

Biological and Medical Sciences MBiolSci

COURSE DETAILS

- A level requirements: [AAB](#)
- UCAS code: C132
- Study mode: Full-time
- Length: 4 years

KEY DATES

- Apply by: [25 January 2023](#)
- Starts: 25 September 2023

Course overview

This programme provides a broad-based education in life sciences related to medicine and medical research, and offers great flexibility of module choice so that you can tailor elements of your degree to your own particular interests.

INTRODUCTION

Introduction

This programme allows you to pursue your own areas of specific interest and to have an appreciation of the full range of the subject.

Should you decide sometime in the first two years that you wish to specialise, you can transfer to several programmes in the School of Life Sciences, subject to meeting the appropriate pre-requisites for your chosen programme.

The MBiolSci is a four-year programme, in which students first follow the three-year BSc in Biological Sciences 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 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

Across all three years there are options to choose laboratory practicals or field courses. In your final year you will also undertake a research project that you will choose from one of the various parts of the School to complement the lecture programme you have chosen for your

Honours year. Each project gives an invaluable opportunity to see what real scientific research is like and to work alongside staff who are international authorities in their fields.

WHAT YOU'LL LEARN

- Independent and collaborative work
- Becoming literate in finding, interpreting, evaluating, managing and sharing information
- Self-management skills
- Problem-solving
- Using lab equipment correctly and safely
- Knowledge and understanding of the subject and the ability to evaluate and

interpret this knowledge to solve problems

- Skills that will equip you to investigate research topics and communicate your findings
 - How to analyse and interpret real-world data and communicate the results clearly and concisely
 - How to access and critically evaluate scientific literature in the area of biological and medical sciences
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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

In your first year, you will be taking mainly compulsory modules however there is an optional module as well.

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).

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.

COMMUNICATION AND STUDY SKILLS FOR THE LIFE SCIENCES (LIFE130)

Credits: 7.5 / Semester: whole session

BIOCHEMISTRY AND BIOMEDICAL SCIENCES (LIFE102)

Credits: 15 / Semester: semester 2

This module will provide the foundation for future studies on the molecular basis of life and disease. It covers basic biochemistry and immunity and how these fields can provide a molecular explanation for life and disease. The module will encourage confidence, teamwork and communication through active learning in lectures and workshops centred around authentic assessments.

INTRODUCTION TO PHYSIOLOGY AND PHARMACOLOGY (LIFE106)**Credits: 15 / Semester: semester 2****INTRODUCTION TO GENETICS AND DEVELOPMENT (LIFE128)****Credits: 15 / Semester: semester 2**

This module introduces students to modern genetics and developmental biology at an introductory level. Using examples taken from across the biosciences and medicine, students will develop their understanding of the inheritance of genetic traits, how mutation can lead to disease and the molecular techniques used to study genes. They will also be introduced to development from meiosis and germ cell formation through to organogenesis, emphasising both the underlying genetic and molecular mechanisms involved and the embryological processes. Students will explore current advances in both fields including current and potential use of gene editing techniques and stem cells in therapeutics, and will consider the ethical implications of these advances.

The module is taught through a combination of lectures and workshops incorporating problem solving and discussion, with an emphasis on an appreciation of the techniques and experimental evidence underpinning the material. Assessment is by a combination of a written examination and a group ethics poster presentation.

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.

OPTIONAL MODULES**MICROBIOLOGY (LIFE110)****Credits: 15 / Semester: semester 2**

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

YEAR TWO

In your second year, you will have a chance to pick more optional modules alongside

the compulsory ones to begin specialising in your research area of interest.

COMPULSORY MODULES

PRINCIPLES OF PHARMACOLOGY (LIFE207)

Credits: 15 / Semester: semester 1

This module will provide an understanding of the quantitative aspects of drug action on cellular receptors and will address the relationship between drug efficacy and chemical structure.

The module will introduce the basic principles of pharmacokinetics, outline the relationship between drug concentration and response, and include an introduction to the principles of toxicity of drugs and their metabolites.

The module will provide knowledge of the molecular biology of receptors.

The lectures will be supplemented with online 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

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.

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.

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.

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 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.

OPTIONAL MODULES

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.

