UNIVERSITY OF LIVERPOOL

Biological Sciences BSc (Hons)

COURSE DETAILS

- A level requirements: ABB
- UCAS code: C100
- Study mode: Full-time
- Length: 3 years

KEY DATES

- Apply by: 29 January 2025
- Starts: 22 September 2025

Course overview

Study Biological Sciences at Liverpool to focus on the study of living things, and understand how they respond to each other and the world around them.

INTRODUCTION

In this first year, you'll gain an understanding of core concepts of biology as well as the fundamental principles of immunity, infection, and therapy. You will also study how organisms develop and function and learn about ecology and the global environment. You will develop practical skills and participate in field studies, and you will discover how to utilise quantitative skills and study techniques.

WHAT YOU'LL LEARN

- Develop practical and theoretical knowledge of contemporary health and environmental challenges in local, national and international communities.
- Develop practical skills in your choice of fieldwork or laboratory modules.
- Enhance your understanding of topical issues and ethical principles in the study of humans, animals and the environment.
- Become literate in finding, interpreting, evaluating and managing information
- Communicate ideas effectively to a variety of audiences
- Work independently and collaboratively
- Develop critical thinking and problem-solving skills
- Use lab equipment correctly and safely.

Course content

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

YEAR ONE

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COMPULSORY MODULES

BIOLOGY CORE CONCEPTS (BIOS101)

Credits: 30 / Semester: semester 1

The transition into higher education can be a challenging one. This module aims to aid students in their journey from further education learners into higher education students of the Biosciences. To truly appreciate the disciplines which make up the Biosciences we must first develop an understanding and appreciation of their commonalities. This module brings together the core concepts of biology at the macro through the micro levels. This will provide students with the opportunity to develop and enhance their knowledge of the Biosciences and the possible pathways which they wish to study further. A mix of learning & teaching methods will be used in this module which will include, but are not limited to lectures, active learning, and learning through assessment, plus the use of directed reading/multimedia resources. This module will be assessed by a midterm assessment comprising mixed multiple choice, multiple answer and matching item questions (30%). There will also be an end of module assessment which is split into two parts: Part A which will be a similar format to the midterm assessment (35%) and Part B which will comprise a data interpretation assessment (35%).

ORIGINS, SPECIALISATIONS, CHALLENGES AND THERAPEUTICS (BIOS102)

Credits: 30 / Semester: semester 2

In this module students will study in three blocks, the first is embryology and development of organ systems. The students will then continue to develop their knowledge of organ function in invertebrate and vertebrate animals (including humans) and compare these with organisms who have adapted their function to meet the challenges of a range of environments, in the second block. This approach has been taken to aid in our understanding of organ function from its commonalities to its varied differences. A cellular & molecular approach is used as students focus on the control, regulation, development and function of organs, organ systems & organisms. The third and final block has a focus on infection, immunity and microbial diversity.

The overall aim of this module is to facilitate the study of how cells develop and work together to form functional tissues and organs, and how this is imperative to the normal functioning of organisms and their adaptation, response and defence mechanisms.

The module will be taught through a combination of lectures and workshops, which will be supported with directed learning resources (reading/ multimedia).

There are three assessments. This module will be assessed by two in-course assessments, scheduled outside of the School of Biosciences two cycle assessment strategy and an end of module exam.

INTRODUCTORY PRACTICAL SKILLS IN BIOSCIENCES I (BIOS103)

Credits: 15 / Semester: semester 1

This is the first practical module that students will take in the School of Biosciences. The variety of experimental, quantitative and transferable skills that students acquire will be required for future practical modules that they will take in Year 1 Semester 2, 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 field of life sciences, provide an understanding of basic lab practice and safety and to allow application of theoretical knowledge to solve practical challenges. It will be taught through a combination of lectures, practical sessions, workshops and self directed learning.

This module will be assessed via three methods: continual assessment to assess understanding of practical skills (experimental, technical and computational/quantitative statistics), a practical skills observational assessment to improve research and experimental skills and a written scientific abstract to assess overall understanding and communication of research outputs through scientific writing.

FROM INDIVIDUALS TO ECOSYSTEM (BIOS104)

Credits: 15 / Semester: semester 2

Ecology explores the intricacies of our living environment, encompassing the spatial and temporal distribution of organisms, their dispersal patterns, population dynamics, interspecies interactions, community development over time, and the formation and functioning of diverse ecosystems. Evolutionary ecology explores the biological variations among species within this natural context, examining phenomena like rapid life cycles or long lifespans. This course provides a comprehensive overview of both foundational ecology and evolutionary ecology, addressing the challenges that natural populations and ecosystems face in our dynamic world.

The module will be delivered through, research-connected lectures by research active scientists. There are two assessments which assess students in interpreting scientific publications, while online tests assess their grasp of the covered topics. These assessments collectively contribute to evaluating students' knowledge and understanding of the subject matter.

STUDY AND COMMUNICATION SKILLS TUTORIALS (BIOS105)

Credits: 15 / Semester: whole session

This module will develop students' transferable skills. It will focus on improving the students' written, communication, presentation and employability skills via a series of fortnightly tutorials and lectures. As this module is taken by students on all programmes, to allow students to explore their interests different essay titles, journal papers and discussion topics relevant to students programme area of interest will be offered. Students will complete tasks that count towards a Portfolio and three larger assessments.

