

Bachelor of Pharmacy (BPharm) – SC403

1. Specific Titles

Bachelor of Pharmacy (BPharm) – 8 semesters FT (Theory & Practical Training) + 1 Year (Pre-registration Training)

Special Note

The four-year BPharm programme leads to a **Bachelor of Pharmacy** and is designed to be a professional undergraduate course, like the BSc (Hons) Biomedical Sciences programmes, the BSc Hons Occupational Therapy and the BSc Hons Physiotherapy currently run by the Department of Health Sciences. Accordingly, the degree of flexibility will differ from most BSc (Hons) Programmes being run by the Faculty. All modules are compulsory and assessment methods will be specific to the modules.

The programme design has taken into account the minimum requirements for the training and education of Pharmacists set by the UK Quality Assurance Agency subject benchmark for award of a Pharmacy degree. The BPharm here, like in all UK pharmacy degree courses, is a 4 year full-time extended undergraduate degree, hence equivalent to a Master of Pharmacy classified honours award in UK.

In addition to the successful completion of the four-year full-time theory and practical training, students will need to complete a 12-month pre-registration training placement in hospital and private retail pharmacies to be awarded the BPharm. BPharm graduates will need to satisfy any other prevailing requirements of the Mauritius Pharmacy Board to obtain professional registration as a pharmacist in Mauritius.

2. Objectives

Pharmacy integrates the main strands of the chemical and biological sciences which relate to medicines and combines these sciences with all the related aspects of health care for the benefit of patients. Pharmacy is also concerned with the provision of evidence-based advice to patients and the public on general health matters. Pharmacists are scientists in the health care community, bringing together physical, biological, clinical, social and behavioural sciences in relation to medicines and their usage.

Pharmacists are the legal and physical guardians of an enormous range of valuable, potent and potentially dangerous substances. They are thus expected to have impeccable standards with a thorough knowledge of relevant law, ethics and codes of practice.

This Pharmacy degree, as recommended by the QAA, has been designed to produce graduates who can think clearly and systematically with a strong vocational element. It addresses the themes and concepts underpinning pharmacy education. Graduates will have a strong academic science base and will be competent pharmaceutical scientists and well prepared for a role in health care.

The practice of pharmacy continues to develop a multi-disciplinary character and evolve. Pharmacy practice now comprises or includes managing medicines at a strategic as well as an individual patient level, the management of repeat dispensing systems, supplementary prescribing, monitoring the effects of medicines and specialisations such as independent prescribing and diagnostic testing.

Pharmacists require a sufficient knowledge and comprehensive understanding of the clinical features and general medical management of diseases, including non-medicine management. They must also have a profound knowledge of the actions and uses of medicines. In addition, all pharmacists are expected to have a basic understanding of the physical and chemical properties of the materials that

go into the medicines they handle, drug manufacture and formulation in order to ensure safe and effective usage.

Furthermore, pharmacists are also expected to be skilled in management and information technology. The widespread use of computer systems in dispensing ensures that medicine interactions, overdoses and incompatibilities are readily detected, allowing pharmacists more time to give advice to patients and other health care professionals. In addition, they must know where to find and how to assess information quickly and reliably.

In the community, pharmacists are responsible for dispensing prescriptions while ensuring that they are legal and appropriate for the patient, for counseling and educating patients on the best use of medicines and responding to their symptoms, for promotion of good health and ensuring self-care and for medication review.

In hospitals, pharmacists have a clinical appraisal function and are a major source of information on medicines. They are expected to provide prompt advice to other professionals and to develop treatment protocols.

This BPharm course has been designed to equip graduates with all the basic training and professional needs outlined above and required of a Pharmacist for general practice, including good communication and interpersonal skills and commitment to ethical and social responsibility. Graduates will be expected to be analytical, critically aware, evaluative, interpretative, empathic and reflective in their approach.

The breadth and multi-disciplinary character of the pharmacy degree, along with the ever-changing nature of pharmaceutical services gives a central role to pharmacists for research into the discovery, characterisation, formulation, administration and therapeutic activity of medicines. Pharmacists are therefore expected to play a leading role in research into the safe and economically responsible use of medicine in practice. The fourth year of study is specifically designed to meet the research, administrative and management needs of the profession. The 'Dispensing Practice' throughout the course duration will provide the opportunity for translation of theoretical knowledge into hands-on practice of immediate relevance and will further help students in acquiring professional competence.

The sharing of some common modules with other Health programmes run by the Department of Health Sciences is in line with the prevailing Primary Health Care Philosophy. For these shared modules, the core content will be identical and the specificity of individual professions will be addressed by specific tutorials run by practicing members of the respective professions.

The programme being proposed is a very wide-reaching programme, open to private candidates as well as in-service trainees from various Ministries, Non-Governmental Organisations and Private Organisations. Graduates with this degree can practice as pharmacists in hospital and retail pharmacies following registration with the Pharmacy Board, join the pharmaceutical industry, the academic profession or pursue further studies.

3. Programme Requirements

GCE Advanced Level passes (or equivalent) in Mathematics, Chemistry and either Physics or Biology. Minimum grades should be three Cs or a total 'A' level mark of 18.

Foundation courses in Physics and Biology will be offered and examined prior to the start of the programme. Students must successfully complete any required Foundation courses before being eligible to join the programme.

Students having successfully completed the Pharmacy Technician Diploma at the University of Mauritius will be eligible for entry into Year 3 of this programme provided they hold GCE Advanced level passes (or equivalent) in a minimum of two subjects.

Students having successfully completed part of a BPharm degree or equivalent elsewhere may apply for entry in a relevant year of the programme, but will get no exemptions from that year or subsequent years of this BPharm degree. Students may be required to take specific modules from previous years as applicable on a case to case basis.

4. Programme Breakdown and Duration

	Normal	Maximum
Pharmacy Technician Diploma (Theory and Practical)	4 semesters (2 yrs)	8 semesters (4 yrs)
BPharm - Full-Time (Theory and Practical)	8 semesters (4 yrs)	12 semesters (6 yrs)

The programme allows for an exit point at Diploma level (Pharmacy Technician Diploma) as indicated above.

