



ASU
APPLIED SCIENCE PRIVATE UNIVERSITY



Amman- Jordan

عمان - الأردن



كلية الصيدلة
Faculty Of Pharmacy



The Bachelor Degree in Pharmacy
of Applied Science Private
University is Certified by the
Accreditation Council for Pharmacy
Education



المستوى الذهبي

Courses Taught in the Pharmaceutical Chemistry and Pharmacognosy Department

905120- Pharmaceutical Organic Chemistry I. (Theoretical), (3 Cr. Hrs), (Prereq. 1501132)

This course will subject the student to the basic principles of pharmaceutical organic chemistry including; molecular orbital theory of organic compounds, acid and base concepts, saturated aliphatic cyclic and acyclic hydrocarbon, principles of the IUPAC nomenclature of organic compounds, unsaturated hydrocarbons, alkyl halide compounds and reaction mechanisms. Additionally, the course will discuss the stereochemistry of pharmaceutical organic compounds focusing on its effect on drugs activities.

905210- Pharmaceutical Organic Chemistry II. (Theoretical), (3 Cr. Hrs), (Prereq. 905120)

The course is designed as a continuation a further understanding of the behavior of organic compounds including: alcohols, ethers, thiols amines, carbonyl chemistry covering aldehyde, ketone, carboxylic acid and their derivatives as well as the study of heterocyclic chemistry; using APIs as examples.

905211- Pharmaceutical Organic Chemistry lab. (Practical), (1 Cr. Hr), (Concur. 905210)

The course is designed to provide the student with a knowledge and understanding of the basic experimental principles of pharmaceutical organic chemistry. The experiments will provide first-hand experience for the student and equip him/her with the ability to solve a wide range of synthetic chemistry problems relating to pharmaceutical products. In addition to practicing organic based computer software.

905220- Pharmaceutical Analytical Chemistry. (Theoretical), (2 Cr. Hrs), (Prereq. 1501123/1501132).

Analytical chemistry is a measurement science consisting of a set of powerful ideas and methods that are able to get quantitative information about the matter. Qualitative analysis reveals the identity of the elements and compounds in a sample, whereas quantitative analysis indicates the amount of each substance in a sample.

905221- Pharmaceutical Analytical Chemistry lab. (Practical), (1 Cr. Hr), (Concur. 905220, Prereq.1501135).

This course is an introduction to the science of chemical measurements. Students will learn how to properly make measurements and record them, see how to measure the important physical and chemical properties of samples and learn how to quantitate and minimize measurement error. These important ideas are then used to teach students how to obtain accurate results and use them properly. This is will be done by exposing the students to a wide range of analytical chemistry problems relating to pharmaceutical products and performing practical experiments of different titrimetric methods (Acid-Base, Oxidation-Reduction, Precipitation, Complexation and Non aqueous Titration).

**905310- Instrumental Analysis and Drug Identification.
(Theoretical), (3 Cr. Hrs), (Prereq. 905210/905220)**

This course introduces the student to spectral methods of analysis including UV-Visible, atomic absorption, flame emission, Infra-Red (IR), Nuclear Magnetic Resonance (NMR), and fluorimetry. Also covers separation techniques (chromatography), in addition to electrochemical principles "potentiometry".

**905311- Instrumental Analysis and Drug Identification lab.
(Practical), (1 Cr. Hr), (Concur. 905310)**

This course is concerned with the practice of instrumental methods for the separation, identification and quantitative analysis of chemical substances. Satisfactory completion of this course will afford students a working knowledge of analytical instrumentation typically employed in chemical and pharmaceutical research laboratories. It will also provide the student with an appreciation of the relative strengths and limitations of different instrumental based analysis.

**905312- Medicinal Chemistry I.
(Theoretical), (3 Cr. Hrs), (Prereq. 905210, Concur. 906310).**

Following the basic knowledge in organic chemistry and physical pharmacy, medicinal chemistry 1 will introduce the student to the expected effects of active organic molecules inside the human physiological system to be able to predict physicochemical properties of these active ingredients. Also, covers different drug classes including antibacterial, antiviral, antineoplastic, steroids and hormones. For each drug class, drug-target, chemical structure and properties, structure-activity relationships, metabolism, and therapeutic uses are discussed.

**905322- Medicinal Chemistry II.
(Theoretical), (3 Cr. Hrs), (Prereq. 905312)**

The course covers drug classes that have not been discussed in Medicinal Chemistry I. For each drug class, the drug-target, chemical structure and properties, structure-activity relationships, metabolism and therapeutic uses, for CNS, Cardiovascular, Respiratory, Urinary systems and antihistamines are discussed.

