

## Courses Descriptions

### Department of Clinical Sciences

#### A. Department Obligatory Courses:

##### **PHA100 Pharmacy and Communication Skills (3-0-3)**

This course aims to introduce aspects of professional practice, communication skills, and patient care and management to the first-year pharmacy students. The course also covers pharmaceutical and medical abbreviations used in practice, best prescribing practice, and the prescription and its legal requirements. The course gives students a view of the pharmacist career options in the settings of retail, hospital, industry, research and academia. This course will also offer some concepts of pharmaceutical calculations used in practice.

Pre-requisite: NA

##### **PHA115 Biochemistry I (2-0-2)**

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: PHA110

##### **PHA130 Principles of Human Anatomy and Physiology I (2-2-3)**

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: NA

##### **PHA131 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: PHA130

##### **PHA147 Principles of Pharmaceutical Care (2-2-3)**

The purpose of this course is to introduce patient assessment techniques and documentation. It also provides students with the background and application of pharmacist-provided patient-centered care. It also provides students with basics of patient assessment processes and documentation.

Pre-requisite: (PHA100)

### **PHA150 Introductory Pharmacy Practice Experiences I (0-80-2)**

This course is observatory in nature and will familiarize the students to both hospital and community pharmacy practice 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. Similarly, this training course provides an opportunity for the students to familiarize them on role of pharmacist in community pharmacy and necessary information on functioning of a Community Pharmacy, its organization, management etc. Students also gain understanding on the law and ethical standards practiced in hospital and community pharmacy settings.

Pre-requisite: PHA100

### **PHA216 Biochemistry II (2-2-3)**

This course is designated to provide a comprehensive survey of the clinical aspects of diseases and their effect on body chemistry. Topics include Lipid metabolism and lipoproteins disorders, renal function tests, liver function tests, cardiac function tests, metabolic aspects of tumors, and main hematological disorders.

Pre-requisite: PHA115

### **PHA220 Introductory Pharmacy Practice Experiences II-Hospital Pharmacy (0-160-4)**

During this training the student will learn different concepts in the hospital pharmacy. The student will also develop professionalism attitudes, judgment and skills needed to work in a hospital. In addition, the student will be able to record drug distribution and perform inventory control processes. Whenever applicable, the student participates various operations carried out in the hospital pharmacy and communicate with other healthcare professionals.

Pre-requisite: PHA150

### **PHA230 Pharmacology I (2-2-3)**

This course provides students with basic pharmacological concepts and knowledge about autonomic nervous system, respiratory system and autacoids. The course aims to improve students' ability to understand the pharmacodynamics and pharmacokinetic properties of drugs and identify how to assess the relevant factors for the management of patients with various autonomic and respiratory systems related conditions. This course also aims to improve students' ability to provide professional reports and assignments.

Pre-requisite: (PHA115) + (PHA131)

### **PHA231 Pharmacology II (2-2-3)**

This course provides students with in-depth pharmacological knowledge on cardiovascular, renal, blood and gastrointestinal medications. The course aims to improve students' ability to understand the pharmacological actions and the therapeutic uses of drugs acting on the cardiovascular system, the renal system, the gastrointestinal tract and the hematopoietic system, their mechanism of actions, adverse effects, indications and contraindications. This course also aims to improve students' self and

team learning skills in providing professional decision making.

Pre-requisite: (PHA230)

### **PHA264 Pharmaceutical Microbiology and Immunology I (2-2-3)**

Microbiology and Immunology I designed to introduce the students to microbe's 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. Explore sterilization techniques. Antibiotics discussed at length.

Immunology as rapidly developing field plays a pivoted role in health and disease so it deserves a fair share in this course

Pre-requisite: (PHA115)

### **PHA265 Pharmaceutical Microbiology and Immunology II (2-0-2)**

The course microbiology and immunology II discusses in more detail Gram-positive and negative bacteria, mycobacteria, spirochetes, chlamydia and rickettsia, viruses of medical importance and unconventional infectious agents. Pathogenicity, signs and symptoms and diagnosis and treatment for the mentioned pathogens is covered.

