



Yarmouk University

Faculty of Pharmacy

Course Descriptions plan 2021

Course description

Foundational Knowledge

Course Title: Pharmaceutical Analytical Chemistry		Course Code: PHRM110	Credit Hours: 3
Year and semester	Second Semester-First Year	Type	Mandatory
Prerequisites/Co-requisites	General Chemistry for Medical Students (CHEM103) Pharmaceutical Analytical Chemistry Lab (PHRM111)-Co-requisite		
Course Description	This course aims to provide students with a broad understanding of analytical chemistry principles and their application in the areas of medicinal and pharmaceutical sciences. The course starts with introducing the theory on sampling, concentration units, errors in chemical analysis, and statistical analysis as applied to analytical chemistry. The course covers specific analytical techniques from the perspective of theory and the associated analytical instrumentation such as preparation of solutions, stoichiometric calculations, gravimetric and volumetric analysis, and aqueous solution equilibrium principally involving complexation equilibria, electrochemical methods, acid-base equilibrium, buffer solution and indicator theory.		
Course Title: Pharmaceutical Analytical Chemistry Lab		Course Code: PHRM111	Credit Hours: 1
Year and semester	Second Semester-First Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Analytical Chemistry (PHRM110)-Co-requisite		
Course Description	This is the practical course of pharmaceutical analytical chemistry. This course aims to introduce the students to the fundamental quantitative and qualitative chemical analysis commonly used in pharmaceutical laboratories. A range of experiments will be demonstrated and conducted during the course, such as preparation of analytical reagents and calibration standards, standardization methods, acid-base titrations, back titration, precipitation titrations, gravimetry, complexometric titrations, and acids or bases titrations.		

Course Title: Pharmaceutical Organic Chemistry-1		Course Code: PHRM112	Credit Hours: 2
Year and semester	Second Semester-First Year	Type	Mandatory
Prerequisites/Co-requisites	General Chemistry for Medical Students (CHEM103)		
Course Description	<p>This course aims to introduce the students to the constitutions and properties of the different organic compounds' classes and their relation to pharmaceutical products. The course covers a range of topics such as bonding and atomic structure, major reaction mechanisms and pathways in addition to stereochemistry. Furthermore, the course provides elaboration on functional groups with emphasis on alkanes, cycloalkane, alkenes, alkynes, and alkyl halides. Each group will be discussed in terms of naming, properties, synthesis, reactions, and pharmaceutical applications.</p>		
Course Title: Pharmaceutical Organic Chemistry-2		Course Code: PHRM210	Credit Hours: 3
Year and semester	First Semester-Second Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Organic Chemistry-1 (PHRM112) Pharmaceutical Organic Chemistry 2 Lab (PHRM211)-Co-requisite		
Course Description	<p>This course aims to build on students' background and knowledge of organic chemistry and its relevance to the pharmaceutical sector. The course covers the major functional groups available in drugs including benzenes, alcohols and phenols, ethers and epoxides, carbonyl compounds, amines, heterocyclic compounds, poly-aromatic, and biomolecules (amino acid and peptides). Each group will be discussed in terms of naming, properties, synthesis, reactions, and pharmaceutical applications.</p>		

Course Title: Pharmaceutical Organic Chemistry-2 lab		Course Code: PHRM211	Credit Hours: 1
Year and semester	First Semester-Second Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Analytical Chemistry Lab (PHRM111) Pharmaceutical Organic Chemistry-2 (PHRM210)-Co-requisite		
Course Description	This is the practical course of Pharmaceutical Organic Chemistry-2. This course aims to enable students to develop the practical ability to conduct synthesis, extraction, purification, re-crystallization and determination of melting and boiling points. The course covers a range of experiments used to determine elements and functional groups such as hydrocarbons, organic halides, alcohols, aldehydes, ketones, carboxylic acids, and phenols.		
Course Title: Pharmaceutics and Physical Pharmacy		Course Code: PHRM212	Credit Hours: 3
Year and semester	First Semester-Second Year	Type	Mandatory
Prerequisites/Co-requisites	General Physics (PHYS101) General Chemistry for Medical Students (CHEM103) Pharmaceutics and Physical Pharmacy Lab (PHRM213)-Co-requisite		
Course Description	This course aims to study the physicochemical principles of drug delivery and pharmaceutical dosage forms. The course introduces and integrates the physical, chemical, and mathematical principles, theories, terminology, calculations and methodologies of physical pharmacy, dosage forms and drug delivery systems. This course covers basic physical pharmacy principles like the states of matter, physicochemical and biopharmaceutical properties of drugs, the non-electrolyte solutions, the solubility and distribution phenomena, drug release and dissolution, the interfacial phenomena, and the chemical kinetic and drug stability.		

Course Title: Pharmaceutics and Physical Pharmacy Lab		Course Code: PHRM212	Credit Hours: 1
Year and semester	First Semester-Second Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Analytical Chemistry Lab (PHRM111) Pharmaceutics and Physical Pharmacy (PHRM212)-Co-requisite		
Course Description	This is the practical course of Pharmaceutics and Physical Pharmacy. This course aims to teach the students how to apply theoretical concepts and phenomena discussed in the theoretical course. The course covers a range of physical pharmacy topics such as drug diffusion through membranes, the effect of temperature on solubility, factors affecting drug stability, improving drug solubility using different methods, and distribution of drugs between two immiscible solvents and calculations of complex stability constants.		
Course Title: Pharmaceutical Microbiology		Course Code: PHRM214	Credit Hours: 3
Year and semester	Second Semester-Second Year	Type	Mandatory
Prerequisites/Co-requisites	General Biology for Medical Students (BIO111) Pathophysiology for Pharmacy (PHRM220) Pharmaceutical Microbiology Lab (PHRM215)-Co-requisite		
Course Description	This course aims to introduce the students to the science of microbiology and its relevance to the medical and pharmaceutical fields. The course covers a number of topics related to the classification of microorganisms, epidemiology, host-microbe relationships and sterilization and antiseptics techniques. Additionally, the course discusses antimicrobial agents in terms of classification, mechanisms of action, resistance, and medical applications.		