**905323- Medicinal Chemistry lab.
(Practical), (1 Cr. Hr), (Concur. 905322).**

This laboratory will evolve the basic knowledge obtained by the student in organic and analytical chemistry of simple organic molecules into active drugs as simple synthesis or multistep. Focus will be

made on the assay and purification techniques with regard to the biologically active ingredients. In the molecular modelling part, the student will be able to draw and name simple organic molecules on free drawing software as well as carry out simple properties calculations and draw full reactions.

905410- Phytochemistry.
(Theoretical), (3 Cr. Hrs), (Prereq. 905310)

This course is roughly composed of introduction for different classes of phytochemicals. Extraction and chromatographic methods commonly used in phytochemistry will be also introduced. In addition, basic knowledge on the categorization system of plants, nomenclature, taxonomy and evaluation prior to pharmaceutical formulation will be covered.

905411- Phytochemistry lab.
(Practical), (1 Cr. Hr), (Concur. 905410)

This course will evolve the basic knowledge obtained by the students in phytochemistry. Focus will be made on methods of identification and extractions of naturally occurring substances with medicinal uses from plants. Methods for their quantitation will be also introduced.

905412- Drug Design.
(Theoretical), (2 Cr. Hrs), (Prereq. 905322)

The course will cover the basic principles of how new drugs are discovered with emphasis on the molecular aspects of drug action (chemical, physical and biological), important methods and computational techniques within the drug discovery process like QSAR, lead identification and optimization. The course is further enhanced with seminars on recent developments and applications of drug design principles discussed by students.

905420- Phytotherapy.
(Theoretical), (3 Cr. Hrs), (Prereq.906320/905410)

The course aims to discover the history of herbal medicine and its traditional use (Chinese, Western, and Ayurvedic). It gives a basic idea about the use of medicinal plants for improving health, beauty and nutrition. It includes: definition of phytotherapy, terminology, available dosage form in the market, toxicity, precaution, regulation and legislation.

905501- Screening of Medicinal Plants.
(Theoretical), (3 Cr. Hrs), (Prereq. 905420)

This course is roughly composed of different basic knowledge on the categorization system of plants and their evaluation, applications in natural products, current situation in the market, real life examples and clinical cases discussion.

905502-Forensic Chemistry.
(Theoretical), (3 Cr. Hrs), (Prereq. 905310)

This course is designed to provide a basic foundation in the field of forensic chemistry for those students who are interested in the science of crime scene investigation. The student will gain experience in the

use of various analytical and instrumental methods that are used to analyze physical evidence during criminal investigations.

**905503- New Methods for Drug Discovery.
(Theoretical), (3 Cr. Hrs), (Prereq. 905412)**

This 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, lead optimization, classification and kinetics of molecules targeting enzymes and receptors, as well as structure-based drug design methods. The course is further enhanced with up-to-date research papers on recent developments and applications of drug discovery principles in the pharmaceutical industry.

**905504- Chemistry of Anti-Cancer Drugs.
(Theoretical), (3 Cr. Hrs), (Prereq. 905322)**

In this course, the students are exposed to the recent additions of different classes of anti-cancer drugs. The student will be able to know the interactions of drugs with bio-receptors. It focuses on the role of biotechnology in the design of these drugs.

**905505- Research Methodology.
(Theoretical), (3 Cr. Hrs), (Prereq. 906310)**

The course focuses on a pragmatic view of pharmaceutical research, carrying out literature survey, and teaches the student the ethics of conducting a research and avoiding plagiarism. Attention to problem solving techniques, writing of research proposals, publications and presentations of the research are outlined.

Courses Taught in the Clinical Pharmacy and Therapeutics Department

**906120- Anatomy and Histology.
(Theoretical), (2 Cr. Hrs), (Prereq. 1501141)**

This course presents a systemic approach to the study of the human body. The course begins with an introduction of anatomical terminology and an overview of cellular processes and tissue classification. Students then are introduced to the gross and microscopic anatomy of the following systems: integumentary, skeletal, muscular, nervous, cardiovascular, lymphatic, respiratory, digestive, urinary, reproductive, and endocrine.

**906210- Physiology I.
(Theoretical), (2 Cr. Hrs), (Prereq. 906120)**

This course is designed to provide the student with the principles of homeostasis, control system mechanisms and regulatory feedback systems. The course aims to enable student to understand the correlations between human body organs functions and their complementarities. Physiology I covers the following systems: cardiovascular, pulmonary and digestive.

