

PHARMACEUTICAL SCIENCE COURSE MODULES (YEAR 2)

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 2.1

Current Good Manufacturing Practice

This module aims to equip students with an understanding of current Good Manufacturing Practice regulations for pharmaceuticals and related products. Various aspects, such as attributes of materials, labelling, materials in process, finished pharmaceuticals, manufacturing validation, quality control, personnel and facilities are covered.

Pathology

This module helps students to understand the causes and mechanisms of disease. Students will learn about disease processes affecting common organ systems. The mechanisms of disease, natural history and progression and implications for treatment and prevention will be discussed.

Pharmaceutical Analysis

This module studies modern analytical techniques that are used for the detection, identification and quantitative determination of drugs and related substances. Techniques for the evaluation of analytical data and validation of analytical methods will be discussed.

Pharmaceutics

This module focuses on the design and formulation of two-phase pharmaceutical products, including suspensions, emulsions and solid pharmaceutical products, and how they relate to absorption and drug delivery routes. Topics include drug formulations, preparation and dispensing of pharmaceuticals, introduction to biopharmaceutics, pharmacokinetics, bioavailability, specialised dosage forms, prodrugs, liposomes, targeted drug delivery, drug stability of various formulations and shelf life.

Pharmacology

This module covers the basic principles of pharmacology, the mechanism of drug action, dose response relation, adverse reaction, pharmacokinetics (absorption, distribution, metabolism, elimination) and major drug classes.

LEVEL 2.2

Applied Biostatistics

This module covers advanced statistical skills to analyse and interpret a wide range of biological, pre-clinical and

clinical data, and preparation of data for scientific presentation. The statistical skills covered are biological experiment design, hypothesis testing, quantitative data analysis by parametric and non-parametric methods, qualitative data analysis by Chi-square and Fisher tests, and simple correlation and regression analysis for non-linear data. The scientific presentation section covers how to organise data, prepare and incorporate statistical results on graphs and interpretation of results.

Career & Professional Preparation II

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 module, students will explore basic job search strategies, practise writing effective resumes and cover letters, and learn interview skills. Students will also learn professional and intercultural communication skills to prepare them for a dynamic and diverse workplace.

Medicinal Chemistry & Drug Discovery

The first part of this module highlights the drug discovery process and how compounds are identified and developed into drugs. The second part of the module introduces students to the chemistry of drugs and drug systems, with particular emphasis on heterocyclic chemistry and the major drug classes. They will also learn about the relationship between activity and functional group chemistry, and drug design.

Microbiology & Immunology

This module covers fundamental knowledge regarding the role of microbial pathogenesis and the role of immune cells in protective immunity against bacterial, viral, fungal and parasitic infections. Topics include mechanism of disease production, antibiotic resistance, contamination, sterilization and disinfection, infection control, methods of treatment and prevention of disease, innate and adaptive immune system. After the completion of this module, students will have gained an understanding in medical microbiology, microbial pathogenesis, functions of the immune system and immunological concepts for the understanding of drugs that target components of the immune system.

Molecular & Cellular Biochemistry

This module builds upon knowledge covered in foundation modules and encompass molecular biology, protein structure, and cell function with a focus on cellular metabolism. Students will learn not only how molecules function in healthy cells but also how disruption of their function leads to disease. This module will equip students with an understanding of molecular biology, cellular metabolism and biochemical techniques.

World Issues: A Singapore Perspective[^]

This module develops a student's ability to think critically on world issues. Students will discuss a wide range of social, political and cultural issues from the Singapore perspective. It also looks at how city-state Singapore defied the odds and witnessed close to half a century of rapid economic growth, strong political ties and social harmony.

COURSE CURRICULUM (YEAR 2)

Module Name	Credit Units
YEAR 2	
Level 2.1 (22 hours per week)	
Current Good Manufacturing Practice	2
Pathology	3
Pharmaceutical Analysis	5
Pharmaceutics	5
Pharmacology	5
World Issues: A Singapore Perspective [^]	2
Level 2.2 (20 hours per week)	
Applied Biostatistics	3

Career & Professional Preparation II	2
Medicinal Chemistry & Drug Discovery	3
Microbiology & Immunology	5
Molecular & Cellular Biochemistry	5
Interdisciplinary Studies (IS) elective ^	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.