

Number		Theoretical	Practical	Hours	
1201524	Applied chromatography	2	-	2	1201315
1201531	Poisonous and hallucinogenic plants	2	-	2	1201302
1201535	Pharmaceutical biotechnology	2	-	2	1201401
1201571	Seminar in pharmaceutical sciences	1	-	1	1201401+ 1201302
1202532	Selected topics in physical pharmacy	2	-	2	1202235
1202533	Pharmaceutical radioisotopes	2	-	2	1201401
1202538	Selected topics in pharmaceutical technology	2	-	2	1202333
1202541	Selected topics in pharmaceutical microbiology	2	-	2	1202441
1202572	Seminar in pharmaceutics and pharmaceutical technology	1	-	1	1212331+ 1202341
1203514	Pharmaceutical promotion and marketing (2)	2	-	2	1203513
1203515	Pharmaceutical intellectual property	2	-	2	1203401
1203573	Seminar in biopharmaceutics and clinical pharmacy	1	-	1	1203364
1211522	Selected Topics in phytochemistry	2	-	2	Phytopharmaceuticals
1213552	Parapharmaceuticals	2	-	2	1203364
1213563	Selected topics in clinical toxicology	2	-	2	1203562

**Fourth:** Courses offered by other faculties and departments .....

Course Number	Course Title	Contact Hours		Credit Hours	Pre-requisite
		Theoretical	Practical		

**Fifth:** Advisory Study Plan  
(1st) Year

(1) Semester			(2) Semester		
Course Number	Course Title	Credit Hours	Course Number	Course Title	Credit Hours
0304101	General biology (1)	3	0303231	Organic chemistry (1)	3

0304111	General Biology Laboratory (1)	1	1902103	Computer skills for Medical Faculties	3
0303101	General chemistry (1)	3	1202134	Physicochemical principles of pharmacy	2
0333109	Practical General chemistry	1		University requirement	3
0301101	Calculus (1)	3		University requirement	3
	University requirement	3			
	University requirement	3			
<b>Total</b>		<b>17</b>	<b>Total</b>		<b>14</b>

(2nd) Year

(1) Semester			(2) Semester		
Course Number	Course Title	Credit Hours	Course Number	Course Title	Credit Hours
0551214	Physiology for pharmacy (1)	2	0551215	Physiology for pharmacy (2)	2
0532201	Anatomy and histology for Pharmacy	2			
1203251	Biochemistry (1)	2	1203253	Biochemistry (2)	3
1201215	Pharmaceutical organic chemistry (1)	3	1202235	Physical pharmacy	2
1211212	Pharmaceutical organic chemistry-practical (1)	1	1202236	Physical pharmacy-practical	1
1202230	Pharmaceutical calculations and compounding	2	1201201	Pharmaceutical chemical analysis	2
1202234	Pharmaceutical calculations and compounding-practical	1		University requirement	3
	University requirement	3			
<b>Total</b>		<b>15</b>	<b>Total</b>		<b>14</b>

(3rd) Year

(1) Semester			(2) Semester		
Course Number	Course Title	Credit Hours	Course Number	Course Title	Credit Hours
1201301	Phytotherapy and natural products chemistry (1)	2	1201302	Phytotherapy and natural products chemistry (2)	2

1203363	Pharmacology (1)	3	1203364	Pharmacology (2)	3
1212331	Pharmaceutical technology (1)	2	1201315	Pharmaceutical instrumental analysis	2
1212332	Pharmaceutical technology-practical (1)	1	1202341	Pharmaceutical microbiology (1)	3
1202381	Pharmaceutical statistics	2	1202333	Pharmaceutical Technology (2)	2
1203303	Pharmacotherapy: A Pathophysiologic Approach	3	1202334	Pharmaceutical Technology practical (2)	1
	University requirement	3	1201204	Pharmaceutical analysis – Practical	1
<b>Total</b>		<b>16</b>	<b>Total</b>		<b>14</b>

(summer) Semester					
Course Number	Course Title	Credit Hours	Course Number	Course Title	Credit Hours
1210401	Pharmaceutical field training (1)	3			
<b>Total</b>		<b>3</b>	<b>Total</b>		

(4th) Year

(1) Semester			(2) Semester		
Course Number	Course Title	Credit Hours	Course Number	Course Title	Credit Hours
1201401	Medicinal chemistry (1)	3	1201402	Medicinal chemistry (2)	2
1203402	Pharmacology (3)	3	1201403	Medicinal chemistry practical	1
1203426	Therapeutics (1)	3	1203475	Pharmacokinetics	2
1203471	Biopharmaceutics	2	1203476	Case studies in pharmacokinetics	1
1202441	Pharmaceutical microbiology (2)	2	1203429	Therapeutics (2)	3
1202442	Pharmaceutical Microbiology –practical	1	1203401	Pharmacoeconomics	2
1203403	Pharmaceutical clinical biochemistry and nutrition	3	1201404	Phytopharmaceuticals	2
			1201405	Phytopharmaceuticals-Practical	1
			1202536	Cosmetics science	2
<b>Total</b>		<b>17</b>	<b>Total</b>		<b>16</b>