INTRODUCTORY PRACTICAL SKILLS IN BIOSCIENCES 2 (BIOS106)

Credits: 15 / Semester: semester 2

Biology is a practical science, whether you want to study disease in microbes, plants, invertebrate and vertebrate animals (including humans), understand the function of a gene, or how the behaviour of organisms can shape an ecosystem. In the first half of this module, all students will learn fundamental practical techniques that every biologist should be familiar with. Alongside the experimental skills, students will learn practical computational and bioinformatic methods that can be used to support and advance scientific understanding of the lab techniques. In the second half, students will split into three topical strands: Molecular Research, Anatomical & Physiological Research or Whole Organism Field Research. Students in each strand will learn a set of skills and techniques that are particularly useful for degree course, with a focus on their specific discipline. All students will learn how to safely and effectively carry out practical biology, skills that will be vital throughout the rest of your degree.

Learning and teaching is created and delivered by research-active scientists, ensuring that teaching is informed by the latest research and advancements in the biosciences, and is designed to be accessible, inclusive, and representative of the student cohort.

This practical will be assessed via three methods: a computer-based assessment to assess understanding of bioinformatic and computational skills; an individual practical skills assessment in the form of observation or online assessment to assess knowledge, understanding and application of knowledge; a written scientific report to assess data analyses and communication of research outputs through scientific writing.

Any optional modules listed above are illustrative only and may vary from year to year. Modules may be subject to minimum student numbers being achieved and staff availability. This means that the availability of specific optional modules cannot be guaranteed.

YEAR TWO

In your second year you'll expand your range of knowledge building those essential research skills, experimental design and analysis together with professional skills preparing you for a career within or outside the area of biological sciences. You will study animal and human behaviour, and explore the relationship between cells and how they sense and respond to their environment. In addition, you will have optional modules from a variety of disciplines, enabling you to follow your interest in cellular biology, therapeutics, infection biology, human and animal physiology, marine ecology and comparative/animal biology.

COMPULSORY MODULES

GENETICS & IMMUNOLOGY FOR BIOSCIENCES (BIOS201)

Credits: 15 / Semester: semester 1

The science of genetics, including gene-editing and genome sequencing is a fast-moving and exciting area for biosciences study. In this module we will explore the fundamentals of genetics and genomics such that students can apply cutting-edge knowledge to the areas of the biosciences that interest them most. Students will be asked to consider the relevant ethical implications of current knowledge and technologies in genomics and genetics. In addition, we will expand the horizons of the module toward understanding of disease, by looking at the genomic, and physiological bases of immune defences against microbial enemies. The module is taught via a set of workshops in which students explore and develop their comprehensions working with groups, and their tutor. Students will be assessed by creating their own teaching materials (e.g. videos, powerpoint slides) as well as an end-of-module examination

INTERMEDIARY PRACTICAL SKILLS IN BIOSCIENCES (BIOS203)

Credits: 15 / Semester: semester 1

This practical skills module is designed to give you hands-on experience in a range of essential laboratory techniques, building on foundational practical skills developed in the first year of study. From protein purification to nucleic acid quantification and the use of general model systems, this module covers a variety of techniques that you need to further your practical development within the breadth of the Biosciences disciplines.

Through a series of interactive experimental sessions and live synchronous workshops, you will gain practical experience in a variety of analytical and quantitative experimental practices. You will also learn the underpinning knowledge behind some of the methodologies and the intricacies of experimental design, all the while supplementing your wider theoretical learning through experimental application of techniques to tackle problems across the Biosciences disciplines. Students will learn how to analyse collected data and communicate the findings effectively, with the opportunity to apply your newly acquired skills to research projects tailored towards your programme and fields of interest. This module will be assessed via a computer-based assessment to assess understanding of quantitative and computational skills, a group research output focused on experimental design and a written scientific report to assess communication of research outputs through scientific writing.

This module will expand your laboratory skills and allow the advancement of practical experiences in a range of essential techniques and equip you with the skills and knowledge you need to prepare you for your honours dissertation projects.

ACADEMIC AND PROFESSIONAL SKILLS TUTORIALS (BIOS205)

Credits: 15 / Semester: whole session

This module will continue to develop students' transferable skills and will build on the year 1 skills module. It will focus on improving the students' written, communication, and employability skills. As this module is taken by students on all programmes, to allow students to explore their interests different essay titles, journal papers and discussion topics relevant to students programme area of interest will be offered. Students will complete four assessments which include an essay, a written critique of lay science communication, an individual report and group digital pitch, and a portfolio. The module is based on fortnightly small-group tutorials with an Academic Advisor. Each tutorial will have a topic that relates to a small task which students need to complete either before or after the tutorial. The topics will be introduced within plenary lectures. In addition to the plenary lectures relating to skills development and employability, students will also receive lectures and seminars relating to programme specific content. These lectures will form the basis for discussions in programme specific tutorials

ANIMAL BEHAVIOUR (BIOS207)

Credits: 15 / Semester: semester 1

In this module, students will explore the rich diversity of behaviours exhibited by various species, from the smallest insects to the largest mammals. Whether you're an aspiring biologist, or wildlife enthusiast, this module offers a comprehensive exploration of animal behavior that will inspire curiosity, critical thinking, and a deeper appreciation for the wonders of the natural world.