Pre-requisite: (PHA264)

### **PHA333 Pharmacology III (2-2-3)**

This course provides students with in-depth Pharmacological and Therapeutic knowledge on Central Nervous System and endocrine medications. The course aims to improve students' ability to understand the pharmacological actions and the therapeutic uses of drugs acting on the central nervous system and endocrine system, their mechanism of actions, adverse effects, indications and contraindications. This course also aims to improve students' self and team learning skills in providing professional decision making.

Pre-requisite: (PHA231)

### **PHA370 OTC drug and products (3-2-4)**

This OTC course is designed to establish a strong knowledge of nonprescription 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 in community 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. It also covers herbal, nutritional supplements available in the community pharmacy.

Pre-requisite: (PHA374)

### **PHA374 Therapeutics I (2-2-3)**

This course provides students with in-depth therapeutic knowledge on cardiovascular and respiratory, gastrointestinal disorders (GIT). The course aims to improve students' ability to identify and critically assess the relevant factors for the management of patients with cardiovascular, respiratory, and GIT diseases. Further, it is designed to help students integrate drug therapy into an overall cardiovascular/respiratory or GIT disease management plan.

Pre-requisite: (PHA231)

### **PHA377 Drug Information & Literature Evaluation (2-2-3)**

"Drug Information and Literature Evaluation" is a course designed to introduce students to the fundamentals of drug information, types of literature with evaluation for each, types of study designs, and evaluation of clinical trials by equipping students with the principles to critique literature and judge their practical implications. A common drug information resource such as Lexicomp will be used to allow students to use the technology of drug information, and retrieval for different drug requests and for quality assurance. The course also describes referencing styles for writing scientific reports.

Pre-requisites: (RES211) + (PHA374)

### **PHA379 Therapeutics II (2-2-3)**

This course provides students with in-depth knowledge of Endocrine, Renal, and Urological disorders. Therapeutic management of these conditions and pharmacist role is emphasized. The course also covers topics related to drug use in pregnancy and lactation and the factors used in decisions about medication use in these conditions.

Pre-requisite: (PHA374)

### **PHA380 Introductory Pharmacy Practice Experiences III- Community pharmacy (0-80-2)**

This training provides students with skills of handling prescriptions. In addition, students develop the required skills of handling medical devices, herbal and nutritional supplements, baby care and nonprescription skin care products available in the community pharmacy. Students will appreciate the profession of pharmacy as practiced in the community and develop professional attitudes, judgment and skills needed to provide pharmacy related services.

Pre-requisite: (PHA220)

### **PHA415 Pharmacy Management & Marketing (3-0-3)**

The first part of the course covers the concepts of pharmaceutical business management in pharmacy practice, which includes human resource management, budgeting, inventory management, financial statements, and managing risks in pharmacy practice settings. The second part of this course is designed to provide students with a comprehensive understanding of the principles and aspects of pharmaceutical marketing to explore the major components of the marketing mix, including product,

place, promotion and pricing, and their role in pharmaceutical industry. This prepares future pharmacy practitioners with the fundamentals of analytical and decision-making skills to create basic marketing strategies.

Pre-requisite: (PHA470)

### **PHA434 Chemotherapy (3-0-3)**

This course provides students with in-depth knowledge on the understanding of how antimicrobial and chemotherapeutic agents work. Principles of antimicrobial and chemotherapeutic therapy are covered. Pharmacist management of common infections encountered in the community will be discussed.

Pre-requisite: (PHA333)

### **PHA442 Principles and Practice of Toxicology (2-0-2)**

This course is designed to give the student basic concepts of toxicology as they apply to the effects of environmental agents, e.g. chemicals, metals, on human health. The course discusses the distribution, cellular penetration, metabolic conversion, and elimination of toxic agents, as well as the fundamental laws governing the interaction of foreign chemicals with biological systems to cause adverse effects. The lecture course provides students with a conceptual framework for understanding the broad spectrum of Clinical toxicology of drugs and essential chemicals, (toxic dose, diagnosis and treatment with focus on antidotes and, the basic principles and mechanisms of toxicology as applied to various chemicals or classes of chemicals in selected tissues and organs.