(summer) Semester					
Course Number	Course Title	Credit Hours	Course Number	Course Title	Credit Hours
1220402	Pharmaceutical field training (2)	3			
Total		3	Total		

(5th) Year

(1 ) Semester			(2 ) Semester		
Course Number	Course Title	Credit Hours	Course Number	Course Title	Credit Hours
1203561	Clinical pharmacy-Practice	1	1202517	Pharmacy regulations and ethics	2
1203404	Pharmacy practice and informatics	3	1203563	Over the counter drugs	2
1201515	Medicinal chemistry (3)	3		University requirement	3
1203562	Toxicology	2		Elective	2
1203513	Pharmaceutical promotion and marketing (1)	3		Elective	2
	University requirement	3		Elective	2
	Elective	2		Elective	2
				Elective	2
Total		17	Total		17

## Course Description

### 0304101 General Biology (1)

3 Cr. Hrs

**Prerequisite: ( None )**

Internal structure of the cell. Molecules of the cell. Metabolism-respiration and photosynthesis, cell-cell signalling, cell division, Mendelian inheritance, molecular biology of the gene, DNA technology, chemical signals in plants and animals, phylogeny and systematic introduction to ecosystematics and introduction to ecosystems.

### 0304111 General Biology Laboratory (1)

1 Cr. Hrs

**Prerequisite: (0304101 or Co-Req.)**

Laboratory experiments in microscopy and cells, chemical aspects of cells, tissues, and plant physiology. Mammalian anatomy and systems of major living groups.

### 0303101 General Chemistry (1)

3 Cr. Hrs

**Prerequisite: ( None )**

Measurements and significant figures, chemical reactions, stoichiometry, the gaseous state, thermochemistry, electronic structure and periodicity, chemical bonding, molecular shapes, states of matter and intermolecular forces, physical properties of solutions, principles of equilibrium.

### 0301101 Calculus (1)

3 Cr. Hrs

**Prerequisite: ( None )**

Functions: domain, operations on function, graphs of functions, trigonometric functions; limits: meaning of a limit, computational techniques, limits at infinity, infinite limits :continuity; limits and continuity of trigonometric functions; the derivative : techniques of differentiation, derivatives of trigonometric functions chain rule; implicit differentiation; differentials; Rolle's Theorem; the mean value theorem; the extended mean value theorem; L'Hopital's rule; increasing and decreasing functions; concavity maximum and minimum and minimum values of a function; graphs of functions including rational functions (asymptotes) and functions with vertical tangents(cusps); antiderivatives; the indefinite integral; the definite integral; the fundamental theorem of calculus; the area under curve; the area between two curves; transcendental functions: inverse functions, logarithmic and exponential functions; derivatives and integrals; limits(the indeterminate forms); hyperbolic functions and their inverses; inverse trigonometric functions; some techniques of integration.

### 0333109 General Chemistry Laboratory

1Cr.Hrs

**Prerequisite: (0303101)**

Selected experiments representing the following subjects in general chemistry: tools and measurements, empirical formula, limiting reagent, acid-base reactions, oxidation reduction reactions, thermodynamics, common ion effect.

### 0303231 Organic Chemistry (1)

3 Cr. Hrs

**Prerequisite: ( 0303101 )**

Alkanes and cycloalkanes, alkenes and alkynes, stereochemistry, common organic reactions, substitution, addition, elimination, alcohols, ethers, conjugated systems.

### 1202134 Physicochemical Principles of Pharmacy

2 Cr. Hrs

#### Prerequisite: ( 0303101 )

Learn the basics and relevance of physicochemical properties of drug entities which influence drug solubility, dosage form design, formulation development, drug delivery and bioavailability. Understand principles involving solubility, intermolecular forces and states of matter, phase equilibria, physical properties of molecules, solutions of nonelectrolytes and electrolytes including application of their colligative properties. Moreover, gain insight into isotonic solutions.

### 1203251 Biochemistry (1)

2 Cr. Hrs

#### Prerequisite: ( 0303101 )

Learn information concerning the chemical and physical properties of biomolecules (carbohydrates, lipids and proteins) and their interrelated functions in a biological system. Gain knowledge about bioenergetics and oxidative phosphorylation.

### 1902103 Computer skills for Medical Faculties

3 Cr. Hrs

#### Prerequisite: ( 1902099 )

This course empowers the medical students with the necessary computer skills associated with the health information systems. It also provides entry level knowledge for conducting medical research experiments and utilizing the available software tools including spread sheet (Excel) and database (Access). Moreover, it introduces the necessary computer skills for understanding medical experimental settings, hypotheses testing, and statistical tests (student t-test and Chisquare) as well as the computer skills for computing both the correlation and regression. Furthermore, this course includes case studies for both a database in health information system and medical data analysis

### 1201215 Pharmaceutical Organic Chemistry

3 Cr. Hrs

#### Prerequisite: ( 0303231 )

Learn the classification, nomenclature, general properties, chemical reactions and their mechanisms and methods of preparation of various organic compounds (alcohols, phenols, ethers, aldehydes and ketones, carboxylic acids and derivatives, nitro compounds, amines, thiols and thiophenols). Recognize the heterocyclic and poly-carbocyclic compounds specially those of pharmaceutical significance. Know the stereochemistry and its applications in pharmacy and relation to pharmacological action of some organic compounds.

