

## Courses Descriptions

### Department of Pharmaceutical Sciences

#### PHA111 Introduction to Pharmacy (2-2-3)

This course provides students with basic knowledge of pharmaceutical calculations needed for compounding and dispensing of medications. It includes an introduction to prescriptions, general dispensing procedures, dosage forms with special emphasis on pharmaceutical solutions and basic techniques of compounding simple solutions. The course also covers basic skills and abilities needed to identify various pharmaceutical incompatibilities and basic techniques needed for extraction of crude drugs.

Pre-requisite: None

#### PHA112 Physical Pharmacy I (2-2-3)

The course is designed to acquaint students with physical pharmacy principles in order for them to have strong foundation in the physical sciences which apply to pharmaceutical dosage forms and formulations. This course will be complemented by and is a prerequisite to Physical Pharmacy II. The course covers states of matter, phase equilibria and phase rule, electrolyte and nonelectrolyte solutions and their colligative properties and solubility and distribution phenomena.

Pre-requisite: PHA111

#### PHA124 Pharmaceutical Botany (2-2-3)

This course deals of the study of the medicinal plants and their botanical structure including cell differentiation, cell contents and the general study of the plant organs macroscopically and microscopically.

Pre-requisite: None.

#### PHA125 General Pharmacognosy (3-2-4)

Pharmacognosy is the subject that deals with the general study of the important medicinal plants . The study includes their origin, morphology, histology, constituents and uses. The drugs are classified into groups according to their main therapeutic values.

Pre-requisite: PHA124

#### PHA141 Pharmaceutical Organic Chemistry I (2-2-3)

This course presents the fundamentals of certain topics in organic chemistry. It covers some important areas in organic chemistry, which include aliphatic and aromatic hydrocarbons, alkyl- and aryl halides, alcohols, ethers and epoxides. It emphasizes the pharmaceutical importance of these functional groups.

Pre-requisites: None

#### PHA142 Pharmaceutical Organic Chemistry II (2-2-3)

This course is continuation to Pharm. Organic chemistry I. The course includes basic chemical reactions and mechanisms, Stereochemistry, phenols, aldehydes, ketones, and carboxylic acid and their derivatives, properties and reactions of dysfunctional compounds, amines, aromatic and heterocyclic compounds, and introduction to organic natural products. Laboratory work concerning specific chemical reactions, organic synthesis and identification of organic compounds.

Pre-requisite: PHA141

**PHA143 Pharmaceutical Analytical Chemistry I (2-2-3)**

This course covers the theoretical basis and introductory to quantitative analysis techniques including chemical equilibrium, dissociation of acids and bases, pH calculations, and buffer solutions. It also involves covering the fundamentals and applications of volumetric quantitative methods based on acid-base reactions in both aqueous and non-aqueous media.

Pre-requisite: PHA141

**PHA212 Physical Pharmacy II (2-2-3)**

This course aims to provide students with basic physicochemical principles needed to explain characteristics & behavior of pharmaceutical dispersions like colloids, suspensions, emulsions, ointments, creams & aerosols. It also covers rheological properties of both Newtonian & non-Newtonian systems.

Pre-requisite: PHA112

**PHA213 Pharmaceutical Dosage Form I (2-2-3)**

The course comprised of principles and techniques involved in the formulation, preparation and evaluation of solid dosage forms. It covers physical properties of powders, preparation of bulk and divided powders, as well as effervescent and non-effervescent granules. Capsules and tablets types, methods of production/filling and storage are described. The course also covers rectal drug absorption, formulation and evaluation of suppositories.

Pre-requisite: PHA112

**PHA214 Pharmaceutical Dosage Form II (2-2-3)**

This course covers basic principles of drug stability, routes of drug degradation and various means of avoiding them. It also covers sterile products including parenteral and ophthalmic preparations; their advantages & disadvantages, formulations, quality control tests and various sterilization procedures. In addition, aseptic techniques applied during the preparations of sterile products shall be covered. The course also includes an introduction to sustained released products, as well as packaging materials.