Course Title: Pharmaceutical Microbiology Lab		Course Code: PHRM215	Credit Hours: 1
Year and semester	Second Semester-Second Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Microbiology (PHRM214)-Co-requisite		
Course Description	This is the practical course of pharmaceutical microbiology. This course aims to put knowledge and concepts taught during the theoretical course into practice. The course covers a range of experiments such as identifying microorganisms (microscopic and by diagnostic media, preparation of stained slides, testing susceptibility of microorganisms to antibiotics, evaluating antimicrobial agents, evaluating microbial quality for sterile and non-sterile products.		
Course Title: Biochemistry		Course Code: PHRM216	Credit Hours: 3
Year and semester	Second Semester-Second Year	Type	Mandatory
Prerequisites/Co-requisites	General Biology for Medical Students (BIO111) Pharmaceutical organic Chemistry-2 (CHEM103)		
Course Description	This course aims to introduce students to the general families of biomolecules that comprise the science of biochemistry and the principles that integrate biochemistry with medical disciplines. The course focuses on studying the molecular composition of living cells, the cellular organization of biological molecules, and the structure and function of these biological molecules. This course covers many topics such as proteins, polysaccharides, lipids, nucleic acids, and the monomeric units of these macromolecules.		

Course Title: Pharmaceutical Instrumental Analysis		Course Code: PHRM310		Credit Hours: 3	
Year and semester	First Semester-Third Year	Type	Mandatory		
Prerequisites/Co-requisites	Pharmaceutical Organic Chemistry-2 (PHRM210) Pharmaceutical Analytical Chemistry (PHRM110) Pharmaceutical Instrumental Analysis Lab (PHRM311)-Co-requisite				
Course Description	This course aims to introduce the theory and practice of instrumental methods for separating, identifying, and quantitative analysis of chemical substances. The course covers a range of instrumental analysis methods such as the basic concepts of ultraviolet-visible (UV/VIS) spectroscopy, Infra-Red spectroscopy, luminescence spectroscopy, atomic absorption, and atomic emission techniques. The course discusses chromatography principles and applications such as gas chromatography (GC) and high-performance liquid chromatography (HPLC). Additionally, the basics of nuclear magnetic resonance (NMR) and mass spectroscopy will be explained during the course.				
Course Title: Pharmaceutical Instrumental Analysis Lab		Course Code: PHRM311		Credit Hours: 1	
Year and semester	First Semester-Third Year	Type	Mandatory		
Prerequisites/Co-requisites	Pharmaceutical Analytical Chemistry Lab (PHRM111) Pharmaceutical Organic Chemistry-2 Lab (PHRM211) Pharmaceutical Instrumental Analysis (PHRM310)-Co-requisite				
Course Description	This is the practical course of Pharmaceutical Analytical Chemistry. This course aims to train the students to carry out and to interpret the results of different instrumental methods of analysis. The course covers a number of instrumental analyses applied in pharmaceutical analysis such as potentiometric measurements using the pH meter, ultraviolet-visible (UV/VIS) spectroscopy, Infra-Red (IR), atomic absorption spectrometer (AAS), high-performance liquid chromatography (HPLC), gas chromatography (GC) and paper chromatography.				

Course Title: Medicinal Chemistry-1		Course Code: PHRM312	Credit Hours: 3
Year and semester	First Semester-Third Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Organic Chemistry-2 (PHRM210)		
Course Description	This course aims to introduce the molecular properties that influence drug pharmacokinetic and pharmacodynamics properties. The course highlights the different metabolic transformations that affect absorption, distribution, excretion, toxicity, duration of action, and drugs' effectiveness. Additionally, the course discusses drug target, chemical structure and properties, structure-activity relationships, metabolism, and therapeutic application of a number of pharmacological groups such as drugs acting on cholinergic, adrenergic, and histaminic receptors.		
Course Title: Chemistry of Natural Products		Course Code: PHRM313	Credit Hours: 3
Year and semester	Second Semester-Third Year	Type	Mandatory
Prerequisites/Co-requisites	Instrumental Analysis (PHRM310) Chemistry of Natural products Lab (PHRM314)-Co-requisite		
Course Description	This course aims to introduce concepts related to pharmacognosy and phytochemistry. The course discusses plants' scientific names and taxonomy, the used parts, and methods for active ingredients extraction. The course discusses plant chemical groups such as glycosides, alkaloids, steroids, volatile oils, and terpenes.		
Course Title: Chemistry of Natural Products Lab		Course Code: PHRM314	Credit Hours: 1
Year and semester	Second Semester-Third Year	Type	Mandatory
Prerequisites/Co-requisites	Instrumental Analysis Lab (PHRM311) Chemistry of Natural products (PHRM313)-Co-requisite		
Course Description	This is the practical course of Chemistry of Natural Products. This course aims to provide the students with a practical application of natural product macroscopical and microscopical identification, extraction, and isolation. The course involves practical experiments on isolation, identification, and extraction of natural products such as saponin, anthraquinone, glycoside, flavonoids, tannins, and alkaloids.		

Course Title: Medicinal Chemistry-2		Course Code: PHRM315		Credit Hours: 3	
Year and semester	Second Semester-Third Year	Type	Mandatory		
Prerequisites/Co-requisites	Medicinal Chemistry-1 (PHRM312) Medicinal Chemistry-2 Lab (PHRM316)-Co-requisite				
Course Description	This course aims to build on the students' knowledge acquired from the medicinal chemistry-1 course. The course discusses drug-target, chemical structure and properties, structure-activity relationship, metabolism, and therapeutic uses of a number of pharmacological groups such as antibacterial agents, antiviral agents, antifungal agents, diuretics, and drugs acting on the cardiovascular system.				
Course Title: Medicinal Chemistry-2 Lab		Course Code: PHRM316		Credit Hours: 1	
Year and semester	Second Semester-Third Year	Type	Mandatory		
Prerequisites/Co-requisites	Medicinal Chemistry-2 (PHRM315)-Co-requisite				
Course Description	This is the practical course of Medicinal Chemistry-2. This course aims to guide the students through a multistep synthesis of selected medicinal compounds. The course involves practical techniques used in drug design, molecules purification, evaluation, and identification.				
Course Title: Selected Topics in Physical Pharmacy		Course Code: PHRM510		Credit Hours: 3	
Year and semester	First/Second Semester-Fifth Year	Type	Elective		
Prerequisites/Co-requisites	Pharmaceutics and Physical Pharmacy (PHRM212) Drug Delivery (PHRM430)				
Course Description	This course aims to provide students with a detailed understanding of concepts related to physiochemical properties of drug molecule, drug delivery systems and routes of administration. The course covers a range of topics such as the role of the physiochemical properties in drug formulation and the drug delivery systems. Additionally, the course involves discussing most recent and contemporary literature related to physical pharmacy and pharmaceutics.				