This module is taught using lectures, with some flipped classroom sessions for discussion. Through engaging lectures, interactive discussions, and in-depth study of scientific literature, students will gain insights into the evolutionary, ecological, and physiological factors that shape animal behavior. Through case studies and real-world examples, students will see how the principles of animal behaviour have practical applications across a variety of fields such as conservation, agriculture, and bioveterinary science. Assessment will be in the form of two pieces of written communication.

CELLULAR BASIS OF HEALTH AND DISEASE (BIOS209)

Credits: 15 / Semester: semester 1

Cell signalling underlies the ability of cells to sense their environment and respond. In multicellular organisms, individual cells receive and integrate vast amounts of information that they use to modify their behaviour to ensure the development and survival of the organism as a whole. Disruption in these lines of communication underlies almost all disease.

Despite the apparent complexity, diverse signalling processes are carried out by very similar sets of molecular components that interact in common patterns. This module will be taught via lectures which focus on the common molecular themes and concepts that underlie normal cell signalling. This will be interspersed with disease case studies that show how disruption of these processes affect cells, tissues, and the whole organism.

Assessment will include open-book on-line assessments which will focus on the evaluation of case studies, data analysis/interpretation.

OPTIONAL MODULES

ADVANCED PRACTICAL SKILLS IN BIOMOLECULAR AND DRUG INTERACTIONS (BIOS204)

Credits: 15 / Semester: semester 2

This practical skills module is designed to give students hands-on experience in essential molecular biology, biochemical, and pharmacological-associated practical techniques through a series of interactive laboratory-based experimental sessions and live synchronous workshops. From recombinant DNA technology to protein expression, purification, enzyme kinetic assays, and drug interactions, this module covers a variety of techniques that students need to further their practical career within the Biosciences. Each topic is supported by bioinformatics/computational approaches and exercises to understand the structure and function of enzymes, proteins, and drug interactions.

Students will also learn the underpinning knowledge behind some of the methodologies and the intricacies of experimental design while supplementing their wider theoretical learning by applying techniques to tackle problems across the Biosciences disciplines. Students will learn how to analyze collected data and communicate the findings effectively, with the opportunity to apply their newly acquired skills to research projects tailored towards their programme and fields of interest.

The module comprises laboratory-based practical sessions alongside introductory plenary lectures and workshops, using active-learning delivery methods to ensure students can understand, synthesize, evaluate and communicate their research findings.

Learning and teaching are created and delivered by research-active scientists, ensuring that teaching is informed by the latest research and advances and is designed to be accessible, inclusive, and representative.

Students are assessed through an online exam (involving problem-solving activities) and a group poster to communicate the research outputs through scientific writing and graphical presentations.

ADVANCED PRACTICAL SKILLS IN MICROBIOLOGY, INFECTION & DISEASE (BIOS206)

Credits: 15 / Semester: semester 2

This practical module aims to provide students with an opportunity to learn and apply a range of microbiology and infection biology practical and laboratory techniques, in order to develop your ability to plan and execute research projects and tackle scientific problems related to infection, health & disease. The module will address areas of research-connected infection biology teaching, across areas of broad relevance to infectious diseases in a variety of hosts. Topics will focus on the diagnosis and surveillance, treatment and prevention of infectious diseases and will enable students to understand the impact of infectious diseases on society.

Through a series of interactive experimental sessions and live synchronous workshops, you will gain practical experience in a variety of analytical and quantitative experimental practices. You will also learn the underpinning knowledge behind some of the methodologies and intricacies of experimental design, all the while supplementing your wider theoretical learning through experimental application of microbiological techniques to tackle problems related to infectious disease, with application to the wider Life Sciences disciplines. You will learn how to collect and analyse data and communicate the findings effectively, with the opportunity to enhance your skills in research projects tailored towards your programme and fields of interest.

There are two assessments in the module: 1) a resource development related to communication of a contemporary scientific development in biomedicine and biotechnology; 2) a written scientific report related to experimental lab practicals, to analyse and present current research findings.

ADVANCED PRACTICAL SKILLS IN EVOLUTION, ECOLOGY, AND BEHAVIOUR (BIOS208)

Credits: 15 / Semester: semester 2

This module is a core component in Year 2 of the BSc Zoology. It is also an optional module for students studying bioveterinary science. It is a practical module which includes access to dissection, molecular biology, mathematical modelling, observing live animals and bioinformatics.

This module aims to provide practical experience in laboratory and field techniques for studying animals. 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 evolution, form and function of animals, animal behaviour, and ecology. The module is laboratory and field based and students will work in small groups to conduct experiments and generate data that will be analysed using R and R Studio. Students will also use bioinformatics databases.

Learning and teaching is created and delivered by research-active scientists, ensuring that teaching is informed by the latest research and advances, and is designed to be accessible, inclusive, and representative.

Learners are assessed through scientific reports and an exam.

METABOLISM (BIOS212)

Credits: 15 / Semester: semester 2

The module explores the major animal and plant metabolic pathways that sustain life and, in some cases, those that account for disease. How plants create key nutrients and how animals use these to sustain life. How macromolecules (sugars, proteins, fats) and other useful metabolites are also created by animals and how plants can be used to harness new useful molecules. How metabolism is biologically integrated and linked to healthy lifestyles such as exercise and a balanced diet and how it is also linked to diseases such as cancer. Introduction to metabolomics and other techniques for studying metabolism such as bioinformatics. The module will be taught through a combination of lectures and workshops. and assessed by short answer exercises and an extended written piece.