Pre-requisite: (PHA333)

### **PHA450 Graduation Project (3-0-3)**

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: 120 C.Hr + (PHA377)

### **PHA466 Pharmacoeconomics (3-0-3)**

This course is an introduction to understanding the basic concepts of Pharmacoeconomics through the use of various analysis techniques to compare the costs and consequences of pharmaceutical products and services to patients, healthcare systems and society. The course deliberates on Pharmacoeconomics application in informing health decisions and resource allocation.

Pre-requisite: (PHA377)

### **PHA470 Regulatory Affairs in Pharmacy (2-2-3)**

This course provides students with an overview of quality management systems in various pharmacy practice settings. Regulatory requirements during manufacturing and control of pharmaceuticals including numerous good practices will be covered. Drug approval process and registration in local, regional, and key Arab and international world pharmaceutical markets will be discussed. The course also focuses on the detection and regulatory aspects of counterfeit pharmaceutical products. Ethical principles and codes that govern the pharmacy profession in different pharmacy practice settings are discussed.

Pre-requisite: (PHA226) + (PHA301)

### **PHA476 Therapeutics III (2-2-3)**

This course provides students with in-depth therapeutic knowledge on neurological, psychiatric, bone, and hematological disorders. The course aims to improve students' ability to identify and critically assess the relevant factors for the management of patients with neurological, psychiatric, bone, and hematological disorders. Further, it is designed to help students integrate drug therapy into an overall neurological, psychiatric, bone, and hematological disorders management plan.

Pre-requisite: (PHA379)

### **PHA478 Pharmacogenomics (2-0-2)**

This course will provide the students with general understanding of basic pharmacogenomics principles and concepts as well as the understanding of genotype/phenotype relationships and gene-environment interactions as determinants of disease susceptibility. It will examine the molecular basis for differences in drug disposition and application of that information for individualized drug treatment regimens and disease prevention strategies. Finally, it will explore ethical, legal, social, and economic issues relevant to pharmacogenomics testing.

Pre-requisite: (PHA333)

### **PHA484 Pharmacovigilance and Epidemiology (2-2-3)**

The course aimed to describe concepts and principles of pharmacoepidemiology in the broad context of therapeutic evaluation and drug decision-making.

It prepares students to develop a methodology to study medication use in large number of population, reports adverse drug reaction and use post-marketing surveillances, drug utilization reviews in order to study the safety and efficacy of medications.

Pre-requisite: (PHA377)

### **PHA590 Professional Practice Experience - I (Internal Medicine) (0-160-4)**

This rotation provides students with expertise in internal medicine. The student will develop advanced knowledge and skills needed for providing pharmaceutical care to patients with an emphasis on patients admitted in the internal medicine wards. Learning will be accomplished through ward round participation with healthcare team, student projects, presentations, and other tasks provided by the preceptor.

Pre-requisite: (PHA380) + (PHA476)

### **PHA591 Professional Practice Experience – II (Critical care) (0-120-3)**

This rotation provides students with expertise in critical care medicine. The student will develop advanced knowledge and skills needed for providing pharmaceutical care to critically ill patients with an emphasis on patients admitted in the intensive and coronary care units. In addition, the student experiences skills in dosage adjustment of common medications used in the ICU and CCU. Learning will be accomplished through ward round participation with healthcare team, student projects, presentations, and other tasks provided by the preceptor.

Pre-requisite: (PHA380) + (PHA476)

### **PHA592 Professional Practice Experience – III (Community Pharmacy Practice) (0-120-3)**

This rotation provides opportunity for the students to build upon skills acquired during Introductory Pharmacy Practice Experiences and apply these skills in direct patient care activities in the community setting. Students are expected to participate in patient care services and deals with them in an individual capacity. During this rotation, students advance themselves in areas related to pharmacy management, extended community pharmacy services, identification of drug therapy related problems and developing pharmaceutical care plan. Learning will be accomplished through patient interviews, patient counseling, prescription analyses, written projects, oral presentations, and other routine pharmacy related tasks.

Pre-requisite: (PHA380, PHA476)

### **PHA593 Professional Practice Experience – IV (Hospital Pharmacy and Management) (0-120-3)**

The Hospital Pharmacy and Management rotation provides students with expertise on various aspects of inpatient and outpatient pharmacy services. The focus areas include management of inventory, hospital formulary, narcotic drugs and crash cart. In addition, students will investigate the future aspects of pharmacy services in hospitals.