Course Title: Drug Design		Course Code: PHRM511		Credit Hours: 3	
Year and semester	First/Second Semester-Fifth Year	Type	Elective		
Prerequisites/Co-requisites		Medicinal Chemistry-2 (PHRM315)			
Course Description		<p>The course aims to provide students with an understanding of the process of drug discovery and development from the identification of novel drug targets to the introduction of new drugs into clinical practice. It covers the basic principles of how new drugs are discovered with emphasis on lead identification, leads optimization, classification and kinetics of molecules targeting enzymes and receptors, pro-drug design and applications, and structure-based drug design methods. The course also touches upon the recent advances in the use of computational and combinatorial chemistry in drug design.</p>			
Course Title: Organometallic Pharmacy		Course Code: PHRM512		Credit Hours: 3	
Year and semester	First/Second Semester-Fifth Year	Type	Elective		
Prerequisites/Co-requisites		Medicinal Chemistry-2 (PHRM315)			
Course Description		<p>This course aims to discuss organometallic chemistry and its pharmaceutical applications. It also covers a range of related topics such as the recent developments in organic synthesis, organometallics, heterocyclics, and phase transfer catalysis.</p>			
Course Title: Selected Topics in Pharmaceutical Microbiology		Course Code: PHRM513		Credit Hours: 3	
Year and semester	First/Second Semester-Fifth Year	Type	Elective		
Prerequisites/Co-requisites		Immunology (PHRM447)			
Course Description		<p>This course aims to study advanced topics in pharmaceutical microbiology. This course addresses several topics such as microbial quality control of pharmaceutical products, disinfection and sterilization mechanisms, microbial contamination, bacterial resistance, and the mode of action of antimicrobial substances.</p>			

Course Title: Selected Topics in Pharmacy		Course Code: PHRM514	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Therapeutics-2 (PHRM445)		
Course Description	This course aims to discuss one of the topics related to the pharmacy profession in-depth. The content of this course will be determined at the beginning of each semester, and the Dean will approve it.		

General Basic Knowledge

Course Title: Human Anatomy and Physiology		Course Code: PHRM120	Credit Hours: 3
Year and semester	Second Semester-First Year	Type	Mandatory
Prerequisites/Co-requisites	General Biology for Medical Students (BIO111) Human Anatomy and Physiology Lab (PHRM121)-Co-requisite		
Course Description	This course aims to introduce the students to the science of the human body's structure and function. The course is based on both systems and regional approach to uncover the anatomy and physiology of integumentary, nervous, cardiovascular, and circulatory, respiratory, digestive, renal, and endocrine systems. The course emphasizes the mechanisms and regulation by which homeostasis is maintained within the human body.		

Course Title: Human Anatomy and Physiology Lab		Course Code: PHRM121	Credit Hours: 1
Year and semester	Second Semester-First Year	Type	Mandatory
Prerequisites/Co-requisites	Human Anatomy and Physiology (PHRM120)-Co-requisite		
Course Description	This is the practical course of human anatomy and physiology. This course aims to provide students with hands-on learning experience in exploration of human anatomy and physiology. During the course, students will learn how to use equipment commonly used in physiology research and medical testing such as microscope slides, blood cell counting, hemoglobin determination, blood clotting, blood pressure and electrocardiograph measurement.		

Course Title: Pathophysiology for Pharmacy		Course Code: PHRM220	Credit Hours: 3
Year and semester	First Semester-Second Year	Type	Mandatory
Prerequisites/Co-requisites	Human Anatomy and Physiology (PHRM120) Human Anatomy and Physiology Lab (PHRM1201)		
Course Description	This course aims to provide an overview of the body's functional changes that result from disease processes. Building on the knowledge of normal human anatomy and physiology, students learn the biological basis of change that occur after losing normal structure and function, including variations due to life stages. The course will cover the etiology, pathogenesis, and diagnosis of commonly occurring conditions across several organ systems such as the endocrine, hematology, cardiovascular, respiratory, urinary, and digestive systems.		
Course Title: Biostatistics		Course Code: PHRM221	Credit Hours: 2
Year and semester	Second Semester-Second Year	Type	Mandatory
Prerequisites/Co-requisites	Calculus (MATH101)		
Course Description	This course aims to provide the students with an understanding of pharmaceutical statistics' basic principles and concepts. The course covers different research data types and how to carry out the most appropriate statistical tests for each data type. Additionally, the course discusses the probabilistic distribution and students will learn how to perform statistical inferences and hypothesis testing.		

Course Title: Metabolic Diseases and Metabolic Modulators		Course Code: PHRM520	Credit Hours: 2
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Pathophysiology for Pharmacy (PHRM220) Clinical Biochemistry (PHRM442)		
Course Description	This course aims to discuss the general principles of metabolic disorders and focus on pathways and enzyme mechanisms associated with endocrinology, cardiovascular diseases, obesity, and diabetes. Additionally, the course novels therapeutic approaches that are designed to treat metabolic diseases by targeting metabolic pathways.		

Pharmaceutical Product Expert

Course Title: Pharmaceutical Dosage Forms and Dispensing		Course Code: PHRM230	Credit Hours: 3
Year and semester	Second Semester-Second Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutics and Physical Pharmacy (PHRM212) Pharmaceutical Dosage Forms and Dispensing Lab (PHRM231)-Co requisite		
Course Description	This course aims to provide students with an understanding of pharmaceutical dosage forms in terms of their physicochemical aspects, prescription, simple formulation, compounding procedures and preparation. The course covers the basics of pharmaceutical calculations and the characteristics and the preparation of various pharmaceutical dosage forms such as suspensions, emulsions, solutions, and aerosols.		

