

VETERINARY BIOSCIENCE COURSE MODULES (YEAR 1)

Do you love animals and care for their welfare? Keen to work with animals in the future? Our Diploma in Veterinary Bioscience [VBS] will teach you how to care for, handle and manage various animals, ranging from laboratory animals to pets. You will be trained to assist veterinarians in a clinical setting, as well as learn about the importance of animal models in the search for new drugs and vaccines. You will also get a head start in a career in biomedical research.

In your first year, you will learn about the maintenance and well-being of animals through modules such as Animal Anatomy & Physiology, Animal Nutrition and Animal Welfare, Behaviour & Handling. Modules such as Wildlife Conservation & Biodiversity will give you an understanding of animals in their natural habitats.

You will learn about the importance of the animal immune system in the prevention of infection, as well as the clinical diagnosis and treatment of animal diseases in your second year. The role of genes in animal health will be covered through modules such as Animal Developmental Biology & Genetics.

In your final year, you will carry out a research project and undertake a four-month internship either locally or abroad, where you could be attached to research laboratories, veterinary clinics or animal theme parks such as the Singapore Zoo and River Safari.

LEVEL 1.1

Animal Anatomy & Physiology

This module equips students with an understanding of the anatomy and physiology of the various anatomical systems in an animal body. These systems include the integumentary, musculoskeletal, respiratory, cardiovascular, gastrointestinal, urinary, reproductive, nervous and endocrine systems.

Animal Nutrition

This module provides students with an opportunity to understand animal nutrition and its importance in growth and well-being of laboratory, domesticated and farm animals. Students will have an insight into the nutritional requirements of large and small animals and the use of animal feed additives and growth promoters. The digestive processes and functions of the gastrointestinal tract will be studied. This module provides some knowledge on the feed milling processes, management of a feed mill, evaluation methods of the nutrients for feed rations and formulation of animal feed. Students will understand the use of raw ingredients in the formulation of commercial feed and the regulatory procedures involved to ensure safe production of animal feedstuffs. Students will also acquire knowledge regarding the different types of pet foods and regulation of pet foods in Singapore. Alternative sources of animal feed such as the use of unconventional animal feed and feed replacement will be studied.

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 career and/ or further education. In this first module, students will undergo personal discovery and exploration of industry and career prospects. Students will learn how to plan and set achievable goals in preparation for their future. Students will also learn the importance of passion and professionalism, and basic teamwork and interpersonal skills.

Inorganic & Physical Chemistry

This module introduces students to aspects of inorganic and physical chemistry. Topics covered comprise the structure of matter, chemical bonding, thermochemistry, chemical equilibria, kinetics, electrochemistry, redox reactions, transition metal chemistry, and chemistry of solutions including acids, bases and buffers.

Veterinary Microbiology

This module provides students with an understanding of how bacteria of veterinary importance cause disease in animals. Pathogenic bacteria studied will include those that cause gastrointestinal diseases, respiratory diseases, reproductive diseases, skin and nervous system diseases. This module also includes the study of molecular mechanisms underlying host/pathogen interactions in the pathogenesis of animal diseases, as well as aspects of disease control, including diagnosis, antibiotic treatment and vaccination. Standard microbial laboratory techniques

involving the isolation, culture and identification bacteria (based on microbial metabolic characterisation and microscopy examination) will also be covered.

LEVEL 1.2

Animal Welfare, Behaviour & Handling

This module provides students with an understanding of the proper handling and restraint of domestic animals, as well as the responsible care and use of laboratory animals for research purposes. The techniques include step-by-step instructions for performing each procedure and the purposes, followed by learning the potential complications. This module also covers the fundamental principles underlying animal behaviours, such as animal learning behaviour, sexual selection and mating behaviours, kinship, cooperation, foraging, communication, aggression and elimination behaviours. The basic principles of animal welfare will also be explained, including methods of measuring animal welfare (such as the 'Five Freedoms' and preference testing) and the limitations of such assessment methods.

Biostatistics

This module is designed to provide students with basic statistical skills to analyse and interpret simple biological, preclinical and clinical data. Students will acquire proficiency in the quantitative analysis of scientific data. The statistical skills covered include 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. Students will have proficiency in the use of statistical software for data analysis, preparation of documents and presentation of results.

Cell Biology

This module explores mammalian cells, tissue and organ systems, and prokaryotic and eukaryotic genetics at the molecular level. Topics include the fundamental chemicals of life, structure and the function of cells and organelles, DNA structure, replication, transcription and translation, protein synthesis, gene mutation, cell communication, cell division (mitosis and meiosis), genetics and hereditary, apoptosis and cancer.

Organic & Biological Chemistry

This module gives students a strong foundation in basic organic chemistry. Topics include the IUPAC nomenclature, structural formulae, preparations and reactions of the main classes of organic compounds namely alkanes, alkenes, alkynes, benzene, alcohols, thiols, ether, aldehydes, ketones, amines, carboxylic acids and derivatives.

Wildlife Conservation & Biodiversity

This module covers aspects of biodiversity conservation and discusses how biodiversity is generated and maintained. This module also addresses issues such as how we can manage and restore habitats, the formulation of strategies for the conservation of species threatened with extinction, and human-wildlife conflict situations. National policies and legislation pertaining to conservation of local biodiversity will also be covered.

COURSE CURRICULUM (YEAR 1)

Module Name	Credit Units
YEAR 1	
Level 1.1 (26.5 hours per week)	
Animal Anatomy & Physiology	6
Animal Nutrition	3.5
Career & Professional Preparation I	1
Inorganic & Physical Chemistry	7
Veterinary Microbiology	6
Innovation Made Possible ^	3

Level 1.2 (28 hours per week)

Animal Welfare, Behaviour & Handling	4
Biostatistics	3
Cell Biology	7
Organic & Biological Chemistry	7
Wildlife Conservation & Biodiversity	2
Communication Essentials ^	3
Sports & Wellness ^	2

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.