



# Faculty of Pharmacy

## Department of Pharmacy

**Study Plan of the Bachelor's Degree**

**In: Pharmacy**

**Academic Year:2018-2019**

**Vision of the Department:**

Excellence in pharmaceutical education, scientific research and health care.

**Mission of the Department:**

Graduating highly qualified pharmacists in pharmacy profession and having a leading role in scientific research and local community services.

**Objectives of the Department:**

1. Providing the local and regional community with highly qualified pharmacists.
2. Encouraging original scientific research, Ph.D. scholarships grants, and graduate studies.
3. Providing community service.

**Intended Learning Outcomes (ILOs):**

1. Updating and developing study plans to accommodate the job market and community needs.
2. Attracting distinguished faculty members to achieve the faculty mission.
3. Granting Ph.D. scholarships in different disciplines of pharmaceutical sciences in reputable universities worldwide.
4. Keeping up with the latest methods of pharmacy training and education.
5. Encouraging scientific research and providing the appropriate environment to conduct research in different pharmaceutical fields.
6. Developing the master program of pharmaceutical sciences regarding both academic and research areas.
7. Establishing new disciplines in different pharmaceutical and clinical fields.
8. Providing excellent pharmaceutical community services.



## Framework

### Framework of the Bachelor's Degree in..... ( ..... Cr. Hrs.)

Sequence	Classification	Credit Hours	Percent %
1st	University Requirements	27	
2nd	Faculty Requirements	27	
3rd	Department Requirements	96	
4th	Ancillary Courses	10	
Total		160	

## Course Numbering

x	x	x	x	1	7	
Sequence		Course Level		Cognitive Domain	Dept. Code	Faculty Code

## Cognitive Domains

Number	Cognitive Domain	Credit Hours
0		
1	Chemistry (pharmaceutical/medicinal)	
2	Pharmaceutics	
3	Medical sciences	
4	Advanced pharmaceutics	
5	Support sciences	
6		
7		

**University Requirements: ( 27 Credit Hours)****A. Compulsory Requirements: (18 Credit Hours)**

Course No.	Course Title	Cr. Hr.	Prerequisite
55011102	Arabic language (I)	3	(pre) 55011108
55011103	English Language (I)	3	(pre)55011109
55011108	Arabic language pre-requisite	0	
55011109	English language pre-requisite	0	
55011110	Computer Basics pre-requisite	0	
55011206	National Education	3	
55011308	Military sciences	3	
55041103	Computer Skills	3	
<b>Total</b>		<b>18</b>	

**B. Elective Requirements: (9 Credit Hours) from the following list:**

Course No.	Course Title	Cr. Hr.	Prerequisite
55011205	Life Skills	3	
55011306	Entrepreneurship and Creativity	3	
55021101	Arabic Language (2)	3	(pre)55011101
55021102	English Language (2)	3	(pre)55011102
55021203	Principles of Psychology	3	-
55021204	Human Rights	3	-
55031101	Islamic Culture	3	-



55031205	Jerusalem and the Hashemite Guardianship	3	
55041101	Health of Individuals and Society	3	-
55041102	Information Technology and Problem Solving	3	-
55041307	Communications and the Internet	3	-
<b>Total</b>			



## 1. Faculty Requirements: ( 27 Credit Hours)

### A. Compulsory Requirements: (27 Credit Hours)

Course No.	Course Title	Cr. hr.	Theoretical	Practical	Prerequisite
71011203	Organic chemistry	3	3	-	(pre)71051103
7101201	Pharmaceutical analytical chemistry	2	2	-	(pre)71051103
7101202	Practical pharmaceutical analytical chemistry	1	-	3	7101201
71013115	Medicinal chemistry (I)	3	3	-	(pre)71012209
71031201	Anatomy and histology	2	2	-	(pre)71051105
71031202	Practical anatomy and histology	1	-	3	71031201
71032103	Physiology	3	3	-	(pre)71031201
71032104	Physiology practical	1	-	3	71032103
71033209	Immunology and serology	3	3	-	(pre)71032105
71032205	Pathophysiology	3	3	-	(pre)71032103
71024108	Pharmaceutical Legislation and Ethics	2	2	-	(pre)71033207
52021101	Calculus for Pharmacy students	3	3	-	-
<b>Total</b>		<b>27</b>	<b>24</b>	<b>9</b>	