Course Title: Pharmaceutical Dosage Forms and Dispensing Lab		Course Code: PHRM231	Credit Hours: 1
Year and semester	Second Semester-Second Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutics and Physical Pharmacy Lab (PHARM213) Pharmaceutical Dosage Forms and Dispensing (PHRM230)-Co requisite		
Course Description	This is the practical course of Pharmaceutical Dosage Forms and Dispensing. This course aims to provide the students with the knowledge needed to perform and carry out pharmaceutical calculations, formulation and extemporaneous dispensing, packaging, and medicines storage. The course covers several pharmaceutical dosage forms such as solutions, suspensions, emulsions, creams, ointments, gels, suppositories, and powders preparations. For each dosage form, several types, additives, preparation methods, packaging, and quality requirements will be discussed.		
Course Title: Pharmaceutical Technology-1		Course Code: PHRM330	Credit Hours: 3
Year and semester	First Semester-Third Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Dosage Forms and Dispensing (PHRM230) Pharmaceutical Technology-1 Lab (PHRM331)-Co-requisite		
Course Description	This course aims to provide students with a comprehensive understanding of industrial processes used in producing pharmaceutical dosage forms. The course covers a range of process used in the pharmaceutical industry such as pre-formulation, size reduction and separation, mixing, drying, filtration, granulation, particle size analysis and powder flow. The course discusses the processes of formulating, producing, evaluating, and assessing conventional tablets dosage form.		

Course Title: Pharmaceutical Technology-1 Lab		Course Code: 331	Credit Hours: 1
Year and semester	First Semester-Third Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Dosage Forms and Dispensing Lab (PHRM231) Pharmaceutical Technology-1 (PHRM330)-Co-requisite		
Course Description	This is the practical course of Pharmaceutical Technology-1. This course aims to provide students with hands-on training in the basic techniques and methods used to manufacture conventional dosage forms such as milling, particle size analysis, mixing, powder flowability, granulation, drying, tableting and capsulation.		
Course Title: Pharmaceutical Biotechnology		Course Code: PHRM332	Credit Hours: 3
Year and semester	First Semester-Third Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Microbiology (PHRM214)		
Course Description	This course aims to provide the students with an understanding of the preparation, stability, and formulation of different protein and peptide-based drugs such as antisense agents, transgenic and gene therapy. Additionally, currently licensed biotechnology-based medicines such as human insulin, growth hormones and interferons will be discussed.		
Course Title: Pharmaceutical Technology-2		Course Code: PHRM333	Credit Hours: 3
Year and semester	Second Semester-Third Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Technology-1 (PHRM330)		
Course Description	This course aims to provide an overview of the preparation of specific manufacturing techniques of solid, liquid, and semisolid dosage forms such as coated tablets preparation, hard gelatin capsules, soft gelatin capsules, nanoencapsulation, suspension, emulsions, creams, ointments, and gels. The course discusses each dosage's form in terms of design, rational uses, formulation, production, performance and stability evaluation and assessment.		

Course Title: Drug Delivery		Course Code: PHRM430	Credit Hours: 2
Year and semester	Second Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Technology-2 (PHRM333)		
Course Description	<p>This course aims to provide students with an understanding of the principles and rationale of drug delivery, and the current and future approaches to controlled drug delivery and drug targeting. The course provides a detailed description of the recent technologies for designing targeted drug delivery systems and the methods used to maximize medicines concentration at targeted sites. The course also covers topics such as nanotechnology drug delivery systems, methods of nanoparticle preparation, pulmonary drug delivery, nasal drug delivery, topical and transdermal drug delivery, and rectal drug delivery.</p>		
Course Title: Cosmetic Products		Course Code: PHRM431	Credit Hours: 3
Year and semester	Second Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Technology-2 (PHRM333)		
Course Description	<p>This course aims to discuss different cosmetic preparations, their formulation, and their indications. The course also correlates the anatomy, structure and function of the skin, nails and hair with the physicochemical properties and formulation of cosmetic products. This course discusses the formulation, component, indication and properties of several cosmetic products such as skin cleansing and moisturizing products, acne products, hair care products and oral and dental care products.</p>		

Course Title: Biological Drugs		Course Code: PHRM530		Credit Hours: 3	
Year and semester	First/Second Semester-Fifth Year	Type	Electives		
Prerequisites/Co-requisites		Immunology (PHRM447)			
Course Description		This course aims to discuss key features of biopharmaceuticals and pharmaceutical biotechnology. Additionally, the course covers a range of relevant topics such as gene expression, pharmacodynamics, pharmacokinetic properties, therapeutic applications, biological medicines production and manufacturing processes, quality control as well as safety evaluation.			
Course Title: Pharmaceutical Nanotechnology		Course Code: PHRM530		Credit Hours: 3	
Year and semester	First/Second Semester-Fifth Year	Type	Electives		
Prerequisites/Co-requisites		Pharmaceutical Technology-2 (PHRM333) Drug Delivery (PHRM430)			
Course Description		This course aims to discuss nanotechnology's distinctive features and its pharmaceutical and medical applications. The course also covers a range of related topics, including nanomaterials, application areas of nanotechnology, diverse types of medicinal products produced using nanotechnology, nanotechnology-based drug delivery systems in addition to different societal aspects associated with the introduction of nanotechnology.			
Course Title: Pharmaceutical Intellectual Property		Course Code: PHRM532		Credit Hours: 3	
Year and semester	First/Second Semester-Fifth Year	Type	Electives		
Prerequisites/Co-requisites		Pharmaceutical Ethics, Law, and Regulatory Affairs (PHRM454)			
Course Description		This course aims to introduce students to the basic concepts of intellectual property relevant to medical research and development, pharmaceuticals, and medical technology. It also provides the students with an overview of the general intellectual property law in Jordan, the region, and the selected international markets such as the United States and the European Economic Region markets.			

