your chosen course. |

## ALTERNATIVE ENTRY REQUIREMENTS

- If your qualification isn't listed here, or you're taking a combination of qualifications, contact us for advice
- Applications from mature students are welcome.

THE ORIGINAL REDBRICK

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