The award of an BPharm requires a **12 month pre-registration training year** which will only be undertaken upon successful completion of the four years of full-time theoretical and practical training at the University of Mauritius, and will entitle graduates to practice as Pharmacists.

5. Semester: 15 Weeks (Excluding Exam Period)

6. Credit System: 15 hours of lectures and/or tutorials - 1 credit
30 hours of practicals - 1 credit

7. Credits per Semester: Minimum 9 credits subject to regulation 5 above.

8. Specifications

Professional Practice in the form of dispensing practice in hospital and/or other public/private pharmacies will form an essential part of the professional programme. Professional practice will be undertaken for a 6 hrs/week (preferably Saturdays) in all of the 15 weeks of each of Semesters 1 to 8 (i.e. 90 hrs of Professional practice per Semester). A formal agreement will need to be worked out with participating pharmacies for students to use existing facilities for Professional Practice. Formal lectures/tutorials/practicals will be scheduled over the rest of the week as per programme structure.

STUDENTS MUST PASS ALL PROFESSION-RELATED MODULES OFFERED IN A GIVEN YEAR IN ORDER TO PROCEED TO THE FOLLOWING YEAR.

STUDENTS MUST PASS ALL MODULES OFFERED TO BE AWARDED THE PHARMACY TECHNICIAN DIPLOMA or the BPHARM DEGREE.

9. Assessment

9.1 Continuous and Written Assessment of Modules

All modules will carry 100 marks (i.e. expressed as %) and will be assessed as follows (unless otherwise specified):

Written examinations for all modules, whether taught in semester 1 or 2 or both, will be carried out at the end of the academic year (unless other wise stated). All papers will be assessed over 100 marks.

The pass mark for the Continuous Assessment and the respective written paper will be 50% each.

For modules examined jointly, marks for the two modules will be considered **together** and not the individual marks for each of the two modules.

For all modules taught in Semester 1, the compulsory class test counting for the continuous assessment will be at the end of Semester 1 of the given academic year.

Written exams will carry a weighting of **60%** of the total marks with continuous assessment counting for the remaining **40%** of the marks. Details are given below.

All written papers will have six compulsory questions carrying a maximum of 10 marks each. In case of Semester modules being assessed jointly, papers will contain two sections (one for each module) comprising of three questions each.

Semester Modules Examined Singly

All modules, except where specified, will be assessed by a 2 hr written exam paper at the end of the year in which they are offered.

Semester Modules Examined Jointly

The following pairs of semester modules will be assessed jointly by a 3 hr written exam paper at the end of the academic year in which they are offered:

Year I

PHAR 1111(1) / PHAR 1221(1); PHAR 1121(1) / PHAR 1211(1)

Year II

PHAR 2111(3) / PHAR 2241(3); PHAR 2121(3) / PHAR 2231(3); PHAR 2221(3) / PHAR 2251(3)

Year III

PHAR 3131(5) / PHAR 3211(5); PHAR 3141(5) / PHAR 3111(5); PHAR 3151(5) / PHAR 3221(5)

Year IV

PHAR 4111(5) / PHAR 4211(5); PHAR 4121(5) / PHAR 4241(5); PHAR 4221(5) / PHAR 4231(5)

All other Semester modules will be examined as single modules at the end of the academic year in which they are offered.

9.2 Professional Practice Training (Dispensing Practice Modules)

Professional training is distributed throughout every year of the curriculum in the form of Dispensing Practice Modules (equivalent to 90 hrs of practice each).

To ensure a depth of learning, professional practice will be guided and workplace skills assessed by a learning contract (an agreement about the particular knowledge, skill, or attitudes the student will develop as well as the roles and responsibilities of the student, including regular attendance at placement) and supervised and assessed by practicing pharmacists, preferably with at least three years' experience.

The identified supervisor at the Pharmacy where the students will be placed will be required to fill out a questionnaire pertaining to student's performance during the placement. Students must demonstrate that they have achieved the learning objectives specified in the learning contract.

For the Dispensing Practice, students will be assessed via a reflective portfolio which they will need to submit at the end of each year and via the supervisor's questionnaire assessing their performance during placement. Successful students will be awarded a satisfactory grade (Grade S). Students with unsatisfactory performance in the Dispensing Practice will be awarded a Grade U.

Students must obtain a Grade S in all the Dispensing Practice Modules for the relevant years for the award of a Pharmacy Technician Diploma and/or a BPharm.

9.3 **Practical work and Continuous Assessment**

➤ **Modules including a Practical Component**

Written exams for such modules will carry a weighting of 60% and continuous assessment of practical work and of theory work will carry a weighting of 40%.

There will be no practical exams. Practical work will be assessed on a continuous assessment basis which will carry a weighting of 30% of the total marks awarded for the respective modules involved. The continuous assessment for practical work will include a **practical class test** (weighting 20%), and a **Practical Viva** (weighting 10%).

Continuous assessment for the theory part of modules having a practical component may be in the form of assignments but should include at least one class test and will carry a weighting of 10% of total marks for the module. The pass mark for the continuous assessment of practical work and of theory work will be 50% each.

➤ **Modules not including a practical component**

Continuous assessment for modules not including a practical component may be in the form of assignments but should include at least one class test and will carry a weighting of 40% of total marks for the respective modules. For HLS 2151 the meta-analysis will carry a weighting of 50%, class test 10% and exams 40%.

➤ **Modules including project work**

For modules including mini-project work, **whether assessed jointly or singly**, the mini-project will carry a total weighting of 30% of total marks and will have a pass mark of 50%. The project will be assessed through a formal oral presentation of the mini-project carrying 50 marks and a weighting of 15% of total marks and a report as specified in module description which will carry 50 marks and a weighting of 15% of total marks. **Students will need to pass the mini-project work in order to pass the module or exam paper.**

Continuous assessment for the theory part of the modules may be in the form of assignments but should include at least one class test and will carry a weighting of 10% of total marks for the respective modules.