Course Title: Research and Development		Course Code: PHRM533	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Electives
Prerequisites/Co-requisites	Drug Delivery (PHRM430)		
Course Description	This course aims to discuss the production and development stages of drug dosage forms. The course also covers a variety of relevant topics, such as concepts of pre-formulation, good manufacturing practice (GMP), stability testing, and quality control and assurance.		
Course Title: Radiation Technology		Course Code: PHRM534	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Electives
Prerequisites/Co-requisites	Pharmaceutical Technology-2 (PHRM333)		
Course Description	This course aims to introduce and discuss the various uses of pharmaceutical radiation technology. Its course covers a range of relevant topics, such as the uses of radioactive isotopes in the diagnosis and therapy of some pathological conditions.		
Course Title: International Drug Trading Requirements		Course Code: PHRM535	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Electives
Prerequisites/Co-requisites	Pharmaceutical Technology-2 (PHRM333) Pharmaceutical Ethics, Law, and Regulatory Affairs (PHRM454)		
Course Description	This course aims to introduce students to the documents required for drug registration and international trading by the United States Food and Drug Administration (FDA), the European Medical Agency (EMA), and the Middle East. The course also helps students appreciate the needs for international harmonization of regulatory standards to support development, evaluation, and surveillance of pharmaceuticals, biologics, biosimilars, and medical devices.		

Essentials for Practice and Care

Course Title: Pharmacology-1		Course Code: PHRM340	Credit Hours: 3
Year and semester	First Semester-Third Year	Type	Mandatory
Prerequisites/Co-requisites	Pathophysiology for Pharmacy (PHRM220) Pharmaceutical Microbiology (PHRM214)		
Course Description	This course aims to provide the students with an understanding of pharmacological principles and provide a framework for future pharmacology and therapeutic courses. This course starts with a thorough grounding in pharmacokinetic and pharmacodynamic principles. These principles will be applied to the pharmacology of autonomic drugs, cardiovascular drugs, drugs with an important action on smooth muscles, drugs used to treat blood diseases and endocrine drugs.		
Course Title: Pharmacology-2		Course Code: PHRM341	Credit Hours: 3
Year and semester	Second Semester-Third Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmacology-1 (PHRM340)		
Course Description	This course aims to build on the students' knowledge acquired from the Pharmacology-1 course. The course introduces the study of properties, effects, and therapeutic values of primary agents in major drug categories such as antimicrobial agents, drugs used to treat asthma and chronic obstructive pulmonary disease, drugs used for gastrointestinal disorders and diseases, and drugs used to treat blood diseases.		

Course Title: Biopharmaceutics		Course Code: PHRM342	Credit Hours: 2
Year and semester	Second Semester-Third Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutics and Physical Pharmacy (PHRM212) Pharmaceutical Dosage Forms and Dispensing (PHRM230)		
Course Description	<p>This course aims to introduce the students to the interrelationships between formulation and physiological factors and pharmacokinetic aspects of drug absorption, distribution, metabolism, and excretion. The course discusses factors affecting drug bioavailability, such as medicinal products' physiological and physicochemical properties, and the dosage form formulation and design. Additionally, the course discusses factors affecting the bioavailability of medicinal products following different routes of administration.</p>		

Course Title: Phytotherapy		Course Code: PHRM440	Credit Hours: 2
Year and semester	First Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Chemistry of Natural Products (PHRM313)		
Course Description	<p>This course aims to introduce the students to the concept of medical herbalism and complementary and alternative medicine. The course highlights pharmacists' role in providing evidence-based advice for both patients and healthcare providers either in community or clinical settings regarding herbal remedies consumption, possible adverse, possible toxicity, precautions, herb-drug interactions, and licensed and available dosage forms in the market.</p>		

Course Title: Therapeutics-1		Course Code: PHRM441	Credit Hours: 3
Year and semester	First Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Medicinal Chemistry-1 (PHRM312) Pharmacology-2 (PHRM341) Clinical Biochemistry (PHRM442)-Co-requisite Pharmacy Practice Lab-1 (PHRM451)-Co-requisite		
Course Description	This course aims to provide the students with comprehensive knowledge and understanding of the evidence base that supports the therapeutic interventions in managing a number of disease areas concerning patient care and medicines optimization. The course covers a range of therapeutic areas such as cardiovascular diseases, endocrine diseases, renal insufficiencies, thyroid gland disorders and anemia.		
Course Title: Clinical Biochemistry		Course Code: PHRM442	Credit Hours: 3
Year and semester	First Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Biochemistry (PHRM216) Therapeutics-1 (PHRM441)-Co-requisite		
Course Description	This course aims to provide students with advanced knowledge of the biochemical basis of disease, specialized laboratory testing, the value of biochemical and molecular biological tests in the investigation of disease, and the interpretation and communication of biochemical data in clinical and pharmacy settings. The course discusses commonly used diagnostic tests to assess organ or system functions such as renal, cardiovascular, hepatic, bone, and gastrointestinal tract.		

Course Title: Pharmacokinetics		Course Code: PHRM443		Credit Hours: 2	
Year and semester	First Semester-Fourth Year	Type		Mandatory	
Prerequisites/Co-requisites		Biopharmaceutics (PHRM342) Pharmacokinetics Cases (PHRM444)-Co-requisite			
Course Description		This course aims to investigate the basic principles of pharmacokinetics. The Mathematical models will describe the pharmacokinetics of the drug in the body after different administration routes such as oral administration, intravenous bolus dose, and multiple dosing. The students will learn how to design appropriate dosage regimens and identify patient's related factors, which require a modification of the dosing regimen.			
Course Title: Pharmacokinetics Cases		Course Code: PHRM444		Credit Hours: 1	
Year and semester	First Semester-Fourth Year	Type		Mandatory	
Prerequisites/Co-requisites		Pharmacokinetics (PHRM443)-Co-requisite			
Course Description		This is the practical course of pharmacokinetics. This course aims to build on the students' skills and knowledge that was acquired from the pharmacokinetics theoretical course. This course provides students with hands-on training on using mathematical models or graphs for the determination of pharmacokinetics after different administration routes such as oral administration, intravenous bolus dose, and multiple dosing in clinical cases.			