Pre-requisite: PHA213

**PHA244 Pharmaceutical Analytical Chemistry II (2-2-3)**

The first part of the course focuses on the basics of titrimetric methods based on precipitation and oxidation-reduction reactions. The applications of these methods for the analysis of pharmaceutical compounds in pure forms, dosage forms, and biological fluids will be covered. In the second part, the course covers the fundamentals and pharmaceutical applications of gravimetric methods of analysis, and the different classes of chemicals based on their purity.

Pre-requisite: PHA143

**PHA245 Instrumental Analysis I (2-2-3)**

The course provides an introduction to the instrumental methods of analysis including spectroscopic methods of analysis such as UV-VIS and fluorimetry; in addition to a number of electrochemical methods of analysis.

Pre-requisite: PHA244

**PHA311 Biopharmaceutics and Pharmacokinetics I (2-2-3)**

This course focuses on biopharmaceutics aspects of how drugs get to the site of absorption, drug dissolution, membrane permeability, bioavailability and bioequivalence. More specifically, students are introduced to the importance of drug plasma levels, and the physiological and cell biology background related to gastrointestinal tract drug absorption. The routes of drug administration and formulation factors are covered as they influence its bioavailability. Emphasis are given to discuss bioavailability and bioequivalence along with the new drug development process.

Pre-requisite: PHA214, PHA245

**PHA312 Biopharmaceutics and Pharmacokinetics II (2-2-3)**

Pharmacokinetic concepts are introduced, including the concepts of pharmacokinetic models, linear and nonlinear pharmacokinetics, clearance and volume of distribution as they relate to drug concentration-time relationships for common routes of administration. Physiologic determinates of variability including age, body composition, renal and hepatic disease are also covered in relation to clinical application of pharmacokinetics.

Pre-requisite: PHA311

**PHA313 Pharmaceutical Technology (3-2-4)**

This course covers theoretical background & practical demonstration of different manufacturing unit processes like; heat transfer, filtration, particle size reduction, particle size analysis, mechanisms of mixing, powder flow, granulation, and drying that are applied in pharmaceutical industries. The course also comprises the design & operation of clean rooms with special emphasis on quality assurance & good manufacturing practice guidelines.

Pre-requisite: PHA212, PHA214

**PHA346 Instrumental Analysis II (2-2-3)**

This course aims to introduce to the students a concept of applying the available instruments used for separation of mixtures as well as qualitative and quantitative analysis of medicinal and pharmaceutical raw materials and formulated medicines. The course covers different chromatographic methods and techniques (PC, TLC, GC, and HPLC). In addition, it involves certain spectroscopic methods such as infrared, nuclear magnetic resonance and mass spectroscopy.

Pre-requisite: PHA245

**PHA347 Phytochemistry (3-2-4)**

This course covers the study of the chemistry of crude drugs such as volatile oils, glycosides, alkaloids bitter principles, resins and saponins etc. The study covers the chemical and physical properties, identification tests, methods of isolation and methods of assays.

Pre-requisites: PHA125, PHA346

**PHA354 Medicinal and Pharmaceutical Chemistry I (2-2-3)**

This course covers the basic principle of medicinal chemistry. It deals with the relationship between chemical structure and biological activity. Topics covered include the effect of physicochemical properties on biological response, the effect of molecular modification on receptor binding and drug metabolism. The second part of the course is devoted to the study of chemotherapeutic agents.

Pre-requisites: PHA142, PHA253

**PHA356 Medicinal and Pharmaceutical Chemistry II (2-2-3)**

This course covers synthesis, pharmacological mechanism/ classification, structural features and structure activity relationship (SAR) studies and metabolism of major classes of medicinal agents. The detailed knowledge and understanding about targets by various medicinal compounds are discussed with emphasis given on the chemical basis of drug action. The new approaches to tackle the disease/ disorders are looked at briefly. Topics covered include adrenergic and cholinergic drugs, CNS depressants, analgesics, antihistamines, local anesthetics and cardiovascular drugs.