The **Research Projects** (PHAR 2000 and PHAR 4000) will carry a total of 100 marks with a weighting distribution as follows:

- | | | | |
|-------|--------------------------------------|------------|---|
| (i) | Written project report: | 70% | [35% Supervisor(s) and 35% Second Assessor with moderation of both set of marks by External Examiner] |
| (ii) | Formal oral presentation of project: | 10% | (30% for PHAR 2000) |
| (iii) | Viva by external examiner: | 20% | (0% for PHAR 2000) |

10. Grading Structure

This will be as shown below taking into account that the pass mark for all modules is 50%.

GRADE POINT AVERAGE (GPA) and CUMULATIVE POINT AVERAGE (CPA) FORMULAE

Under the GPA, the following letter grades and their grade point equivalent are used:

Letter Grade	Grade Point	Percentage Mark
A ⁺	4.00	$90 \leq x \leq 100$
A		$80 \leq x < 90$
A ⁻		$70 \leq x < 80$
B ⁺	3.00	$65 \leq x < 70$
B		$60 \leq x < 65$
C	2.00	$50 \leq x < 60$
F	0	$x < 50$

11. Classification of Award

The degree classification will be based on the **overall percentage marks** at the end of the Programme as follows:

CPA (%)	CLASSIFICATION
$\geq 70\%$	1 st Class)
$60 \leq x < 70$	2 nd Class 1 st Division) With
$50 \leq x < 60$	2 nd Class 2 nd Division) Honours
< 50	No Award

12. Repeat and Termination of Registration

If the CPA of a student is below 50% for an academic year, s/he will have to repeat the entire academic year and retake modules as and when offered. However, s/he will not be required, if s/he wishes, to retake modules for which Grade C or above has been obtained.

Students will be allowed to repeat only once over the entire duration of the Programme of Studies.

Registration of a student will be terminated if:

- (i) the CPA $< 50\%$ at the end of an academic year and the student has already repeated one year of study; or
- (ii) the maximum duration allowed for completion of the Programme of Studies has been exceeded.

However a student whose CPA is less than 50% at the end of an academic year and who has already repeated one year of study may be allowed, subject to approval by Board of Examiners, Faculty Board and Senate, to continue with his/her Programme of studies provided:

- (i) at least 75% of the number of credits required for the award of the degree have already been earned; and
- (ii) the maximum allowable duration of the Programme of Studies, as specified in the structure, has not been exceeded.

A student's registration will lapse at the end of the semester in which he/she has successfully completed the minimum requirements for the award of the degree.

13. Reassessment

Re-examination will be allowed only on medical grounds and other special circumstances subject to approval by Faculty Board and Senate upon recommendation by the Board of Examiners. In such cases, Grade I indicating incomplete will be provisionally awarded.

14. Modules of Special Nature

Audit Module

Students who wish to follow specific module(s) or are advised to do so by a Department may audit same. Such Audit modules are not examinable but will appear in their transcript subject to satisfactory attendance (Grade S).

Self-Study Modules

Self-study modules for unsuccessful candidates will only be available for non-professional modules.

15. Important Note

The rules as stipulated in this Programme Structure and Outline Syllabus will replace all other rules and regulations.

16. List of Modules

(L = Lectures; P = Practicals; NA = Not Applicable; O.E. = Online)

All modules carry 3 credits, except where indicated.

The Foundation modules and Dispensing Practice modules throughout the course carry no credits.

Weighting of modules: BPharm: Year 1 : 1; Year 2: 3; and Years 3 & 4: 5.

Code	Module Name	L/P	Credits
<u>Year I</u>			
<i>Optional modules as per individual requirements</i>			
HLS 1011/ HLS 1012	Foundation Course in Biology or Foundation Course in Physics	60/30	0
<i>Compulsory Modules</i>			
<u>Year I</u>			
Semester 1			
PHAR 1111	Pharmaceutics I (Introduction to Pharmacy)	45/0	3
PHAR 1121	Pharmaceutical Chemistry I (Organic, Inorganic and Medicinal Chemistry)	30/30	3
HLS 1131	Introduction to Human Anatomy and Physiology	45/0	3
HLS 1141	Molecular and Cell Biology for Health Sciences	40/10	3
COMS 1010	Communication Skills		3
PHAR 1011	Dispensing Practice I	0/90	0
Semester 2			
BMS 1221	Medical Microbiology I	30/30	3
HLS 1261	Biochemistry for Health Sciences I	30/30	3
PHAR 1211	Pharmacognosy I	45/0	3
PHAR 1221	Pharmaceutics II (Dispensing Pharmacy)	45/0	3
CSE 1010E	Introduction to Information Technology	O.E	3
PHAR 1011	Dispensing Practice I	0/90	0
<u>Year II</u>			
Semester 1			
HLS 2141	Biology of Disease I (Basic Pathology)	45/0	3
HLS 2151	Health Research Methods and Biostatistics	45/0	3
HLS 2161	Biochemistry for Health Sciences II	30/30	3
PHAR 2111	Pharmaceutical Chem II (Pharmaceutical Analysis I)	30/30	3
PHAR 2121	Pharmacology I	30/30	3
PHAR 2011	Dispensing Practice II	0/45	0
PHAR 2000	Research Dissertation	NA	6