Pre-requisite: (PHA380, PHA476)

### **PHA594 Professional Practice Experience – V (Infectious disease) (0-120-3)**

The Infectious disease rotation provides students with expertise in infectious diseases. The student will develop advanced knowledge and skills needed for providing pharmaceutical care to patients admitted in hospital due to infectious diseases. During this rotation students utilize various skills learnt during the pharmacy curriculum and introductory pharmacy practice experiences. Tasks performed by students include gathering patient details, interpretation of culture sensitivity reports, patient assessments, assessment of drug therapy related problems, patient education, answering drug information inquiries, and functioning within health care team. Students accomplish their learning goals through ward round participation with healthcare team, student projects, presentations, and other tasks provided by the preceptor.

Pre-requisite: (PHA380, PHA476)

#### **B. Department Elective courses:**

### **PHA432 Arabic Language Competence in Pharmacy (3-0-3)**

This course aims to introduce communication skills in pharmacy communications and patient assessment and management carried out in the Arabic language. Types of communication such as verbal and nonverbal and written communications and their application in patient care will be covered. Professional decision making and practical knowledge of management of common disease state will also be covered.

Pre-requisite: 80 C.Hr + (ARB113) for Arabs or 80 C.Hr + (ARB116) for Non-Arabs.

## **Department of Pharmaceutical Sciences**

#### **A. Department Obligatory Courses:**

### **PHA110 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 and gives examples of their applications.

Laboratory work concerning specific chemical reactions, organic synthesis, identification of organic compounds and synthesis of aspirin.

Pre-requisite: NA



### **PHA113 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. It emphasizes the pharmaceutical importance of these functional groups and gives examples of their applications.

Laboratory work concerning specific chemical reactions, organic synthesis, identification of organic compounds and synthesis of paracetamol.

Pre-requisite: (PHA110)

### **PHA222 Medicinal Chemistry I (2-2-3)**

This course covers the basic principles of medicinal chemistry. It discusses the relationship between drug-receptor interaction and the influence of chemical structure with the biological activity. The initial part of the course includes the basic topics of medicinal chemistry such as drug-receptor interaction, physicochemical properties, 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: (PHA113)

### **PHA223 Medicinal Chemistry II (2-0-2)**

This course covers classification, chemical properties, structural features, synthesis, pharmacological mechanism, metabolism and structure activity relationship (SAR) studies 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. Topics covered include adrenergic and cholinergic drugs, cardiovascular drugs, antihistamines, opioid analgesics and NSAIDs, anti-diabetics, antipsychotics and anxiolytics.

Pre-requisites: (PHA222)

### **PHA225 Pharmaceutical Analysis 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 covers the fundamentals and applications of various quantitative volumetric and gravimetric methods that are used in pharmaceutical analysis.

Pre-requisite: PHA113

### **PHA226 Pharmaceutical Analysis II (2-2-3)**

This course provides students with fundamentals and hands-on practice on essential instrumental techniques used in the pharmaceutical analysis. In the first part of the course, the basics of electrochemical, absorption spectrophotometric, and atomic spectroscopic methods of analysis will be covered. In the second part of the course the theory, instrumentation, and applications of a number of common chromatographic methods including thin layer liquid chromatography, gas chromatography, and high performance liquid chromatography, as well as common molecular spectroscopic techniques will be discussed.

Pre-requisite: (PHA225)

### **PHA254 Pharmaceutics I (2-2-3)**

The course comprised of principles and techniques involved in the formulation, preparation and evaluation of solid dosage forms and drug delivery systems. 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 transdermal drug delivery systems and suppositories absorption, formulation and evaluation. Description of the solid oral dosage forms and drug delivery systems that, by virtue of formulation and product design, have modified drug-release features is covered as well. Counselling patients regarding the proper use of selected solid dosage forms will be emphasized during the course. Pre-requisite:

Prerequisite: PHA147

### **PHA255 Pharmaceutics II (2-2-3)**

This course covers basic concepts solution dosage forms, disperse systems, semisolids preparations and sterile products including parenteral preparation 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. Counselling patients regarding the proper use of semi-solid dosage forms and parenterals will be covered during the course.