## 2. Department Requirements ( 96 Credit Hours)

### A. Compulsory Requirements: ( 87 Credit Hours)

Course No.	Course Title	Cr. hr.	Theoretical	Practical	Prerequisite
71012104	Pharmaceutical organic chemistry	3	3	-	(pre)71011203
71012105	Practical Pharmaceutical organic chemistry	1	-	3	(Co)71012104
71012106	Physical pharmacy	2	2	-	(pre)71011201
71012107	Practical Physical pharmacy	1	-	3	(Co)71012106
71012206	Biochemistry	3	3	-	(pre)71012104
71012207	Pharmaceutical instrumental Analysis	2	2	-	(pre)71011201
71012208	Practical Pharmaceutical instrumental Analysis	1	-	3	(Co)71012207
71012209	Pharmacognesy and Photochemistry	3	3	-	(pre)71012206
71012210	Practical Pharmacognesy and Photochemistry	1	-	3	(Co)71012209
71013113	Clinical biochemistry	3	3	-	(pre)7102206
71013114	Practical Clinical biochemistry	1	-	3	(Co)71013113
71013220	Medicinal chemistry (2)	2	2	-	(pre)71013115
71013217	Practical Medicinal chemistry (2)	1	-	3	(Co)71013220
71013218	Pharmaceutical calculation and compounding of dosage forms	2	2	-	(pre)71051106
71013219	Practical pharmaceutical calculation and compounding of dosage forms	1	-	3	(Co)71013218
71014219	Drug Design	3	3	-	(pre)71013220



71022201	Pharmaceutics (I)	3	3	-	(pre)71013218
71023102	Practical Pharmaceutics (I)	1	-	3	(Co)71022201
71023103	Pharmaceutics (2)	2	2	-	(pre)71022201
71023204	Practical Pharmaceutics (2)	1	-	3	(Co)71023103
71024105	Cosmetics	3	3	-	(pre)71023103
71024107	Biopharmaceutics	2	2	-	(pre)71023103
71024209	Pharmacokinetics	3	3	-	(pre)71033207
71024210	Practical Pharmacokinetics	1	-	3	(Co)71024209
71025111	Industrial Pharmacy	3	3	-	(pre)71023103
71025112	Practical Industrial Pharmacy	1	-	3	(Co)71025111
71025113	Pharmaceutical Economics	2	2	-	(pre)71033207
71032105	Microbiology	2	2	-	(pre)71031201
71033106	Pharmacology (I)	3	3	-	(pre)71032205
71033207	Pharmacology (2)	3	3	-	(pre)71033106
71033208	Practical Pharmacology (2)	1	-	3	(Co)71033207
71034110	Pharmaceutical Microbiology	3	3	-	(pre)71033209
71034111	Practical Pharmaceutical Microbiology	1	-	3	(Co)71034110
71034112	Clinical Pharmacy and Therapeutics	3	3	-	(pre)71034213
71034213	Pharmacology (3)	3	3	-	(pre)71033207
71034214	Pharmaceutical Field Training	-	-	-	After passing 120 credit hours successively
71035115	Toxicology	2	2	-	(pre)71033207
71035219	Over The Counter Drugs (O.T.C.)	2	2	-	(pre)71033207





71044101	phytotherapy (Remedy with Medicinal plants)	3	3	-	(pre)71033207
71044202	Pharmaceutical Biotechnology	3	3	-	(pre)71013113
71045203	Advanced Pharmacy Technology	3	3	-	(pre)71025111
71045207	Pharmaceutical Marketing	3	3	-	(pre)71025113
<b>Total</b>		<b>87</b>	<b>73</b>	<b>42</b>	