### 1211212 Pharmaceutical Organic Chemistry –Practical

1 Cr. Hrs

#### Prerequisite: (1201215 or Co-Req.)

Explore the physical and chemical properties of different functional groups of organic compounds of pharmaceutical interest and differentiate between them by chemical reactions. Synthesize different organic compounds by employing chemical reactions and learn techniques that involve their separation, purification, and testing.

### 1201201 pharmaceutical chemical analysis

2Cr.Hrs

#### Prerequisite: (0303231 or Co-Req)

Discusses various analytical methods used in drug analysis in order to identify structure, purity and

action.

**1202230 Pharmaceutical Calculations and Compounding**

**2 Cr. Hrs**

**Prerequisite: ( 1202134 )**

Learn the fundamentals of extemporaneous compounding and the standards for applying good practice to all aspects of small-scale manufacture of medicines. Explore dispensing techniques, pharmaceutical calculations, packaging, storage considerations and stability of compounded formulae. Recognize routes of administration and various dosage forms. Gain knowledge of appropriate techniques and correct practice applied in extemporaneously compounded formulae that are in the form of solutions, suspensions, emulsions, suppositories, powders and semi-solid preparations (ointments, creams), in addition to their packaging and storage conditions, labelling, and dispensing.

**1202234 Pharmaceutical Calculations and Compounding - Practical 1 Cr. Hrs**

**Prerequisite: (1202230 or Co-Req.)**

Gain the knowledge and practical skills that are essential for applying good pharmacy practice during small-scale compounding of pharmaceutical preparations in which quality, safety and stability are maintained. Utilise practical aspects concerning pharmaceutical calculations, proper dispensing techniques, labelling, suitable packaging and appropriate storage conditions through direct application on worked examples of various compounded formulae including solutions, suspensions, emulsions, creams, ointments, gels, suppositories and powders.

**1203253 Biochemistry (2)**

**3 Cr. Hrs**

**Prerequisite: ( 1203251 )**

Learn the main biochemical concepts regarding different metabolic pathways of biomolecules, carbohydrates, lipids, proteins, and nucleotides. Gain knowledge about storage and the expression of genetic information.

**0532201 Anatomy and Histology for Pharmacy**

**2 Cr. Hrs**

**Prerequisite: (0304102 )**

An overview of structure of the human body and tissues and their cooperative role in normal function. Topic include: embryology, blood, nervous, musculoskeletal, skin, cardiovascular, digestive, urinary, respiratory, endocrine, and reproductive system.,

**1202235 Physical Pharmacy**

**2 Cr. Hrs**

**Prerequisite: ( 1202134 )**

Explore critical concepts and phenomena in Physical Chemistry with relevance to pharmaceutical systems such as: partitioning, complexation, reaction kinetics/drug stability, diffusion, dissolution and interfacial phenomena. Identify the applications/implications of each phenomenon in pharmaceutical systems.

**1202236 Physical Pharmacy- practical**

**Prerequisite: (1202235 or Co-Req.)**

A practical course in physical pharmacy focusing on observing physicochemical phenomena at work in pharmaceutical dosage forms and systems

**1202381 Pharmaceutical Statistics**

**2 Cr. Hrs**

Gain knowledge of statistical analysis approaches directed towards applications in clinical pharmacy and the pharmaceutical industry. Develop an insight into sampling and experimentation, descriptive statistics, probability, binomial and normal distributions, confidence interval and hypothesis testing. Learn how to perform computerized statistical analysis which is an integral part of the course.

**0551214 Physiology for Pharmacy (1)**

**2 Cr. Hrs**

**Prerequisite: ( 0304102 )**

Correlation of morphological, biochemical, and functional organization of the human body as related to normal state. Topics include cell, nerve and muscle, autonomic nervous system, blood and body fluids, cardiovascular system, respiratory system physiology.

**0551215 Physiology for Pharmacy (2)**

**2 Cr. Hrs**

**Prerequisite: ( 0551214 )**

Correlation of morphological, biochemical, and functional organization of the human body as related to normal state. Topics include: GI system, endocrine system, reproductive systems, renal system, central nervous system and special topics such as skin, and sensory organs.

**1203363 Pharmacology (1)**

**3 Cr. Hrs**

**Prerequisite: (0551215)**

Understand the basic principles of drugs' pharmacodynamics, pharmacokinetics, adverse reactions, and drug-drug interactions, also learn about drugs affecting the autonomic nervous system (cholinergic and adrenergic agonists and antagonists), drugs for neurodegenerative diseases, antihypertensives, drugs for hyperlipidemia, heart failure treatments, antiarrhythmics, antianginal medications, anticoagulants, and antiplatelet therapies.