Pre-requisite: PHA354

**PHA414 Pharmaceutical Technology Training (3-3)**

This training program was designed to provide pharmacy students with the main principle of drug industry and to understand the main role of pharmacists in such field. Students during the training program will be asked to attend and to take part in all sections of drug industry such as: production line, quality control, quality assurance, raw material handling, and marketing department.

Pre-requisite: PHA313

**PHA441 Nuclear Pharmacy (College Elective Course) (3-3)**

This course covers the fundamentals of nuclear pharmacy, radiopharmaceuticals compounding, stability prediction, packaging as well as uses and applications of radiopharmaceuticals as a diagnostic and therapeutic agents. The nuclear pharmacy practice guideline of APHA Academy of Pharmacy Practice and Management (APHA-APPM) will be discussed to cover the responsibility of pharmacist in maintaining quality of radiopharmaceuticals, safety of coworkers and environments and providing pharmaceutical care to patient with optimal outcome

Pre-requisite: PHA337

**PHA448 Phytotherapy (College Elective Course) (3-3)**

Study of medicinal plants and their active constituents. The study includes pharmacokinetic and pharmacodynamic effects of these constituents, as well as the appropriate dosage forms for administration of their preparations. Monographs on *Materia Medica* of selected medicinal plants are included in the study.

Pre-requisite: PHA347

**PHA453 Pharmaceutical Biotechnology**

This course introduces the student to the field of biotechnology with especial emphasis on its applications in the preparation of biopharmaceuticals. The course entails definitions, brief history and major areas of contribution of biotechnology. The course shall also cover recombinant DNA technology including cloning of DNA, PCR and Gene libraries. In addition, different methods adopted for the preparation of biotechnology drug products and their evaluation, handling and storage shall be covered. Current marketed biotechnology drug products, as well as the future prospects of biotechnology shall be discussed.

Pre-requisite: PHA252

**Department of Clinical Sciences**

**DDS318 Pathology (2-2)**

This course will introduce the concepts of injury and the alterations in normal structure and function of the human body, as occurring in diseases. It is aimed to provide students a comprehensive knowledge of key concepts of general pathology which include cell injury, inflammation, wound

healing, regeneration and repair, neoplasia, hemodynamic disorders, pathology of infectious diseases, metabolic and nutritional diseases. This course is useful in understanding the etiology, pathogenesis, morphological features and diagnosis of diseases that affect different organs of the body in order to establish a sound foundation for clinical practice in pharmacy.

Pre-requisite: PHA253

**PHA135 Principles of Human Anatomy and Physiology I (3-2-4)**

The course provides basic knowledge of normal human body structure and function necessary for students of College of Pharmacy to be capable of understanding other related pathological and clinical medical courses. It also assists students to properly understand the pharmacology of drugs and its application in clinical pharmacy.

Pre-requisite: None

**PHA136 Principles of Human Anatomy and Physiology II (2-2-3)**

The course provides basic knowledge of normal human body structure and function necessary for students of Faculty of Pharmacy & Medical Sciences to be capable of understanding other related pathological and clinical medical courses. It also assists students to properly understand the pharmacology of drugs and its application in clinical pharmacy.

Pre-requisite: PHA135

**PHA221 Community Pharmacy Training I (3-3)**

The objectives of this initial training is to develop students' communication skills, knowledge of community pharmacy practice and to become familiar with different trade of the over- the- counter (OTC) and generic names of some drugs available in the market. In addition, students are expected to understand how to respond to commands in the different types of prescriptions.

Pre-requisites: PHA236

**PHA235 Pharmacology and Therapeutics I (2-2-3)**

This course deals with the general aspects of pharmacokinetics and pharmacodynamics, the pharmacological actions and the therapeutic uses of drugs acting on the autonomic nervous system, the respiratory system and drugs acting on local hormones (autacoids). Various groups of drugs are studied including their pharmacokinetics, mechanism of actions, adverse effects, indications and contraindications.

Pre-requisite: PHA136

**PHA236 Pharmacology and Therapeutics II (2-2-3)**

Deals with the pharmacological actions and the therapeutic uses of drugs acting on the cardiovascular system, the renal system, the gastrointestinal tract and the hematopoietic system. Various groups of drugs are studied including their pharmacokinetics, mechanism of actions, adverse effects, indications and contraindications.

