SCHOOL OF BIOSCIENCES

The School of Biosciences has 49 academic staff providing 20 undergraduate and 13 postgraduate courses to approximately 1,200 you. The School also has a thriving research culture with over 30 you registered for PhDs. Active research and postgraduate programmes ensure that undergraduate you are in close contact with the cutting edge of applied scientific knowledge. Close working relationships with London teaching hospitals, health authorities, and institutions around the world have been established.

Biosciences is an expanding subject area and the new technological advances it fosters, such as the genetic manipulation of organisms, are having a great impact on society. Human fitness in mind and body has become increasingly important as medical advance succeeds in lengthening life expectancy - both individuals and society are facing the challenge presented by increasing leisure time. Degree programmes in molecular and applied biosciences, biomedical sciences, human sciences and exercise sciences address these issues through the development of a sound understanding of the biological processes.

The School aims to expand understanding of the important issues in biosciences and provide tools and methods for addressing problems and answering questions. Practical training, the development of key transferable and communication skills and teamwork all play a part in this process. Programmes undergo continual development to ensure that you are relevant to the workplace.

The School has extensive laboratory facilities enabling a range of detailed scientific analyses to be undertaken. The courses have a strong emphasis on developing and using practical skills. Recently refurbished laboratories include facilities for biochemistry, cell and tissue culture, microbiology and fermentation technology, molecular biology, microscopy and a state-of the-art analytical instrumentation suite. Computer simulation is used to teach many aspects of the biological sciences.

Modules

The School of Biosciences offers modules in the areas of Biochemistry, Biomedical Sciences, Biotechnology, Environmental Science, Microbiology and Physiology. Please note that because of the specific nature of these subjects, you must be prepared to demonstrate previous knowledge in the subject before you can undertake certain modules and pay great attention to any pre-requisites.

Please note that the University of Westminster is unable to guarantee the availability of the modules in this catalogue. All modules are subject to change, but are as accurate as possible at the time of going to print.

Pre-requisites

As explained earlier in the module catalogue, please be aware that some modules at Level 5 and Level 6 may have a pre-requisite requirement for you to have already completed specific modules or equivalents at a lower level.

e.g. **3HCS552 Support System Physiology**
has a pre-requisite of **3HCS442 Human Physiology.**

As a study abroad student, you are not expected to have taken the specific pre-requisite requirement, but you must have studied a relevant or similar course / module in your home country / institution. Some modules have co-requisites, which mean that the module and the co-requisite must be taken at the same time.

Module Code	Title	Semester	Level	Credits
3SAB474	Cell Science: The Eukaryotic Cell	1	4	15
3SAB475	Introduction to Physiology and Anatomy	1	4	15
3SAB476	Introduction to Chemistry and Microbiology	1	4	15

3SBS477	Introduction to Health and Nutrition	Full Year	4	30
3HCS547	Human Nutrition	1	5	15
3HCS558	Cell Communication	1	5	15
3BCM506	Biochemistry	Full Year	5	30
3BCM507	Molecular Biochemistry	Full Year	5	30
3BLY511	Molecular Genetics	Full Year	5	30
3BLY515	Recombinant DNA Applications	Full Year	5	30
3BLY518	Techniques in Forensic Biology	Full Year	5	30
3BLY520	Microbial Physiology and Culture	Full Year	5	30
3BLY521	Microbial Form and Function	Full Year	5	30
3BLY522	Biological and Organic Chemistry	Full Year	5	30
3HCS545	Exercise Physiology	Full Year	5	30
3HCS553	Organ Systems Pharmacology	Full Year	5	30
3HCS556	Physiology for Health Sciences	Full Year	5	30
3HCS557	Health Behaviour	Full Year	5	30
3MED567	Infection and Immunity	Full Year	5	30
3BLY621	Bioscience and Business	1	6	15
3HCS653	Public Health	1	6	15
3BCM601	Enzymes: Mechanisms and Control	Full Year	6	30
3BCM604	Protein Biochemistry	Full Year	6	30
3BCM605	Current Topics in Biochemistry & Molecular Biology	Full Year	6	30
3BLY612	Bioinformatics	Full Year	6	30
3BLY613	Industrial Microbiology	Full Year	6	30
3BLY614	Molecular Biology and Disease Diagnosis	Full Year	6	30
3BLY615	Molecular Therapeutics	Full Year	6	30
3BLY617	Processes in Pathology	Full Year	6	30
3BLY618	Medical Forensic Biology	Full Year	6	30
3BLY619	Molecular Applications in Forensic Biology	Full Year	6	30
3BLY621	Bioscience and Business	Full Year	6	30
3BTY683	Environmental Biotechnology	Full Year	6	30
3HCS641	Advanced Nutrition	Full Year	6	30
3HCS644	Clinical Nutrition	Full Year	6	30
3HCS653	Public health	Full Year	6	30
3HCS655	Drug Development & Toxicology	Full Year	6	30
3HCS656	Nutrition and Performance	Full Year	6	30
3HCS657	Environmental and Stress Physiology	Full Year	6	30
3HCS659	Diagnostic & Clinical Physiology	Full Year	6	30
3HCS660	Endocrinology & Reproduction	Full Year	6	30
3HCS661	Immunopharmacology	Full Year	6	30
3SBS674	Current Issues in Bioethics	Full Year	6	30
3SBS675	Human Parasitology	Full Year	6	30

