

# Bioveterinary Science

 MBioSci

## COURSE DETAILS

- A level requirements: [AAB](#)
- UCAS code: D902
- Study mode: Full-time
- Length: 4 years

## KEY DATES

- Apply by: [31 January 2024](#)
- Starts: 23 September 2024

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## Course overview

This three-year programme will provide you with a wide knowledge of biological and veterinary animal sciences, practical techniques and transferable skills for careers allied to veterinary science, scientific research, conservation, animal welfare and the biotechnology and pharmaceutical industries.

## INTRODUCTION

The programme contains bespoke modules in Bioveterinary Science, in topics such as animal husbandry and welfare, veterinary form and function, veterinary diseases, epidemiology, pathology and public health. Students also choose modules available in the School of Life Sciences, which include animal biodiversity, animal behaviour, zoology practical skills, comparative animal physiology and conservation biology.

The MBioSci is a four-year programme, in which students first follow the three-year BSc in Bioveterinary Science and then continue into a fourth year, subject to performance.

The fourth (Master's) year aims at developing enhanced research and

personal skills for students seeking a high-level career in research (eg studying for a PhD or working in industry) or those seeking to enhance their qualification. Students take advanced modules (include [hyperlink](#)) and will join a research team to undertake a significant research project. Students can also apply for a six-week summer research internship in the UK or overseas or apply to spend time working in industry or in other enterprises in the final year.

### Programme in detail

There are several options available in years two and three allowing the student to tailor their degree to fit with their strengths, interests and career aspirations. In the third year, all students carry out an extended

research project of their choice with an active research group. Various modes of teaching are used throughout the programme including lectures, practical classes, problem-based learning and

guided study supported by our Virtual Learning Environment.

## **WHAT YOU'LL LEARN**

- Knowledge and understanding of biological and veterinary animal disciplines
  - Animal husbandry and welfare
  - Veterinary diseases, form and function and public health
  - Animal biodiversity, animal behaviour, comparative animal physiology, zoology practical skills and conservation biology
  - Methods and transferable skills for professions allied to veterinary science
  - How to communicate scientific concepts and findings in a variety of formats
  - Skills in critical thinking and data interpretation in the context of bioveterinary science
  - Ability to evaluate and interpret the subject knowledge to solve problems
  - Research and communication skills
  - Analysis and interpretation of real-world data
  - How to access and critically evaluate scientific literature
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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

Year one's modules will develop your knowledge of the subject giving you the ability to apply, evaluate and interpret this knowledge to solve problems in areas like biotechnology, biomedicine, and molecular cell biology. You will be introduced to a spectrum of practical skills and techniques, including some fundamental components

of digital technology that will enable you to perform robust statistical analyses of biological datasets. You will gain expert training in a vast range of areas which will equip you for the more specialised modules coming in the later years of the degree.

## COMPULSORY MODULES

### 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 both continuous assessments and by a final examination.

### 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 continuous assessments.

## **GRAND CHALLENGES IN BIOLOGY (LIFE105)**

**Credits: 7.5 / Semester: semester 1**

This module introduces students to how grand challenges (scientific and societal) are addressed in universities and in particular at the University of Liverpool. Students will be introduced to four major topics (Infections and Global Health, Ageing, Food Security, Personalised Medicines) by experts in the respective fields. Emphasis will be placed on students understanding concepts and assembling information rather than memorizing facts. The material will be delivered based on the concept of a scientific conference with plenary talks and parallel sessions presented by the lecturers, and (in light of Covid-19 driven procedures at scientific meetings) a video session driven by student input. Assessment of lecture material and associated readings will be by continuous assessment.

## **EXPERIMENTAL SKILLS IN CURRENT BIOLOGY (LIFE107)**

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

This is the first practical module that students will take in the School of Life Sciences. The skills that students acquire will be needed for other practical modules that they will take in semester 2 Year 1, and during Year 2 and will prepare them for their year 3 research project and for their subsequent career.

This module is designed to teach the basic multidisciplinary skills required in the biological sciences.

It aims to develop careful working practices, experimental design and interpretation of results. Skills acquired in this module will be both utilised and enhanced by the co-requisite module LIFE 109 (communication and study skills and quantitative skills).

The way in which LIFE 107 is taught and assessed is designed to place emphasis on encouraging students to take responsibility for their own learning. Demonstrators and academic staff will be on hand to answer questions or show students how to use lab equipment.

Resources will be available online via VITAL and include a weekly Blog, technical manual, module handbook, lab instruction manual and weekly lectures.

The module will be taught in weekly practical classes and it will be assessed through continuous assessment (assessment 1-2) and a final exam (assessment 3).

## **ANIMAL BIODIVERSITY (LIFE112)**

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

This module studies the body plans of the major groups of animals and explores the

This module studies the body plans of the major groups of animals and explores the relationship between body form and function.

It also discusses the evolutionary origins of these basic body plans and how these have been modified to adapt to particular habitats.

The module will be taught through a mixture of asynchronous and synchronous material. The former consists of pre-recorded videos and other online learning material, the latter consists of scheduled interactive online sessions. 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 through continuous assessment.

### **QUANTITATIVE SKILLS FOR THE LIFE SCIENCES (LIFE113)**

**Credits: 7.5 / Semester: semester 1**

For any student studying the Biological Sciences a firm grasp of quantitative skills is an absolute necessity. This module will provide you with the knowledge and skills you need to manipulate numbers and analysis/visualise data using digital tools. The module emphasises a "learn by doing" approach to the development of quantitative skills and is heavily workshop based.

### **INTRODUCTION TO ANIMAL HUSBANDRY (LIFE118)**

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

This module provides an introduction to veterinary animal husbandry in the form of lectures, a workshop on poster presentation and a mini conference where students exhibit their posters.

The module covers the basic physiology relevant to animal management; environmental considerations, nutrition and housing; the welfare of managed animals and breeding issues.

The module is assessed by continuous assessment, the poster, and by a final examination.

### **BIOCHEMICAL METHODS (LIFE122)**

**Credits: 7.5 / Semester: semester 2**

This course introduces widely used laboratory concepts and practical techniques that are relevant to academic research, industry and medical applications.