Pre-requisite: PHA235

**PHA251 Biochemistry I (2-2-3)**

This course deals with the general aspects of Chemistry of carbohydrates, amino acids polypeptides and proteins, nucleic acids, lipids, vitamins and enzymes. This includes: the structure of these compounds, their classification and biomedical importance. The course relates structure of the compounds to their function.

Pre-requisite: PHA142

**PHA252 Biochemistry II (2-2-3)**

The course covers the following topics: bioenergetics, metabolism of carbohydrates lipids, proteins, energy releasing and energy consuming metabolic processes. The regulation of synthesis and breakdown of sugars, lipids, nucleic acids and amino acids. The biochemistry of specialized biological materials. Biosynthesis of the macromolecules proteins, DNA, and RNA.

Pre-requisite: PHA251

**PHA253 Pharmaceutical Microbiology and Immunology (3-2-4)**

This course takes in consideration the microbiology as an explosive subjects with many ramification .It is designed to introduce the students to the microbes world exemplified by Prokaryotes, Eukaryotes and the unique properties of the viruses. Trying to give a brief and up-date presentation of those aspects of medical organisms that can inflict damages to human health. Antibiotics will be discussed at length. Immunology as rapidly developing field plays a pivoted role in health and disease so it deserve a fair share in this course.

Pre-requisite: PHA251

**PHA337 Pharmacology and Therapeutics III (2-2-3)**

Deals with the pharmacological actions and the therapeutic uses of drugs acting on the central nervous system and endocrine system. Various groups of drugs are studied including their pharmacokinetics, mechanism of actions, adverse effects, indications and contraindications.

Pre-requisite: PHA236

**PHA422 Community Pharmacy Training II (3-3)**

Through the utilization of selected community pharmacies and competency-based objectives, the student will gain an appreciation for the profession of pharmacy as practiced in the community and develop professional attitudes, judgment and skills needed to function in this setting.

Pre-requisite: PHA221+462

**PHA438 Toxicology and Chemotherapy (2-2-3)**

This course is designed to give the student basic information about the general principles of clinical and environmental toxicology and the clinical management of poisoned patients. The study of chemotherapeutic drugs aimed at allowing the student to gain a basic understanding of drugs used for the treatment of various types of infections, infestation and malignancy and then commencing the development of an understanding of the therapeutic applications of these drugs based on their underlying pharmacodynamic and pharmacokinetic properties.

Pre-requisite: PHA337, DDS318

**PHA439 Bioassays and Drug Screening (2-2-3)**

This course is designed to give the student basic knowledge of the methods used in the preclinical drug development. These include general methods used in the screening for a new drug and the determination of the potency using biological objects. The general methods used in the screening and bioassay of drugs on different systems of the body are covered.

Pre-requisites: STA112, PHA337

**PHA451 Project (2-2-3)**

By the time students reach this level (115Crd.Hrs) they will have studied a range of pharmaceutical topics, and have gained some experience of the techniques used in research, through lecture and workshop. Students will initially undertake a period of open-learning time covering research methodology and then spend a period of time on a course of specialist study. The faculty project committee has recently decided that this project should be run across both semesters in the final year. This will enable students to investigate an area of clinical pharmacy in significant detail, under supervision.

Pre-requisite: 115 Credit Hours

**PHA454 Clinical Microbiology (College Elective Course)(2-2-3)**

This course explores various diseases and their causative agent and relate such information with the diagnostic procedures aiming to identify those agents and determine the most suitable treatment. The course is primarily intended to provide a firm grounding in the understanding of infection and its control.

Pre-requisite: PHA253

**PHA455 Gene Therapy (College Elective Course) (3-3)**

Discussion of the diagnosis of genetic disorders and how the causal genes be identified and isolated. The course teaches the basic science of gene therapy, gene delivery vectors, expression of transferred genes, and current gene therapy protocols in humans. The course allows the students to assess the current status and promise of gene therapy and recognize the advantages, disadvantages, and limitations of gene therapy.