CELL SCIENCE: THE EUKARYOTIC CELL
Module Code 3SAB474 Level 4 Credit 15 Semester 1
Pre-requisite: High School Biology
Eukaryotic cell diversity; membrane structure and function; intracellular components; chemotrophic and phototronic energy metabolism; cellular information, DNA, chromosomes, nucleus; cytoskeletal system; cell cycle; replication, mitosis and meiosis; gene expression;Mendelian genetics; karyotyping and chromosomal defects; key cells and tissues of the body; cell communication and disease.

INTRODUCTION TO PHYSIOLOGY AND ANATOMY
Module Code 3SAB475 Level 4 Credit 15 Semester 1
Pre-requisite: High School Biology
This module will give an overview of a range of physiological systems, including the cardiovascular, renal, nervous, respiratory and endocrine axes, with emphasis placed on the inter-relationship between the structure and function of various systems. The module will also provide an introduction to human anatomy, nutrition and exercise physiology, linking these to both health and performance.

INTRODUCTION TO CHEMISTRY AND MICROBIOLOGY
Module Code 3SAB476 Level 4 Credit 15 Semester 1
Pre-requisite: High School Biology
Functional group chemistry. Buffers and their importance to life. Reactions, catalysis and enzymes, Biomolecules of importance. Microbiology and the importance of micro-organisms to man. Molecular Biology and Genetics.

INTRODUCTION TO HEALTH AND NUTRITION
Module Code 3SBS477 Level 4 Credit 30 Full Year
Pre-requisite: High School Biology
This module aims to provide underpinning knowledge in biochemistry, physiology and public health to enable further study into nutrition and health sciences. Further to this, the module will examine the way in which science provides insight into the health status of individuals and populations.

HUMAN NUTRITION
Module Code 3HCS547 Level 5 Credit 15 Semester 1
Some background in the subject area is needed.
The module aims to consolidate and expand on ideas introduced at Level 4, and to ensure students have a solid scientific grasp of the role of essential nutrients, key aspects of macro and micronutrient metabolism and the means of assessing nutritional status.

CELL COMMUNICATION
Module Code 3HCS558 Level 5 Credit 15 Semester 1
Some background in the subject area is needed.
The module examines the major mechanisms of cell communication in mammalian physiology. It contrasts cell communication by cells that circulate, cells of the immune system as a primary example, with cells that are relatively fixed in their associations, i.e. cells of the nervous system.

BIOCHEMISTRY
Module Code 3BCM506 Level 5 Credit 30 Full Year
Pre-requisite: Basic Biochemistry
This module will provide a comprehensive overview of modern Biochemistry. Topics include the major pathways for the degradation and biosynthesis of carbohydrates, fatty acids and amino acids, as well as a review of protein structure and enzyme kinetics. The module will conclude with a review of the importance of vitamins in biology and a discussion of metabolic regulation.

MOLECULAR BIOCHEMISTRY
Module Code 3BCM507 Level 5 Credit 30 Full Year
Pre-requisite: Basic Biochemistry
This module will provide a comprehensive view of protein structure, (including and introduction to uses in bioinformatics) and an examination of enzyme mechanisms. Relationships between structure and function will be further explored for fibrous proteins and

other structural macromolecules and students will also study signal transduction, photosynthesis and microbial nitrogen metabolism.

MOLECULAR GENETICS
Module Code 3BLY511 Level 5 Credit 30 Full Year
Pre-requisite: Basic Genetics
The module aims, by building on a knowledge base from level 4, to explore the relationship between the biochemical expression of genes & the phenotypic characteristics of cells & complete organisms. It is designed to develop an appreciation of how the control of gene expression & DNA sequence variation determines phenotypic charactersitics by the description of genetics.