Course Title: Therapeutics-2		Course Code: PHRM445	Credit Hours: 3
Year and semester	Second Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Medicinal Chemistry-2 (PHRM315) Therapeutics-1 (PHRM441) Pharmacy Practice Lab-2 (PHRM453)-Co-requisite		
Course Description	This course aims to provide the students with comprehensive knowledge and understanding of the evidence base that supports the therapeutic interventions in managing a number of disease areas concerning patient care and medicines optimization. The course covers a range of therapeutic areas such as respiratory diseases, gastrointestinal diseases, and infectious diseases.		
Course Title: Over-the-Counter Medicines		Course Code: PHRM446	Credit Hours: 2
Year and semester	Second Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Therapeutics-1 (PHRM441)		
Course Description	This course aims to build and enhance the students' knowledge and skills necessary for contemporary and future pharmacy practice in self-care and minor ailments. The course covers a range of minor ailments such as gastrointestinal, respiratory, gynecology, skin, infection and infestation, acute pain management, and minor childhood ailments. The course also emphasizes the pharmacist's role and responsibility in accurately assessing and triaging patients, determining the appropriate use of non-prescription drugs, determining when to follow-up, refer, and how to document the patient's care.		

Course Title: Immunology		Course Code: PHRM447	Credit Hours: 2
Year and semester	Second Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Pathophysiology for Pharmacy (PHRM220) Pharmaceutical Biotechnology (PHRM332)		
Course Description	<p>This course aims to study the molecular and cellular interactions and principles of the immune system. The course discusses the components of the immune system and their functions in immune responses in health and disease statuses. The course covers a range of immunology related topics such as the development of the immune system, innate immunity, immunoglobulin structure and genetics, antigen-antibody reactions, the main histocompatibility complex reactions and antigen presentation, T cell receptors (genetics, structure, selection), T cell activation and effector functions, anergy and apoptosis, cytokines, phagocytic cell function, immune responses to infectious organisms and tumors, autoimmune diseases, autoimmunity, allergies, and immune deficiencies.</p>		
Course Title: Clinical Nutrition		Course Code: PHRM448	Credit Hours: 1
Year and semester	Semester- Year	Type	Mandatory
Prerequisites/Co-requisites	Therapeutics-1 (PHRM441) Clinical Biochemistry (PHRM442)		
Course Description	<p>This course aims to provide the students with a thorough understanding of clinical nutrition. The course explains how to calculate nutritional needs for all ages and disease states, provide necessary diet counseling specific to disease state and explain fad diets to patients. The course also includes calculating the enteral and parenteral nutrition needs and choosing an appropriate nutrition formula for a specific patient.</p>		

Course Title: Therapeutics-3		Course Code: PHRM540	Credit Hours:3
Year and semester	First Semester-Fifth Year	Type	Mandatory
Prerequisites/Co-requisites	Therapeutics-2 (PHRM445)		
Course Description	This course aims to provide the students with comprehensive knowledge and understanding of the evidence base that supports the therapeutic interventions in managing a number of disease areas concerning patient care and medicines optimization. The course covers a range of therapeutic areas such as bone and joints disorders, neurologic disorders, psychiatric disorders, gynecology, and obstetrics disorders.		
Course Title: Advanced Pharmacology and Toxicology		Course Code: PHRM541	Credit Hours: 3
Year and semester	First Semester-Fifth Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmacology-2 (PHRM341) Therapeutics-2 (PHRM445)		
Course Description	This course aims to discuss the mechanism of action, doses, adverse effects, and contraindications of drugs used to manage and treat diseases of the central nervous system. Additionally, the course covers the basic principles of clinical toxicology, including factors affecting toxicity in humans and toxins' disposition in the human body. The course also discusses poisoning with food, pesticides, metals and frequently utilized medications in addition to the primary clinical manifestation and treatment methods.		

Course Title: Health Informatics and Global and Public Health in Pharmacy		Course Code: PHRM542	Credit Hours: 2
Year and semester	First Semester-Fifth Year	Type	Mandatory
Prerequisites/Co-requisites	Evidence-Based Practice and Drug Information (PHRM452)		
Course Description	<p>This course aims to introduce and discuss the basic concepts of public health. The course also provides the students with a broad framework for understanding public health's role in community health, prevention, and medicine. Students will explore public health infrastructure, surveillance, social determinants of health, policy, and emerging issues. In addition, the course examines the utilization and application of informatics and information technology to support decision-making in pharmaceutical practice, research, education, and pharmacy management.</p>		
Course Title: Selected Topic in Therapeutics		Course Code: PHRM543	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Therapeutics-2 (PHRM445)		
Course Description	<p>This course aims to provide the students with comprehensive knowledge and understanding of the evidence base that supports the therapeutic interventions in managing a number of disease areas concerning patient care and medicines optimization. The course covers a range of therapeutic areas such as neoplastic disorders as well as breast, colon, and lung cancer. In addition, the course also covers cystic fibrosis, strokes, cirrhosis, and sepsis.</p>		

Course Title: Pharmacogenetics		Course Code: PHRM544	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Pharmacology-2 (PHRM341) Therapeutics-2 (PHRM445)		
Course Description	This course aims to provide students with an understanding of pharmacogenetics in the context of variability in drug response and the application of pharmacogenetics to drug development and drug treatment. Also, the course covers a range of topics such as the current literature in pharmacogenomics, emerging technologies and research, the main challenges facing pharmacogenomics implementation, ethical and legal considerations, and gene therapy.		
Course Title: Pharmacology of Substances of Abuse and Dependence		Course Code: PHRM545	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Pharmacology-2 (PHRM341) Therapeutics-2 (PHRM445)		
Course Description	This course aims to discuss the pharmacology of substance of abuse and dependency. The course examines the effects of psychopharmacological chemicals on human physiology. Moreover, the course discusses current pharmacological approaches to treat drug addiction and dependence, and recommended management guidelines. This course also covers a range of related topics such as concepts and principles of abuse, misuse, addiction and tolerance and abuse of life-style medications and performance-enhancing medications.		