Semester 2			
PHAR 2211	Pharmacy Practice I (Hospital and Clinical Pharmacy)	45/0	3
PHAR 2221	Pharmaceutics III (Physical Pharmacy)	40/10	3
PHAR 2231	Pharmacology II	30/30	3
PHAR 2241	Pharmaceutical Chemistry III (Organic Chemistry including Heterocyclic & Medicinal Chemistry)	30/30	3
PHAR 2251	Pharmaceutics IV (Pharmaceutical Technology- Unit Operations)	40/10	3
PHAR 2011	Dispensing Practice II	0/45	0
PHAR 2000	Research Dissertation	NA	6
 <u>Year III</u>			
Semester 1			
PHAR 3111	Pharmaceutical Chemistry IV (Pharmaceutical Analysis II)	30/30	3
PHAR 3121	Pharmaceutical Chemistry V (Medicinal Chemistry)	30/30	3
PHAR 3131	Pharmacognosy II	30/30	3
PHAR 3141	Pharmaceutics V (Pharmaceutical Technology II)	45/0	3
PHAR 3151	Pharmaceutics VI (Pharmaceutical Microbiology, Biological Pharmacy & Cosmeticology)	30/30	3
			PHAR 3011
Dispensing Practice III		0/90	0
 Semester 2			
PTH 3221	Psychology for Health Sciences	45/0	3
PHAR 3211	Pharmacognosy III	30/30	3
PHAR 3221	Pharmaceutics VII (Drug Development, Pharmaceutical Biotechnology & Formulative Pharmacy)	45/0	3
HLS 3211	Medical Physiology and Endocrinology	45/0	3
HLS 3221	Biology of Disease II (Pathophysiology)	45/0	3
PHAR 3011	Dispensing Practice III	0/90	0
 <u>Year IV</u>			
Semester 1			
PHAR 4111	Pharmacotherapy I	30/30	3
PHAR 4121	Pharmacy Practice II (Pharmaceutical Management)	45/0	3
PHAR 4131	Environmental Health and Toxicology	45/0	3
PHAR 4141	Pharmacognosy IV	30/30	3
PHAR 4011	Dispensing Practice IV	0/90	0
PHAR 4000	Research Project	NA	10
 Semester 2			
PHAR 4211	Pharmacotherapy II	30/30	3
PHAR 4221	Pharmacy in Society	45/0	3
PHAR 4231	Pharmacogenetics and Pharmacovigilance	45/0	3
PHAR 4241	Pharmacy Practice III (Forensic Pharmacy and Ethics)	45/0	3
PHAR 4011	Dispensing Practice IV	0/90	0
PHAR 4000	Research Project	NA	10

17. Programme Plan - BPharm

HLS 1011/HLS 1012: Foundation courses in Biology and Physics will be offered between July and August prior to the start of Semester 1.

Semester 1		Semester 2	
Code	Module Name	Code	Module Name
PHAR 1111	Pharmaceutics I (Introduction to Pharmacy)	BMS 1221	Medical Microbiology I
PHAR 1121	Pharmaceutical Chemistry I (Organic, Inorganic and Medicinal Chemistry)	HLS 1261	Biochemistry for Health Sciences I
HLS 1131	Introduction to Human Anatomy and Physiology	PHAR 1211	Pharmacognosy I
HLS 1141	Molecular and Cell Biology for Health Sciences	PHAR 1221	Pharmaceutics II (Dispensing Pharmacy)
COMS 1010	Communication Skills	CSE 1010E	Introduction to Information Technology
PHAR 1011	Dispensing Practice I	PHAR 1011	Dispensing Practice I
Semester 3		Semester 4	
Code	Module Name	Code	Module Name
HLS 2141	Biology of Disease I (Basic Pathology)	PHAR 2211	Pharmacy Practice I (Hospital and Clinical Pharmacy)
HLS 2151	Health Research Methods and Biostatistics	PHAR 2221	Pharmaceutics III (Physical Pharmacy)
HLS 2161	Biochemistry for Health Sciences II	PHAR 2231	Pharmacology II
PHAR 2111	Pharmaceutical Chemistry II (Pharmaceutical Analysis I)	PHAR 2241	Pharmaceutical Chemistry III (Organic Chemistry including Heterocyclic and Medicinal Chemistry)
PHAR 2121	Pharmacology I	PHAR 2251	Pharmaceutics IV (Pharmaceutical Technology – Unit Operations)
PHAR 2011	Dispensing Practice II	PHAR 2011	Dispensing Practice II
PHAR 2000	Research Dissertation	PHAR 2000	Research Dissertation
Semester 5		Semester 6	
Code	Module Name	Code	Module Name
PHAR 3111	Pharmaceutical Chemistry IV (Pharmaceutical Analysis II)	PTH 3221	Psychology for Health Sciences
PHAR 3121	Pharmaceutical Chemistry V (Medicinal Chemistry)	PHAR 3211	Pharmacognosy III
PHAR 3131	Pharmacognosy II	PHAR 3221	Pharmaceutics VII (Drug Development, Pharmaceutical Biotechnology & Formulative Pharmacy)
PHAR 3141	Pharmaceutics V (Pharmaceutical Technology II)	HLS 3211	Medical Physiology and Endocrinology
PHAR 3151	Pharmaceutics VI (Pharmaceutical Microbiology, Biological Pharmacy and Cosmeticology)	HLS 3221	Biology of Disease II (Pathophysiology)
PHAR 3011	Dispensing Practice III	PHAR 3011	Dispensing Practice III
Semester 7		Semester 8	
Code	Module Name	Code	Module Name
PHAR 4111	Pharmacotherapy I	PHAR 4211	Pharmacotherapy II
PHAR 4121	Pharmacy Practice II (Pharmaceutical Management)	PHAR 4221	Pharmacy In Society
PHAR 4131	Environmental Health and Toxicology	PHAR 4231	Pharmacogenetics and Pharmacovigilance
PHAR 4141	Pharmacognosy IV	PHAR 4241	Pharmacy Practice III (Forensic Pharmacy and Ethics)
PHAR 4011	Dispensing Practice IV	PHAR 4011	Dispensing Practice IV
PHAR 4000	Research Project	PHAR 4000	Research Project

18. Outline Syllabus

This outline syllabus is not prescriptive and is intended to serve as a guide only.

YEAR I

HLS 1011 - FOUNDATION COURSE IN BIOLOGY

This module will be equivalent in level to Biology 'A' level and will be compulsory for students not holding 'A' levels in Biology. The A level syllabus (relevant core and electives) prevailing at the time the module is being taught will be adopted. INCLUDES A PRACTICAL COMPONENT.

HLS 1012 - FOUNDATION COURSE IN PHYSICS

This module will be equivalent in level to Physics 'A' level and will be compulsory for students not holding 'A' levels in Physics. The A level syllabus (relevant core and electives) prevailing at the time the module is being taught will be adopted. INCLUDES A PRACTICAL COMPONENT.

PHAR 1111(1) - PHARMACEUTICS I (INTRODUCTION TO PHARMACY)

Pharmacy Profession. Metrology. Classification of dosage forms. Pharmaceutical additives. Size reduction and size separation. Mixing and homogenisation. Clarification and Filtration. Heat processes. Extraction and galenicals.