## B. Elective Requirements: ( 9 Credit Hours)

Course No.	Course Title	Cr. hr.	Theoretical	Practical	Prerequisite
71015221	Research Project	3	3	-	
71015222	Topics in Pharmaceutical Sciences	3	3	-	
71025114	Pharmaceutics -3	3	3	-	
71025115	Drug Delivery System	3	3	-	
71025116	Advanced Pharmaceutical Practice	3	3	-	
71025117	Pharmaceutical Biostatistics	3	3	-	
71035217	Clinical Pharmacology	3	3	-	
71035118	Parasitology	3	3	-	
71035219	Clinical Nutrition	3	3	-	
71035220	Toxic and Hallucinogenic Plants	3	3	-	
71035221	First Aids	3	3	-	
71045206	Gene Therapy	3	3	-	
<b>Total</b>				-	

## 3. Ancillary Courses (10 Credit Hours):

Course No.	Course Title	Cr. hr.	Theoretical	Practical	Prerequisite
71051102	General physics for pharmacy students	3	3	-	
71051103	General chemistry for pharmacy students	3	3	-	
71051104	General practical chemistry for pharmacy students	1	-	3	71051103
71051105	General biology for pharmacy students	3	3	-	
<b>Total</b>		<b>10</b>	<b>9</b>	<b>3</b>	

**Advisory Study Plan for the Bachelor's Degree in**

First Year				
First Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
52021101	Calculus-I	3	-	-
71051102	General physics for pharmacy students	3	-	-
71051103	General chemistry for pharmacy students	3	-	-
71051104	General practical chemistry for pharmacy students	1	-	71051103
71051105	General biology for pharmacy students	3	-	-
	University requirement	3	-	-
<b>Total</b>		<b>16</b>		

Second Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
71031201	Anatomy and histology	2	71051105	-
71031202	Practical anatomy and histology	1	-	71031201
7101201	Pharmaceutical analytical chemistry	2	71051103	-
7101202	Practical pharmaceutical analytical chemistry	1	-	7101201
71011203	Organic chemistry	3	71051103	-
	University requirement	3	-	-
	University requirement	3	-	-
<b>Total</b>		<b>15</b>		



Second Year				
First Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
71012104	Pharmaceutical organic chemistry	3	71011203	-
71012105	Practical Pharmaceutical organic chemistry	1	-	71012104
71032103	Physiology	3	71031201	-
71032104	Physiology practical	1	-	71032103
71032105	Microbiology	2	71031201	-
71012106	Physical pharmacy	2	71011201	-
71012107	Practical Physical pharmacy	1	-	71012106
	University requirement	3	-	-
<b>Total</b>		<b>16</b>		

Second Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
71012206	Biochemistry	3	71012104	-
71012207	Pharmaceutical instrumental Analysis	2	71011201	-
71012208	Practical Pharmaceutical instrumental Analysis	1	-	71012207
71012209	Pharmacognesny and Phytochemistry	3	71012206	-
71012210	Practical Pharmacognesny and Phytochemistry	1	-	71012209
71013218	Pharmaceutical calculation and compounding of dosage forms	2	71051106	-



71013219	Practical pharmaceutical calculation and compounding of dosage forms	1	-	71013218
71032205	Pathophysiology	3	71032103	-
<b>Total</b>		<b>16</b>		



Third Year				
First Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
71022201	Pharmaceutics (I)	3	71013218	-
71023102	Practical Pharmaceutics (I)	1	-	71022201
71013113	Clinical biochemistry	3	7102206	-
71013114	Practical Clinical biochemistry	1	-	71013113
71013115	Medicinal chemistry (I)	3	71012209	-
71033106	Pharmacology (I)	3	71032205	-
	University requirement	3	-	-
<b>Total</b>		<b>17</b>		

Second Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
71033207	Pharmacology (2)	3	71033106	-
71033208	Practical Pharmacology (2)	1	-	71033207
71033209	Immunology and serology	3	71032105	-
71013220	Medicinal chemistry (2)	2	71013115	-
71013217	Practical Medicinal chemistry (2)		-	71013220
71023103	Pharmaceutics (2)	2	71022201	-
71023204	Practical Pharmaceutics (2)	1	-	71023103
	University requirement	3	-	-
<b>Total</b>		<b>16</b>		