**1212331 Pharmaceutical Technology (1)**

**2 Cr. Hrs**

**Prerequisite: ( 1202230 )**

Understand the process of a product development in the pharmaceutical industry and the organizational structure of a pharmaceutical manufacturer. Gain knowledge of unit processes used in pharmaceutical manufacturing including milling, granulation, drying, mixing and tableting in terms of rationalization for use, equipment utilized and characteristics of the product.

**1212332 Pharmaceutical Technology - Practical(1)**

**1 Cr. Hrs**

**Prerequisite: ( 1212331 or Co-Req )**

Understand the process of a product development in the pharmaceutical industry and the



organizational structure of a pharmaceutical manufacturer. Gain knowledge of unit processes used in pharmaceutical manufacturing including milling, granulation, drying, mixing and tableting in terms of rationalization for use, equipment utilized and characteristics of the product.

**1203303 Pharmacotherapy: A Pathophysiologic Approach**

**3 Cr. Hrs**

**Prerequisite: (0551215)**

Learn about the nature of major diseases, its associated alterations in the structure and function of human organs, and their clinical manifestations, related to cardiology, rheumatology, endocrine system disorders, gastrointestinal disorders, and hematologic/ oncologic, respiratory, renal, and infectious diseases.

**1203364 Pharmacology (2)**

**3 Cr. Hrs**

**Prerequisite: ( 1203363 )**

Learn about anxiolytic and hypnotic drugs, antidepressants, antipsychotic, drugs for Epilepsy, anaesthetics, opioids, CNS Stimulants, drugs of abuse, drugs affecting pituitary and thyroid, drugs for diabetes, estrogens and androgens, adrenal hormones, drugs affecting bone metabolism, histamine and serotonin, anti-inflammatory, antipyretic, and analgesic agents, drugs for disorders of the respiratory system, gastrointestinal and antiemetic drugs.

**1201315 Instrumental pharmaceutical Analysis**

**2Cr.Hrs**

**Prerequisite: (1201201)**

Study of the basic instrumental methods used in the qualitative and quantitative analysis of pharmaceutical active and non-active chemicals in different dosage forms. In addition to analysis stated in the pharmacopoeias e.g. spectroscopy and chromatography.

**1202341 Pharmaceutical Microbiology (1)**

**3 Cr. Hrs**

**Prerequisite: (1203253)**

Know different types of microorganisms: what they are made of, how they live and function, how they can affect aspects of life and how to deal with the biorisk associated with them. Appreciate the importance of having a variety of antimicrobial medications, discover the way they work and learn how to properly use them. Understand the microbial disease processes and how new diseases emerge. Explain how the immune system and other defence mechanisms can protect the human body from pathogens and other threats, and also what happens upon their malfunction. Recognize the common infectious diseases that can affect the body and how they could be prevented, controlled and treated.

**1203401 Pharmacoeconomics**

**2 Cr. Hrs**

**Prerequisite: (1203363)**

Learn about the principles and tools of pharmacoeconomics and health outcomes assessment particularly those commonly used to assess the cost-effectiveness of health, medical, and pharmaceutical interventions. Study cases and examples from other health systems that focus on evidence-based decision-making, economic evaluation, decision analysis, and modeling techniques. Recognise applications to technology assessment, health policy process, clinical

practice, drug pricing policy and price control, drug expenditure, and resource allocation from a local and international context.

**1201302      Phytotherapy and natural products chemistry (2)**

**2 Cr. Hrs**

**Prerequisite: (1201301)**

This course is a continuation of "Phytotherapy and natural products chemistry (1)" course. It discusses the chemistry and the pharmaceutical uses of secondary metabolites obtained from both the mevalonate pathway and the alkaloids. This course also provides a review of the alternative and complementary therapies that are current and available. In addition, it discusses the science of using herbal remedies and botanical extracts to treat illness and improve health with special emphasis on herbal therapy in Jordan. Contraindications of herbs and their interactions with drugs will be also discussed in this course

**1202333      Pharmaceutical Technology (2)**

**2 Cr. Hrs**

**Prerequisite: ( 1212331 )**

Identify different formulation and manufacturing aspects of coated solid dosage forms, capsules, disperse systems and parenteral products. Explore the processing technologies, knowledge of materials and quality testing procedures, and combine such knowledge into pharmaceutical products capable of satisfying therapeutic objectives.

**1202334      Pharmaceutical Technology- practical (2)**

**1 Cr.Hrs**

**Prerequisite: ( 1202333 )**

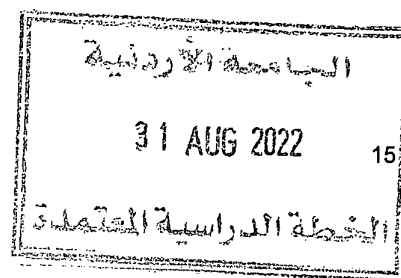
Application of different tablet coating (film coating and enteric coating). Evaluating the coating process and coated dosage forms. In addition to design and evaluation of sustained release matrix. Quality control of semisolid dosage forms will be addressed. The evaluation of micro encapsulation will be covered.