### **INTRODUCTION TO ANIMAL INFECTIOUS DISEASES, EPIDEMIOLOGY AND PUBLIC HEALTH (LIFE126)**

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

The module will introduce the biology of a range of veterinary infectious diseases. Basic concepts in disease epidemiology, surveillance and control will be introduced and the effects/association diseases have on animals, society and the environment. Students will be taught in small tutorial groups by research active teaching staff to develop information on a specific disease and present their group findings as a PowerPoint presentation at a "mini-

specific disease and present their group findings as a PowerPoint presentation at a "mini-conference". The module is assessed through the presentation and a final exam.

## **COMMUNICATION AND STUDY SKILLS FOR THE LIFE SCIENCES (LIFE130)**

**Credits: 7.5 / Semester: whole session**

to provide students with study and communication skills for higher education in the Life Sciences;

to develop students' ability to reflect on their progress and use feedback to identify opportunities for personal development;

to develop students' appreciation of the application of these skills to future employment.

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

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## **YEAR TWO**

Years two and three, through a range of optional modules offers the opportunity for you to explore and tailor your degree to fit your strengths, interests and career ambitions. During this second year, you will explore more advanced modules to equip you with a greater understanding of Bioveterinary science and zoology as a whole. It further focuses on developing

knowledge in these areas, and others like molecular and cellular biology, ecology and epidemiology. Year two aims to develop your ability to plan and execute experiments and to use appropriate controls to solve zoological problems and properly communicate the results.

## **COMPULSORY MODULES**

### **ADVANCED ANIMAL HUSBANDRY (LIFE217)**

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

This module is designed to integrate and extend student's knowledge of nutrition, reproduction, genetics and breeding, behaviour and welfare and to combine this with an assessment of the environment in which animals are kept. A species approach is used in which feeding, housing, breeding and general management of several major species important in the animal industries are considered. Transfer of knowledge about principles will be expected between species to help develop a deep understanding of animal husbandry.

The module 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 both continuous assessments and by a final examination.

### **TECHNIQUES IN CELL BIOLOGY (LIFE227)**

**Credits: 7.5 / Semester: semester 1**

This practical module aims to provide practical and theoretical experience in techniques currently used in cell biology. These techniques include assay, culture, histology and microscopy. The module is assessed through coursework and a final exam.

### **ESSENTIAL SKILLS FOR THE LIFE SCIENCES 2 (LIFE223)**

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

This module will continue, extend, and broaden the transferable skills developed in Year 1. It will focus on improving the students' analytical, communication, quantitative, and employability skills. The communication skills component is assessed through a portfolio whereas the quantitative skills component is assessed through a group poster and SAQ.

### **ADVANCED TECHNIQUES IN ZOOLOGY (LIFE230)**

**Credits: 7.5 / Semester: semester 2**

This module aims to provide practical experience in advanced laboratory techniques in zoology. These techniques are placed within a biological context so that students will not only learn the techniques, but also use them to answer questions about form and function of animals. The module is laboratory-based and students will work in small groups to conduct experiments and generate data that will be analysed using Excel and Minitab, SPSS or similar software. The module is assessed continuously and through an exam.

### **VETERINARY PARASITOLOGY AND PUBLIC HEALTH (LIFE216)**

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

The aim of this module is to develop knowledge of the important parasitic diseases of companion and food producing animals in the U.K. and globally, leading also to an understanding of the importance of these diseases to human and animal public health. 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 two items of continuous assessment and by a final examination.

### **VETERINARY FORM AND FUNCTION (LIFE215)**

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

This module will allow students to develop an understanding of functional anatomy and physiology of the major body systems (reproductive/endocrine, cardiovascular/respiratory, musculoskeletal, nervous, and digestive/excretory) using the dog as a model species;

The module will take an integrative approach, allowing the students to compare and contrast the anatomy and physiology of these body systems with those in other species of veterinary interest and apply this knowledge to understand how disruption of these systems can result in disease;

The module 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 and a final exam.

## **OPTIONAL MODULES**

### **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 first part of 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. At the end of the module, students will choose between two specialised short courses on either evolutionary ecology or molecular evolution.

The lectures will be supplemented with online resources. Students will be given guided reading, and regular formative assessment exercises that will enable students to evaluate their understanding of the module.

The module will be assessed by both continuous assessments (40%) and by a final examination (60%).

### **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 both continuous assessments and by a final examination.

### **THE MULTICELLULAR ORGANISM: TISSUES, DEVELOPMENT, REGENERATION AND AGING (LIFE205)**

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

This module aims to describe the structure and function of fundamental tissues, such as epithelial and connective tissue and of specialised tissues such as bone, muscle and the nervous system. An introduction to the mechanisms by which cells differentiate to form different tissues and regenerate following injury will be included. The processes that occur during ageing will be explained with special reference to changes in key tissues and organs.



The lectures will be supplemented with on-line resources, guided reading and formative assessment exercises that will enable students to evaluate their understanding of the module. The module will be assessed by both continuous assessment and by a final examination.

## **THE IMMUNE SYSTEM IN HEALTH AND DISEASE (LIFE221)**

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

The module will develop knowledge and understanding of the immune system, the molecules, cells and tissues that are involved in its function, its role in combating infection and how its dysfunction can contribute to disease.

Lectures will be supplemented with on-line resources. Problem solving workshops dedicated to case studies will be held to help students prepare for the assessments. Students will be given guided reading, and formative and summative assessment exercises held during the course will enable students to monitor and evaluate their progress and to prepare for the final assessment.

The module will be assessed by two assessments.

## **ENDOCRINE AND NEURO-PHYSIOLOGY (LIFE204)**

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

This module aims to provide the essential background knowledge to understand key concepts in neuroscience. It covers the principles of operation of nervous system, systematic and sensory neurophysiology, excitotoxicity and behaviour. The module also provides essential background knowledge to understand the key principles of endocrinology, and how it contributes to physiological homeostasis. It covers the secretions, functions and regulation of the major endocrine glands. The module also explores the role of the nervous and endocrine systems in the integrative control of the digestive tract. 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 both continuous assessments and by a final examination.