906212- Biochemistry I.
(Theoretical), (2 Cr. Hrs), (Prereq. 1501141/905120)

The course is intended to teach basics of biochemistry. The course will cover the following topics: acids, bases and buffers, amino acids, peptides and proteins, enzymes, carbohydrates, lipids and related compounds, nucleotide and nucleic acids, vitamins and co-enzymes, hormones.

906213- Biochemistry lab.
(Practical), (1 Cr. Hr), (Concur. 906212)

This course is designed to provide second year pharmacy students with basic skills and methods in biochemistry including techniques for of distinguishing, identification and quantitation of biomolecules such as amino acids, proteins, enzymes, carbohydrates and lipid.

906220- Physiology II.
(Theoretical), (2 Cr. Hrs), (Prereq. 906210)

This course is a continuation of physiology I. It covers: neurophysiology, endocrine and renal physiology. The course is pharmaceutically-directed to prepare the student for better understanding of pathophysiological basis of diseases and the mechanism of action of drugs.

906221- Physiology lab.
(Practical), (1 Cr. Hr), (Concur. 906220)

This course practically covers theoretical topics thought in Physiology I and II. The following topics are practically covered: CBC, WBC differentiation, blood clotting tests, ECG, spirometry tests, human reflexes, blood pressure measurement, and blood glucose test.

906222- Biochemistry II.
(Theoretical), (2 Cr. Hrs), (Prereq. 906212)

This course is designed for students to use the knowledge gained in Biochemistry I to understand the basic concepts of metabolism. Understand the metabolic pathways of the major biomolecules; carbohydrates, lipids, proteins, both anabolic and catabolic pathways including Oxidative phosphorylation and aerobic production of energy as well as understanding the regulation of metabolism.

906310- Pharmacology I.
(Theoretical), (2 Cr. Hrs), (Prereq. 907222, Concur. 906312)

The course is designed to cover the major concepts students need to know about the basis of drug action and the use of drugs in therapy. The first part of the course introduces the principles of pharmacokinetics and pharmacodynamics including types of drug-receptor interaction. The second part

deals with systemic pharmacology and will include drugs affecting the autonomic system and drugs affecting the cardiovascular system.

906312- Pathology and Pathophysiology.
(Theoretical), (3 Cr. Hrs), (Prereq. 906220)

This course is designed to enable Pharmacy students to understand the pathogenesis of human diseases, to explain how and why the manifestation of the disease appear. It focuses on the compensatory mechanisms during the pathogenesis of the disease. This course enables students to understand mechanism of the disease and rationale for clinical interventions and treatment. The course is divided into two sections: molecular and cellular basis of the disease, then the students study systemic level of the disease.

906320- Pharmacology II.
(Theoretical), (3 Cr. Hrs), (Prereq. 906310)

This course covers drugs affecting the cardiovascular system, drugs affecting the endocrine system, drugs affecting the central nervous system; drug mechanism of action, doses, adverse effects, and interaction with other drugs.

906321- Pharmacology lab.
(Practical), (1 Cr. Hr), (Concur. 906320)

In this practical course the student performs experiments on laboratory animals, to implement and observe some of the pharmacological phenomena and acquire some principles of scientific research. Pharmacological experiments include handling of animals, routes of administration, dose response relationship, drug-drug interactions, organophosphate insecticide poisoning, insulin hypoglycemic shock, and evaluation of the analgesic activity of drugs.

906322- Training I.
(Theoretical), (1 Cr. Hr), (Prereq. 906310)

This unit of study will enable students to gain awareness and skills in counseling patients on actual medications found in the virtual Pharmacy, mimicking what is found in the Jordanian pharmacies. This real life practice will promote Pharmacy students focused on patient health care, including medication counseling and management in the actual Pharmacy setting.

906410- Pharmacology III.
(Theoretical), (3 Cr. Hrs), (Prereq. 906320)

This course covers drugs used for diabetes, gastrointestinal and antiemetic drugs, anti-inflammatory drugs, antipyretic and analgesic agents, antibacterial, anti-mycobacterial, antiviral, antifungal, and chemotherapeutic drugs. This course includes drugs' mechanism of action, doses, adverse effects, and interaction with other drugs.