RECOMBINANT DNA APPLICATIONS
Module Code 3BLY515 Level 5 Credit 30 Full Year
Pre-requisite: Basic Genetics
The methods of recombinant DNA techology underpin many areas of molecular biological analysis and an awareness of their applications is essential. The module is intended to present students with the fundamental techniques of molecular biology and illustrates their importance and relevance in areas as diverse as molecular medicine, forensic analysis and agriculture.

TECHNIQUES IN FORENSIC BIOLOGY
Module Code 3BLY518 Level 5 Credit 30 Full Year
Pre-requisite: Microsocopy and Biological Techniques
The module aims to give students experience of a range of techniques used in forensic biology. The theoretical background to these will be studied in order to develop understanding of the significance of biological forensic indicators in investigations and to develop awareness of the problems associated with analysis of biological materials.

MICROBIAL PHYSIOLOGY AND CULTURE
Module Code 3BLY520 Level 5 Credit 30 Full Year
Pre-requisite: Biology and Cell Science
The structure of bacteria, archae and fungi. Growth media. Kinetics of microbial growth and environmental factors affecting growth. Fermenter types and design. Sterilization. Requirements for oxygen. Production and actions of secondary metabolites.

MICROBIAL FORM AND FUNCTION
Module Code 3BLY521 Level 5 Credit 30 Full Year
Pre-requisite: Biology and Cell Science
Definition of the ‘kingdom’ system of the classification of life on earth and its relationship to the phylogeny of the major groups of micro-organisms. Definition and review of major taxonomic groups of micro-organisms: fungi, eubacteria. The benefits of micro-organisms to humans, animals and plants e.g. through impacts on health and nutrient cycling, are explored, together with the adverse effects, e.g. human, animal and plant diseases, food pathogens and spoilage. The applications of micro-organisms are considered through discussions on subjects such as food microbiology, water and sewerage treatment and biotechnology.

BIOLOGICAL AND ORGANIC CHEMISTRY
Module Code 3BLY522 Level 5 Credit 30 Full Year
Pre-requisite: Chemistry
Features of chemical structure in organic compounds relevant to biochemistry. Exploration of organic reaction mechanisms, notably nucleophilic substitution and elimination. Practical organic chemistry methods. NMR fundamentals and applications. Thermodynamics and redox chemistry.

EXERCISE PHYSIOLOGY
Module Code 3HCS545 Level 5 Credit 30 Full Year
Pre-requisite: Human Physiology
The module aims to provide knowledge about the immediate and long-term physiological responses to exercise.

ORGAN SYSTEMS PHARMACOLOGY
Module Code 3HCS553 Level 5 Credit 30 Full Year
Pre-requisite: Biochemistry
Physiological mediators of organ system function; pharmacology of drugs acting on a variety of physiological systems, including cardiovascular, gastrointestinal and renal systems; usage of these drugs in the treatment of disease states.

PHYSIOLOGY FOR HEALTH SCIENCES
Module Code 3HCS556 Level 5 Credit 30 Full Year
Pre-requisite: Human Physiology
The module will address aspects of human physiological process, their adaptations and regulation selected because of their relevance to the study of health sciences.

HEALTH BEHAVIOUR
Module Code 3HCS557 Level 5 Credit 30 Full Year
Pre-requisite: Human Physiology
This module examines the role of behaviour in human health and disease. The diseases of developed economies are, to a large extend determined by health related behaviours. Within these behaviours, food choices, and levels of physical activity have the most significant effect upon modifiable aspects of human health. Theories of behaviour, motivation, reward and affect will be discussed in terms of their associations with health and well being.

INFECTION AND IMMUNITY
Module Code 3MED567 Level 5 Credit 30 Full Year
Pre-requisite: Cell Biology and Biochemistry
Infectious agents and the diseases they cause. Microbial virulence and mechanisms of pathogenicity. Innate and acquired immunity and the roles of the different leucocytes. Lymphoid tissues, lymphocyte ontogeny and re-circulation. Immunoglobulins, classes and activities. MHC molecules, antigen processing and presentation. Effector pathways of the immune responses. Inflammation.

BIOSCIENCE AND BUSINESS
Module Code 3BLY621 Level 6 Credit 15 Semester 1
Some background in the subject area is needed.
The course introduces students to the commercial development of scientific discoveries in biology and medicine.

PUBLIC HEALTH
Module Code 3HCS653 Level 6 Credit 15 Semester 1
Some background in the subject area is needed.
To explore the determinants of health status and choices according to tradition, politics, economics and geography. To examine the means of dissemination of health related information. The means of assessing and methods for promoting public health. This will include epidemiological, political and sociological perspectives.