Pre-requisites: (PHA254)

### **PHA301 Pharmaceutics III (2-2-3)**

This course covers theoretical background & practical demonstration of some manufacturing unit processes like, particle size reduction & analysis, mixing, powder flow and granulation that are applied in pharmaceutical industries. The course also comprises stability of drug products, packaging materials and design and operation of clean rooms, as well as pulmonary drug delivery.

Pre-requisites: (PHA255)

### **PHA302 Biopharmaceutics and Pharmacokinetics I (2-2-3)**

Basic pharmacokinetic concepts are introduced, including the aspects of drug administration, distribution, metabolism and excretion, pharmacokinetic modelling and linear pharmacokinetics as they relate to drug concentration-time relationships for most common routes of administration. Additionally, gastrointestinal absorption pathways, pharmacokinetics after oral administration, bioavailability and bioequivalence studies will be discussed.

Pre-requisite: (PHA255)

### **PHA303 Biopharmaceutics and Pharmacokinetics II (2-2-3)**

This course is a continuation of PHA302. It covers fundamentals of various physiological, pathological, physicochemical and formulation factors affecting oral drug absorption. Emphasis will be placed on the pharmacokinetics after multiple IV bolus and oral doses, routes of excretion, metabolism, multi-compartment models, non-compartmental analysis and non-linear pharmacokinetics. Physiological determinants of variability, including age, body composition, renal and hepatic disease are also covered in relation to clinical application of pharmacokinetics.

Pre-requisite: (PHA302)

### **PHA360 Pharmaceutical Biotechnology (2-0-2)**

This course introduces the student to the field of biotechnology with especial emphasis on its applications in the manufacturing of biopharmaceuticals. The course entails definitions, brief history and major areas of contribution of biotechnology. The course shall also cover modern biotechnology tools and techniques including the principles of recombinant DNA technology (DNA isolation, cutting, ligation (vectors) & replication (PCR)). In addition, different methods adopted for the manufacturing of biotechnology drug products and their formulation, evaluation and stability aspects as well as potential clinical uses shall be covered. The course shall include stability aspects, biosimilarities and clinical implications of therapeutic proteins. The course shall also discuss the impact of biotechnology in the diagnostic and therapeutic management and illustrate some examples of marketed biopharmaceuticals as well as anticipate their future prospects.

Current some marketed biotechnology drug products, as well as the future prospects of biotechnology shall be discussed.

Pre-requisites: (PHA216, PHA265)

## **B. Department Elective courses:**

### **PHA420 Phytotherapy (3-0-3)**

Study of Phytomedicines including their active constituents, preparation and therapeutic value relevant to Pharmacist and Complimentary Practitioners. The course also includes pharmacodynamic and pharmacokinetic studies of the active constituents to support research and development in the field of Pharmacy. Monographs and Materia Medica of Phytomedicines are included in the study.

Pre-requisite: 80 C.Hr + (PHA370)

### **PHA431 Complementary and Alternative Medicine (CAM) (3-0-3)**

In this course, CAM is classified into six Systems, based on different philosophies: 1- Alternative Medical Systems 2- Mind-Body System 3- Biological-Based System 4- Manipulative Body-Based System 5- Energy System 6- Blood Cupping. This in addition to Iridology as a diagnostic technique. Each of these systems include different therapies which are given in detail, including definition, philosophy, techniques, indications, and contraindications for each therapy.

Pre-requisite: 80 C.Hr + (PHA370)

### **PHA433 Pharmaceutical Technology Training (3-0-3)**

The course provides students with essential training in large-scale manufacturing of sterile and non-sterile pharmaceutical products and quality control tests. It covers quality assurance aspects, current Good Manufacturing Practice (cGMP) guidelines, as well as validation of the manufacturing processes followed during large-scale drug manufacturing.

Pre-requisite: 80 C.Hr + (PHA301)

### **PHA435 Novel Drug Delivery (3-0-3)**

This course is designed to provide students with an understanding of the current state of the art for novel drug delivery systems with a particular focus on nanocarrier systems such as nanoparticles, polymeric micelles, liposomes and solid lipid nanoparticles, for delivering small molecules. This course will introduce students to advanced technologies in colon-targeted delivery and ocular delivery. The class format will be lectures followed by critique of recent literature.

Pre-requisites: 80 C.Hr + (PHA301)