Fourth Year				
First Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
71034110	Pharmaceutical Microbiology	3	71033209	-
71034111	Practical Pharmaceutical Microbiology	1	-	71034110
71024105	Cosmetics	3	71023103	-
71034213	Pharmacology (3)	3	71033207	-
71024107	Biopharmaceutics	2	71023103	-
71044101	phytotherapy	3	71033207	
	University requirement	3	-	-
<b>Total</b>		<b>18</b>		

Second Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
71014219	Drug Design	3	71013220	-
71044202	Pharmaceutical Biotechnology	3	71013113	-
71034112	Clinical Pharmacy and Therapeutics	3	71034213	-
71024209	Pharmacokinetics	3	71033207	-
71024210	Practical Pharmacokinetics	1	-	71024209
71024108	Pharmaceutical Legislation and Ethics	2	71033207	-
	University requirement	3	-	-
<b>Total</b>		<b>18</b>		



Fifth Year				
First Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
71025111	Industrial Pharmacy	3	71023103	-
71025112	Practical Industrial Pharmacy	1	-	71025111
71025113	Pharmaceutical Economics	2	71033207	-
71035115	Toxicology	2	71033207	-
	University requirement	3	-	-
	Department Elective	3	-	-
<b>Total</b>		<b>14</b>		

Second Semester				
Course No.	Course Title	Cr. hrs.	Prerequisite	Co-requisite
71035219	Over The Counter Drugs (O.T.C.)	2	71033207	-
71045203	Advanced Pharmacy Technology	3	71025111	-
71045207	Pharmaceutical Marketing	3	71025113	-
	Department Elective	3	-	-
	Department Elective	3	-	-
<b>Total</b>		<b>14</b>		





### Description of Courses offered by the

Course Number	Course Title	Credit Hours	(Prerequisite)
<b>7011203</b>	<b>Organic Chemistry (Prerequisite 71051103)</b>	<b>(3 credit hours)</b>	
The study includes the study of carbon compounds and their construction, focusing on the relationship between chemical construction, chemical properties, reactions and mechanisms such as free radicals, substitution and addition in aliphatic, cyclic and aromatic compounds, and some active compounds such as alcohols, aldehydes and ketones. The study also includes studying the spatial variations of these compounds and their relation to biological activity.			
<b>71011201</b>	<b>Pharmaceutical Analytical Chemistry (Prerequisite 71051103)</b>	<b>(2 credit hours)</b>	
Chemical calculations, principles of chemical equilibrium, acids, bases and regulated solutions, acid and base assays in aqueous and aqueous solutions, sedimentation adjustments, complex configuration calibrations, oxidation reduction and calibrations using voltage methods. With emphasis on applications that applications analyzes for pharmaceuticals.			
<b>71011202</b>	<b>Practical Pharmaceutical Analytical Chemistry (Prerequisite 71011201)</b>	<b>(1 credit hours)</b>	
This course deals with the analysis of pharmaceutical compounds that have the ability to oxidation, reduction, complex formation or precipitation, as well as weight analysis and the use of analytical methods in the study of pharmaceutical compounds quantitatively and qualitatively through selected experiments in practical applications in the pharmaceutical and scientific research industries.			
<b>71013115</b>	<b>Medicinal Chemistry (I) (Prerequisite 71012209)</b>	<b>(3 credit hours)</b>	
This course is an introduction to drug chemistry. This course focuses on the effect of physico-chemical properties on its kinetics. The course discusses the effect of chemical composition on interactions with receptors in the body. The course will also examine the drug and the factors affecting it. The course presents a simple introduction to principles.			
<b>71031201</b>	<b>Anatomy and Histology (Prerequisite 71051105)</b>	<b>(2 credit hours)</b>	
This course includes a description of the characteristics of life, organization and general plans of the body, tissues and membranes, integumentary system, skeletal system, digestive system, muscular system, urinary system, respiratory system, cardiovascular system, nervous system, endocrine system, lymphatic system, reproductive system, the senses.			
<b>71031202</b>	<b>Practical Anatomy and Histology (Prerequisite 71031201)</b>	<b>(1 credit hours)</b>	
The course of practical human anatomy and histology is the practical study of tissues, organization, covering, supporting and movement of our body, with understanding of the regulation, maintenance and continuity of its various parts and how these parts related to one another.			