Course Title: Selected Topics in Medicinal Plants and Alternative Medicine		Course Code: PHRM546	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Phytotherapy (PHRM440)		
Course Description	<p>This course aims to introduce the concept of complementary medicine and the diverse types of complementary therapies commonly used and recognized by international health authorities, all of which emphasizes the modern herbal and integrative medicine. Furthermore, the course covers a range of topics such as the concept of homeopathy, aromatherapy, medical herbalism, ayurvedic medicine, reflexology and traditional Chinese medicine including acupuncture and Chinese traditional herbal medicine.</p>		
Course Title: From Experimental to Applied Therapeutics		Course Code: PHRM547	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Therapeutics-2 (PHRM445)		
Course Description	<p>This course aims to bridge the gap between experimental and clinical applications of medicines. Moreover, the course discusses groups of structurally related drugs designed to treat certain conditions, their basic molecular pharmacological action, and how they are applied clinically. The course also includes discussing the toxicity of some drugs and xenobiotics manufactured for specific applications, their basic molecular actions, and their clinical toxicity.</p>		

Course Title: Innovation in Applied Pharmacology		Course Code: PHRM548	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Pharmacology-2 (PHRM341) Therapeutics-2 (PHRM445)		
Course Description	This course is designed to equip the students with the principles of applied pharmacology. Additionally, the course presents models of innovative tools to deliver the pharmacological information to patients and other healthcare professionals.		
Course Title: Selected Topics in Neuropharmacology		Course Code: PHRM549	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Pharmacology-2 (PHRM341) Therapeutics-2 (PHRM445)		
Course Description	This course aims to discuss the drug-induced changes in the functioning of the nervous system and the synaptic transmission. The course also refers to the nervous system's specific diseases and their treatment and gives an overview of the techniques used in studying neuropharmacology.		

Approaches to Practice and Care

Course Title: Patient Centered Care		Course Code: PHRM450	Credit Hours: 2
Year and semester	First Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmacology-2 (PHRM341) Pharmacy Practice Lab-1 (PHRM451)-Co-requisite		
Course Description	This course aims to introduce and discuss the pharmaceutical care practice and pharmacists' role in patient care. The course covers a range of pharmaceutical care topics such as patient-centeredness pharmaceutical care, effective communication with patients, taking a patient's medical history, assessing patients' adherence, assessing, and evaluating medication and treatment plan, appropriateness, and following-up care plan.		

Course Title: Pharmacy Practice Lab-1		Course Code: PHRM451	Credit Hours: 1
Year and semester	First Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmacology-2 (PHRM341) Therapeutics-1 (PHRM441)-Co-requisite Patient Centered Care (PHRM450)-Co-requisite		
Course Description	<p>This course aims to integrate the knowledge and skills from previous years' courses and their application to several complex patient care scenarios. During the course, students will consider a range of patient groups and the complications and pharmaceutical care considerations associated with each group. The course begins with addressing pharmaceutical care-related skills and competencies, including effective and professional communication with patients, processing, and dispensing medication prescriptions, and conducting patient counseling. The course discusses patients' pharmaceutical care in a number of specialties such as hypertension, ischemic heart diseases, heart failure, dyslipidemia, venous thromboembolism, diabetes mellitus, kidney insufficiencies and thyroid gland diseases.</p>		
Course Title: Evidence-Based Practice and Drug Information		Course Code: PHRM452	Credit Hours: 2
Year and semester	First Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Biostatistics (PHRM221)		
	Pharmacology-2 (PHRM341)		
Course Description	<p>This course aims to teach the students evidence-based practice (EBP) skills needed to determine the validity, applicability, and significance of published clinical and pharmaceutical research. The course provides students with a comprehensive overview of EBP and the components essential for implementing EBP in pharmaceutical and clinical settings. Additionally, this course aims to equip the students with skills required to provide evidence-based patient-centered care and appropriately support other healthcare professionals through its drug information component.</p>		

Course Title: Pharmacy Practice Lab-2		Course Code: PHRM453	Credit Hours: 1
Year and semester	Second Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmacy Practice Lab-1 (PHRM451) Therapeutics-2 (PHRM445)-Co-requisite		
Course Description	This course aims to build on the students' skills and knowledge that was acquired from the pharmacy practice lab-1 course. This course discusses the pharmaceutical care of patients in a number of specialties such as: upper and lower respiratory tracts infections, urinary tract infections, peptic ulcers diseases, inflammatory bowel disease, asthma, and chronic obstructive pulmonary disease, and most commonly reported minor ailments.		
Course Title: Pharmaceutical Ethics, Law, and Regulatory Affairs		Course Code: PHRM454	Credit Hours: 3
Year and semester	Second Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Pharmaceutical Technology-2 (PHRM333) Patient Centered Care (PHRM450)		
Course Description	This course aims to examine the Jordanian laws that impact pharmaceutical practice while emphasizing the legal and ethical principles applicable to the pharmacy profession's day-to-day practice. The course focuses mainly on legal and ethical situations commonly encountered by pharmacists working in community pharmacies, medicine development as well as manufacturing and medicines marketing. Additionally, the course discusses the Jordanian medicines licensing and registration framework and requirements.		

Course Title: Clinical Cases Lab		Course Code: PHRM455	Credit Hours: 1
Year and semester	Summer Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Therapeutics-2 (PHRM445) Pharmacy Practice Lab-2 (PHRM453)		
Course Description	This course aims to integrate the knowledge and skills from previous years' courses, and their application to a number of complex patient care scenarios. This course emphasizes the comprehensive delivery of pharmaceutical care to patients with different acute and chronic diseases. The course is also based on virtual healthcare settings that promote and encourage self-guided education and learning.		
Course Title: Pharmacoeconomics		Course Code: PHRM550	Credit Hours: 3
Year and semester	First Semester-Fifth Year	Type	Mandatory
Prerequisites/Co-requisites	Evidence-Based Practice and Drug Information (PHRM452)		
Course Description	This course aims to introduce concepts and applications of Pharmacoeconomics and different methods, and techniques used for evaluating costs and outcomes of healthcare interventions. The course emphasizes the importance of economic evaluation, decision analysis and modeling for determination and efficient use of resources.		
Course Title: Pharmaceutical Marketing		Course Code: PHRM551	Credit Hours: 3
Year and semester	Second Semester-Fifth Year	Type	Mandatory
Prerequisites/Co-requisites	Principles of Business Administration for Pharmacy (PHRM560)		
Course Description	This course aims to teach pharmacy students the principles of marketing and their applications in any capacity within the field of pharmacy. Students will learn how to launch and develop a marketing plan for pharmaceutical products or services in the Jordanian market and learn marketing ideas and techniques to build practices, develop innovative services, and generate business for organizations within the pharmacy scope.		