FROM GENES TO PROTEINS (LIFE201)

Credits: 15 / Semester: semester 1

This module aims to provide students with an understanding of the fundamental processes whereby genetic information is expressed as proteins in prokaryotic and eukaryotic cells. 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 two assessments.

BIOLOGICAL CHEMISTRY (LIFE245)

Credits: 15 / Semester: semester 1

The Biochemistry and Pharmacology programmes, and at UoL require students to have studied chemistry to A level or equivalent standard. The Biological Chemistry module is designed to build on this background, and the chemical content of the Year 1 modules, especially LIFE101 and LIFE102 (which is designed for all students) to develop chemical understanding and analytical skills to support later modules in structural and mechanistic biochemistry, medicinal chemistry and pharmacokinetics. The module may also be taken by C130 or C100 students with the appropriate chemical background to equip them to study some of these later modules as part of their general programmes.

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 aging 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.

VIROLOGY (LIFE209)

Credits: 15 / Semester: semester 1

This module is an introduction to modern virology.

The module provides an overview of different virus families and aims to explain the fundamental properties of different viruses, their infection in different organisms, their detection and control, and positive applications of viruses.

The lectures will be supplemented with online 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.

PRACTICAL HUMAN PHYSIOLOGY (LIFE229)

Credits: 7.5 / Semester: semester 1

The aim of this practical module is to develop students' core experimental skills in human physiology, including methods to measure the cardiovascular and respiratory systems. Students will thus improve their understanding of scientific method, and develop teamworking and presentation skills. During the practical classes and plenary lectures students will be introduced to various techniques for measuring physiological variables. Then they will learn how to apply appropriate statistical tools to define the normal or expected range for physiological variables. Students will learn how to design experiments and how to assess the accuracy and precision of data, and identify sources of error. 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.

DRUG ACTION (LIFE206)

Credits: 15 / Semester: semester 2

This module aims to enable students to develop their understanding of the cardiovascular, endocrine and central nervous systems and the mechanisms by which drugs interact with physiological processes operating within each of these systems. They will also gain an appreciation of the drug development process, including clinical trials and drug regulation. The lectures will be supplemented with on-line resources. Students will be given guided reading, and regular formative assessment exercises in class will enable students to evaluate their understanding of the module. The module will be assessed by through two online assessments.

MOLECULAR AND MEDICAL GENETICS (LIFE208)

Credits: 15 / Semester: semester 2

This module aims to introduce students with an interest in Genetics and Molecular Biology to the range of biological mechanisms that control structure and stability of the genetic material and their impact on health and disease.

It uses examples from both prokaryotic and eukaryotic organisms, to develop principles that explain DNA replication, repair and recombination. These principles and processes are then discussed in a clinical/medical genetics context.

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.

BIOTECHNOLOGY (LIFE210)

Credits: 15 / Semester: semester 2

This module will examine the ways in which biological processes are applied for solving technological processes.

Examples of specific processes will be used including production of antibiotics, biomass, single cell protein, biopolymers, vaccines and other therapeutic agents.

The lectures will be supplemented with on-line reading 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 assessments.

PRACTICAL PHARMACOLOGY (LIFE234)

Credits: 7.5 / Semester: semester 2

This module aims to provide practical experience in many of the techniques specifically used in the study of Pharmacology. It will also provide you with the specialist skills and knowledge of techniques necessary to undertake practical work and project work in Year Three. Each practical will be introduced through a 15-20 minute presentation and will run for 3 hours. The module will be assessed through a report describing the experimental techniques and main findings of one of the key practicals, and through a final online assessment aimed at evaluating student understanding of the experimental approaches, underpinning pharmacological principles and data processing/interpretation.

ADVANCED BIOCHEMICAL TECHNIQUES (LIFE224)

Credits: 7.5 / Semester: semester 2

This module will provide practical experience in advanced biochemical techniques. Students, working in small groups (of 4, exceptionally 3) will plan and perform two experimental projects: one on enzyme stability, and the other on protein purification. This module is required for students intending to enter the Biochemistry Honours School and is continuously assessed.

ADVANCED MICROBIOLOGICAL TECHNIQUES (LIFE228)

Credits: 7.5 / Semester:

This practical module aims to provide students with an opportunity to learn and apply a range of microbiological laboratory techniques in order to develop their ability to plan and execute research projects in microbiology. The module is continuously assessed.

