Bachelor of Science (Pharmaceutical Science)

Year One Modules

PR1110A Foundations for Medicinal Chemistry
This module studies the fundamental physical & chemical principles that are important to the design and development of drugs. The major topics to be covered include: molecular properties, intermolecular forces, acidity & basicity, stereochemistry, tautomerism, mechanisms of action, biotransformation and some basics on UV-VIS and IR.

PR1111A Pharmaceutical Biochemistry
This module is aimed at providing fundamental biochemistry knowledge which is important and relevant for pharmacy students to relate the knowledge to drug discovery and development. The module will emphasise the relevance and application of biochemistry in pharmaceutical and pharmacy practices.

PHS1120 Essential Topics in Pharmaceutical Chemistry
This module adopts a biological approach to explain and illustrate foundational pharmaceutical chemical principles that are essential for the understanding of pharmaceutical sciences related to drug synthesis, drug properties, drug analysis and preparation of biomaterials.

PA1113 Basic Pharmacology
This is a team-taught module that aims to prepare pharmacy students with the fundamental principles in how drugs influence human body and how human body handles these agents. These principles are key to introducing system pharmacology here which includes major topics: autonomic, corticosteroid, steroid hormone and immune-pharmacology.

AY1130 Human Anatomy & Physiology I
The module encompasses core material on aspects of human anatomy and physiology with reference to relevant clinical examples. Topics for the module include the following human systems: 1. Cell, Integumentary and Musculoskeletal, 2. Cardiovascular, 3. Haematology and Related Immunology, 4. Respiratory, and 5. Endocrine.

PY1131 Human Anatomy & Physiology II
The module encompasses core material on aspects of human anatomy and physiology with reference to relevant clinical examples. Topics for the module include the following human system: 1. Gastrointestinal, 2. Nervous, 3. Renal and Acid-Base, and 4. Reproductive.

ST1232 Statistics for Life Sciences
This module introduces life science students to the basic principles and methods of biostatistics, and their applications and interpretation. A computer package is used to enhance learning and to enable students to analyze real life data sets. Topics include probability, probability distributions, sampling distributions, statistical inference for one and two sample problems, nonparametric tests, categorical data analysis, correlation and regression analysis, multi-sample inference.
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Year Two Modules

**PR2114A Formulation & Technology I**

This module studies the fundamental physical chemical principles which are important to the design and development of pharmaceutical formulations. The major topics to be covered include: phase diagrams; solutions; buffers & isotonicity; partition, diffusion & mass transfer; solubility & dissolution; reaction kinetics & drug product stability; physical properties of solids (crystallinity, polymorphism); interfacial phenomenon; colloidal systems.

**PR2115A Medicinal Chemistry for Drug Design**

This module provides the basic principles of drug design, with the emphasis on the relationship between structure, physicochemical properties and the molecular basis of drug action.

**PR2122 Biotechnology for Pharmacy**

The aim of this module is to provide students with knowledge of the various techniques in biotechnology and their applications in the manufacturing of biopharmaceuticals and biomedical research, the physicochemical properties, pharmacology and the formulation of commonly used biopharmaceuticals, as well as the principles of the mechanism of some biotechnologically derived diagnostic aids/tests. Major topics to be covered include biotechnologically derived therapeutics such as insulin, growth hormones, cytokines, enzymes, monoclonal antibodies, vaccines, blood products, diagnostic aids/tests for urine analysis, plasma glucose, plasma lipids, HIV and pregnancy, gene therapy, transgenic technology and RNA interference technology.

**PR2143 Pharmaceutical Analysis for Quality Assurance**

This module aims to train students in the principles and practical capability of pharmacopeia assays and various analytical instruments for pharmaceutical analysis. In particular, students will apply the analytical techniques in the characterization of active pharmaceutical ingredient (API), the quality assurance of dosage forms and the analysis of biological fluids, coupled with hands-on experience with instrumentation and real-life problem solving.

**PHS2191 Laboratory Techniques in Pharmaceutical Science**

This module introduces the theory and practical applications of major tools and techniques used in the continuum of drug discovery and development. Factual knowledge in medicinal chemistry techniques, such as synthetic skills, lead optimization, molecular modelling; and in formulation science, such as rheological, dissolution testing, characterization of solid dosage forms, will be integrated with laboratory practice.