906411- Pharmacokinetics.
(Theoretical), (2 Cr. Hrs), (Prereq. 907322)

This course investigates the basic principles of pharmacokinetics that affect the absorption, distribution, metabolism and excretion. The (Mathematical) models will be used to describe the pharmacokinetic of the drug in the body after oral administration, IV bolus dose, IV infusion, and multiple dosing. The students will learn how to design dosage regimens, evaluate pharmacologic response, identify patient factors which require a modification of dosing regimen, and finally understand drug bioavailability and bioequivalence concepts.

906413- Pharmacokinetics lab.
(Practical), (1 Cr. Hr), (Concur. 906411)

This course is the practical part for the Pharmacokinetics course. It is intended to help students developing mathematical skills and practice on using mathematical models or graphs in determining pharmacokinetic parameters after oral administration, IV bolus dose, IV infusion, and multiple dosing. Students also learn how to apply these mathematical models in clinical cases.

906414- Training II.
(Theoretical), (1 Cr. Hr), (Prereq. 906320/906322)

The course starts to give a guidance to Pharmacy students about how to work in a community Pharmacy and the requirements for training. Students will learn the various roles of pharmacists in community Pharmacy practice. Through this supervised experience, the student will be able to apply concepts from clinical didactic course work to real situations to ensure competencies in direct patient care, and disease prevention. In addition to gaining proficiency in roles related to assessing patient data and reviewing medications orders. Students will also be involved in processes related to product delivery and operations management.

906416- Immunology.
(Theoretical), (1 Cr. Hr), (Prereq. 906222/906312)

This course explores the main principles in immunology. The course begins by covering the basic structures of the human immune system, and then move on to look at ways of interaction between immune cells to produce an immune response. The role of the immune system is studied in the following cases: infectious diseases, cancer, allergy, transplantation, and vaccination.

906422- Clinical Pharmacy and Therapeutics I.
(Theoretical), (3 Cr. Hrs), (Prereq. 906320)

This course focuses on giving Pharmacy students the knowledge and skills to successfully manage the treatment of patients in the clinical Pharmacy setting. It explores the pathology of diseases and the options for management, which include hypertension, heart failure, coronary heart disease, venous thrombo-embolism, dyslipidemia, diabetes mellitus, and chronic kidney disease. It also focuses on methods of delivering patient care that will facilitate improving health outcomes through effective communication.

906424-Toxicology.

(Theoretical), (2 Cr. Hrs), (Prereq. 906320)

This course presents the basic principles of toxicology including areas of toxicology, factors affecting toxicity in humans and disposition of toxins in human body. It also introduces the students to non-organ targeted toxicity which include chemical carcinogenesis. The course also gives a general clinical approach in the management of poisoned patients. Poisoning with common groups of chemicals (pesticides, metals, solvents and common drugs) will be presented including, mechanism of toxicity, sources of exposure, major clinical manifestation and methods of treatment.

**906426- Over the Counter Drugs.
(Theoretical), (2 Cr. Hrs), (Prereq. 906320)**

The course focuses on giving Pharmacy students the knowledge and skills to successfully manage the treatment of patients in the community Pharmacy setting. It is the first course within the undergraduate B.Sc. curriculum which explores the concept of primary care provided by the pharmacist. The course deals with a number of common diseases that could be encountered in a community Pharmacy and how to provide a diagnosis depending on the symptoms, provide dosing regimens, in addition to learn how to deal with patients in the Pharmacy.

**906428- Clinical Biochemistry.
(Theoretical), (2 Cr. Hrs), (Prereq. 906222/906312)**

This course aims to help understand the biochemical consequences of the common disorders on different body organs and their functions. To gain knowledge about the role of clinical chemistry in investigations carried out for diagnosis, screening, monitoring, and management in health and/or disease state. To understand the biochemical tests used in clinical chemistry and the interpretation of the results.

**906429- Clinical Biochemistry lab.
(Practical), (1 Cr. Hr), (Concur. 906428)**

This course is intended to teach students different procedures used in the clinical chemistry labs, with the emphasis on the most frequently used laboratory tests (electrolytes, liver, kidney, cardiac and hormones profile). Test results obtained from these analytical procedures are correlated to disease processes and applied in the diagnosis and management of conditions.

**906512- Clinical Pharmacy and Therapeutic II.
(Theoretical), (2 Cr. Hrs), (Prereq. 906422)**

The course provides students with a way of thinking in the management of certain common diseases. The course aims at teaching students basic skills needed for independent learning capacity. The course will cover the basic concepts in the management (both non-pharmacologic and pharmacologic approaches) of some disorders such as asthma, COPD, headache: migraine and tension-type, anxiety disorders, osteoarthritis, osteoporosis, rheumatoid arthritis, GERD and peptic ulcer disease, gastrointestinal infections, respiratory tracts infections, and urinary tract infections.