PHAR 1121(1) - PHARMACEUTICAL CHEMISTRY I (ORGANIC, INORGANIC AND MEDICINAL CHEMISTRY)

Basic principles and concepts of organic chemistry. Stereochemistry. Nomenclature of certain classes of organic compounds. Aliphatic and acyclic hydrocarbons. Aliphatic halohydrocarbons. Aliphatic alcohols. Ethers. Aldehydes and ketones. Saturated monocarboxylic acids and esters. Di and Tricarboxylic acids. Aliphatic amines and related compounds. Sources of impurities. Pharmaceutical aids and necessities. Intra and extracellular electrolytes. Essential and trace ions. Gastrointestinal agents. Radiopharmaceuticals used in medicine. Topical agents and dental products. Miscellaneous inorganic pharmaceutical agents. Terpenoids. Alkaloids. Xanthine bases. Chemistry of flavones and isoflavones.

HLS 1131(1) - INTRODUCTION TO HUMAN ANATOMY AND PHYSIOLOGY

Introduction to human anatomy: anatomical terminology and topography. The endocrine system. The central and peripheral nervous system. The gastrointestinal system: nutrition and digestion. Structure and function of circulatory system: heart, blood vessels, lymphatics, lymph nodes, spleen. Control of Heart Beat and the Cardiac cycle. Structure and function of kidneys: excretion and osmoregulation. Mechanism and control of breathing. Control of growth and reproduction in man. Support, movement and muscle contraction: major muscle groups, ultrastructure of skeletal muscle, contractile mechanisms, skeleton, hard connective tissue. Integument: structure and function of skin, buccal cavity, teeth. General principles and social aspects of human health and disease: diet, gaseous exchange, exercise, drugs, infectious diseases. Fundamentals of the immune system and immune responses. Immune regulation. Autoimmune diseases.

HLS 1141(1) - MOLECULAR AND CELL BIOLOGY FOR HEALTH SCIENCES

Prokaryotic and Eukaryotic cell ultrastructure and function. Cellular genetics. Mendelian Genetics. Population genetics. Gene structure and expression. Translation and post-translational modifications and protein targeting. Applications of genetics. Molecular aspects of cellular structure and function. Molecular genetics. Cellular responses at the molecular level. Animal cell cycle and control of cell division. Membrane structure and membrane transport. Cell signalling. Cell-cell communication. Protein structure and function relationship.

COMS 1010(1) - COMMUNICATION SKILLS

As described in the University of Mauritius on-line module directory, this module will deal with: Writing skills, non-verbal communication, modes of speech delivery and presentation aids, speeches, perception and listening skills, business and technical writing.

PHAR 1011 - DISPENSING PRACTICE I

This module is one of four double modules of fieldwork running over the eight semesters of theory and practical training. Students will be expected to integrate knowledge, professional reasoning and professional behaviour within practice and to develop knowledge, skills and attitudes to the level of competence required of qualifying pharmacists. Teamwork aspects of professional practice will be addressed.

BMS 1221(1) - MEDICAL MICROBIOLOGY I

Microbial diversity and classification of microorganisms: diversity of bacteria, fungi, viruses and parasites and their habitats and modes of existence and taxonomy. Impact of microbes on human lives and the environment. Introduction to tools used to study the microbial world. Aseptic technique and sterilisation. Use of apparatus and equipment. Safety in a microbiological laboratory. Disinfection. Structure and morphology of bacteria. Bacterial growth and its environment. Use of apparatus and equipment. Cell culture techniques. Culture media. Preservation of cells in liquid nitrogen. Laminar flow safety hood – principle and use. General techniques in staining, quantification and identification of microorganisms. Biology (structure, morphology, replication and growth) of microorganisms. Virus structure and size. Replication of the RNA and DNA viruses. Retroviruses : e.g HIV. Comparison between viruses and bacteria. Bacteriophage. Good laboratory practice and safety. Fundamentals of biotechnology.

HLS 1261(1) - BIOCHEMISTRY FOR HEALTH SCIENCES I

Physico-chemical principles of biochemistry. Introduction to major classes of biomolecules. Introduction to enzymology. Biochemical basis of diseases and biochemical investigations in clinical diagnosis and treatment: Specimen collection, handling and general quality control procedures: blood, urine, faeces and other tissue and body fluids. Physiological factors affecting the composition of body fluids and long term biological influences on body fluids. Introduction to Molecular diagnostics.

PHAR 1211(1) - PHARMACOGNOSY I

Introduction, development, present status, future and scope of Pharmacognosy. Importance in Pharmaceutical sciences.. Introduction to different groups of plant constituents and their testing. Definition of selected botanical and Pharmacological terms. Principles of classification of plants with special reference to Algae (Rhodophyta), Fungi (Eumycetes), Angiosperm (Apocynaceae etc). Study of plant tissue and ergastic cell. Different systems of classifications of crude drugs. . Different systems of medicines practised in India e.g. Unani, Ayurvedic and Homeopathic Medicines. Factors involved in production of drugs from wild and cultivated sources. Biological source, chemical tests for identification of salient microscopic features of commercial fibres. Natural Pesticides and Insecticides.

PHAR 1221(1) - PHARMACEUTICS II (DISPENSING PHARMACY)

Prescriptions. Metrology. Posology. Powders. Liquid dosage forms. Emulsions and Suspensions. Semi-solid dosage forms. Tablets. Capsules. Sterile Dosage forms. Introduction to Ayurvedic/ Unani Tibb dosage forms. Incompatibility prescriptions. Computerisation and networking in prescription and dispensing. Current patents and propriety products.

CSE 1010E(1) - INTRODUCTION TO INFORMATION TECHNOLOGY

IT and computers, stepping in the computer; input and output devices, secondary storage, programming, systems software, applications software, systems development, computer networks, the Internet, computer security, software utilities, issues and trends in IT.