Pre-requisites: PHA252, PHA253

**PHA461 OTC Drug and Products (2-2-3)**

This OTC course is designed to establish a strong knowledge of OTC drugs in all of its aspects and making pharmacist's job to be patient oriented and not product oriented. This will include monitoring, screening and evaluating drug treatment regimens either in community or hospital settings. In particular, symptoms associated with: gastro-intestinal tract, respiratory, skin, central nerves system, pediatrics, women's health, men's health, eyes and ears, holiday healthcare will be considered with respect to: possible causes; symptoms and signs; treatment available; counseling points; and when to refer to doctors.

Pre-requisites: PHA337

**PHA462 Clinical Pharmacy I (2-2-3)**

Clinical Pharmacy I (PHA462) course offered for B.Pharm degree, pharmacy students build on the prior knowledge gained in pharmacology, biopharmaceutics and kinetics. The overall aim of the module is to develop skills students require to understand new aspects of pharmacy practice and the concept of pharmaceutical care. Patient assessment and documentation available to conduct and analyze patient assessment are covered. The role of laboratory values in patient assessment will be introduced. Pathophysiology and management of major organ disease, namely, the respiratory system and infectious diseases are detailed.

Pre-requisites: PHA312, PHA337

**PHA463 Clinical Pharmacy II and First Aid (2-2-3)**

Clinical Pharmacy II (PHA463) course offered for B.Pharm degree, pharmacy students build on the prior knowledge gained in clinical Pharmacy I (PHA462). The overall aim of the module is to help students to access the knowledge base and skills required for assessment of the pharmaceutical needs of patients in either primary or secondary health care settings. Understanding of how major diseases present and are managed including the options available for drug therapy and the importance of establishing therapeutic goals for the patient will be emphasized throughout the course time schedule. Upon completion of the course, students should be able to demonstrate sound knowledge and understanding of the pathophysiology of the major diseases and the mechanisms action and rational clinical use and major side-effects and contraindications of the drugs that are currently used to treat or manage different diseases.

Pre-requisite: PHA462

**PHA464 Marketing and Sales (1-1)**

The course will concepts of personal, human resource and business management in general and in pharmacy practice. It also covers the principles of marketing theories and applications.

Pre-requisite: PHA462

**PHA465 Pharmaceutical Legislations (1-1)**

The course will cover ethical principles and codes that govern the practice of pharmacy and medicine in patient care; the different ethical issues pharmacists encounter in daily pharmacy practice; competency of pharmacists and standards of practice expected to be met by regulatory and licensing bodies locally and internationally; the laws and regulations governing pharmacy practice and drug control in the UAE.

Pre-requisite: PHA438

**PHA471 Hospital Pharmacy Training (3-3)**

This training course will familiarize the student to hospital pharmacy practice in the inpatient and outpatient settings. The training is designed to provide students with the preparation needed to understand the practice environments they will enter and to expose them to areas of pharmacy practice they may have not previously considered within the hospital environment. The student will learn different concepts in the hospital pharmacy, the philosophy of pharmacy consultant services and how to implement pharmaceutical care services. Moreover, the student will develop professional attitudes, judgment and skills needed to function in this setting. He will learn methods used to monitor drug therapy in the patient, treatment of common disease states seen, and how to effectively communicate with patients and health professionals regarding drug utilization. Where available, the student will be involved in the different operations carried out in the inpatient setting.

Pre-requisite: PHA337

**PHA472 Clinical Pharmacy Training (3-3)**

This training course (clerkship) will introduce the student to clinical pharmacy practice in the inpatient setting through clinically oriented patient-specific and non patient-specific activities. The student will learn clinical pharmacy concepts, the philosophy of pharmacy consultant services and how to implement pharmaceutical care. In addition, the student will be exposed to methods used to monitor drug therapy in the patient, clinical manifestations, treatment and monitoring parameters of common disease states seen, and how to effectively communicate with patients and health professionals regarding drug utilization.



Pre-requisites: PHA461, PHA462