PRACTICAL SKILLS IN TROPICAL MEDICINE (LIFE236)

Credits: 7.5 / Semester: semester 2

This practical module will enhance knowledge and understanding of the biology and control of parasites of medical importance and their vectors. This is achieved through a series of laboratory experiments and plenary lectures. Topics will include the diagnosis and pathology of parasitic infections; interactions between the environment, humans, mosquitoes, and their parasites; techniques for the control of vectors, including susceptibility to insecticides; data handling and interpretation. The module is continuously assessed.

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

YEAR THREE

In your third year, you will be taking a smaller amount of compulsory modules, including a research project and work placement, once again combined with

optional modules to focus on your chosen research area of interest.

COMPULSORY MODULES

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.

CELL SIGNALLING IN HEALTH AND DISEASE (LIFE305)

Credits: 15 / Semester: whole session

This module will introduce the concepts that are fundamental to modern ideas in biophysics and cell signalling in both health and disease. It will provide students with the ability to access, collate and discuss the modern literature in cell signalling from a systems physiology perspective. Successful students will develop the skills required for interpretation of experimental cell signalling data. The module will be taught through a series of lectures and tutorials and will be assessed by both continuous assessment and by a final examination.

UNDERSTANDING DISEASE: AN INTEGRATED APPROACH (LIFE375)

Credits: 15 / Semester: semester 1

This module will cover selected diseases which will be discussed in terms of a number of clearly-identified processes from the clinical presentation of the disease to our understanding of the underlying anatomy, physiology, pathology, and current therapies.

Successful students will achieve an integrated and cross-disciplinary understanding of disease processes. They will also attain a knowledge of current thinking on the underlying cause of each disease and how scientific tools can be used to develop novel approaches for new treatments. Students will be required to think across the various disciplines they have studied at Level 4 and 5 in their quest to understand disease mechanisms.

The module will be taught by lectures and tutorials and it will be assessed by a formal final examination and continuous assessment.

ADVANCED SKILLS IN BIOLOGICAL AND MEDICAL SCIENCES (LIFE365)

Credits: 15 / Semester: semester 1

The module aims to provide a set of related skills in the context of biological and medical sciences, including evaluation of scientific literature, oral, written, and multimedia presentation skills, data analysis and problem solving. These are designed to 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 will be taught through lectures, workshops and groupwork, and it will be 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**CARDIOVASCULAR AND RESPIRATORY PHARMACOLOGY (LIFE313)****Credits: 15 / Semester: semester 1**

The aim of this module is to develop advanced knowledge and understanding of cardiovascular and respiratory pharmacology. It will develop an awareness of the basic pathophysiology of major cardiovascular and respiratory diseases. It will also explain the mechanisms of action of drugs at the molecular, cellular, organ, and system levels in health and disease. The module is taught through short asynchronous course content delivery and face to face tutorial and revision sessions held in person in lecture theatres. It will be assessed according to the two teaching-cycle model with an assessment at week 8 (40%, 1,250 words) and a final assessment at the end of the course (60%, 1,750 words).

MOLECULAR AND NEUROPHARMACOLOGY (LIFE317)

Credits: 15 / Semester: semester 1

The aim of this module is to provide a contemporary review of drug treatment for the most common disorders of the brain, focusing on pathophysiology, receptors and ion channels as drug targets, and the mechanisms of action of key classes of neuropharmacological agents. The module will be assessed by both continuous assessment and by a final examination.

HUMAN AND CLINICAL GENETICS (LIFE321)

Credits: 15 / Semester: semester 1

This module aims to develop an advanced understanding of modern medical genetics. It will develop fundamental principles introduced at level 5, including the identification of disease genes, epigenetics, genome instability, cytogenetics and post-genomic approaches. These processes will be explained in the context of clinical genetics, in a manner that illustrates the variety of genetic phenomena that affect human health. The module also aims to develop a critical awareness of the ethical considerations raised by advances in clinical genetics. Content will be delivered through a mixture of lectures and workshops with discussion. In workshops, students will participate by considering the appropriate genetic analyses and techniques that should be utilised in a variety of clinical scenarios, together with the arising ethical concerns. Stream capture of all sessions will be available on VITAL, together with additional resources. The module is assessed by an in course written test (examination) and by a final examination.