YEAR II

HLS 2141(3) - BIOLOGY OF DISEASE I (BASIC PATHOLOGY)

Review of basic cell biology. Introduction to pathology. Characteristics of disease. Nomenclature and classification of disease. Genetic and environmental causes of disease. Diagnostic pathology. Sublethal and lethal injury. Toxic and hypoxic injury. Agents causing injury. Apoptosis and necrosis. Abnormal tissue deposits. Acute inflammation : basic mechanisms and sequelae. Chronic inflammation. Healing and repair, including skin repair. Overview of: cardiovascular disease, urinary and reproductive system disease, respiratory disease, gastrointestinal and liver disease.

HLS 2151(3) - HEALTH RESEARCH METHODS AND BIOSTATISTICS

Will cover the importance of research, types of research, research designs, ethics in research, measurements in research, and analyses of research data. The fundamentals of biomedical and clinical research and the basic principles of epidemiological surveys. Research tools in biomedical research will be explored. Ethical considerations in research, more specifically in biomedical and clinical research will also be addressed. An overview of research as a profession will be given. Use of online retrieval systems in health sciences (e.g. MEDLINE, the WORLD WIDE WEB).

Principles of Biostatistics. Use of statistical packages. Statistical methods in epidemiological surveys and data analysis. Health statistics. Research project design and management. Statistical principles required in health sciences to record, manipulate numerical and non-numerical information and selection of appropriate techniques and statistical consideration to carry out experimental activities. Use of facts and principles to construct hypotheses and make predictions.

The module will also introduce basic skills in oral and written communication to enable the student to effectively communicate biological and other information coherently in continuous prose and by means of tables, diagrams, drawings and graphs, essays, laboratory reports, analytical exercises, poster presentations, oral presentations, abstract writing and journal article reviews. Emphasis will also be placed in this module on analysis, evaluation and interpretation of experimental data and communication skills. Students will be trained to identify and bring together information to give a concise and coherent explanation or description and assess the validity of biological information, experiments, inferences and statements using knowledge gained in biostatistics and information technology. This module will also equip students with a knowledge of project design, experimental planning and project management, application for and sources of funding as well as a critical evaluation of published literature. Problem-based and case studies will form part of this module.

Students will **undertake a mini meta-analysis project** based on a research synopsis which they will be required to develop. The project which will be submitted as a written ring-bound report of length **4000** words. This will enable students to apply research methods and academic communications skills acquired in the module and will help in acquiring practice in information search and critical evaluation and reporting.

HLS 2161(3) - BIOCHEMISTRY FOR HEALTH SCIENCES II

Introduction to enzyme catalysis and mechanisms of enzyme action. Enzyme inhibition. Further study of the major classes of biomolecules : lipids, amino acids, proteins, carbohydrates, nucleotides and nucleic acids. Principles of metabolism and metabolic regulation. Bioenergetics. ATP cycle. Carbohydrate metabolism. Lipid metabolism. Amino acid metabolism. Biochemistry of cell death. Biochemical aspects of cell signaling. Free radical in cell and organ function.

PHAR 2111(3) - PHARMACEUTICAL CHEMISTRY II (PHARMACEUTICAL ANALYSIS I)

Significance of quantitative analysis in quality control. Different techniques of analysis . Acid base titrations. Oxidation and Reduction titrations. Precipitation titrations. Diazotisation titrations. Gravimetric analysis. Non Aqueous Titrations. Complexometric titrations. General methods of isolation of natural products belonging to various groups.

PHAR 2121(3) - PHARMACOLOGY I

Branches of pharmacology. Sources of drugs. Pharmacodynamics. Introduction to Pharmacokinetics and Biopharmaceutics. Pharmacology of autonomic nervous system. Autocoids. Ocular Pharmacology.

PHAR 2211(3) - PHARMACY PRACTICE I (HOSPITAL AND CLINICAL PHARMACY)

Status of Health delivery systems and definition of role of hospitals. Hospital pharmacy, definition, functions and objectives of hospital pharmacy. Drug distribution systems in hospitals. Establishment of OTC counter and dispensing. Maintenance of records of issue of narcotic and dangerous drugs. Medical stores. Pharmacy therapeutics committee. Drug information service and drug information bulletin. Manufacture of pharmaceuticals in hospitals: Sterile and non sterile manufacture. Nomenclature and uses of surgical instruments, equipments and health accessories. Introduction to clinical pharmacy practice. Functioning and working of clinical pharmacy unit. Methodology and techniques of analysis of drug contents and metabolites in blood and biological fluids. Biological half-life, pKa, pH partition. Pharmacist and patient counseling. Drug interactions. Adverse drug interactions. Drugs in clinical toxicity. Designing treatment protocols.

PHAR 2221(3) - PHARMACEUTICS III (PHYSICAL PHARMACY)

Complexation of drug action. Kinetic and drug stability. Surface and interfacial phenomenon. Colloids and macromolecular systems. Rheology. Micrometrics. Coarse dispersions. Diffusion and dissolution.

PHAR 2231(3) - PHARMACOLOGY II

Introduction to pharmacogenetics : environmental and genetic factors contributing to individual variation in drug response in terms of efficacy and safety. Biopharmaceutics : biological factors in drug absorption, drug disposition, bioavailability; assessment of bioavailability, physiological factors affecting dosage regimens. Pharmacokinetics : Drug absorption, distribution and disposition; Compartment models; pharmacokinetic basis of sustained release formulations.

PHAR 2241(3) - PHARMACEUTICAL CHEMISTRY III (ORGANIC CHEMISTRY INCLUDING HETEROCYCLIC AND MEDICINAL CHEMISTRY)

Aromatic compounds. Preparation, properties and actions of phenol sulphonic acids and derivatives, carboxylic acids, carboxamides, nitro compounds, amines, diazonium salts. Aryl halides and Ketones. Polynuclear aromatic hydrocarbons. Heterocyclic compounds. Five member and six member heterocycles. Selected drugs: Outline of synthetic procedures, uses, structure activity relationships including physicochemical and steric aspects and mode of action.

PHAR 2251(3) - PHARMACEUTICS IV – PHARMACEUTICAL TECHNOLOGY I (UNIT OPERATIONS)

Introduction to pharmaceutical engineering. Unit operations concept and requirement. Conveying of solids. Materials of Pharmaceutical plant construction and factors affecting material selection for pharmaceutical plants. Safety hazards and environmental pollutants. Fluidity. Heat transfer dynamics. Distillation. Refrigeration. Drying. Leaching and extraction. Engineering drawings. Projection.