CELLULAR AND SYSTEMS PHYSIOLOGY (BIOS214)

Credits: 15 / Semester: semester 2

Knowledge of the molecular physiology of cells and the physiology of organs on a systems level provides a fundamental basis for our understanding of the healthy body as well as disease-related mechanisms. Students will learn about a range of cellular functions, the roles of subcellular compartments, ranging from the nucleus to intracellular membrane compartments, plasma membrane and extracellular matrix, as well as dynamic molecular mechanisms like intracellular trafficking processes. Taking general cell biology to the organ systems level, this module will develop knowledge about the specialised functions of cells in specific human tissues and how the body regulates the various organ functions through communication pathways in a systemic way to achieve homeostasis. You will encounter various examples, including the digestive, renal, respiratory and neuroendocrine organs among others. Furthermore, you will be learning about a number of techniques and methods that are used to study the molecular biology of cells and the systems physiology of the body, including imaging techniques.

The module is taught through lectures and workshops, which are supported through directed reading/ multimedia.

There are two assessment in this module. The first assessment is a midterm assessment (40%) comprising a mixture of Multiple answer, multiple choice and extended matching item questions. The second assessment consists of two parts: Section 1 – assessing cellular and systems physiology concepts (30%) and Section 2 – Data interpretation and understanding (30%)

DRUG DISCOVERY AND DEVELOPMENT (BIOS216)

Credits: 15 / Semester: semester 2

Drug discovery & development is risky: only 1 in 7 drugs entering clinical development obtained approval between 2000 and 2015. This module is designed to give students a broad understanding of the fundamental principles of drug discovery & development. The curriculum includes all important aspects of drug discovery & development, including target identification, drug design, safety assessment, clinical trials, and health economy. A highlight of this module is it will introduce some relevant mathematical modelling – (e.g., bioinformatics, computational chemistry and pharmacodynamics) which will prepare the students with necessary quantitative skills. Teaching will be via formal lectures and workshop and the module will be assessed by a multiple-choice question (MCQ) examination (40%) and written exam assessment (60%).

MOLECULAR MICROBIOLOGY AND THERAPEUTICS (BIOS218)

Credits: 15 / Semester: semester 2

Understanding how microorganisms interact with their host, and the environment, is fundamental for the understanding and developing treatment for microbial disease. On this module students will explore the molecular mechanisms that lead to microbial infection for bacteria, viruses and fungi. This knowledge will then be applied to help students gain insight of various therapeutic strategies used to control microbial infections and the challenges associated with this. The module will be delivered via lectures and workshops, utilising active-learning delivery methods to enhance student engagement. Teaching material will be hosted in the University virtual learning environment (VLE) to aid development of digital fluency and promote assimilation and appraisal of the module content. The module will be assessed by online tests combining MCQs, MAQs and short answer questions.

ANIMAL ANATOMY, PHYSIOLOGY AND HUSBANDRY (BIOS220)

Credits: 15 / Semester: semester 2

This module will equip students with a working knowledge of animal form and function and develop their ability to critically examine the ways in which this might influence the productivity, health and welfare of domestic species. Through the use of lecture and case based learning, students will develop knowledge of comparative anatomy and physiology, and apply this knowledge to understand appropriate husbandry of domestic species (production animals, pets and laboratory species) including appropriate breed choices, behaviour, housing, management, diet and reproduction.

The module will be taught using a combination of lectures, case based workshops and tutorials, and will include the opportunity for practical animal husbandry or anatomy based sessions where applicable. Opportunities for self testing and formative feedback will be embedded within the taught sessions. Students will develop communication skills and commercial awareness through small group work and the use of industry based husbandry scenarios during workshop and tutorial sessions.

Assessment will take the form of a written communication (advice for an owner or producer) based on a husbandry related topic of the students choice and a written exam to allow students to demonstrate and apply their knowledge of anatomy, physiology and animal husbandry.

ANIMAL ECOPHYSIOLOGY (BIOS222)

Credits: 15 / Semester: semester 2

This module is concerned with the question how animals survive in challenging, often hostile environments. It will examine physiological adaptations that occur when animals face changes in their environment, either acute short term changes or over longer periods of time, such as seasonal changes, those over evolutionary time scales, or ongoing climate change. The module is taught through lectures and interactive workshops which will give students the opportunity to discuss concepts and practice problem solving. The assessment consists of producing a short explainer video and a data interpretation essay.

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.

Any optional modules listed above are illustrative only and may vary from year to year. Modules may be subject to minimum student numbers being achieved and staff availability. This means that the availability

of specific optional modules cannot be guaranteed.

YEAR THREE

Year three will provide an unparalleled opportunity for you to learn at the cutting edge of biological sciences research and be taught by world-leading academics in your choice of subjects. You can choose modules from a variety of disciplines exploring the breadth of biology, ranging from ecology, evolution, and conservation biology to cancer biology, infection biology, molecular systems biology and pharmacology to veterinary infection, immunology and pathology. You will also have the option to develop advanced practical computational or field skills and you will have the opportunity to take a physical or virtual placement. Central to this year is the research project where you will plan and execute your own research, analyse and critically evaluate data and communicate your research findings in your chosen specialisation.