ENZYMES: MECHANISMS AND CONTROL
Module Code 3BCM601 Level 6 Credit 30 Full Year
Pre-requisite: Biochemistry Level 5
The module aims to integrate knowledge of protein structural biochemistry and of enzyme kinetics to the study of enzyme catalysis and the control of biosynthetic pathways by feedback inhibition involving allosterism.

PROTEIN BIOCHEMISTRY
Module Code 3BCM604 Level 6 Credit 30 Full Year
Pre-requisite: Biochemistry Level 5
Examining protein function through an appreciation of structure, evolution, maturation and ultimately biochemistry. In vivo, in vitro and in silico methods to analyse proteins, particularly enzymes, will be explored. Recombinant protein production will be addressed theoretically and practically. Parameters of biochemical assays will be explored to understand function and for drug evaluation.

CURRENT TOPICS IN BIOCHEMISTRY AND MOLECULAR BIOLOGY
Module Code 3BCM605 Level 6 Credit 30 Full Year
Pre-requisite: Biochemistry Level 5
A module designed to provide students with insight into selected current research topics in biochemistry and molecular biology. Since these areas are evolving rapidly, the most recent relevant topics would be selected. Examples of topics would be: molecular biology of cancer, animal cloning, transgenic plants, cell signalling, apoptosis, carcinogenesis.

BIOINFORMATICS
Module Code 3BLY612 Level 6 Credit 30 Full Year
Pre-requisite: Biochemistry and Molecular Genetics Level 5
This module provides an introduction to the rapdly growing field of biuoinformatics, equipping students with the skills necessary to carry out DNA & protein sequence analysis, interrogate protein & DNA databases, predict protein secondary structure & interpret data. Also peovides an overview of recent developments in proteomics & the human and other genome projects

INDUSTRIAL MICROBIOLOGY
Module Code 3BLY613 Level 6 Credit 30 Full Year
Pre-requisite: Microbiology Level 5
The aims of this module are to enable students to discuss the essential qualitative and quantitative biotechnological aspects at industrial scale and to create an understanding of the upstream & downstream processing of a range of biotechnological industries.

MOLECULAR BIOLOGY AND DISEASE DIAGNOSIS
Module Code 3BLY614 Level 6 Credit 30 Full Year
Pre-requisite: Molecular Genetics Level 5
The aims of the module are to analyse a variety of methods for investigating the molecular basis of inherited and acquired diseases and to induce awareness of appropriate usage of the technology.

MOLECULAR THERAPEUTICS
Module Code 3BLY615 Level 6 Credit 30 Full Year
Pre-requisite: Molecular Genetics Level 5
The aims of this module are to enable students to explore the range of areas of therapy based upon the knowledge and techniques of molecular biology and to appreciate consequences of such technology.

PROCESSES IN PATHOLOGY
Module Code 3BLY617 Level 6 Credit 30 Full Year
Pre-requisite: Human Physiology and Biochemistry Level 5
Classical processes in pathology will be presented to the student, and the module will examine ways in which pathological insult peturbs normal tissues and systems. The molecular control of response to injury in human pathology will be addressed and tissue changes related to homoeostatic decline and degeneration apposite to forensic pathology are discussed in detail. The student will have the opportunity to use the laboratory techniques of cellular pathology.

MEDICAL FORENSIC BIOLOGY
Module Code 3BLY618 Level 6 Credit 30 Full Year
Pre-requisite: Analytical Techniques Level 5 (see Module Leader)
This module presents specific aspects of forensic biology and pathology. Trauma, tissue effects of poisons and infections are covered. Mechanisms of toxic actions, toxicology, toxicological pathology and forensic toxicology are included.

MOLECULAR APPLICATIONIONS IN FORENSIC BIOLOGY
Module Code 3BLY619 Level 6 Credit 30 Full Year
Pre-requisite: Molecular Biology Level 5
The module provides a grounding in the use of DNA typing and protein analysis in forensic biology. The collection and preservation of biological samples and the methods available for DNA extraction will be discussed. A number of techniques, including analysis of STRs and SNPs, commonly used to characterise DNA, will be evaluated.

BIOSCIENCE AND BUSINESS
Module Code 3BLY621 Level 6 Credit 30 Full Year
Pre-requisite: General Biosciences Level 5
The course introduces students to the commercial development of scientific discoveries in biology and medicine.