GENE EXPRESSION AND DEVELOPMENT (LIFE323)

Credits: 15 / Semester: semester 1

This module aims to provide students with a systematic knowledge and critical understanding of how patterns of gene expression in an organism alter in response to environmental changes, growth and development;

It will explain the steps at which control of gene expression can be exerted, focusing on eukaryotic cells;

The module will be taught through lectures and assessed by both continuous assessments and by a final examination.

NEUROMUSCULAR PHYSIOLOGY AND DISEASE (LIFE311)

Credits: 15 / Semester: semester 1

This module will develop an understanding of the concepts fundamental to modern ideas in the physiology of muscles and neurons, related human diseases and model organisms. It will also develop in students the skills to access, collate and discuss the modern literature and to interpret experimental data in neuromuscular physiology. The module will be taught in lectures and tutorials and it will be assessed by both continuous assessment and by a final examination.

MOLECULAR, CLINICAL AND TRANSLATIONAL CANCER (LIFE373)

Credits: 15 / Semester: semester 1

The module trains students in molecular oncology, with an emphasis on how scientific advances are translated into clinical practice for patient benefit. This transition from basic biology of cancer to the technologies actually used in cancer diagnosis and treatment, is usually called "translational cancer research" and it is a major focus of the Department of Molecular and Clinical Cancer Medicine, whose scientists will teach the module.

Oncology, whether approached from the clinic, research or the pharmaceutical industry, is a very important career path for Life Sciences graduates. Final year biomedical students will have already seen some aspects of the molecular basis of cancer, through their learning of normal cellular function. This module will strengthen their knowledge of the biochemistry of cancer and will integrate it with the pathology in a cancer patient and the epidemiology and prognosis of cancer.

Students will learn about diagnostic technology, treatment and clinical trials. The module is taught in four topics: 1) introduction to cancer biology; 2) haematological; 3) head and neck and 4) pancreatic cancer.

These themes are delivered as lectures, followed by formative tutorials.

The module assessment comprises two essays.

PARASITOLOGY (LIFE361)

Credits: 15 / Semester: semester 1

This module aims to describe the major features of the structure and life histories of a range of protozoan and helminth parasites of humans. It describes the causes of major clinical symptoms and pathology attributable to these parasites and describes major approaches to their prevention and control. The module is delivered in four main themes, diagnostics, pathogenesis, epidemiology, and control. The module will be delivered through lectures and is assessed by formal examination and continuous assessment.

CANCER PHARMACOLOGY (LIFE314)

Credits: 15 / Semester: semester 2

The aim of this module is to provide an understanding of cancer development and progression and how this is exploited in the rational design of drugs to target cancer. A further aim is to explain the molecular mechanism of anti-cancer drugs and the potential for side-effects, drug toxicity and drug resistance. The module will be assessed by continuous assessment in the form of a student presentation, and by a final examination. Module material will be delivered primarily through standard lectures. For independent learning, materials such as lecture handouts and links to research articles will be available on VITAL. Students will be directed to further key articles in the literature (textbooks, original papers, and review articles) and be expected to use this material to inform their independent learning. One class revision tutorial will be held at the end of the course.

MOLECULAR TOXICOLOGY (LIFE316)

Credits: 15 / Semester: semester 2

The aim of this module is to introduce current concepts of mechanisms by which cells are killed by toxic chemicals with particular emphasis on drugs. It will also outline the main defence mechanisms that cells possess against injury. The module will be assessed by both continuous assessments and by a final examination.

GENES AND CANCER (LIFE302)

Credits: 15 / Semester: semester 2

The main aim of this module is to develop students' understanding of the molecular and cellular mechanisms that lead to tumour formation and be able to critically read published papers on the biology of cancer. In the first part of the module, the students will learn about the molecular and cellular mechanisms that lead to tumour formation. This includes understanding the origin of cancer by studying the mutations causing cancer and the genome instability. A bioinformatic workshop and a case study exercise on mutations in cancer cells will complement the lectures. This leads to the identification of oncogenes and tumour suppressor genes. The second part focuses on the general cancer hallmarks acquired during the development of human cancer, including the role of tumour microenvironment and cancer stem cells. The third part of the module will cover therapeutic strategies including drug design, targeted therapies, and a clinical viewpoint. The module will be assessed by both continuous assessment and a final examination.