906513- Clinical Pharmacy and Therapeutic Lab.
(Practical), (1 Cr. Hr), (Concur. 906512)

This course focuses on limited but more in-depth range of therapeutic areas. The method of teaching is based on Problem-Based Learning (PBL), presenting medical cases in the form of realistic problems which students will be required to solve using a clinical reasoning process. Students are responsible for finding the information necessary to solve the problem while working cooperatively in small groups. The lab is to be conducted in the virtual Pharmacy to fulfill the needed objectives and enable student to develop skills to become a self-directed lifelong learner.

906514- Pharmacoeconomics.
(Theoretical), (2 Cr. Hrs), (Prereq. 906410)

The course starts to serve as an introduction, stressing the importance of the use of pharmacoeconomics to compare costs and outcomes of pharmacy interventions. This course covers the measurement of costs extensively. After that, it discusses the four basic types of pharmacoeconomic research, i.e. cost-minimisation analysis, cost-effectiveness analysis, cost-utility analysis, and cost-benefit analysis. All four analyses include the measurement of costs, but differ in the methods used to measure outcomes. As an advanced topic, the course outlines the use of decision analysis methods to model costs and outcomes, and the pricing policy for drugs in the Jordan Food and Drug Administration (JFDA).

906520- Advance Training.
(Practical), (1 Cr. Hr), (Prereq. 906422/906414)

This module is an advanced training course, that will allow fifth year students to choose among three modules from the following: Industrial: Factories facilities (manufacturing, regulatory affair, marketing, etc.), Research centers, Community Pharmacies: Advanced training, Insurance companies, Jordan Food and Drug Association, Consolidated purchase unit; Hospitals Pharmacies: pharmacy training, Drug information centers/Toxic centers. As those training sites would potentiate the student's pharmaceutical skills and open a new era for professional development. The student will be given the option of three units within the capacity of each unit.

906500- Selected Topics in Therapeutics.
(Theoretical), (3 Cr. Hrs), (Prereq. 906422)

This course focuses on giving Pharmacy students the knowledge and skills to successfully manage the treatment of patients in the clinical Pharmacy setting.

906501- Radioactive Pharmaceuticals and their Applications.
(Theoretical), (3 Cr. Hrs), (Prereq. 905322)

The courses introduction recalls the basic information related to the atomic structure and the difference between stable and radioactive isotopes. The main types of radiation will be discussed in details: their origin, energy, interaction with matter, detection and finally the protection and shielding from each type. After this major introductory part; the biological effect of radiation will be discussed followed by their medical application in diagnosis and therapy. Production of radionuclides and quality control issues specific to radiopharmaceuticals are discussed. In addition, students are introduced to the safety precautions that should be taken in dealing with radioactive substances.

906502- Clinical Pharmacokinetics.
(Theoretical), (3 Cr. Hrs), (Prereq. 906411)

This course is a continuation of pharmacokinetics course. It focuses on basic principles of treatment intervention to reach optimum drug intervention. The course also aims to increase students' knowledge about the follow up of the therapeutic intervention particularly for toxic and dangerous drugs.

906503- Drug Informatics.
(Theoretical), (3 Cr. Hrs), (Prereq. 906410)

The course aims to increase students' knowledge about drug information concepts and how to obtain drug information from different resources. The course also covers pharmacovigilance concept, and medication errors prevention.

906504- Hospital Pharmacy Practice.
(Theoretical), (3 Cr. Hrs), (Prereq. 906422)

This course focuses on giving Pharmacy students the knowledge and skills to successfully manage the treatment of patients in the clinical Pharmacy setting in the hospital. It also includes teaching the role of hospital pharmacist in dispensing medications and nutrients. It is considered as a course that integrates with the clinical Pharmacy and therapeutics courses by implementing methods of delivering patient care that will facilitate improved health outcomes through effective communication in the hospital.

906505- Introduction to Nutrition.
(Theoretical), (3 Cr. Hrs), (Prereq. 906222)

This course covers basic concepts of nutrition, minerals and vitamins, as well as metabolism of basic macromolecules. The course focuses on malnutrition disorders and their rationale to treatment. Finally the course considers interactions between food and drugs.