ENVIRONMENTAL BIOTECHNOLOGY
Module Code 3BTY683 Level 6 Credit 30 Full Year
Pre-requisite: Biology Level 5
To explore the ways that biological systems can contribute to the treatment and control of anthropogenic pollution; to examine the biochemistry, physiology and ecophysiology of processes that underpin environmental biotechnologies, and to consider mechanisms to improve the efficiency and effectiveness of biotreatment processes. You must have passed 210 credits & taken 240 to study this module.

ADVANCED NUTRITION
Module Code 3HCS641 Level 6 Credit 30 Full Year
Pre-requisite: Nutrition Level 5
The module aims to integrate knowledge from various areas of nutritional science in order to examine nutritional needs and dietary practices according to age, culture, availability and psychology.

CLINICAL NUTRITION
Module Code 3HCS644 Level 6 Credit 30 Full Year
Pre-requisite: Nutrition Level 5
To demonstrate the association between diet & causation of and/or management of important pathogical conditions. To discuss the routes, means and consequences of nutrient provision in the clinical setting.

PUBLIC HEALTH
Module Code 3HCS653 Level 6 Credit 30 Full Year
Pre-requisite: Nutrition Level 5
To explore the determinants of health status and choices according to tradition, politics, economics and geography. To examine the means of dissemination of health related information. The means of assessing and methods for promoting public health. This will include epidemiological, political and sociological perspectives.

DRUG DEVELOPMENT AND TOXICOLOGY
Module Code 3HCS655 Level 6 Credit 30 Full Year
Pre-requisite: Pharmacology Level 5
The drug discovery and developmental process; introduction to clinical trials and drug legislative; toxicological and analytical techniques pivotal in drug development; environmental impact of common toxicants and drugs.

NUTRITION AND PERFORMANCE
Module Code 3HCS656 Level 6 Credit 30 Full Year
Pre-requisite: Nutrition and Exercise Physiology Level 5
The module provides students with an overview of the role of nutrition in regulating physiological processes associated with exercise performance. Nutritional requirements and recommendations for physically active individuals are also presented.

ENVIRONMENTAL AND STRESS PHYSIOLOGY
Module Code 3HCS657 Level 6 Credit 30 Full Year
Pre-requisite: Physiology Level 5
This module is designed to build upon existing physiological knowledge and apply the concepts of exercise physiology to a variety of different environmental conditions (such as high altitude, hot and cold, and microgravity) in order to and understand the implications for exercise and training.

DIAGNOSTIC AND CLINICAL PHYSIOLOGY
Module Code 3HCS659 Level 6 Credit 30 Full Year
Pre-requisite: Physiology Level 5
This module provides information and methodologies on the principal medical imaging techniques currently used in patient health care. Upon presentation of different disease pathologies (relating to changes in physiology), the methods and markers for diagnosis prior to treatment will be investigated. Topics including patient confidentiality, patient considerations and safety will also be covered so that a good understanding of the entire imaging diagnosis process is conveyed.

ENDOCRINOLOGY AND REPRODUCTION
Module Code 3HCS660 Level 6 Credit 30 Full Year
Pre-requisite: Human Physiology and Cell Communication Level 5
This module is designed to give you a sound background to human endocrinology and an introduction to human reproductive endocrinology and physiology. The reproductive axis will be used to illustrate and reinforce understanding of the general concepts of endocrinology.

IMMUNOPHARMACOLOGY
Module Code 3HCS661 Level 6 Credit 30 Full Year
Pre-requisite: Pharmacology and Immunology Level 5
Pharmacology of drugs acting on the immune system; use of these drugs in the treatment of inflammatory disease states and identification of novel therapeutic targets for their treatments.

CURRENT ISSUES IN BIOETCHIS
Module Code 3SBS674 Level 6 Credit 30 Full Year
Pre-requisite: Biology Level 5
The essential background and related arguments required to appreciate the ethical dilemmas posed in key areas of modern biology including environmental science, animal rights, biotechnology, molecular biology, cloning, new reproductive technologies, abortion and euthanasia.

HUMAN PARASITOLOGY
Module Code 3SBS675 Level 6 Credit 30 Full Year
Pre-requisite: Biology and Microbiology Level 5
The pathogenesis and control of selected human parasitic diseases will be studied in depth; case histories will be used as part of this study. This study will enable the demonstration of the principles and practice of parasitology. The life cycles and control of ectoparasites, endoparasites (protozoa and helminths) of the gut and endoparasites (protozoa and helminths) of blood and other tissues will form the core of the module. The failures and successes of control programmes will be critically reviewed.The relative importance of parasites in developing countries, the developed world and in HIV/AIDS will be covered. The importance of arthropods as vectors will be assessed.