**PHS2120 Drug Product Development & Lifecycle Management**

This module will provide the knowledge and understanding on the complete development plan ensuing successful lead identification in the drug discovery process, describing preclinical studies, formulation and product developments, clinical trials and post-marketing studies. The importance of quality, quality assurance and control and key global/regional regulatory frameworks and strategies for product development will be covered. Following post-marketing approval, upcoming innovative...
regulatory and marketing strategies for effective lifecycle management of a pharmaceutical such as improved patient compliance, revenue growth, expanded clinical benefits, cost advantages, life extension exclusivity etc. will also be introduced.

**LSM2241 Introductory Bioinformatics**

Students will be introduced to the concepts, tools and techniques of bioinformatics, a field of immense importance for understanding molecular evolution, individualized medicine, and data intensive biology. The module includes a conceptual framework for modern bioinformatics, an introduction to key bioinformatics topics such as databases and software, sequence analysis, pairwise alignment, multiple sequence alignment, sequence database searches, and profile-based methods, molecular phylogenetics, visualization and basic homology modelling of molecular structure, pathway analysis and personal genomics. Concepts emphasized in the lectures are complemented by hands-on use of bioinformatics tools in the practicals. Students will achieve highly valued skills as biological researchers with basic competence in computational and bioinformatics techniques, with proper foundation to learn more advanced skills in bioinformatics and biocomputing.
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Year Three Modules

PR3117 Formulation & Technology II
This module gives an insight into various liquid, semi-solid and solid dosage forms. The fundamental knowledge of the properties, formulation, manufacture, quality control and applications of these dosage forms will be discussed. The behaviour of materials and unit operations employed in the manufacture of the various dosage forms will also be emphasised.

PR3144 Principles of Research Methods
This module provides students with a comprehensive understanding on the basic principles, concepts and methodology in clinical and pre-clinical research, including applying statistical knowledge in research design. Research examples are chosen to illustrate and facilitate the learning process. Major topics include: selection and formulation of research hypothesis, study designs used in pharmacy practice and clinical research, hierarchy of evidence, potential biases associated with various designs, data acquisition and handling approaches, statistical data analyses, pharmacoeconomics, outcomes research, general methodology in basic science research, and techniques in scientific communication.

PR3145 Compliance & Good Practices in Pharmacy
This module provides students with the foundation in various aspects of good practices, regulation and accreditation standards in pharmacy practice and pharmaceutical industries. It serves to emphasize the pharmacist’s obligation to ensure consumer/patient safety in the supply and use of medicines and health products.

PHS3122 Pharmaceutical Quality Management
The aim of this module is to provide an understanding of the important guidelines, tools and practices of quality risk management that can be applied to all aspects of pharmaceutical quality including development, manufacturing, distribution, and the inspection and submission/review processes throughout the lifecycle of drug. The module will cover the history and philosophy of product quality management, the concept of quality by design, overview of major quality management systems such as “Six Sigma”, “Total Quality Management”, “Lean Management” etc. The module will also provide an overview of various types of audits and inspections that occur in the pharmaceutical industry.
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Year Four Modules

PHS4199 Honours Project in Pharmaceutical Science

The research project work is undertaken either in the first or second semester of the academic year and last for 12 weeks. Each candidate will be required to carry out an independent laboratory-based or literature-based project under the supervision of an academic staff. They will be assessed based on their ability to communicate their research findings via presentations and a formal written report in the form of a research paper.

PHS4299 Applied Project in Pharmaceutical Science

As an alternative to PHS4199 Honours Project in Pharmaceutical Science that is similarly undertaken either in the first or second semester of the academic year and last for 12 weeks, this module serves as a platform to accommodate internship and professional placements in applied and industrial contexts, as well as projects that are of non-basic/preclinical science research nature. Relevant projects of non-academic research nature may be in the areas of, but not limited to, administration, management, marketing, business strategy and regulatory pertaining to the pharmaceutical and consumer healthcare industry.