PHAR 2011 - DISPENSING PRACTICE II

This module is one of four double modules of fieldwork running over the eight semesters of theory and practical training. Students will be expected to integrate knowledge, professional reasoning and professional behaviour within practice and to develop knowledge, skills and attitudes to the level of competence required of qualifying pharmacists. Teamwork aspects of professional practice will be addressed.

PHAR 2000(3) - RESEARCH DISSERTATION

Students will design and carry out a survey on a relevant research topic and submit a ring-bound dissertation of around 6000 words altogether on same.

YEAR III**PHAR 3111(5) - PHARMACEUTICAL CHEMISTRY IV (PHARMACEUTICAL ANALYSIS II)**

Physical Chemistry and Principles of Instrumental analysis. Ionization and Ionic Equilibria: Principles and theory. Hydrogen Ion Concentration. Indicators. pH. Solutions. Catalysis. Chemical Kinetics. Thermodynamics. Potentiometric Analysis. Conductometric Analysis. Aquametry. Spectrofluorimetry. Principles of turbidity. Polarimetry. Chromatography: Fundamental principles of various types of chromatography. Visible and UV absorption spectroscopy. Nuclear Magnetic Resonance. Infrared spectrophotometry. Mass spectrometry. Flame Photometry. Atomic absorption spectroscopy. Emission spectroscopy. Polarography. Analysis of selected drugs by instrumental methods.

PHAR 3121(5) - PHARMACEUTICAL CHEMISTRY V (MEDICINAL CHEMISTRY)

Principles of medicinal Chemistry including chemical aspects of drug absorption, distribution, elimination, steric aspects, drug receptor interaction, rational drug design and drug metabolism. Outline of synthetic procedures, structure activity, physicochemical and steric aspects of selected drugs. Steroids: Nomenclature. Stereochemistry, classification, isolation methods, chemistry (excluding synthesis) of specific steroids. Steroid-related drugs. Cardiac glycosides and coronary dilators, hypotensive anti-arrhythmic, antibrillatory and antilipidaemic agents. Outline of synthetic procedures, uses, structure activity relationship including physicochemical and steric aspects and mode of action of selected drugs. Chemistry of vitamins. Prostaglandins.

PHAR 3131(5) - PHARMACOGNOSY II

Modern concepts of Pharmacognosy. Sources of drugs from biological, marine and plant tissue culture. Classification and chemistry of Carbohydrates. Study of drugs dealing with biological sources, geographical distribution, collection, commercial production, Chemical constituents, chemical tests for identity, substitutes, adulterants and uses of specific drugs. Study of lipids, their chemistry, classification and biogenesis. Specific lipid containing drugs dealing with general methods of extraction and purification of fixed oils, biological sources, chemical constituents, tests for identity and uses. Drugs of animal origin. Tannin containing drugs. Protein containing drugs. Plant allergens and allergenic substances. Hallucinogens, narcotics, and common poisonous plants. Biogenesis of primary metabolites and their relationship to the formation of secondary metabolites. Evaluation of crude drugs.

PHAR 3141(5) - PHARMACEUTICS V (PHARMACEUTICAL TECHNOLOGY II)

Drug Manufacture and drug delivery systems. Review of factors influencing rates of drug absorption, distribution, bioavailability and excretion. Product design and formulation : successful formulation of a medicine, starting from the pure drug substance. Processing and manufacturing technology/operations. Mixing. Injections. Capsules. Microencapsulation. Tablets. Measurement of tablet Punch Forces. Pharmaceutical Aerosols. Controlled drug delivery systems. Sustained action dosage forms. Packaging technology. Stability and preservation of medicine. Good manufacture practices for Pharmaceuticals. General principles and methods of bioassays of drugs. Illustration of principles of bioassays using the action of selected pharmacological agents in an appropriate system. Quality assurance and drug analysis including physico-chemical and biological assay of drugs and review of the control of microbial contamination.

PHAR 3151(5) - PHARMACEUTICS VI (PHARMACEUTICAL MICROBIOLOGY, BIOLOGICAL PHARMACY AND COSMETICOLOGY)

Aspects of Microbiology. Action of physical and Chemical agents on microorganisms. Introduction to anti-microbial drug development and chemotherapy. Immunology and immunization. Disinfection. Sterilisation methods and principles. Asepsis. Sterility testing of pharmaceutical products. Fermentation technology. Pharmaceutical applications of microbiological techniques. Microbiological standardisation. Control and detection of microbial contamination during manufacture. Microbial Spoilage in preservation of pharmaceutical products.

This module will also include biological pharmacy: Glandular Products; and Cosmeticology: Raw materials used for cosmetic preparations. Hair care products. Skin care products. Color cosmetics. Dental products. Personal hygiene products.

PHAR 3011 - DISPENSING PRACTICE III

This module is one of four double modules of fieldwork running over the eight semesters of theory and practical training. Students will be expected to integrate knowledge, professional reasoning and professional behaviour within practice and to develop knowledge, skills and attitudes to the level of competence required of qualifying pharmacists. Teamwork aspects of professional practice will be addressed.

PTH 3221(5) - PSYCHOLOGY FOR HEALTH SCIENCES

Introduces students to some of the major theoretical perspectives in Psychology on the nature of human beings, and to the concept of psychological development, with emphasis placed on the cultural contexts of human development.

PHAR 3211(5) - PHARMACOGNOSY III

Study of volatile oil containing drugs with nature occurrence, chemistry, and biogenesis. Pharmacognostic study of Hydrocarbons, Production, export and world trade in oil of mentha, Eucalyptus and oleoresins. Nature, occurrence, chemistry, collection, and preparation of selected drugs. Biological sources, preparation and uses of selected enzymes. Quantitative microscopy. Factors affecting drug constituents. Drug adulteration.