MOLECULAR MEDICINE (LIFE306)

Credits: 15 / Semester: semester 2

This module introduces advanced principles of the application of molecular approaches to the study and treatment of human disease. Selected topics, namely inherited disorders, post-genomic medicine and drug discovery, the therapeutic potential of stem cells in regenerative medicine, and diseases associated with the extracellular matrix are presented in detail. The module will be assessed by both continuous assessment and a final examination.

VIRAL DISEASE MECHANISMS (LIFE320)

Credits: 15 / Semester: semester 2

This module provides a review of the role of viruses as important pathogens of humans and animals. A broad overview of viral virulence mechanisms, immune evasion and vaccine development will be given followed by detailed consideration of significant groups of viruses. The module is assessed by formal examination and continuous assessment.

BACTERIAL DISEASE MECHANISMS (LIFE318)

Credits: 15 / Semester: semester 2

This module describes the mechanistic diversity and common themes of bacterial infection. The pathogenesis of infection is described from first contact with the host to explain the importance of attachment, colonisation and avoidance of the immune system through to persistence and chronic infection. Pathogenesis is described in terms of common themes and the variation between pathogens due to their complement of virulence determinants by covering multiple, key bacterial pathogens. Lectures are delivered on broad aspects such as subversion of the host, expression of bacterial toxins and expression, motility loci and intracellular survival. Specific disease mechanisms used by major human pathogens are outlined to demonstrate the complexity and multicomponent aspects leading to successful infection. The use of infection models to study infection and techniques to assay the contribution of both individual and multiple genes are described. The importance of temporal regulation of virulence determinant expression is outlined along with gene mobilisation via phages, plasmids and transposons. Resistance to antimicrobials and the future prospects for treatment are featured. The module is assessed by formal examination and continuous assessment.

TOPICS IN GLOBAL HEALTH (LIFE340)

Credits: 15 / Semester: semester 2

The module gives students a broad understanding of the public health significance of tropical infectious and non-infectious diseases.

It aims to enhance awareness of the global distribution of disease and the impact of poverty induced inequalities in access to effective and affordable treatments.

The module is assessed by equally weighted formal examination and continuous assessment.

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

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.

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 (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.

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 (LIFE721)

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 assessed by three data analysis continuous assessments.

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 assessed by three data analysis continuous assessments.

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 MBIolSci 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 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:

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 e-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 an e-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.

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 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.

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.

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 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

student and graduate employers as well as our global alumni.

- 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.
-

Fees and funding

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

TUITION FEES

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.](#)

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

International fees	
Full-time place, per year	£25,450

Fees stated are for the 2023-24 academic year.

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

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

Select your country or region for more scholarships and bursaries.

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	<p>Typical A level offer AAB</p> <p>Applicants with the Extended Project Qualification (EPQ) are eligible for a reduction in grade requirements. For this course, the offer is ABB with A in the EPQ.</p> <p>You may automatically qualify for reduced entry requirements through our contextual offers scheme.</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">• Biological Sciences (with a Foundation Year) leading to BSc (Hons)
GCSE	4/C in English and 4/C in Mathematics
Subject requirements	<p>Biology and Chemistry at A level.</p> <p>For applicants from England: Where a science has been taken at A level (Chemistry, Biology or Physics), a pass in the Science practical of each subject will be required.</p>

Your qualification	Requirements About our typical entry requirements
BTEC Level 3 National Extended Diploma	<p>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).</p> <p>For previous BTEC (QCF) qualification:</p> <p>D*DD 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>
BTEC Applied Science unit requirements	<p>View the BTEC Applied Science unit requirements.</p>
International Baccalaureate	34 points, including 6 in Higher Level Biology, and 5 in another Higher Level Subject
Irish Leaving Certificate	H1, H1, H2, H2, H2, H3
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.

Your qualification	Requirements About our typical entry requirements
International qualifications	<div data-bbox="1002 331 1441 465" style="border: 1px solid #ccc; padding: 10px; text-align: center;"> Select your country or region to view specific entry requirements. </div> <p>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.</p>

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