COMPULSORY MODULES

RESEARCH PROJECT (BIOS301)

Credits: 30 / Semester: whole session

The Research Project module is taken by all students studying a Biosciences BSc or MBiol degree. This 30-credit module runs throughout the Level 6 year and gives students the opportunity to experience authentic Biosciences research, applying the knowledge and skills that they have developed through the first two years, supported by the Research Methods module (BIOS303) in Semester 1 of Level 6 and under the guidance of an individual named supervisor. Students may work as a group to develop related or collaborative projects, although the assessment is always individual.

A large diversity of projects is available to students, including but not limited to lab-based (in research labs), field research, bioinformatics, mathematical modelling, computer analysis, meta-analysis, systematic review, education research, outreach, school-based projects. Students express a preference for keywords describing project content and style of project, and projects are allocated to optimise the fit between student preference and available projects.

Students meet their supervisor at the start of Semester 1 and develop a proposal for their project, including a literature review, aims and proposed methodology, with regular meetings with and guidance from their supervisor throughout the semester. Students are also instructed in relevant aspects of safety. The proposal is presented at the end of Semester 1 as an assessed negotiated communication (poster, live or video presentation), with discussion. This development of the proposal is supported by the concurrent Research Methods module, in which students will develop their skills in critical analysis of literature and appreciation of research ethics and will choose to study relevant research methodologies and associated analytical methods from a menu of options.

The substantive experimental work for the project is carried out in the first half of Semester 2, followed by the writing of the final project report, which is the primary assessed output of the project.

The student's approach and development of skills throughout the project will be recorded in a reflective log consisting of an ongoing project record book followed by a marked written reflective piece at the end of the project period.

Successful completion of the Research project module will equip students with the organisational, technical and communication skills to carry out individual project work in their future careers.

INTRODUCTION TO THE WORLD OF WORK (BIOS302)

Credits: 15 / Semester: semester 2

This 15-credit year three module acts as a steppingstone for students into the world of work. The module will utilise and develop knowledge, understanding, and skills that students have acquired during their first five semesters of study. Incorporating a placement, it will provide an opportunity for students to improve skills that are particularly sought after by employers, such as problem solving, teamwork, and communication, and will train them to better recognise, evidence, and articulate their skillset to future employers. The module will be assessed via a reflective portfolio, that they will develop throughout their engagement with the module activities.

For those students undertaking a placement external to the university, costs may be associated with travel to and from the student's placement site, and (temporary) accommodation if the student has to stay away from their normal term-time accommodation whilst attending the placement. Students will be made fully aware of these expenses, and the possibility of reimbursement will be considered on individual basis, where appropriate.

RESEARCH METHODS (BIOS303)

Credits: 15 / Semester: semester 1

This module aims to provide a set of critical reflection and data communication skills in a subject-specific context. These skills will support students in the execution and presentation of their research projects (BIOS301), in the critical analysis of literature including a grounding in research ethics, and in the development of a repertoire of skills in experimental design, analysis and reporting of results specifically relevant to their project work. The module is taught through lectures, seminars and tutorials, as well as a collection of online materials, and has a strong emphasis on independent learning.

In the first part of the module students will be introduced to the key principles of critical thinking and will apply their skills to perform critical analyses of the scientific literature, in workshops in small groups drawn from their subject area. For assessment, they will produce a peer review for a sample article in their subject area. These skills will be directly applicable to the production of a research proposal for BIOS301, which involves a review of the literature forming the background to their project topic, and which is submitted at the end of semester 1.

In the second part students, in collaboration with their project supervisor, will select three examples most appropriate to their projects from a catalogue of experimental and associated analytical (including statistical) methods. They will develop their understanding using online material and drop-in workshops. The assessment will require the production of publication-quality figures reporting sample data or equivalent acquired using the relevant methods, with appropriate figure legends and explanatory text. The skills gained here will be directly applicable to the students' project work and the production of their final report, submitted at the end of semester 2.

APPLIED BIOLOGICAL SCIENCES (BIOS308)

Credits: 15 / Semester: semester 2

This is a 15-credit 3rd year module that develops students' understanding of contemporary issues in biological and biomedical sciences. It allows students to build on the knowledge and skills they have developed over the course of their studies and apply their skills to some of the most challenging and relevant issues facing the modern world. The skills developed and utilised in this module are highly valued in many different career pathways and give students the early-career skills they will need to excel as they progress. Students will be assessed by group work in the form of a science communication piece and an individual report.

OPTIONAL MODULES

MOLECULAR, CLINICAL AND TRANSLATIONAL CANCER (BIOS307)

Credits: 15 / Semester: semester 1

The module will train you in molecular oncology, with an emphasis on how scientific advances are translated into clinical practice for patient benefit.
On successful completion of this module, students will be able to:
1. Critically evaluate phenotypic behaviours of a cancer cell using knowledge of cellular functions, in order to identify possible points of therapeutic intervention.
2. Critically analyse, evaluate and align altered oncogene/tumour suppressor gene functions, DNA repair mechanisms and cellular processes to the pathological consequences for the patients.
3. Understand the role of cell-autonomous and non-cell-autonomous mechanisms in cancer development.
4. Critically appraise discovery pathways for new diagnostic and prognostic cancer biomarkers.
5. Analyse signalling pathways likely to become novel therapeutic targets in the near future.
Learning and teaching throughout this module is designed and delivered by research-active scientists to ensure that teaching is informed by the latest research and best evidence. Teaching will be delivered in the form of lectures and tutorials. The subject of each tutorial will be based on the corresponding lectures, and student will lead the discussion during the tutorial sessions.
This module will use two assessment approaches: Formative: Tutorials have a formative purpose and will provide students with a reference for the level expected in the examinations. Summative: It will comprise two essays. Essay 1: to be held on week 6mid-semester, covering the introductory block. This assessment comprises 40% of the final module mark. Essay 2: to be held on week 14 at the end of the semester, covering the cancers-specific blocks. This assessment comprises 60% of the final module mark.