906506- Introduction to Molecular Biology.
(Theoretical), (3 Cr. Hrs), (Prereq. 906222)

The course explains the meaning of molecular biology science. It covers Mendelism laws, genetic material characteristics, DNA replication, RNA transcription and translation to synthesize protein.

Student can understand abnormal changes (mutations) that may occur to genetic material and their effects on the phenotype. The course also explains cellular responses to endogenous and exogenous variables in addition to some of genetic diseases resulted from the gene defects.

**906507- Pharmaceutical Care and Infection Control.
(Theoretical), (3 Cr. Hrs), (Prereq. 906410)**

This course covers the topics of pharmaceutical care and its applications within the health care and infection control system. The course includes the important principles related to the quality of health care and patient safety and the role of pharmacists in controlling infection and reducing the spread of infectious diseases.

Courses Taught in the Pharmaceutical Sciences and Pharmaceutics Department

**907120- Introduction to Pharmacy.
(Theoretical), (3 Cr. Hrs)**

This course aims to introduce the first year students to pharmacy, as a degree, profession, and a scientific field. It gives a comprehensive idea about Faculty of Pharmacy and its curriculum and facilities. It also covers history of pharmacy, pharmacy's relationship with other health sciences, local and international career opportunities. In addition, the course covers some ethical issues related to pharmacy profession, introduces certain skills such as communication skills, and introduces pharmaceutical terminologies needed by the students during their studies and/ or profession.

**907210- Physical Pharmacy.
(Theoretical), (3 Cr. Hrs), (Prereq. 1501110/1501132)**

This course investigates physicochemical and biopharmaceutical properties of various pharmaceutical dosage forms of drugs, and their impact on the safety, effectiveness, stability and formulation. The following topics are discussed: states of matter and sub-phases, properties of drugs in solution and colligative properties, equilibrium phenomena, solubility, chemical kinetics, drug stability and interfacial phenomena.

**907212- Microbiology I.
(Theoretical), (2 Cr. Hrs), (Prereq. 1501141)**

This is an introductory course to microbiology that covers naming and classification of microorganisms, structure and function of prokaryotic cells compared to eukaryotic cells, and the optimal conditions and stages of bacterial growth. In addition, the course introduces the students to other types of microorganisms including: protozoa, fungi, helminths and viruses, and some of the major diseases caused by these microorganisms.

**907213- Microbiology lab.
(Practical), (1 Cr. Hr), (Concur. 907212)**

The student is introduced to the diversity of microorganisms identified and classified by using different staining techniques. It includes observing the bacterial motility through hanging drop technique and agar motility, and obtaining pure culture by applying different techniques. Students will examine different physical and chemical agents used to control the microbial growth.

907220- Pharmaceutics I.
(Theoretical), (3 Cr. Hrs), (Prereq. 1501123/907210)

This course helps the Pharmacy students to understand how to deal with prescriptions, abbreviations, dispensing of medications. In addition, to learn the basic pharmaceutical calculations, the principles applied in the preparation of pharmaceutical dosage forms and drug delivery systems. Specifically, solutions, suspensions, emulsions, colloidal dispersion and aerosol systems which are discussed along with their various types. The basic formulation, their additives, methods of preparation, common examples, packaging and quality requirements.

907221- Pharmaceutics I lab.
(Practical), (1 Cr. Hr), (Concur. 907220)

In the first part of this course, the students will learn how to use the physicochemical principles on different pharmaceutical applications. These applications include pharmaceutical analysis using UV-Visible spectroscopy, solubilization of poorly soluble drugs. In addition to, determination of the order and activation energy of decomposition reaction and determination of critical micelle concentration of surfactants. In the second part of this course, the student will practice the extemporaneous compounding of pharmaceutical liquid preparations. The content of such preparations, uses, applications, calculations and practical compounding of various preparations are discussed thoroughly during the course.

907222- Microbiology II.
(Theoretical), (3 Cr. Hrs), (Prereq. 907212)

The main aim of this course is to familiarize students with the infection diseases and their risk factors. It also provides a brief information about some important types of bacteria associated with the most common human diseases such as gonorrhoea, syphilis and gastric ulcer. In addition to the basic details about antibiotics types, sources, mechanisms, uses (and misuses) and microbial resistance. It also discusses the sterility of pharmaceutical preparations and the applied procedures in drug industry (quality control). In addition, it explains the basics of immunology and systemic microbial diseases in human.

