

BIOMEDICAL SCIENCE COURSE MODULES (YEAR 1)

Learn to integrate and apply biological and chemical sciences knowledge to solve problems that our world faces, including infectious diseases, cancer, neurodegenerative diseases and an increasing demand for better nutrition and safer foods. Our Diploma in Biomedical Science [BMS] combines knowledge from bioinformatics, chemistry, molecular biology, immunology, microbiology, and proteomics to offer innovative solutions to these challenges. BMS is a launch pad for you to embark on a diversity of careers in the manufacturing, research and development, regulatory affairs and clinical trials, and clinical diagnoses industries.

In your first year, you will take modules such as Anatomy & Physiology, Cell Biology & Genetics, Biostatistics, Chemistry and Microbiology that will give you a firm foundation in chemistry and bioscience. You can build upon this solid foundation and choose one of our two specialisation options in your second year.

SPECIALISATION OPTIONS

General Biomedical Science

Develop analytical, research and problem solving skills that are highly valued by the industry. You will acquire knowledge and skills in analytical chemistry, molecular biology, biopharmaceutical analysis, and biomanufacturing practices. This option includes a six-month local or overseas internship at biopharmaceutical or food manufacturing companies, laboratory testing and analysis companies, research institutes, and healthcare organisations.

Clinical Laboratory Technology

This option includes a two-year Integrated Clinical Laboratory Training Programme at NUH, where you will learn about clinical laboratory techniques and get trained alongside professionals such as doctors, nurses and medical technologists. You will also receive an additional certification in phlebotomy.

LEVEL 1.1

Anatomy & Physiology

This module equips students with an understanding of the basic principles of homeostatic mechanisms and the cardiovascular, respiratory, renal, gastrointestinal, neuromuscular, endocrine and reproductive physiological systems that exist in the human body. It also covers basic skeletal system and anatomy.

Career & Professional Preparation I

This module is part of the Education and Career Guidance framework to provide students with the tools and resources necessary for their further career and/or education. In this first module, students will undergo personal discovery and exploration of industry and career prospects. Students will learn on how they can plan and set achievable goals in preparation for their future. Students will also learn the importance of passion and professionalism, and learn basic teamwork and interpersonal skills.

Cell Biology & Genetics

This module exposes students to key themes and experimental techniques in eukaryotic cell biology and genetics. It covers cell structure and function of cellular organelles, regulations of cell cycle and cell division, study of genes, genetic variation and heredity. Fundamentals of molecular biology such as the structure of DNA, DNA replication, transcription and protein synthesis will also be outlined.

Inorganic & Physical Chemistry

This module covers the structure of matter, chemical bonding, orbital hybridisation, thermochemistry, chemical equilibria, kinetics, electrochemistry and redox reactions, transition metal chemistry, chemistry of solutions, including acids, bases and buffers.

Mathematics

This module provides students with a fundamental and analytical knowledge of Mathematics essential for the study of life sciences. The module is designed to equip students with the necessary mathematical techniques to solve biological and chemical problems, as well as to carry out analytical studies in their future work. Topics include exponential and logarithmic functions, integration, differentiation and differential equations.

LEVEL 1.2

Biosafety & Risk Management

This module is designed based on the curriculum of the WSQ "Follow Good Biosafety Practices" course. This module aims to equip students with essential knowledge and skills for safe handling of chemicals and biological agents as well as fundamentals of decontamination and waste management. Topics such as follow biosafety and biosecurity principles and practices, risk assessment and mitigation, national and international biosafety guidelines and legislation, and emergency response programme will also be covered.

Biostatistics

This module is designed to provide students with basic statistical skills to analyse and interpret simple biological, pre-clinical and clinical data. The basic statistical skills covered are descriptive statistics, data distribution, set sample size, measurement of central tendency, scatter diagram, cluster analysis, and simple linear correlation and regression analysis for linear data. The presentation of data in graphical forms using Microsoft Excel covers selection and preparation of different types of graphs, how to write titles and legends, and interpretation of results and draw conclusions.

Microbiology

This module introduces a basic understanding of microorganisms and techniques in microbiology. Topics include cell structure and function, classification, viruses and fungi, nutrition, growth and regulation, environmental factors affecting growth, microscopy, staining, size measurement, cell enumeration, media preparation, isolation and cultivation of pure cultures.

Organic Chemistry

In this module, students are introduced to the main classes of organic compounds e.g. alcohols, aromatic and carbonyl compounds. The properties and chemical reactivity of these compounds will be discussed especially in their application to the chemistry of life sciences. In addition, some basic organic reaction mechanisms e.g. nucleophilic substitutions (SN2 and SN1 mechanisms) will be covered.

COURSE CURRICULUM (YEAR 1)

Module Name	Credit Units
YEAR 1	
Level 1.1 (18 hours per week)	
Anatomy & Physiology	3
Career & Professional Preparation I	1
Cell Biology & Genetics	4
Inorganic & Physical Chemistry	4
Mathematics	3
Innovation Made Possible ^	3
Level 1.2 (18 hours per week)	
Biosafety & Risk Management	2
Biostatistics	3
Microbiology	4
Organic Chemistry	4
Communication Essentials ^	3
Sports & Wellness ^	2
At the end of their first year, students will select <u>one</u> of two specialisation options: General Biomedical Science or Clinical Laboratory Technology .	

Notes:

^ For more details on Interdisciplinary Studies (IS) electives, please log on to www.np.edu.sg/is/

IS Modules

The School of Interdisciplinary Studies (IS) delivers a broad-based curriculum, which nurtures a new generation of professionals with multidisciplinary skills and an innovative and entrepreneurial spirit to meet the challenges of a knowledge economy. IS offers both prescribed modules and electives to challenge boundaries. Prescribed modules develop students' competencies in core areas such as Communication, Innovation and Enterprise, Culture and Communication, and Personal Mastery and Development, while elective modules provide insights into Arts and Humanities, Business, Design, and Science and Technology.