MOLECULAR SYSTEMS BIOLOGY (BIOS309)

Credits: 15 / Semester: semester 1

This module examines how biology can be explored at scales from individual signalling pathways to whole organisms using methods and approaches from modern molecular systems biology. 'Omics approaches including proteomics, genomics, transcriptomics and metabolomics are taught through the lens of these different experimental questions. Throughout, students will evaluate the field of molecular systems biology, investigate landmark papers using these different methods across different scales, and appreciate and the extent to which different investigative approaches and concepts are complementary to each other.

TRANSLATIONAL PHARMACOLOGY (BIOS313)

Credits: 15 / Semester: semester 1

The translation of therapeutics to clinical use for the benefit of patients is a key milestone in the development of a drug. This module is designed to give students a deeper understanding of diseases and conditions which affect a range of organ systems and how drugs work to treat them. It will build upon pharmacology principles to highlight how, in a range of clinical settings, drugs work for particular conditions including infectious diseases, neurology, oncology and cardiovascular disease. Students will learn about the underlying disease/ condition, therapeutic targets, drugs and their mechanism of action and how they benefit the patient. They will learn aspects of clinical pharmacology, including personalised methodologies, and to assess patient data via case studies incorporating real-world clinical data. Teaching is via a series of formal lectures, interactive workshops and seminars. The module will be assessed by a report of a data analysis task related to the different topics and a written exam assessment.

GENOMICS AND EVOLUTION OF MICROBES (BIOS317)

Credits: 15 / Semester: semester 2

This module is designed to offer a thorough introduction to the genomics and evolution of microbes. It will delve into how microbes adapt in response to both biotic and abiotic factors. The module will explore fundamental concepts in microbial genomics, comparative genomics, and microbial evolution, with a particular focus on the evolution of pathogenic and symbiotic lifestyles within host and microbial communities. A central theme will be the significance and application of genomics and bioinformatics in deciphering the genetics and mechanisms of evolution. The module will employ various teaching methods, including in-person lectures, tutorials, laboratory and computer workshops, supplemented with recorded content and recommended reading materials. Assessment will be practical, involving the completion of reports and papers on data handling.

VETERINARY INFECTION BIOLOGY: RESEARCH AND TRANSLATION (BIOS321)

Credits: 15 / Semester: semester 1

Infectious disease is a key aspect of animal health and well-being, and so understanding infection is critical for people working with animals or veterinarians. This module explains the detailed biology of important animal infections and how this is being translated into novel disease therapies, drawing on the first-hand experience of veterinary scientists at the University of Liverpool. It is delivered through a combination of lectures, research seminars, small-group tutorials and practicals. The module is assessed by an extended piece of writing and a report. This module is ideal for students who want a career in scientific research and to develop a basis for postgraduate studies.

ECOLOGY FOR A SUSTAINABLE FUTURE (BIOS325)

Credits: 15 / Semester: semester 1

We are facing an ecological crisis that threatens biological diversity and undermines the life-support system—the many essential ecological goods and services—provided to us by nature. This module will give an advanced-level treatment of the fundamental concepts and principles of the science of ecology that underpin our understanding of the natural world, the structure of biodiversity, and its responses to environmental change. A case-study / problem-based approach will be used to exemplify how an understanding of ecology is critical to predicting and mitigating the impacts of global environmental change, and in resolving the current ecological crisis. Content will be delivered via lectures, structured discussions and debates, and workshops and assessed by extended writing. Assessment will involve two assignments, the first based on critically evaluating the role of ecology in understanding and addressing global environmental problems and the second involving evaluation of how different biological concepts and processes (including those from within and beyond ecology) are relevant to particular global environmental problems.

EVOLUTIONARY BIOLOGY (BIOS327)

Credits: 15 / Semester: semester 1

“Nothing in biology makes sense except in the light of evolution” (Dobzhansky, 1973). This module will demonstrate the use of a common set of fundamental principles about the origins and maintenance of heritable phenotypic variation to study how populations respond to environmental heterogeneity and change. This framework is extended to considering how new traits and species arise, and the consequences of evolutionary arms races within and between species. The module is taught by a team of academics who are actively researching these problems, through lectures and interactive workshops which will give students the opportunity to discuss concepts and practice problem solving. The assessment consists of a data analysis/interpretation report and an open question essay.

ZOOLOGY FIELD COURSE (BIOS333)

Credits: 15 / Semester: semester 1

This module provides students with the opportunity to apply their theoretical understanding of zoology in stimulating and varied field-based settings, to acquire new field-based survey skills and to master the scientific process from project inception, through data collection and analysis to results communication. The module is a residential field course that usually takes place in late August/early September, prior to the start of Level 6, and lasts for 12 days. Students learn a variety of field skills, including observational study of animal behaviour, field ecology, and experimental and survey design through a mixture of formal lectures, tutorial discussion groups, staff-led field visits and group research projects in the field. The field course also introduces students to a range of conservation projects and gives students the opportunity to interact with conservation biology/ zoology professionals in the field. It is assessed by continuous assessments. All scheduled activities take place during the residential field course, but optional tutorials to provide feedback on data analysis and report writing are offered on campus during Semester 1. Assessment of the course content comprises a written scientific report, an oral presentation and an assessment of each student's practical approach and contribution to the field course.