**1210401      Pharmaceutical Field Training (1)**

**3 Cr. Hrs**

**Prerequisite: ( 1203364+ successful completion of 60 credit hours )**

Practice the fundamental role of pharmacists in community pharmacy settings. Identify different medications and distinguish different dosage forms in community pharmacy including chronic prescribed and OTC. Recognize different products available in community pharmacy like cosmetics products, Infant formula, medical supplies ... etc. Exhibit the skills of proper reading and handling of medical prescription (all types including ordinary, controlled and insurance prescriptions). Perform at-home medical tests like blood pressure measurement using Stethoscope and blood glucose testing using different types of Glucometers. Operate a community pharmacy, manage the pharmacy inventory and utilize technology in pharmacy practice. Role play patients and pharmacists in simulated settings of real pharmacies and educate patients on their medications, different dosage forms and devices for example stethoscope and glucometer. Develop communication skills necessary to interact with patients, colleagues and health care team members.



**1201204 Pharmaceutical analysis – Practical**

**1 Cr. Hrs**

**Prerequisite: (1201315 Or Co-Req.)**

Identify the applications of various analytical and instrumental methods to substances used in pharmacy and medicine. Discover the equipment as well as the experimental techniques of quantitative and qualitative analysis. Conduct Various experiments in titration, such as: acid-base titration, non-aqueous titration, oxidation reduction titration, potentiometric titration, etc. Perform different quality control experiments, derived from the pharmacopoeias, using UV-Visible spectrophotometer. Gain and develop the skills of interpretation and identification based on spectra resulting from different spectroscopic (UV-Visible, IR, and NMR) and chromatographic methods (HPLC and GC, TLC).

**1203426 Therapeutics (1)**

**3 Cr. Hrs**

**Prerequisite: ( 1203364 )**

Learn diseases manifestations and aims of treatment. Gain basic knowledge on used drugs, pharmacokinetics, drug interactions, dose calculations, side effects, treatment algorithms and patient education, related to cardiovascular, endocrine and rheumatic disorders.

**1201401 Medicinal Chemistry (1)**

**3 Cr. Hrs**

**Prerequisite: ( 1201215 and 1203364 )**

Understand the relationship between biology and chemistry. learn how pharmacologically active molecules are designed to treat human diseases. Explore the relationship between drugs' chemical structures and their therapeutic properties, in addition to the chemical considerations in drug design.

**1201403 Medicinal chemistry – Practical**

**1 Cr.Hrs**

**Prerequisite: (1201401 or Co-Req.)**

Assays and tests of medicinal substances and their pharmaceutical preparations will be carried out to provide means of quality control by applying the various methods and techniques described in the official compendias

**1203471 Biopharmaceutics**

**2 Cr. Hrs**

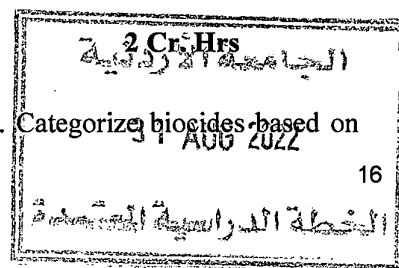
**Prerequisite: ( 1202235 )**

Learn factors influencing drug availability in the systemic circulation such as physicochemical properties of an active ingredient, dosage forms, physiological factors and routes of administration. Recognize limitations and advantages of each route of administration. Acquire knowledge about drug distribution and elimination.

**1202441 Pharmaceutical Microbiology (2)**

**Prerequisite: ( 1202341 )**

Identify the different levels of disinfection and types of biocides. Categorize biocides based on



their physiochemical characteristics, level of activity and applications. Know the advantages, disadvantages, mode of action of biocides and the factors affecting their activity. Understand different methods used for the evaluation of antimicrobial efficacy and factors affecting it. Recognize sources and risks of product contamination and methods used to control it. Introduce the most common sterilization methods, their advantages, disadvantages, applications and the commercially available sterile products. Design a sterilization method for a pharmaceutical product. Describe a sterile manufacturing plant and Good Manufacturing practice governing the manufacturing processes.

**1202442 Pharmaceutical Microbiology - Practical**

**1 Cr. Hrs**

**Prerequisite: (1202441 or Co-Req.)**

Develop the skills of working aseptically in the laboratory and mitigating biorisks. Identify microorganisms and measure the efficacy and potency of different antimicrobial agents. Apply techniques and procedures to evaluate and monitor microbial quality of environment and the sterile and non-sterile pharmaceutical products. Recognize different sterilization procedures and their limitation.

**(1203403) Pharmaceutical Clinical Biochemistry and nutrition**

**3Cr.Hrs**

**Prerequisite: (1203253+1203303)**

This three hours' credit course provides an overview of the key aspects of nutrition and clinical biochemistry. Macro and micronutrients will be discussed with emphasis on diet therapy. This course also provides the student with an introduction to the principles of the biochemical analysis of clinical samples and with an understanding of how biochemical investigations can be employed in the diagnosis, management, and prevention of disease. Case studies are used extensively to highlight and explain the biochemical disorders underlying clinical diseases.

