

# BIOMEDICAL SCIENCE

## STUDY ABROAD MODULE OPTIONS

LEVEL 1
DOUBLE SEMESTER: FALL & SPRING
BMS1104 Human Structure and Function (40 CATS)
LEVEL 2
DOUBLE SEMESTER: FALL & SPRING
BMS2103 Cell Biology and Clinical Genetics (40 CATS)
BMS2107 Professional Practice in Biomedical Science (40 CATS)
BMS2106 The Sciences of Disease (40 CATS)

## MODULE OVERVIEWS

### **BMS1104 Human Structure and Function**

This module give you an introduction to the structure and function of cells, tissues and systems of the human body. Basic anatomical and physiological terminology. The microanatomy of the cell and the structure, function and classification of the basic tissues of the body including epithelium, connective, muscle and nerve; the structure and function of skin, blood, eye and ear; the structure and function of the organs and components of the major body systems including the cardiovascular, respiratory, urinary, endocrine, immune, alimentary and reproductive systems. The study of anatomy is augmented and supported by a range of practical classes where there are opportunities to examine prosected human cadaveric specimens, preserved potted human specimens and microscopic anatomy via virtual slides. Physiology practical classes encourage students to collect data about the functioning of their own bodies in various situations, learning to analyse and interpret that data and thereby providing further explanation behind many of the principles explained in theory and tutorial classes.

*Please note: modules may require demonstration of prior learning. Modules may be subject to change.*



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### **BMS2103 Cell Biology and Clinical Genetics**

This module will focus on two main themes: cell biology and clinical genetics. The cell biology component will provide students with a substantial understanding of the molecular basis of cell structure and function, including practical experience of handling and observing living mammalian cells. The module content covers fundamental issues such as plasma membrane structure and function, cellular compartmentalisation, mechanisms for protein and membrane-based transport between endomembrane compartments, organelle-specific functions, the cytoskeleton and cell junctions. Cell signalling mechanisms and the processes of information flow between the plasma membrane and the nucleus are covered in some detail and will provide students with the knowledge base to understand intracellular control mechanisms and the bulk of the literature published in current medical research.

The medical genetics component of the module will consolidate knowledge of genetic information processing and inheritance patterns of human disease and consider the different mutational mechanisms that underlie disease phenotypes, and the detection mechanisms used to identify them. High throughput mutation detection techniques and in silico representation of human genome data will be considered through practical applications for both Mendelian and complex disease. The influences of chromosomal abnormalities and epigenetic modifications will be considered in the context of the clinical phenotypes that manifest. Ethical and confidentiality issues around clinical consultations and understanding will be discussed.

### **BMS2107 Professional Practice in Biomedical Science**

The bulk of the time devoted to the module concerns the major Biomedical Science disciplines of Cellular Pathology; Clinical Biochemistry; Clinical Immunology; Haematology; Immunohaematology and Transfusion Science; Medical Microbiology. It introduces the practical aspects of the work carried out by hospital Biomedical Scientists and explains the important role these scientists play in the diagnosis and treatment of patients.

A smaller but important part of the module aims to introduce students to the application of statistics to medical research and the methodology of how to undertake scientific research. The statistics component provides students with an introduction to basic statistical principles/methods and experience in presenting, analysing and interpreting data. The scientific methods component will equip students with a working knowledge of the scientific method. Practical use of the scientific method will be developed in sessions focussed on experimental design, reading the scientific literature, peer-review and scientific writing. There will also be an introduction to the types of experimental models currently used in the Biomedical Sciences.

### **BMS2106 The Sciences of Disease**

The module will provide knowledge and understanding in the following areas: Introductory and basic systems pharmacology; physiology of movement and sensation; physiology of pain, analgesia and use of local anaesthetics; the neural control of exercising muscle; physiological regulation of the vasculature and circulation; blood supply to special regions; cardiac output; mechanical and electrical events of the cardiac cycle; the cardiovascular system during exercise; static and dynamic lung mechanics; spirometry; gas transport and transfer; lung function and exercise; renal clearance; acid base regulation and disorders; the kidney's role in exercise and drug excretion; applied physiology including exercise testing and training.