## **CELL SIGNALLING IN HEALTH AND DISEASE (LIFE202)**

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

This module will describe the molecular mechanisms that allow cells to communicate with each other;

The basic properties common to all signalling pathways will be studied and then a series of individual pathways will be examined in more detail, in the light of these general principles;

The importance of cellular signalling mechanisms will be illustrated by examining diseases (e.g. cancer, diabetes, cardiovascular disease, obesity, neurological disorders) that result from defects in these mechanisms;

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 assessment

## **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

## **PATHOLOGICAL BASIS OF ANIMAL DISEASES (LIFE240)**

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

The aims of this module are to describe the comparative pathology, cellular and immunological responses in veterinary diseases in different species and explore the cellular and molecular mechanisms that underpin them. Lectures will be supplemented with a practical session, online resources, guided reading, and regular formative assessment exercises that will enable students to evaluate their understanding of the module. The module will be assessed by a final examination.

## **E-BIOLOGY: INFORMATICS FOR LIFE SCIENCES (S2) (LIFE242)**

**Credits: 7.5 / Semester: semester 2**

Many aspects of modern biology are being revolutionized by high-throughput methods that make copious amounts of data available in digital form. The aim of this module is to provide students with a conceptual appreciation of the nature and significance of this revolution. With the

students with a practical appreciation of the nature and significance of this revolution. While the focus will be on analysis of data from areas such as genome sequencing, gene expression, and protein structure studies, the module will also look at use of such data in the context of understanding higher order phenomena within cells, such as metabolism, gene regulation, and protein-protein interaction. The module is continuously assessed.

### **TROPICAL ECOLOGY FIELD COURSE (LIFE222)**

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

This is an elective residential field course in Uganda. The aim of this module is to introduce students to the ecology of tropical ecosystems and the field techniques used to study them, through staff-led field visits, seminars and student executed field studies.

The module includes tropical ecosystem function, patterns of forest regeneration, patterns of biodiversity in the tropics, the natural history of important plant and animal taxa and primate behavioural ecology. Interactions between humans and tropical ecosystems will also be a key focus, with conservation, sustainable development, human-wildlife conflict and ecotourism also being addressed.

The module will be assessed by continuous assessments. In the event of unforeseen circumstances that prevent either individual students attending, eg illness shortly before departure, or cancellation of the trip, eg on FCO and/or University insurer advice, local alternate assessment exercises will be made available. These will predominantly be library-based, but might involve field visits where possible to practice field skills.

### **E-BIOLOGY: INFORMATICS FOR LIFE SCIENCES (LIFE225)**

**Credits: 7.5 / Semester: semester 1**

Many aspects of modern biology are being revolutionized by high-throughput methods that make copious amounts of data available in digital form. The aim of this module is to provide students with a practical appreciation of the nature and significance of this revolution. While the focus will be on analysis of data from areas such as genome sequencing, gene expression, and protein structure studies, the module will also look at use of such data in the context of understanding higher order phenomena within cells, such as metabolism, gene regulation, and protein-protein interaction. The module is continuously assessed.

### **MOLECULAR SCIENCE (LIFE237)**

**Credits: 7.5 / Semester: semester 1**

This module is a 6 weeks molecular biology practical to provide experience in techniques to isolate, clone and analyse genes (analysis of DNA fragments by agarose gel electrophoresis, PCR, transformations, plasmid DNA preparations, gene cloning). The module has a range of different formative and summative assessments to include in-course problem-solving exercises, online quizzes and abstract writing, which ensure the student becomes confident to continue genetic manipulations in specialist Year 2 Semester 2 practical modules and for project work in Biochemistry, Genetics and Molecular Biology. The module will encourage confidence, teamwork and communication through active learning in lectures and practicals centred around authentic assessments.

## **ADVANCED TECHNIQUES IN ANIMAL BEHAVIOUR, HEALTH AND WELFARE (LIFE239)**

**Credits: 7.5 / Semester: semester 2**

The aims of this module are for students to gain skills in assessing animal health and relate this to measuring behaviour, physical condition and welfare. The module will be supplemented with on-line resources. Students will be given guided reading, and regular formative feedback will enable students to evaluate their understanding of the module. The module will be assessed by producing a final report of protocols.

## **ADVANCED GENETICS TECHNIQUES (LIFE226)**

**Credits: 7.5 / Semester: semester 2**

This practical module aims to provide practical experience in a range of genetic techniques including the production and characterisation of specific deletion mutants, mutagen screening, cytogenetics and karyotype analysis, population studies, molecular analysis of genomes and bioinformatics. This module is required for students intending to enter the Genetics Honours School. The module is continuously assessed.

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

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## **YEAR THREE**

Year three compulsory modules will explore in detail: animal dysfunction, disease and the role of neuro-musculoskeletal cells and biochemical events, enabling learning how to solve complex and novel problems.

In addition, you will select two optional modules from a broad range, tailored to your own areas of interest.

Collectively, you will develop advanced public engagement skills, communication of scientific findings using a variety of formats, building transferable skills in critical thinking and interpretation of data in the context of bio-veterinary science. These skills will be developed during a placement at a commercial, research or voluntary organisation.

## **COMPULSORY MODULES**

### **ANIMAL NERVOUS AND MUSCULOSKELETAL DISORDERS (LIFE344)**

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

This module will address the cellular, molecular and biochemical basis of a number of disorders in animals.

The latest science underpinning these conditions will be examined through case studies explained by experts in the relevant fields.

Students will be assessed by both in-course and final exam written assignments .

### **BIOLOGY OF VETERINARY PATHOGENS: LESSONS FOR DISEASE CONTROL (LIFE367)**

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

The aim of this module is to provide an overview of major veterinary pathogens and modern approaches to their control and diagnosis, with a particular emphasis on the societal impact of infectious diseases of livestock. Lectures will be supplemented with laboratory practicals. To support independent learning, online resources, guided reading, and formative exercises will be provided. The module will be assessed by continuous assessment and a final examination.