**1203402 Pharmacology (3)**

**3 Cr. Hrs**

**Prerequisite: ( 1203363 )**

Understand the principles of antimicrobial agents, cell wall synthesis inhibitors, protein synthesis inhibitors, quinolones, folic acid antagonists, urinary tract antiseptics, antimycobacterial drugs, antifungal drugs, antiviral drugs, anticancer drugs, immunosuppressants, drugs for urologic disorders, drugs for anemia, drugs for dermatologic disorders, antiprotozoal drugs, anthelmintic drugs.

**1203429 Therapeutics (2)**

**3 Cr. Hrs**

**Prerequisite: ( 1203364 )**

Learn diseases manifestations and aims of treatment. Gain basic knowledge on the used drugs, pharmacokinetics, drug interactions, dose calculations, side effects, treatment algorithms and patient education, related to infections, GI, blood, respiratory and kidney disorders.

**1201402 Medicinal Chemistry (2)**

**2 Cr. Hrs**

**Prerequisite: ( 1201401 )**

Apply the knowledge gained from the prerequisite courses in this course. Understand various aspects of medicinal chemistry (discovery, mechanism of action, structure-activity relationship, pharmacodynamics, and pharmacokinetic properties) of drug categories of two major classes of

therapeutic agents: the antimicrobials (including antibiotics, synthetic antibacterial, antiviral, antifungal, anthelmintic, and antiprotozoal agents); and anticancer agents (including alkylating agents, antimetabolites, steroid analogues, and anti-kinases).

**1203475 Pharmacokinetics**

**2 Cr. Hrs**

**Prerequisite: ( 1203471 )**

Learn about the pharmacokinetic concepts, terminology, models, factors affecting drug absorption, distribution, metabolism, excretion and its importance in drug activities and side effects. Gain knowledge on how to predict plasma levels of drugs under varying conditions and apply different pharmacokinetic parameters.

**1203476 Case Studies in Pharmacokinetics**

**1 Cr. Hrs**

**Prerequisite: (1203475 Or Co-Req.)**

Apply case studies to practice theoretical knowledge obtained in the pharmacokinetics course. Handle pharmacokinetic parameters of drugs in the body and solve problems related to them taking into consideration different physiological factors affecting drugs absorption, distribution, metabolism and excretion through selected cases.

**1203513 Pharmaceutical Promotion and Marketing (1)**

**3 Cr. Hrs**

**Prerequisite: ( 1203401 )**

Learn principles of marketing and marketing activity concepts. Gain knowledge about market needs, exchange and communication strategies taking into consideration the modern concept of marketing and influence of environment. Recognise pharmaceutical marketing aspects and its applications in Jordan and regional market emphasizing on detailing and role plays, selling skills and techniques.

**1220402 Pharmaceutical Field Training (2)**

**3 Cr. Hrs**

**Prerequisite: ( 1203364+ successful completion of 90 credit hours )**

Practice the fundamental role of pharmacists in both inpatient and outpatient hospital pharmacies settings. Identify hospital medications and distinguish different dosage forms in both inpatient and outpatient hospital pharmacies including chronic medications, IV preparations, narcotics, SALA, emergency and high alert medications. Operate inpatient and outpatient hospital pharmacies, manage hospital pharmacy inventory and utilize technology in pharmacy practice. Utilize online resources to ensure best pharmacy practice. Identify medications error in medical prescription in real hospital settings. Role play patients and pharmacists in simulated settings of real pharmacies and educate patients on their medications, different dosage forms and devices for example inhalers, smoking cessation and contraceptives. Explore and recognize concepts related to infection control, biosafety management and quality assurance connected to real hospitals settings.

**1203561 Clinical Pharmacy Practice****1 Cr.Hrs****Prerequisite: ( 1203429 )**

This course is directed toward introducing students to Drug Therapy Management (DTM) and Evidence Based Medicine (EBM). Students will be taught skills that will enable them to apply theoretical and basic principles of pharmacology, therapeutic and clinical courses in dealing with real cases to identify and resolve different treatment related problems.

**1201515 Medicinal Chemistry (3)****3 Cr. Hrs****Prerequisite: ( 1201401 )**

Explore various aspects of medicinal chemistry (discovery, mechanism of action, structure-activity relationship, pharmacodynamics, and pharmacokinetic properties) of drugs from diverse categories such as antihistamines, NSAIDs, steroids, cholinergic anticholinergics, antihyperlipidemic, diuretics, adrenergic and antiadrenergic drugs, and hypoglycaemic agents.

**1203562 Toxicology****2 Cr. Hrs****Prerequisite: ( 1203364 )**

Learn about epidemic, physiologic and symptoms of poisoning. Gain knowledge about treatment procedures of toxic materials that humans would be exposed to. Understand toxicity of medicines, side effects and contraindications, and how this is related to strength, dosing frequency, dosage forms and routes of administration. Know basic strategies to adjust patient's therapy to optimize safety.