Course Title: Medicines Review and Disease Management		Course Code: PHRM552	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Patient Centered Care (PHRM450)		
Course Description	This course aims to develop the students' skills needed to enable them to address patients' specific needs in their future practice. During the course, the students will learn how to evaluate patients' health status and comorbidities, assess medication appropriateness, develop an individual care plan, and assure safe administration and medication utilization. The course is also designed to cover the fundamental concepts of comprehensive medication review theoretically and practically.		
Course Title: Selected Topics in Pharmacy Practice		Course Code: PHRM553	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Patient Centered Care (PHRM450)		
Course Description	This course aims to cover up-to-date and contemporary pharmacy practice issues in different practice settings. Additionally, the course touches upon soft and technical skills needed to improve disease outcomes, optimize medication use, and have effective communication with patients, caregivers, and other healthcare professionals.		
Course Title: Research Methods in Clinical Pharmacy and Pharmacy Practice		Course Code: PHRM554	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Pharmacoeconomics (PHRM550)		
Course Description	This course aims to introduce the students to the principles of research methodology, main research designs, principles of the research ethics, good clinical practices, plagiarism, and how to evaluate published pharmaceutical and clinical research.		

Course Title: Health Behavior Theories and Models		Course Code: PHRM555	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Patient Centered Care (PHRM450)		
Course Description	<p>This course aims to provide an overview of the psychosocial determinants of health. It also addresses these determinants within health behavior theories and models such as the Health Belief Model, the Social Learning Theory, the Theory of Planned Behavior, the Trans-theoretical Model, and the Andersen model for healthcare utilization. Additionally, the course emphasizes the importance of applying these theories to health care practice and research.</p>		
Course Title: Sociology in Pharmacy Practice		Course Code: PHRM556	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Patient Centered Care (PHRM450)		
Course Description	<p>This course aims to introduce students to the relevance of sociological theories to the current research and contemporary debates found in pharmacy practice. The course also covers a range of topics and theories such as sociology of health and illness, Marxism and health, functionalism, race and ethnicity in health, feminism and gender perspective, the risks, society and theories of professions and pharmacists.</p>		

Course Title: Pharmacoepidemiology		Course Code: PHRM557	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Biostatistics (PHRM221) Evidence-Based Practice and Drug Information (PHRM452)		
Course Description	This course aims to introduce the students to the pharmacoepidemiology field, the study of the use of drugs, and the effects of drugs in many people. The course covers a range of topics such as the importance of observational studies, post-marketing drug surveillance systems, threats to observational studies' internal validity, and criteria for causation.		
Course Title: Para pharmaceuticals		Course Code: PHRM558	Credit Hours: 3
Year and semester	First/Second Semester-Fifth Year	Type	Elective
Prerequisites/Co-requisites	Over-the-Counter Medicines (PHRM446)		
Course Description	This course aims to discuss managing a group of commonly encountered medical conditions and ailments other than those covered in the Over-the-Counter course. The course also covers a range of health conditions and products such as ostomy care and supplies, wound care, contact lens-related disorders, dermatological disorders, hygiene-related disorders, insomnia and fatigue, nutrition and nutritional supplements and home medical equipment.		

Personal and Professional Development

Course Title: Community Pharmacy Training-1		Course Code: PHRM460	Credit Hours: 3
Year and semester	Summer Semester-Fourth Year	Type	Mandatory
Prerequisites/Co-requisites	Therapeutics-2 (PHRM445) Pharmacy practice Lab-2 (PHRM453)		
Course Description	<p>This course aims to expose students to clinical pharmacy practice in hospitals and outpatients' clinics. The course emphasizes the importance of clinical pharmacy in improving the quality of health services and its impact on the patient's treatment plan. The course is based on eight-week rotations in different clinical departments within hospitals and outpatients' clinics. During each rotation, the students are expected to produce a detailed evaluation of a wide range of patients based on a thorough investigation of their medical history, critical evaluation of drug therapy and identification of drug therapy-related problems. Students are expected to counsel the patients on their medications, monitor patients' adherence, and answer other healthcare providers' queries related to medicinal products.</p>		
Course Title: Principles of Business Administration for Pharmacy		Course Code: PHRM560	Credit Hours: 2
Year and semester	First Semester-Fifth Year	Type	Mandatory
Prerequisites/Co-requisites	Community Pharmacy Training 1 (PHRM460)		
Course Description	<p>The course aims to bring together several basic principles and concepts required for business administration in different pharmacy practice settings. This course is designed to help students become familiar with the main concepts related to business administration such as human resources management, business planning, operation management and economic management.</p>		

Course Title: Community Pharmacy Training-2		Course Code: PHRM561	Credit Hours: 3
Year and semester	Second Semester-Fifth Year	Type	Mandatory
Prerequisites/Co-requisites	Therapeutic-3 (PHRM540) Community Pharmacy Training-1 (PHRM460)		
Course Description	<p>This course aims to expose students to community pharmacy practice in community pharmacy settings. The course emphasizes the importance of community pharmacists in improving the quality of health services and its impact on the patient's treatment plan. The course is based on sixteen-week long rotations in a community pharmacy. During the course, students are expected to be involved in activities related to identifying pharmaceutical products (brand and generic names, route(s) of administration, and dosage form(s)), identifying potential therapeutic problems, demonstrating effective communication skills in interacting with other healthcare provider and patients, adequately counsel patients on essential drug-related information.</p>		