IMMUNOLOGY AND VETERINARY PATHOLOGY (BIOS335)

Credits: 15 / Semester: semester 1

Delve into the fascinating world of veterinary diseases across different species, led by experts in their field.

Explore pathology variations in diverse veterinary diseases, analysing and describing them in detail. Uncover the intricate cellular and immunological responses exhibited across different species. Investigate the underlying cellular and molecular mechanisms that drive veterinary diseases, gaining insights into the fundamental processes governing pathology and immunology.

Immerse yourself in a captivating learning environment, featuring dynamic lectures enriched with real-world examples. Lectures will be complemented with interactive online practical sessions, online resources, guided reading, and regular formative assessment exercises designed to gauge and strengthen your understanding. The module will be assessed by coursework, which are research-connected and allow for the student to showcase their critical thinking and problem-solving skills.

SURVIVING THE MARINE ENVIRONMENT (ENVS310)

Credits: 15 / Semester: semester 2

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 using a theoretical and quantitative practical approach. This module builds on knowledge acquired about techniques, theory and processes in earlier years and provides the opportunity to experience the integration of current research themes in marine biology.

Any optional modules listed above are illustrative only and may vary from year to year. Modules may be subject to minimum student numbers being achieved and staff availability. This means that the availability of specific optional modules cannot be guaranteed.

HOW YOU'LL LEARN

You'll learn through a balanced mix of lectures, workshops, field work, seminars and tutorials as well as hands-on, practical laboratory sessions, working individually and in small groups.

HOW YOU'RE ASSESSED

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.

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

As a Biosciences graduate from the University of Liverpool, you will have an excellent set of career options ahead of you.

Typical types of roles/routes our graduates have gone on include:

- Postgraduate study: (MBiolSci, MSc, MRes, MPhil or PhD)
- Public sector – research institutes, government departments, the National Health Service, forensic science and the Environment Agency.
- Commercial sectors – pharmaceutical, food, biotechnology, water and agriculture industries.
- Journalists and information/liaison officers – by developments in molecular biology and biotechnology.
- Teaching profession by taking a postgraduate qualification (PGCE).
- Routes to postgraduate Medicine, Dentistry or Veterinary Science.

Recent employers and sectors:

- Pharmaceutical sector: Eli-Lilly, AstraZeneca, Glaxo SmithKline, NHS, Red X Pharma;
- Tourism/Conservation sector: Blue Planet Aquarium, Chester Zoo, RSPCA;
- Government/Legal sector: Crown Prosecution Service, The Environment Agency, Public Health England, Home Affairs, Ministry of Defence, Security and International Development;
- Media/Entertainment Sector: BBC;
- Corporate and Utilities sector: United Utilities, Vodafone, Unilever.

4 IN 5 **BIOSCIENCES STUDENTS FIND THEIR MAIN ACTIVITY AFTER GRADUATION MEANINGFUL.**

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	£9,535
Year abroad fee	£1,385

International fees	
Full-time place, per year	£29,100
Year abroad fee	£14,550

The UK full-time tuition fee, international course fee and fee for the year abroad for international students shown are correct for 2025/26 entry. We are currently awaiting confirmation of whether the year abroad fee for UK students will change, so the fee shown is for 2024/25. Please note that the year abroad fee also applies to the year in China.

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 fees and funding.

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.

SCHOLARSHIPS AND BURSARIES

We offer a range of scholarships and bursaries that could help pay your tuition and living expenses.

We've set the country or region your qualifications are from as United Kingdom. Change it here

- ## UNDERGRADUATE GLOBAL ADVANCEMENT SCHOLARSHIP

  - International students

  If you're a high-achieving international student starting an undergraduate degree with us from September 2024, you could be eligible to receive a fee discount of up to £5,000. You'll need to achieve grades equivalent to AAA in A levels. Most of our undergraduate degrees are eligible, with the exception of clinical programmes in Medicine and Dental Surgery.

- ## THE LIVERPOOL BURSARY

  - Home students

  If you're a UK student joining an undergraduate degree and have a household income below £35,000, you could be eligible for a Liverpool Bursary worth up to £2,000 for each year of undergraduate study.

- ## ASYLUM SEEKERS SCHOLARSHIP

  - Home students

  Apply for an Asylum Seekers Scholarship and you could have your tuition fees paid in full and receive help with study costs. You'll need to have applied for asylum in the UK, or be the dependant of an asylum seeker, and be joining an eligible undergraduate degree.

- ## CARE LEAVERS' OPPORTUNITY BURSARY

  - Home students

  If you've spent 13 or more weeks in Local Authority care since age 14, you could be eligible for a bursary of £3,000 per year of study. You'll need to be a UK student joining an eligible undergraduate degree and be aged 28 or above on 1 September in the year you start.

- ## COWRIE FOUNDATION SCHOLARSHIP

  - Home students

  Are you a UK student with a Black African or Caribbean heritage and a household income of £25,000 or less? You could be eligible to apply for a Cowrie Foundation Scholarship worth up to £8,000 for each year of undergraduate study.