**(1201404 ) Phytopharmaceuticals****2 Cr. Hrs****Prerequisite: (1201302)**

This course provides students with information on nutraceuticals and phytopharmaceuticals, emphasising on the products that are currently in market. This course also introduces students to the quality control and evaluation of herbal drugs, natural products and their derived substances and metabolites. Moreover, this course discusses the extraction and the analysis of natural products.

**(1201405 ) Phytopharmaceuticals- Practical****1 Cr. Hr****Prerequisite: (Phytopharmaceuticals or Co-Req.)**

In this practical course, the students will be introduced to physical and microscopical examinations of some medicinal plants and their identification. In addition, in this course the students will apply some isolation techniques, qualitative and quantitative analysis techniques and quality control of natural products.

**1202517 Pharmacy Regulations and Ethics****2 Cr. Hrs****Prerequisite: ( 1203364 )**

Gain knowledge of the Drug and Pharmacy Law in the Hashemite Kingdom of Jordan which includes the regulations and legislations concerning the practice of pharmacy profession, in addition to the significance of ethics in all aspects of pharmacy practice.

**1201535 Pharmaceutical Biotechnology****2 Cr. Hrs****Prerequisite: ( 1201401 )**

Understand the principles of biotechnology and its applications in the pharmaceutical field. Discuss the most recent techniques such as recombinant DNA technology, gene cloning, and genetic engineering. Explore The application of such technologies in preparing new biopharmaceutical products (genes and proteins). Acquire knowledge about various delivery systems of these bioengineered products, together with the required detection techniques. Discover gene delivery as a module in the treatment of different genetic disorders and know possible dual-use research.

**1203563 Over the counter drugs****2 Cr. Hrs****Prerequisite: ( 1203363 )**

Understand the concept of dispensing medications in the pharmacy without medical prescription and self-care. Learn about methods being used to assist the patient with optimal use of non-prescription drugs. Counsel patients regarding the proper and safe usage of drugs. Differentiate between cases that require the referral to the doctor and those that be treated in the pharmacy.

**1202536 Cosmetics Science****2 Cr. Hrs****Prerequisite: ( 1202333 )**

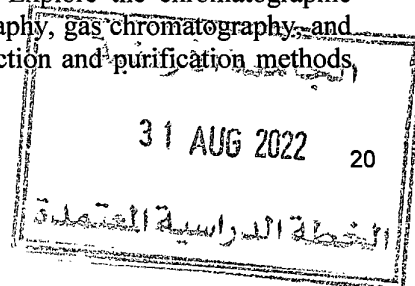
Understand a brief summary of the anatomy and physiology of skin, hair, nail and teeth. Learn about the ingredients and formulations of skin, hair and nail care products, as well as dental, and oral care products.

**1201531 Poisonous and Hallucinogenic Plants****2 Cr. Hrs****Prerequisite: (1201302)**

Acquire basic knowledge about toxic, hallucinogenic, and narcotic plants, natural products, and derivatives. Identify narcotic and hallucinogenic plant material and compounds, their chemistry, and their biological effects. Know toxic plants namely endemic to Jordan, focus on the toxic part(s), toxic constituents, symptoms of poisoning, treatment, and precautions.

**1201524 Applied chromatography****2 Cr. Hrs****Prerequisite: (1201315)**

Understand the modern methods of chromatography used in separation and purification and their applications in quantitative and qualitative analyses. Identify the importance of chromatography in different pharmaceutical fields including drug discovery, bioanalysis, drug identification and characterization, quantitative and qualitative pharmacopeial analysis including its application in the limit test of impurities and in the assay of different drugs. Explore the chromatographic methods including column chromatography, thin-layer chromatography, gas chromatography, and hyphenated techniques. Discuss various aspects of different extraction and purification methods, and analytical method validation.



**1202533 Pharmaceutical Radioisotopes****2 Cr. Hrs****Prerequisite: ( 1201401 )**

Gain an insight of radioactivity and the types of radiation. Discuss the interaction of radiation with matter including biological tissues. Explore the main applications of radiation/radionuclides in therapy, diagnosis, research and analysis, and production of selected radiopharmaceuticals using generators. Learn the safe handling of radioactive substances and the protection from radiation.

**1202532 Selected Topics in Physical Pharmacy****2 Cr. Hrs****Prerequisite: ( 1202235 )**

Explore practical examples that emphasize the role of the physicochemical properties in either pharmaceutical formulation or drug delivery. Understand the basics of a selected topic, such as drug carriers like polymeric micelles and liquid crystals or processes like solubility and diffusion, and discuss a published article related to the chosen topic.

**1203514 Pharmaceutical Promotion and Marketing (2)****2 Cr. Hrs****Prerequisite: ( 1203513 )**

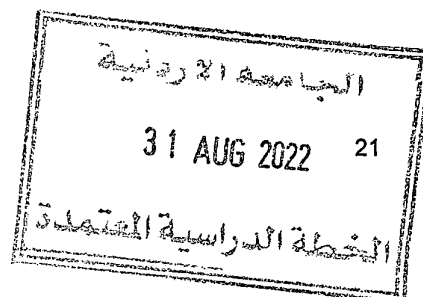
Know about advanced marketing strategy, branding in the pharmaceutical field, and marketing management, in addition to strategies covered in marketing (1) course. Learn environmental forces anticipation and contingency planning, marketing plan development, teamwork, details of sales call steps, and advanced selling skills in addition to some consumer behaviour aspects.