**71032103 Physiology (Prerequisite 71031201) (3 Credit hours)**

The course is designed to assist the student to learn, understand and apply fundamental concepts and principles of neurophysiology, respiratory, cardiovascular and muscle physiology and the ability to apply these in novel situations. The course will encourage you to consider how they are dependent on each other, and develop the ability to apply this understanding in novel situations. This course will provide a sound basis in human physiology to support further study in health and medical sciences or related fields.

**71032104 Practical Physiology (Prerequisite 71032103) (1 credit hour)**

A course that examines the physiological principles of mammals and the basic understanding of human anatomy with a focus on maintaining normal functions and shape and describing the various abnormalities within the organs.

**71032205 Pathophysiology (Prerequisite 71032103) (3 credit hours)**

This course aims to deliver basic understanding of the pathologic anomalies accompanying the disease as well as the ensuing processes of cell/tissue damage. This course discusses the different stages of inflammation and its effects, cell disorder, the concepts of hypertrophy, hyperplasia, atrophy and metaplasia. Further, the course will also cover an array of pivotal topics/systems including blood, cardiovascular and respiratory in both health and disease states. This course will provide students with a profound understanding of the etiology, types, and prognosis of the disease

**71033208 Immunology and Serology (Prerequisite 71032105) (3 credit hours)**

This course is intended to cover different aspects of immunology, starting with historical perspective and covering innate and adaptive immunity, immunogenicity, antibodies, humoral and cellular immune responses, immune regulation, immunopathology such as hypersensitivity, immunological tolerance and autoimmunity, and transplantation. The course also deals with immunization, tumor immunology as well as the diagnostic immunological techniques. Moreover, the course will explain in detail the immunotherapy for various immunological diseases

**71024108 Ethics and Pharmaceutical Legislation (Prerequisite 71033207) (3 credit hours)**

Studying the Pharmacology and Drug Dispensing Law, which includes the laws and regulations related to the practice of pharmacy and pharmacy ethics as a humanitarian profession aimed at serving the patient.

**71012104 Pharmaceutical Organic Chemistry (Prerequisite 71011203) (3 credit hours)**

This material is complementary to organic pharmaceutical chemistry. It includes the study of physical properties, naming, methods of preparation, methods of diagnosis as well as the reactions of the following organic compounds: aromatic compounds, alcohol, ellithol, ethers, sulfides, aldehydes and ketones, carboxylic acids and their derivatives and amines.

**71012105 Practical Pharmaceutical Organic Chemistry (Prerequisite 71012104) (1 credit hours)**




Introduction to methods used in organic chemistry, distillation, crystallization, steam distillation, chromatography, methods of identifying groups and their interactions.

**71012207 Pharmaceutical instrumental Analysis (Prerequisite 71011201) (2 credit hours)**

Statistical analysis of data and quality of chemical analysis methods. Basic principles, devices and applications for methods of automated chemical analysis used in the examination of raw materials and pharmaceuticals. These include: UV, UV spectroscopy, infrared spectroscopy, NMR, mass spectrometry, absorption, atomic emission, gas and liquid chromatography.

**71012208 Practical Pharmaceutical instrumental Analysis (Prerequisite 71012207) (1 credit hour)**

The materials include a set of experiments designed to provide students with basic techniques in the use of a number of devices in automated analysis such as spectrometer, refractive and high-efficiency chromatographic separator.

**71012206 Biochemistry (Prerequisite 71031201) (3 credit hours)**

Elements involved in cell synthesis, cell membrane synthesis and biochemical reactions in the living cell. Structure and functions of proteins, enzymes, receptors and hormones. Definition of nucleic acids, genetic engineering and protein synthesis.

**71012209 Pharmacognesy and phytochemistry (Prerequisite 71012206) (3 credit hours)**

The purpose of this course is to study drugs and their natural sources (plants, animals and minerals) and to focus on medicinal plants in terms of naming methods, classification, methods of collecting information about them, controlling their quality and thus determining the chemical composition of their constituents.

**71012210 Practical Pharmacognesy and phytochemistry (Prerequisite 71012209) (1 credit hour)**

The course aims to examine the laboratory and tissues from different parts of the plant and then determine the different ways to extract the active ingredients and laboratory tests.