**RESEARCH PROJECT (LIFE363)****Credits: 30 / Semester: whole session**

This module provides students with experience in the planning, design, and execution of a research project in the area of their programme discipline. The project will encompass a range of approaches including laboratory work, fieldwork, outreach work and data, and / or literature analysis depending on the nature of the project. Students will write an evaluative report on a relevant scientific area and work in collaboration with an academic supervisor to develop, plan, carry out, and record research work. The supervisor will hold regular discussion meetings with the student, and both will contribute to a reflective record of progress. Students will be expected to communicate their findings orally and in a variety of written formats.

**VETERINARY EPIDEMIOLOGY AND PUBLIC HEALTH (LIFE328)****Credits: 15 / Semester: semester 2**

This module will provide training in epidemiological and statistical approaches and methods, for applications in bioveterinary sciences, animal science and human medical science.

It addresses topics including epidemiology and clinical veterinary medicine, public health issues for farm animals, zoonoses, and food of animal origin.

The module is assessed by written examination and by continuous assessment.

**ADVANCED SKILLS IN BIOVETERINARY SCIENCES (LIFE341)****Credits: 15 / Semester: semester 1**

This module aims to provide a set of communication and critical reflection skills in the context of bioveterinary sciences. These skills will help students enhance the execution and presentation of their research project, prepare them for Level 6 assessments and maximise their employment and personal development opportunities. The module is taught through seminars and tutorials, but has a strong emphasis on independent learning. Learning material is provided through VITAL. The module is assessed by continuous assessment.

**LIFE SCIENCES WORK BASED PLACEMENT (LIFE399)****Credits: 15 / Semester: semester 1**

This module allows students to undertake an employment placement that will be undertaken during the summer-break between Year 2 and Year 3. Students will have to find

and secure their own placement, which will need to be approved by the module leader beforehand. Placements will typically be 6–8 weeks. Early in Year 2 there will be an introductory event to present the module and advise students on how to search for placement opportunities. This session will be available to all students (including those who do not wish to enrol on the placement module). Students will be encouraged to search for placements during Semester 1, with the support of Academic Advisers and the Careers and Employability Service. Other seminar activities will take place during Semester 2 of Year 2 to prepare students for the placement work. More taught sessions will be delivered in early Semester 1 of Year 3, which include lectures on relevant psychological theories and research (e.g., workplace performance, leadership, motivation) and reflective group sessions on placement experience. The module will provide students with an opportunity to develop their employability skills by direct engagement in a commercial, research, voluntary or similar professional organisation that will support future plans, develop skills and graduate attributes. Module assessments include a skill audit and reflective log to be completed before and during practical work placement, and final written recommendations-to-employer report based on reflection on the placement experience of the individual student and the wider cohort, supported by relevant employability and occupational theories.

## **OPTIONAL MODULES**

### **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 preferences, 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 formal examination and continuous assessment.

## **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 formal examination and continuous assessment.

## **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.

## **THE BODY IN MOTION: MUSCULOSKELETAL FUNCTIONING IN HEALTH, PERFORMANCE AND DISEASE (LIFE335)**

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

This module addresses how the musculoskeletal system of humans and other animals functions to perform whole body tasks, such as locomotion and keeping balance.

It will focus on healthy normal functioning but also on sports performance and disease. To do this, the module will first present the basic principles from anatomy, physiology and mechanics that underly musculoskeletal functioning, and then show how these aspects apply to gait and other daily activities, see syllabus.

The module will also address all major relevant techniques.

This module very strongly aligns with the B110 programme, and most notably with the LIFE219, Human Locomotor Anatomy, module but also with LIFE218, Functional Neuroanatomy.

B110 students will see how the anatomy is used in living humans doing daily activities such as walking or running, and how such activities are being studied scientifically and clinically. That said, the module will require no prior detailed anatomical knowledge in order to accommodate for students from other programmes. Rather, the students will contextualise the new materials with their own existing knowledge .

The course will use hybrid teaching delivery with asynchronous content including pre-recorded lectures, videos, texts and interactive use of software. Synchronous sessions will introduce the course contents and provide feedback opportunities.

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Summative assessment will consist of essay-style coursework and a online portfolio.

A peer forum will be setup on Canvas to help peer and self-directed learning.

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

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## **YEAR FOUR**

The fourth year of study offers great flexibility – students may spend it entirely on campus at Liverpool, but more commonly they take up opportunities to broaden their experiences, for example a six-week research internship in the UK (in hospitals, industry or research institutes) or abroad (in our partner universities in Thailand or China). Others may elect to spend the entire fourth year on placement, Core modules

- Research Methods and Applications in Biological Sciences
- Research Project

in similar host institutions. Students will take core modules, in research methods and statistics or informatics, together with a 60-credit research project. Students may replace the internship with other modules that cover advanced topics of global importance.

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## **COMPULSORY MODULES**

### **RESEARCH PROJECT (LIFE700)**

**Credits: 60 / Semester: whole session**

The School offers a range of projects that allow students to conduct research individually at Masters level under the supervision of a member of academic staff. Topics are closely allied to the research field of the supervisor, and the basis of the project may involve data collection by observation and experimentation in situ (field projects), in vitro (laboratory projects), or in silico (bioinformatics). However, all types of projects have the same learning outcomes (that is, all students should acquire the same kinds of skills; see below), achieved by in-depth study. The nature of the lab or field-based projects might be adapted if the field trips or labs access are limited due to unavoidable circumstances.

### **ADVANCED STATISTICS FOR BIOLOGICAL RESEARCH (LIFE707)**

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

Successful research in the biological sciences inevitably depends on the power that statistical inference provides for hypothesis testing. Understanding which test to use and when is the key to success. This module aims to further this understanding of, and competence in, the use of statistical techniques in the design of experiments in biological research, and in the analysis and interpretation of data.



The module is available to students who are on-campus (LIFE707) or, alternatively, who are studying on a University of Liverpool programme while off-campus (LIFE607), for example in a yearly placement in industry or while studying at an overseas University.