**1213552 Parapharmaceuticals****2 Cr. Hrs****Prerequisite: ( 1203364 )**

Advise patients on medical/surgical appliances and devices, durable medical equipment, and prescription accessories, concerning their selection, use, and storage (e.g. cuts and burns products, thermometers, contraceptives, diabetic supplies, diagnostics, and lens preparations). Learn about infants' formulas and strategies for smoking cessation.

**1213563 Selected Topics in Clinical Toxicology****2 Cr. Hrs****Prerequisite: ( 1203562 )**

Deal with different types of human intoxication. Understand the clinical toxicology of multiple medications. Learn the standard procedures undertaken in different cases of intoxication, signs and symptoms, and clinical manifestations. Gain knowledge regarding toxic exposure during pregnancy and intoxication in infants and geriatrics.





**1202541 Selected Topics in Pharmaceutical Microbiology****2 Cr. Hrs****Prerequisite: ( 1202441 )**

Recognize the mechanisms of resistance to antimicrobials, whether inherent or acquired & how to limit it. Identify the specific forms of microbial resistance including microbial biofilms and spore formation. Describe the application of microorganisms in pharmaceutical industry and genetic engineering for the production of antibiotics, vaccines, immunological products & many other products. Explain the diagnostic tests & assays in which microorganisms or their products are major constituents. Implement the knowledge in presenting a report on microbial resistance, microbial application in industry, or assays.

**1203515 Pharmaceutical Intellectual Property****2 Cr. Hrs****Prerequisite: ( 1203401 )**

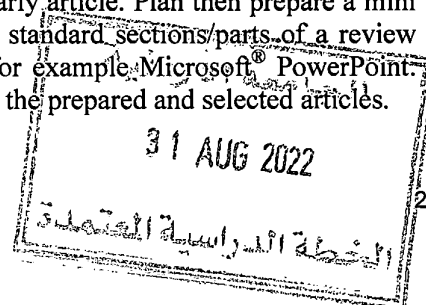
Learn General background of drug product life cycle, history, types and principles of intellectual property (IP) with an emphasis on the application of these principles within the pharmaceutical industry (PI), importance of intellectual property to the PI, research and development (R &D) issues internationally and locally. Define world trading system, data exclusivity, patent protection, trademarks, Trade Related Aspects of Intellectual Property Rights (TRIPs) for pharmaceutical products and antitrust with case studies. Identify potential commercial intellectual property: recording, ownership and registration of IP, strategies, planning and commercialization of IP, current and future impact of IP on the marketing strategies of Jordanian PI.

**1201571 Seminar in Pharmaceutical Sciences****1 Cr. Hrs****Prerequisite: ( 1201401 and 1201302 )**

Prepare a research project in pharmaceutical sciences under the supervision of a faculty member. Identify different tools and concepts related to research and presenting, including conducting a literature review, and scientific writing. Use different software of importance such as Mendeley, ChemDraw, etc. Prepare a report based on the selected articles that follows the standard sections/parts of a review article. Gain and develop the skills of the oral presentation via presenting the prepared and selected articles.

**1202572 Seminar in Pharmaceutics and Pharmaceutical Technology****1 Cr. Hrs****Prerequisite: ( 1212331+ 1202341 )**

Develop the skills required to search the available scientific resources related to the field of Pharmaceutics and Pharmaceutical Technology and perform literature search and review. Differentiate between the different types of scholarly articles and distinguish the quality of scientific journals. Learn how to read and summarize a scholarly article. Plan then prepare a mini review/report based on the selected articles that follows the standard sections/parts of a review article. Prepare an oral presentation using available media for example Microsoft® PowerPoint. Gain and develop the skills of oral presentation via presenting the prepared and selected articles.



**1203573 Seminar in Biopharmaceutics and Clinical Pharmacy**

**1 Cr. Hrs**

**Prerequisite: ( 1203364 )**

Prepare a research project in biopharmaceutics and clinical pharmacy under the supervision of faculty member. Perform a presentation along with an oral discussion with other students and the supervisor. Learn the use of different search databases, referencing and the skill of transferring knowledge to an audience.

**1202538 Selected topics in pharmaceutical technology**

**2Cr.Hrs**

**Prerequisite: (1202333)**

The course will cover non-conventional dosage forms (microspheres microcapsules nanospheres and liposomes). Physicochemical factors which influence their formulation and stability will be covered.

**1211522 Selected Topics in phytochemistry**

**2Cr.Hrs**

**Prerequisite: (Phytopharmaceuticals)**

This course aims at acquainting students with knowledge of local and global phytomedicine, most important international medicinal plants and comparison with Jordanian medicinal plants, folk medicine in Jordan, regulation and registration of herbal medicine and herbal products in Jordan (JFDA).