907310- Pharmaceutics II.
(Theoretical), (3 Cr. Hrs), (Prereq. 907220)

This course is complementary for the prerequisite course Pharmaceutics I. As, Pharmacy students will learn about different applied principles and technologies related to the preparation of pharmaceutical dosage forms and drug delivery systems. Specifically, dispersions, transdermal drug delivery systems, parenterals, suppositories and inserts. As well, the ophthalmic, nasal and otic preparations are discussed along with their various types, additives, methods of preparation, common examples, packaging and quality requirements.

907311- Pharmaceutics II lab.
(Practical), (1 Cr. Hr), (Concur. 907310)

This course exposes the students for the extemporaneous compounding of pharmaceutical prescriptions. As the content of such prescriptions, uses, applications, calculations, labeling, dispensing, and practical compounding of various dosage forms are discussed thoroughly during the course. The students will have the opportunity to compound a sterile ophthalmic preparation, cosmetic (and medicated) topical creams, gels, ointments, emulsions, capsules and suppositories.

907312- Applied Biostatistics.
(Practical), (1 Cr. Hrs), (Prereq. 1501110/907220)

This course provides an introduction to selected important topics in biostatistical concepts. It provides a basic knowledge for statistical studies and their graphical representation. Specific topics include tools for describing central tendency and dispersion of data; probability concepts; statistical hypothesis testing and its application to group comparisons; methods of sampling and various statistical measures.

907320- Industrial Pharmacy.
(Theoretical), (3 Cr. Hrs), (Prereq. 907310)

This course discusses the scientific and technological concepts related to pharmaceutical manufacturing of various dosage forms, especially solid dosage forms. It includes manufacturing processes (size reduction and separation, mixing, granulation, drying, tableting, coating, encapsulation and clarification) in addition to particle science and powder technology topics (solid state properties, size analysis, and powder flow). The course also covers the preformulation, formulation and quality requirements for tablet and capsule dosage forms.

907321- Industrial Pharmacy lab.
(Practical), (1 Cr. Hr), (Concur. 907320)

This course covers the practical technologies related to manufacturing of different pharmaceutical dosage forms, production stages and lines for them (e.g. milling, mixing, granulation, capsule filling, slugging and tableting).

907322- Biopharmaceutics.
(Theoretical), (2 Cr. Hrs), (Prereq. 907310)

This course exposes Pharmacy students to the basic concepts of Biopharmaceutics including the processes of absorption, distribution, metabolism, and excretion of drugs. As well, it will discuss the basic factors that affect the absorption and distribution of drugs in the body. This course will also cover the routes of administration and effect of the physicochemical properties of drugs and drug products on the bioavailability of these drugs. In addition, diffusion and drug release following drug administration will constitute a major part of the course. It will be emphasizing the ability to interconnect the physicochemical properties of the drug and the physiology of the body followed by an optimization of drug delivery using any route of administration.

907324- Pharmaceutical Legislation and Ethics.
(Theoretical), (1 Cr. Hr), (Prereq. 907310)

This course intended to teach students about the basic legislations and Pharmacy practice laws that control Pharmacy profession. The course also introduces the students for Pharmaceutical Society structure and duties. Also, presents the ethics that regulate Pharmacy practice and relationship between patients and health-care providers to ensure optimal Pharmacy services.

907410- Pharmaceutical Technology.
(Theoretical), (2 Cr. Hrs), (Prereq. 907320)

This course discusses the necessary scientific and technological concepts related to formulation design and pharmaceutical manufacturing of various dosage forms. In particular, as a continuation to industrial Pharmacy, this course covers complementary topics to those already studied. Moreover, aside from more traditional aspects of pharmaceutical technology, some advanced drug delivery methodology and advanced formulation and delivery methods will be included in order to meet up with the rapid advances in this field. The course includes formulation and manufacturing of hard and soft capsules, design of modified release dosage forms and updated information about dissolution testing of solid dosage forms. Finally, some advanced dosage form design and manufacturing aspects will be studied i.e. pharmaceutical nanotechnology, nanomedicine, delivery of biopharmaceuticals, design and administration of medicines for children (and the elderly).

907510- Cosmetics preparations.
(Theoretical), (2 Cr. Hrs), (Prereq. 907320)

The course covers numerous topics including the history of the cosmetic production, the physiology of the potential targets of cosmetics, safety, legal and regulatory considerations throughout the world, cosmetic ingredients, vehicles and finished products, new delivery systems, safety and efficacy testing, hair and nail preparations, face and body makeup, and baby care products.