The learning and teaching materials are delivered as an online set of resources (available through Canvas). The module aims to provide a guide to the statistics that students will need to complete an advanced research project (M-level or PhD), and the ability to develop a research-level statistical approach to the analysis of biological data. The module will also introduce students to the powerful open access statistical software package, R.

### **ADVANCED STATISTICS FOR BIOLOGICAL RESEARCH (OFF-CAMPUS) (LIFE607)**

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

Successful research in the biological sciences inevitably depends on the power that statistical inference provides for hypothesis testing. Understanding which test to use and when is the key to success. This module aims to further this understanding of, and competence in, the use of statistical techniques in the design of experiments in biological research, and in the analysis and interpretation of data.

The module is available to students who are on-campus (LIFE707) or, alternatively, who are studying on a University of Liverpool programme while off-campus (LIFE607), for example in a yearly placement in industry or while studying at an overseas University.

The learning and teaching materials are delivered as an online set of resources (available through Canvas). The module aims to provide a guide to the statistics that students will need to complete an advanced research project (M-level or PhD), and the ability to develop a research-level statistical approach to the analysis of biological data. The module will also introduce students to the powerful open access statistical software package, R.

### **RESEARCH METHODS AND APPLICATIONS IN BIOLOGICAL SCIENCES (OFF-CAMPUS) (LIFE631)**

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

This module will provide students with an understanding of the processes and methods required for the successful planning and delivery of research projects. It will also introduce students to the latest, cutting edge technologies that will support their research field of interest. It will develop in students the transferrable communication skills that will enable them to disseminate their findings to both scientific and general audiences.

### **INFORMATICS FOR LIFE SCIENCES (OFF-CAMPUS) (LIFE621)**

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

Bioinformatics is a key skill needed in many research settings. This module gives students a theoretical and technical grounding in a range of application areas including bioinformatics-related topics such as sequence analysis, phylogenetics, and the modelling of proteins, and others. While lectures are provided on core topics, there is a strong emphasis on practical exercises to demonstrate the application of common tools and data sources in these contexts. Teaching is delivered in the form of a weekly lecture and workshops. Students will be given guided reading and online activities to support their learning. The module will

..... be given guided reading and online resources to support their learning. The module ..... be assessed by three data analysis continuous assessments.

## **RESEARCH METHODS AND APPLICATIONS IN BIOLOGICAL SCIENCES (LIFE731)**

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

This module will provide students with an understanding of the processes and methods required for the successful planning and delivery of research projects. It will also introduce students to the latest, cutting edge technologies that will support their research field of interest. It will develop in students the transferrable communication skills that will enable them to disseminate their findings to both scientific and general audiences.

## **DIAGNOSTICS, THERAPEUTICS AND VACCINES (LIFE732)**

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

For students with interests in infection biology, the module will enhance skills and enable critically evaluation of key concepts, technologies and multifactorial considerations circumscribing diagnostics, therapeutics and vaccines. The module is topical in light of the current pandemic. The research-connected teaching will focus on prevention, limitation and treatment of infectious disease.

The module comprises lectures, workshops and seminars and uses active-learning delivery methods to ensure students can synthesise and evaluate relative merits, attributes, issues and applications of the topics. There are two coursework assessments in the module: 1) writing a report on a selected emerging pathogen that communicates the multifactorial considerations for researchers and society 2) presentation of a key factor that contributes to or affects disease emergence and the response by society or an agency. Materials will be included on the VLE to develop digital fluency and promote assimilation and appraisal of the module content.

## **OPTIONAL MODULES**

### **RESEARCH INTERNSHIP (LIFE701)**

**Credits: 30 / Semester: semester 1**

The internship is undertaken as placement in the summer period between years 3 and 4 of the MBioSci programme. The student will work with a research group working on a specific project or a set of related projects. A senior member of the project team will provide day today supervision. The purpose of the internship is for the student to understand the objectives of the research (in of light of the research strategy of the group or institute), how the research is conducted and managed, and how the data are recorded and analysed. The

student will also learn how project design is influenced by factors such as, the business strategy of the company, the research priority areas of the country, and ultimately the funding opportunities available to support the research.

### **EVOLUTION AND BEHAVIOUR (LIFE709)**

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

This module serves as a focal point for students on the M.Biol.Sci, M.Sc. & M.Res whose interests include evolution, ecology and behavioural biology

The module will make use of varied teaching methods including structured discussions on selected texts as student-led seminars.

The content will focus on areas of evolutionary and behavioural biology that are currently important in the senses (i) that they are progressing rapidly and (ii) that they address fundamental questions of general importance. In addition we will also highlight the key papers and ideas in recent evolutionary biology, showing how research fields develop after pivotal work is published.

The module will have two coursework assessments which are designed to show depth of understanding and an evaluative approach to theory and data in evolutionary biology. There will be some group work, related to one of the assessments.

### **CODING FOR LIFE SCIENCES (LIFE733)**

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

This module is aimed at postgraduate students in the Life Sciences, wishing to learn about methods for use in data-intensive research. The module provides a broad introduction to the use of Python coding for performing basic tasks in the biological sciences. The student will get practical experience in writing their own Python scripts for basic bioinformatics tasks, such as manipulating DNA, RNA and protein sequences, file input/output and working with other programs, such as BLAST. There is also an introduction to data visualisation using Python, and simple techniques used in data science, including a basic introduction to machine learning.

Around 10 hours of lectures will be provided on core topics, with a strong emphasis on practical activity in workshops and tutorials (totalling around 40 hours), allowing students to gain confidence in writing scripts for their own tasks. The module will be assessed by two short coding assignments, one team working coding assignment building a bioinformatics pipeline, and a data science mini-project.

### **CELLULAR BIOTECHNOLOGY AND BIOLOGICAL IMAGING (LIFE749)**

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

Modern biotechnology and bioimaging applies novel tools and approaches to address today's global challenges.

You will learn a variety of methods in mammalian cell biotechnology as well as imaging technologies that range from the microscopic scale to cellular and organ imaging in vivo. You will develop knowledge of a diversity of cell analysis techniques. Furthermore, the use of

reporter genes for various types of imaging will be explained, including imaging technologies for cell analysis on the microscopic level as well as for cell imaging and functional analysis in animal models of disease.