- ## ESTRANGED STUDENTS BURSARY

  - Home students

  If you're a UK student identified as estranged by Student Finance England (or the equivalent UK funding body), you could be eligible for a bursary of £1,000 for each year of undergraduate study.

- ## GENESYS LIFE SCIENCES SCHOLARSHIP

  - Home students

  Joining a School of Biosciences degree and have a household income of less than £25,000? If you're a UK student, you could apply to receive £4,500 per year for three years of your undergraduate course.

- ## GRADUATE ASSOCIATION HONG KONG & TUNG UNDERGRADUATE SCHOLARSHIPS

  - International students
  - Hong Kong

  If you're an undergraduate student from Hong Kong who can demonstrate academic excellence, you may be eligible to apply for a scholarship worth £10,000 in partnership with the Tung Foundation.

- ## KAPLAN DIGITAL PATHWAYS EXCELLENCE SCHOLARSHIP

  - International students

  Completed a Kaplan Digital Pathways Foundation Certificate? We're offering a £5,000 fee discount off the first year of undergraduate study for a maximum of two high achieving students joining one of our non-clinical degrees from an online Kaplan Foundation Certificate.

- ## NOLAN SCHOLARSHIPS

  - Home students

  Do you live in the Liverpool City Region with a household income of £25,000 or less? Did neither of your parents attend University? You could be eligible to apply for a Nolan Scholarship worth £5,000 per year for three years of undergraduate study.

- ## RIGBY ENTERPRISE AWARD

  - Home students

  Are you a UK student with a household income of £25,000 or less? If you've participated in an eligible outreach programme, you could be eligible to apply for a Rigby Enterprise Award worth £5,000 per year for three years of your undergraduate degree.

- ## ROLABOTIC SCHOLARSHIP

  - Home students

  Are you a UK student with a household income of £25,000 or less? Did neither of your parents attend University? You could be eligible to apply for a ROLABOTIC Scholarship worth £4,500 for each year of your undergraduate degree.

- ## SPORT LIVERPOOL PERFORMANCE PROGRAMME

  - Home and international students

Apply to receive tailored training support to enhance your sporting performance. Our athlete support package includes a range of benefits, from bespoke strength and conditioning training to physiotherapy sessions and one-to-one nutritional advice.

- ## TECHNETIX BROADHURST ENGINEERING SCHOLARSHIP

  - Home students

Joining a degree in the School of Electrical Engineering, Electronics and Computer Science? If you're a UK student with household income below £25,000, you could be eligible to apply for £5,000 a year for three years of study. Two awards will be available per academic year.

- ## UNIVERSITY OF LIVERPOOL INTERNATIONAL COLLEGE EXCELLENCE SCHOLARSHIP

  - International students

Completed a Foundation Certificate at University of Liverpool International College (UoLIC)? We're offering a £5,000 fee discount off the first year of undergraduate study to some of the highest achieving students joining one of our non-clinical degrees from UoLIC.

- ## UNIVERSITY OF LIVERPOOL INTERNATIONAL COLLEGE FIRST CLASS SCHOLARSHIP

  - International students

We're offering a £1,000 fee discount for years 2 and 3 of undergraduate study to eligible students progressing from University of Liverpool International College. You'll need to be studying a non-clinical subject and get an average of 70% or above in year 1 of your degree.

- ## UNIVERSITY OF LIVERPOOL INTERNATIONAL COLLEGE IMPACT PROGRESSION SCHOLARSHIPS

  - International students

If you're a University of Liverpool International College student awarded a Kaplan Impact Scholarship, we'll also consider you for an Impact Progression Scholarship. If selected, you'll receive a £3,000 fee discount off the first year of your undergraduate degree.

- ## YOUNG ADULT CARER'S (YAC) BURSARY

  - Home students

If you're a young adult and a registered carer in the UK, you might be eligible for a £1,000 bursary for each year of study. You'll need to be aged 18-25 on 1 September in the year you start your undergraduate degree.

Entry requirements

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

Your qualification	**Requirements** About our typical entry requirements
A levels	Typical A level offer ABB 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. You may automatically qualify for reduced entry requirements through our contextual offers scheme. 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. Available foundation years: • Biological Sciences (with a Foundation Year) leading to BSc (Hons)
GCSE	4/C in English and 4/C in Mathematics
Subject requirements	Biology and a second science, preferably Chemistry, at A level Also accepted as a second science: Environmental Science, Mathematics, Physics, Geography, Psychology, Geology and Applied Science. 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
BTEC Level 3 National Extended Diploma	D*DD 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). For previous BTEC (QCF) qualification: D*DD in Applied Science with a selection of preferred units in Biology and Chemistry, with at least 120 Level 3 credits at

Your qualification	**Requirements** About our typical entry requirements
	Distinction. Please note alternative BTEC subjects are not acceptable for this programme.
BTEC Applied Science unit requirements	View the BTEC Applied Science unit requirements.
International Baccalaureate	33 points including 6 in Higher Level Biology and 5 in Higher Level Chemistry (or second science).
Irish Leaving Certificate	H1, H2, H2, H2, H3, H3 - including grade H2 in both of Higher Level Biology and Higher Level (second science).
Scottish Higher/Advanced Higher	Not accepted without Advanced Highers at grades ABB
Welsh Baccalaureate Advanced	Accepted at grade B as equivalent to a third non-science A level at grade B.
Access	45 Level 3 credits in graded units in 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.
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