907520- Pharmaceutical Marketing.
(Theoretical), (2 Cr. Hrs), (Prereq. 906410)

This course intended to provide a comprehensive marketing overview for the basic concepts and requirements for employment in the field of Pharmacy. This involves fostering the acquisition of knowledge and skills required to excel in the areas of value added services, pharmaceutical marketing including distribution, promotion, pricing and products. Emphasis is placed on the use of active learning strategies rather than passive listening and regurgitation of information. This is to ensure that the students have adequate opportunity to elaborate and learn the information and skills that are presented. One of the strategies to accomplish this will be group discussion with some role models in the field of pharmaceutical marketing in Jordan. The course is designed to teach Pharmacy students the principles of marketing and their simulation as a pharmaceutical marketing, students are expected to apply the studied concepts over a major presentation. Students are also given the task to develop and understand marketing plan used by the community Pharmacy practitioners. In addition to the use of group discussion with the role models which will facilitate communication, critical thinking, problem solving and team building skills.

907522- Pharmaceutical Biotechnology.
(Theoretical), (2 Cr. Hrs), (Prereq. 907222/907320)

The course provides an introduction to biotechnology disciplines and its application in a variety of pharmaceutical, medical and other fields. This includes the structure and function of nucleic acids: replication, transcription and translation. This course also covers various techniques involved in recombinant DNA technology, including: microbiological techniques, cloning, stem cells vaccines, gene therapy and paternity test. In addition, this course introduces students to biopharmaceuticals and biomedical products such as hormones (insulin and growth, monoclonal antibodies and how to prepare them).

**907500- Advanced Pharmaceutical Marketing.
(Theoretical), (3 Cr. Hrs), (Prereq. 907520)**

This course provides students with advanced strategies in pharmaceutical marketing, management, sales (and marketing prediction), emergency planning, marketing plans development, team leadership and time management.

**907501- Management and Accounting for Pharmacists.
(Theoretical), (3 Cr. Hrs), (Prereq. 906322)**

This course provides students with the basic knowledge about managerial duties. This includes planning, organizing, directing and auditing. In addition, students will learn about basics of accounting including related definitions, basic accounting elements, analyzing financial transactions, preparing income details and budgets.

**907502- Parasitology.
(Theoretical), (3 Cr. Hrs), (Prereq. 907222)**

This course introduces students to the major terms and vocabularies involved in parasitology. It also introduces them to the classification and life cycles of various parasites. Specific topics include routes of transmission, diseases prevention and control and treatment of parasites. It also covers a brief overview of medical arthropods that act as vectors to certain parasites.

**907503- Polymer Science.
(Theoretical), (3 Cr. Hrs), (Prereq. 907410)**

This course is designed to introduce students to the science of polymers; their properties; classification; methods of characterization and their syntheses. Specific topics include methods of accurate determination of polymers based on their physical and chemical characteristics and fields of application of polymer science in pharmacy and pharmaceutical industry.

**907504- Principles of Drugs Development and Registration.
(Theoretical), (3 Cr. Hrs), (Prereq. 907410)**

This course intended to provide students with a broad knowledge about drug development including their stages from the drug discovery point to marketing for pharmaceutical preparations. This course increases the student's awareness towards the types of research studies, e.g. in vivo and in vitro, which are required for drug development. In addition to the clinical studies that are required for the drug registration, and the requirements for generics registration, in Jordan and internationally.

**907505- Pharmaceutical Quality Control.
(Theoretical), (3 Cr. Hrs), (Prereq. 905310/907320)**

This course intended to introduce the students for all quality criteria in the pharmaceutical manufacturing and drug analysis. It also covers the duties of all departments in the pharmaceutical plants, the good practice in manufacturing and laboratories, in addition to the sterile products manufacturing requirements. Manufacturing and registration laws and legislations according to the WHO are also included in this course.

**907506- Advanced Drug Delivery Systems.
(Theoretical), (3 Cr. Hrs), (Prereq. 907410)**

This course intended to introduce the students for the basics of targeted drug therapy, delivery systems and technologies which involved in the targeted drug therapy. It also provides the student with detailed knowledge about drug release from various dosage forms such as immediate, delayed or extended release dosage forms. The main focus of this course is about oral dosage form as the most convenient route of administration. In addition to the focus on the physicochemical basis of non-conventional dosage forms which used to control drug delivery and release with examples of such successfully marketed dosage forms.

Prereq. : Prerequisite
Concur.: Concurrent
Cr.Hrs : Credit hours