The lectures will convey basic knowledge and include examples of applications from actual research publications, or the lecturer's own research work, in equal measure. The students will have learning tutorials on critical appraisal of literature. There will also be a practical workshop on contemporary microscopy.

The module will be taught through a combination of lectures, workshops and practical exercises. There are two written assessments in this module.

## **EMERGING INFECTIONS AND PANDEMICS (LIFE751)**

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

This is a key module for students on the MSc Infection and Immunity Programme and might also be taken by other MSc, MBioSci and MRes students whose interests include infection and immunology. The module is topical in light of the pandemic and will address areas of research-connected infection biology teaching across areas of broad relevance to infectious disease, as well as to coronavirus. The module includes research connected lectures, workshops and structured discussions on selected texts as student-led topics. The content will focus on areas of infectious disease that support the programme and are relevant in that: (i) they are current/topical or (ii) they address fundamental questions of general importance. In addition, students will also be supported with key research and ideas in emerging infections and pandemics, showing how interconnected interconnected nature of health and disease through integrating aspects of biology and society. The module assessments are aimed at: 1) writing a report on a selected emerging pathogen that communicates the multifactorial considerations for researchers and society 2) presentation of a key factor that contributes to or affects disease emergence and the response by society or an agency. The factor focused on will be selected from workshops and student-led discussions

## **CONSERVATION MANAGEMENT (ENVS423)**

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

Biodiversity, the Earth's support system, is in decline. Conservation of remaining ecosystems and restoration of disturbed ones is essential and urgently needed. Here we cover controversial issues and current debates in conservation with topics covering approaches to protected area management (terrestrial and marine), ecosystem restoration and conservation policy. The module is run as a dynamic, interactive advanced tutorial course.

The sessions are mostly run as lectures with background reading and discussion lead by a member of staff, but also include seminars, group work and student-led presentations.

### **ANALYSING CLIMATE PROCESSES AND VARIABILITY (ENVS475)**

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

This module will introduce the students to a range of large climate data sets from the whole Earth-atmosphere-ocean climate system these data sets will range from satellite data sets of ocean processes, satellite rain estimation to gridded climate data sets of the ocean and atmosphere, produced from observations, reanalysis and forecasts or projections and the introduction and use of paleorecords of climate change and variation.

### **FRONTIERS IN CANCER RESEARCH AND TREATMENT (LIFE724)**

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

The module will address three main topics: hallmarks of cancer, cancer diagnosis and biomarkers, and cancer therapies & current challenges. These topics will be taught using various cancer models that have been selected based on the expertise at the University of Liverpool and to illustrate research, diagnostic and therapeutic problems.

This module will be taught by both scientists and clinicians who are experts in cancer research. The module will be taught through a combination of lectures, seminars, case-based learning tutorials and workshops. The lectures will convey basic knowledge and include examples of applications from actual research publications and the lecturer's own research work.

The students will take part in case-based learning tutorials on critical appraisal of scientific seminars provided by cancer researchers. Workshops will cover literature search, referencing, and preparation of oral scientific presentations in preparation for the final assignment which is a conference style talk. A practical workshop will also cover tumour pathology and will train students in the identification and interpretation of tumour biopsies.

The module will be assessed via two assessments. The first assessment consists of a seminar report, based on a pre-recorded seminar provided by a cancer researcher. The final assessment will be an oral presentation, in which students will be required to give a conference-style lecture on an emerging cancer research topic related to one of the lectures and provide an abstract of their presentation.

### **CANCER CLINICAL TRIALS (LIFE726)**

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

Clinical trials are the key final step to translate medical research into the benefit of patients. The Liverpool Clinical Trials Unit is one of the largest in the UK, running a wide variety of surgical and oncology studies, that range from phase I studies to large, practice-changing phase III studies, as well as more novel trial designs. Since new therapies have become available in the treatment of cancer, the methods used in clinical trials have also evolved.

The module in Cancer Clinical Trials is aimed at developing the knowledge and understanding of decisions affecting the design, delivery and assessment of clinical trials. This module will be taught by clinicians, researchers, statisticians and trial methodologists at the Liverpool Trials Unit, and cover fundamentals of clinical trials and designs, as well as the challenges that arise at each of these strategies. The module in Cancer Clinical Trials is ideal for current in-service health professionals looking to broaden their role in the design, management, analysis and reporting of clinical trials. It is also suited to those wishing to gain an understanding of clinical trials. The module will be taught through a combination of lectures, case-based learning tutorials and workshops, and assessed via a poster presentation and a written assessment, involving the design of a clinical trial.

## **IMMUNOLOGY (LIFE728)**

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

This is a key module for students on the MSc Infection and Immunity Programme and might also be taken by other MSc, MBioSci and MRes students whose interests include infection and immunology. The module is topical in light of the pandemic and will address areas of research-connected immunology teaching across areas of broad relevance to infectious disease, as well as to coronavirus. The module includes research connected lectures, workshops and structured discussions on selected texts as student-led seminars. The content will focus on areas of immunology that support the programme and are relevant in that: (i) they are current/topical or (ii) they address fundamental questions of general importance. In addition, students will also be supported with key research and ideas in immune mechanisms and host defence, showing how research fields progress and our understanding of defence mechanisms develop. The module assessments are aimed at: 1) using graphics to show illustratively specific and complex immunological host-pathogen interactions and will aid skills in image design; and 2) poster presentation to demonstrate immunological interactions based on the student-led workshops on host defence and microbial evasion.

## **DIAGNOSTICS, THERAPEUTICS AND VACCINES (LIFE732)**

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

For students with interests in infection biology, the module will enhance skills and enable critically evaluation of key concepts, technologies and multifactorial considerations circumscribing diagnostics, therapeutics and vaccines. The module is topical in light of the current pandemic. The research-connected teaching will focus on prevention, limitation and treatment of infectious disease.