PHAR 3221(5) - PHARMACEUTICS VII (DRUG DEVELOPMENT, PHARMACEUTICAL BIOTECHNOLOGY & FORMULATIVE PHARMACY)

Drug development. Principles of the search for new drugs and the evaluation of their potential therapeutic value/use and toxicity. Evaluation and bioassays of new drugs : Clinical Trials including acute, subacute and chronic toxicity testing, teratogenicity and carcinogenicity. Introduction to post-Marketing surveillance. Legal and ethical problems regarding animal studies. Considerations of individual variations, side effects and drug

interactions in drug development. Application of techniques of genomics and proteomics in drug design and development. Formulative Pharmacy : Preformulation studies. Monophasic and biphasic dosage forms. Blood products. Radio Pharmaceuticals.

HLS 3211(5) - MEDICAL PHYSIOLOGY AND ENDOCRINOLOGY

Hormone types, including protein and steroid hormones and control of hormone secretion. Molecular modes of actions of hormones. Function of specific hormones and endocrine organs in health and disease. Hormonal control of calcium homeostasis. Endocrine aspects of reproduction, pregnancy, infertility and menopause. Basic embryology. Hormone replacement therapy. Autoimmune endocrine diseases. Methods of determination of cortisol, aldosterone, 11-deoxycortisol, 17-hydroxyprogesterone, dehydroepiandrosterone sulphate, corticosteroids. Thyroid function. Methods of determination of thyroxine, T3, TBG, T3 uptake, FTI, TSH. Nutrition and health: aspects of nutrition and dietary requirements. Vitamins: molecular modes of action in health and disease. Essential trace elements.

HLS 3221(5) - BIOLOGY OF DISEASE II (PATHOPHYSIOLOGY)

This module will involve a study of the pathology of diseases of various systems including cardiovascular, respiratory, blood, endocrine, urinogenital, immune system and gastrointestinal. Aspects of the pathophysiology of infection and developmental pathology will also be covered.

Year IV

PHAR 4111(5) - PHARMACOTHERAPY I

Drugs acting on the central nervous system. Drugs acting on cardiovascular system. Drugs acting on blood and blood forming agents. Diuretics. Drugs acting on gastrointestinal systems. Drugs acting on respiratory systems. Use of bioassays to illustrate the effects of selected pharmacological agents on specific systems.

PHAR 4121(5) - PHARMACY PRACTICE II (PHARMACEUTICAL MANAGEMENT)

Personnel management and Industrial relations. Motivation. Communication. Purchasing and store keeping. Materials management. Drug supply. Pharmaceutical marketing: drug advertisement, DTC advertising, Generic v/s Brand name drugs. Establishment of a pharmaceutical factory.

PHAR 4131(5) - ENVIRONMENTAL HEALTH AND TOXICOLOGY

Environmental pathogens, including environmental toxins. Environmental and communicable diseases. Therapeutic management in communicable diseases and epidemics. Role of vaccination. Principles of Toxicology.

PHAR 4141(5) - PHARMACOGNOSY IV

Study of drugs containing glycosides: Nature, occurrence, chemistry and biogenesis. Study of drugs containing alkaloids. Botanical source, history, clinical uses, chemical constituents, authentication and standardization of selected traditional drugs. Study of general aspects of plant tissue culture techniques and their contribution to phytopharmaceuticals. Plant growth regulators. Processes of plant extraction and chromatographic techniques to phytopharmaceuticals. World wide trade, commercial potential and demand of crude drugs.

PHAR 4011 - DISPENSING PRACTICE IV

This module is one of four double modules of fieldwork running over the eight semesters of theory and practical training. Students will be expected to integrate knowledge, professional reasoning and professional behaviour within practice and to develop knowledge, skills and attitudes to the level of competence required of qualifying pharmacists. Teamwork aspects of professional practice will be addressed.

PHAR 4211(5) - PHARMACOTHERAPY II

Chemotherapy : Antimicrobial agents; anticancer agents. Pharmacology of the endocrine system. Vitamins. Use of bioassays to illustrate the effects of selected pharmacological agents on specific systems. Review of Drug Interactions.

PHAR 4221(5) - PHARMACY IN SOCIETY

An overview of the existing and emerging roles of the pharmacist will be covered. Problems of patients where the disease process requires the regular administration of drugs. Particular problems associated with selected disease states and detailed consideration of drug therapy. Mental health: psychiatric terminology and classification; aetiology, symptoms, treatment and prognosis; the most prevalent psychiatric conditions. Social and therapeutic implications of chronic diseases. Age-related diseases and special problems of the elderly. Therapeutic management in dependent patients and the elderly.

Characteristics of a therapeutic relationship; techniques in listening and responding; grief counselling; instilling hope and responsibility for recovery. The value of group work. Role of other health care personnel. Practising interpersonal communication skills and group work. WHO Essential drugs. Alternative to drugs. Health education and Health promotion. Drug abuse. Counselling about drug interactions and side effects.

PHAR 4231(5) - PHARMACOGENETICS AND PHARMACOVIGILANCE

Genetic variations in safety and efficacy of medicines. Principles and importance of post-marketing surveillance including reporting of adverse drug reactions, unexpected drug interactions, unexpected side effects, additional therapeutic effects. Adverse drug effects in clinical use and methods of epidemiological and scientific investigations of these effects. Role of the pharmacist in adverse drug reactions reporting. Role of the pharmacist in ensuring rational drug utilisation.

Overview of techniques used in the field of pharmacogenetics : DNA fingerprinting, DNA sequencing, western blotting, northern blot, southern blot. *In situ* hybridisation, mass screening, monoclonal antibodies as probes. Bioinformatics.

Students will be expected to carry out a mini community-based project in the form of a family study which will be submitted in the form of a ring-bound report of 3000 words.

PHAR 4241(5) - PHARMACY PRACTICE II (FORENSIC PHARMACY AND ETHICS)

Drug legislation. Drug laws: Prevention of Cruelty Act, Pharmacy Act, Drug and Cosmetic Act, Narcotic and Psychotropic Drug Act, Drug and Remedies Act, Medicinal and Toilet Preparations Act, Poison Act, Factory Act, Medical Termination and Pregnancy Act, drug order, Insecticide Act. Drug store management.

PHAR 4000(5) - RESEARCH PROJECT

Students will design and carry out a research project on a relevant research topic and submit a project report of around **10,000 words** on same.

June 2008

