

## **PHARMACEUTICAL SCIENCE COURSE MODULES (YEAR 1)**

Discover what it is like to work at the forefront of drug therapy and improve human health when you take on the Diploma in Pharmaceutical Science [PHARM]. This course will equip you with a foundation in biological, chemical and pharmaceutical sciences in your first year, before proceeding onto more advanced topics such as clinical trials, drug manufacturing, pharmaceuticals and pharmacology.

In your final year, you will have the opportunity to go for a six-month internship in clinical pharmacy or the industry-designed to engage you in learning directly from working professionals. You will apply the skills and experience gained from the course to solve real-life problems as part of a project during your internship.

In addition, practicing pharmacists from the Pharmacy Department of NUH will teach you clinical knowledge and pharmacy skills as part of the unique Pharmacy Training Programme. You can also choose one of these electives in your final year:

The Complementary Medicine & Traditional Chinese Medicine elective enables you to evaluate the evidence behind alternative therapies and traditional Chinese medicines.

The Nutrition & Dietetic Science elective provides you with a basic understanding of nutritional and dietetic concepts, including the study of nutrients in the diet and their effects on health.

### **LEVEL 1.1**

#### **Anatomy & Physiology**

This module introduces the anatomy and functions of the human body. It equips students with an understanding of the anatomy and physiology of the cardiovascular, respiratory, renal, gastrointestinal, neuromuscular, skeletal, endocrine and reproductive systems.

#### **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.

#### **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 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 basic teamwork and interpersonal skills.

#### **Fundamentals in Pharmaceutical Science**

This module will introduce students to pharmaceuticals and the roles, responsibilities, job scopes and future of pharmacists and pharmacy technicians. The module will provide a foundation for subsequent modules in the course. Introductory topic in pharmacology, pharmaceutical science, pharmacy laws and pharmaceuticals will be covered. Students will also learn how to perform pharmaceutical calculations to determine dosage.

#### **Organic & Biological Chemistry**

In this module, students are introduced to the chemistry of hydrocarbons, alcohols, amines, aldehydes, ketones, carboxylic acids and their derivatives. The structures, functions and chemical reactions of biological molecules, including carbohydrates, lipids and proteins and their derivatives are also covered.

## LEVEL 1.2

### 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.

### Cell Biology

This module provides fundamental overview of cellular systems specifically eukaryotes and prokaryotes. There will also be an introduction to pathogenic microorganisms, including bacteria, fungi and viruses. The topics include the fundamental chemicals of life, structure and the function of cells and organelles, cell division, cytogenetics, DNA structure, cell communication, principles of hereditary, apoptosis and cancer.

### Inorganic & Physical Chemistry

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

### Mathematics

This module provides students with a fundamental analytical knowledge of mathematics essential for the study of pharmaceutical and life science. The rules of conversion of one unit of measurement to another as well as basic mathematical operations will be covered. Students will also learn the properties governing the operation of polynomial, exponential and logarithmic functions and understand their applications in chemistry and biology.

## COURSE CURRICULUM (YEAR 1)

Module Name	Credit Units
<b>YEAR 1</b>	
<b>Level 1.1 (19 hours per week)</b>	
Anatomy & Physiology	4
Biosafety & Risk Management	2
Career & Professional Preparation I	1
Fundamentals in Pharmaceutical Science	4
Organic & Biological Chemistry	5
Innovation Made Possible ^	3
<b>Level 1.2 (21 hours per week)</b>	
Biostatistics	3
Cell Biology	5
Inorganic & Physical Chemistry	5
Mathematics	3
Communication Essentials ^	3
Sports & Wellness ^	2

### Notes:

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