The module comprises lectures, workshops and seminars and uses active-learning delivery

methods to ensure students can synthesise and evaluate relative merits, attributes, issues and applications of the topics. There are two coursework assessments in the module: 1) writing a report on a selected emerging pathogen that communicates the multifactorial considerations for researchers and society 2) presentation of a key factor that contributes to or affects disease emergence and the response by society or an agency. Materials will be included on the VLE to develop digital fluency and promote assimilation and appraisal of the module content.

## **COMPUTATIONAL BIOLOGY (LIFE752)**

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

With the advent of genomics and functional genomics, biology has become a quantitative data-rich discipline. This has created unprecedented opportunities in virtually every area of life sciences. With the right tools, it is now possible to address fundamentally important biological questions simply analysing already available datasets. This module is designed to prepare students for this very challenge. The module covers the most important aspects of computational biology. These range from the analysis of large datasets to infer biological mechanisms to the use of mathematical modelling to conceptualize and simulate complex biological phenomena. In addition to providing an intuitive overview of the basic theoretical principles, the module will focus on real life applications through multiple cases studies. Among these, students will learn how to identify drug targets and mechanisms of drug resistance and how to understand mathematical models of biological systems. They will then learn aspects of quantitative system pharmacology and physiologically based pharmacokinetic modelling pharmacokinetic/pharmacodynamic modelling.

The module will be taught through a combination of lectures, workshops and seminars. The module will be assessed via a written a report and a literature critique.

## **PROTEOMICS METABOLOMICS AND DATA ANALYSIS (LIFE754)**

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

Proteomics and metabolomics represent powerful tools towards unbiased, quantitative and high-throughput analysis of biological systems. Rapid "omic" technological developments in the post-genomic era have provided insights into protein structures, biosynthesis and interactions, as well as the complex metabolic processes that are of significant importance in biological and medical research. The aims of this course are to

importance in biological and medical research. The aims of this course are to provide a comprehensive understanding of proteomic and metabolomic techniques and related data analysis, and to illustrate how they can be applied in fundamental biological research and industrial applications. The module will be taught by lectures and workshops. The module will be assessed via two a scientific reports.

## **SYNTHETIC BIOLOGY AND BIOTECHNOLOGY (LIFE756)**

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

Synthetic Biology and Biotechnology will provide an in-depth understanding of the grand challenges in biotechnological applications and the principles underlying synthetic biology and modern biotechnological techniques that are designed to sustainably address specific problems. The module also aims to teach tools and strategies being developed and applied in the rapidly expanding field of synthetic biology and train students with practical experience in green biotechnology.

The module will be taught through a combination of lectures and workshops. The lectures will convey basic knowledge or the lecturer's own research work. The workshops will provide students with the opportunity to analyse relevant data relevant to the biotechnology field. The module will be assessed via a scientific report and a scientific review.

## **SUSTAINABLE FOOD SYSTEMS (LIFE747)**

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

This module covers the ways different food systems function with regards to production, supply and utilisation in the context of the challenge of global food security. It highlights the highly interdisciplinary nature of food systems and how they have evolved and now need to be developed to ensure future sustainable nutritious healthy diets. Successful students will have a thorough appreciation of the linkages between terrestrial and aquatic production systems, supply chains and consumer behaviour in defining food systems and how the linkages influence sustainability. The module is delivered, through lectures, small group learning and directed self-learning and assessed by continuous assessment. The module assumes level 6 prior knowledge in one of a biological, psychological, environmental science or business studies discipline. Such knowledge and understanding will be augmented in the context of the interdisciplinary curriculum of the module by guided reading (material made available on the Virtual Learning Environment (VLE), recognising levels of prior knowledge, and through provision within e-lectures). Each curriculum topic is introduced through a lecture which develops learning and through in-built formative assessments advises supplemental reading as required. Each topic is followed by a staff-led small group learning session in which the topic is discussed.

The module will be assessed by an essay, presentation and literature review with an emphasis on critical reading, synthesis of concepts and scientific communication.

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

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## **HOW YOU'LL LEARN**

You will experience a range of learning environments during your studies at Liverpool. These will include student-centred activities as well as lectures, tutorials, laboratory practicals, dissection classes, fieldwork, data handling sessions and computer workshops. Some of these activities will be performed individually, such as personal research projects, and others in small tutorial or project groups, in addition to formal lectures and workshops. You will have research staff as well as your own academic adviser for individual tuition on our acclaimed tutorial programme.

## **HOW YOU'RE ASSESSED**

As well as factual knowledge and understanding, biologists need practical and organisational skills, and an ability to work both alone and with other people. We record the development of these abilities through continuous assessment during each semester and by final examination.

## **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.

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# Careers and employability

As a Life Sciences graduate from the University of Liverpool, you will have an excellent set of career options ahead of you. For those committed to a career as a professional scientist, higher degrees (MBiolSci, MSc, MRes, MPhil or PhD) at the University of Liverpool or elsewhere provide a flexible set of options for further study.

In the public sector, Life Sciences graduates are in demand in research institutes, government departments, the National Health Service, forensic science and the Environment Agency. Commercial sectors that actively recruit graduates from the Life Sciences include the pharmaceutical, food, biotechnology, water and agriculture industries.

There is also an increasing demand for life scientists to contribute to the public understanding of science as journalists and information/liaison officers, in view of the ethical and environmental issues that arise, for example, by developments in molecular biology and biotechnology.

A number of routes are available for graduates to enter the teaching profession one of which is taking a postgraduate qualification (PGCE). There are significant financial inducements provided to meet the current demand for science teachers. In addition to all of the opportunities for graduates in general, including careers outside of biology (such as management, accountancy and human resources), where the skills you have obtained in our degree programmes will be of considerable benefit. Our degree programmes are also popular

routes to postgraduate Medicine, Dentistry or Veterinary Science.

## **Work experience opportunities**

Students on our four-year MBiolSci programme have the opportunity to take elective internships abroad at our partner institutions. For example, while at universities in Thailand, students have worked on topics such as coral reef and mangrove ecology, genetics of shrimp development and new drugs for tuberculosis.

Students in their final year of the MBiolSci programme also have the opportunity to take a six-week life sciences related internship as an optional fourth year module which runs during the course of the summer prior to Year Four. Alternatively, students can spend the entire final Year Four in industry or other enterprises. Internships and placements are subject to availability.

You will have the exciting option to undertake a foreign field course in western Uganda which is available when studying a number of our undergraduate degree programmes. The 12-day trip involves study at both the Kibale National Park (10 days) and Queen Elizabeth National Park (two days).

Topics covered whilst in Uganda include tropical forest and savannah ecology, biodiversity patterns, primate behaviour and ecology, subsistence versus commercial agricultural practices, and ecotourism.

In addition there is the option of the LIFE399 Life sciences work-based placement module. LIFE399 is an optional third year module which runs during the course of the summer prior to Year Three. Students will undertake a placement to assist their personal development and employability, and will complete a skills audit, reflective log and report, based on their experience. The module is worth 15 academic credits.

## Postgraduate opportunities

Many of our students decide to stay at Liverpool as postgraduate students. For further information on postgraduate study, the prospectus is now online in two formats for either research degrees (MPhil/PhD) at: [liverpool.ac.uk/study/postgraduate-research](http://liverpool.ac.uk/study/postgraduate-research) or for taught courses at: [liverpool.ac.uk/study/postgraduate-taught](http://liverpool.ac.uk/study/postgraduate-taught)

## **4 IN 5** LIFE SCIENCES STUDENTS FIND THEIR MAIN ACTIVITY AFTER GRADUATION MEANINGFUL.

*Graduate Outcomes, 2018-19.*

### RECENT EMPLOYERS

- AstraZeneca
- BBC
- Blue Planet Aquarium
- Chester Zoo
- Crown Prosecution Service
- Eli-Lilly
- Glaxo SmithKline
- Home Affairs, Security and
- International Development
- United Utilities
- RSPCA
- NHS
- Ministry of Defence
- Unilever
- Vodafone
- Public Health England
- Red X Pharma
- Royal Society of Biology
- The Environment Agency

### PREPARING YOU FOR FUTURE SUCCESS

At Liverpool, our goal is to support you to build your intellectual, social, and cultural

student and graduate employers as well as our global alumni.

capital so that you graduate as a socially-conscious global citizen who is prepared for future success. We achieve this by:

- Embedding employability within your curriculum, through the modules you take and the opportunities to gain real-world experience offered by many of our courses.
- Providing you with opportunities to gain experience and develop connections with people and organisations, including

- Providing you with the latest tools and skills to thrive in a competitive world, including access to Handshake, a platform which allows you to create your personalised job shortlist and apply with ease.
  - Supporting you through our peer-to-peer led [Careers Studio](#), where our career coaches provide you with tailored advice and support.
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# Fees and funding

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

## TUITION FEES

<b>UK fees (applies to Channel Islands, Isle of Man and Republic of Ireland)</b>	
Full-time place, per year	£9,250
Year in industry fee	£1,850
Year abroad fee	£1,385

<b>International fees</b>	
Full-time place, per year	£25,450
Year in industry fee	£1,850
Year abroad fee	£12,725

*Fees stated are for the 2023-24 academic year and may rise for 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 the costs associated with placements or internships and the optional field course in Uganda.

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 help cover tuition fees and help with living expenses while at university.

[Scholarships and bursaries you can apply for from the United Kingdom](#)

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# Entry requirements

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

Your qualification	Requirements <a href="#">About our typical entry requirements</a>
A levels	<p>AAB</p> <p>Applicants with the Extended Project Qualification (EPQ) are eligible for a reduction in grade requirements. For this course, the offer is <b>ABB</b> with <b>A</b> in the EPQ.</p> <p>You may automatically qualify for reduced entry requirements through our <a href="#">contextual offers scheme</a>.</p> <p>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.</p> <p>Available foundation years:</p> <ul style="list-style-type: none"> <li>• <a href="#">Biological Sciences (with a Foundation Year) leading to BSc (Hons)</a></li> </ul>
GCSE	4/C in English and 4/C in Mathematics

	<p>Biology and a second science, preferably Chemistry, at A level</p> <p>Also accepted as a second science: Environmental Science, Mathematics, Physics, Geography, Psychology, Geology and</p>
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<p>Subject Requirements</p> <p><b>Your qualification</b></p>	<p>Mathematics, Physics, Geography, Psychology, Geology and Applied Science.</p> <p><b>Requirements</b></p> <p><a href="#">For applicants from England, where A levels in Biology, Chemistry or Physics have been taken, we will also require a pass in the Practical Endorsement</a></p>
<p>BTEC Level 3 National Extended Diploma</p>	<p>D*D*D in Applied Science with a selection of preferred units in Biology and Chemistry, to include Distinction in Units 1 and 5 (Principles and Applications of Science I and II).</p> <p>For previous BTEC (QCF) qualification:</p> <p>D*D*D in Applied Science with a selection of preferred units in Biology and Chemistry, with at least 120 Level 3 credits at Distinction.</p> <p>Please note alternative BTEC subjects are not acceptable for this programme.</p>
<p>BTEC Applied Science unit requirements</p>	<p><a href="#">View the BTEC Applied Science unit requirements.</a></p>
<p>International Baccalaureate</p>	<p>34 points, including 6 in Higher Level Biology, and 5 in another Higher Level Subject</p>
<p>Irish Leaving Certificate</p>	<p>H1, H1, H2, H2, H2, H3</p>
<p>Scottish Higher/Advanced Higher</p>	<p>Not accepted without Advanced Highers</p>

<p>Welsh Baccalaureate Advanced</p>	<p>Accepted at grade B as equivalent to a third non-science A level at grade B.</p>
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<b>Your qualification</b> Access	<b>Requirements</b> <a href="#">About our typical entry requirements</a> 45 level 3 credits including a relevant Diploma, including 30 at Distinction and a further 15 with at least Merit. 15 Distinctions are required in each of Biology and Chemistry. GCSE Mathematics and English grade C/4 also required.
	Distinctions are required in each of Biology and Chemistry. 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 <a href="#">University of Liverpool International College</a> , means you're guaranteed a place on your chosen course.

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## 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.
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**THE ORIGINAL**

**REDBRICK**