**7101221 Physical Pharmacy (Prerequisite 71011201) (2 credit hours)**

Study the physical and chemical properties that control the composition of complex compounds. The study includes the stability of drugs and ways of determining the age and factors affecting the stability of the drug. Also study the distribution, spread and absorption of pharmaceuticals.

**71012212 Practical Physical Pharmacy (Prerequisite 71012211) (1 credit hour)**

This course covers the physical and chemical concepts that control the basic processes such as the process of spreading the drug through the membranes and chest and the effect of heat on them, the factors that affect the stability of the medicine and increase its solubility in different ways and the process of distributing drugs between non-mixed solvents and methods of calculating complex constants.

**71013113 Clinical Biochemistry (Prerequisite 71012206) (3 credit hours)**



This course includes teaching biological methods to diagnose various disorders in the human body resulting from different diseases.

**71013114 Practical clinical biochemistry (Prerequisite 71013113) (1 credit hour)**

The student will study the general principles in laboratory tests and how to deal with the results and study the conditions of disease.

**71013116 Medicinal Chemistry-2 (Prerequisite 71013115) (3 credit hours)**

This course also deals with the pharmacology of respiratory drugs. The course also includes autocodides, non-steroidal anti-inflammatory drugs, analgesics, hormone drugs, and central nervous system drugs.

**71014118 Practical medicinal Chemistry (Prerequisite 71013117) (1 credit hour)**

Preparation of some organic compounds of pharmacological importance using different methods in the manufacture and identification of some methods of laboratory analysis of drugs and comparing them to international standards according to the specifications of the American and British Pharmacopoeia.

**71014219 Drug Design (Prerequisite 71014118) (3 credit hours)**

This course helps students identify the logical pathway for the development of new pharmaceutical compounds based on the principles of pharmaceutical chemistry and drug design.

**71023101 Pharmaceutics-1 (Prerequisite 71012211) (3 credit hours)**

The course aims to introduce students to various forms of pharmaceuticals, their methods of synthesis and the purpose of their use, conversion of chemical into pharmaceutical, study of the physical and chemical properties of pharmaceutical forms.

**71023102 Practical Pharmaceutics-1 (Prerequisite 71023101) (1 Credit Hours)**

This course aims at training the student in the preparation and principles of selecting ingredients in the formulations, packaging, adhesives, and the preservation of the pharmaceutical structures in their final form in order to ensure a stable and effective compound.

**71023103 Pharmaceutics-2 (Prerequisite 71023101) (2 credit hours)**

The purpose of this course is to introduce students to the basics of the formation, preparation and installation of various pharmaceutical forms. The composition, manufacture and use of a number of forms of medicine are studied in the pharmaceutical sciences, including the solutions used in aerosols, drugs used by the surface of the .skin, eye drops, injections and the body

**71023204 Practical pharmaceutics-2 (Prerequisite 71023103) (1 credit hours)**

The laboratory aims to introduce students to the various pharmaceutical forms: liquid, solid, semi-solid, principles of composition, process steps for the preparation of semi-solid pharmaceuticals such as creams and suppositories, preparation and preservation of pendants and pharmaceutical emulsions in the final form and ensure their stability and effectiveness.

**71024105 Cosmetics (Prerequisite 71023103)****(3 Credit Hours)**

This article deals with the pharmaceutical forms of various cosmetics, their components and mechanism of work, method of preparation and methods of use.

**71024107 Biopharmaceutics (Prerequisite 71012211)****(2 Credit Hours)**

This course examines the effect of physical and chemical properties of the drug, the final form of the drug, and the method of drug administration on the therapeutic effect of the drug. It also includes methods of metabolism of the drug in the body and ways of distributing the drug in the body and a statement of the concepts of studies of bioavailability and bioequivalence of medicines.

**71024209 Pharmacokinetics (Prerequisite 71024107)****(3 credit hours)**

This course studies the various biological processes: absorption, distribution and disposal of drugs using different mathematical equations on the assumption of one chamber, two stones, nonlinear relationships and methods that do not assume any body compartments.

**71024210 Practical pharmacokinetics (Prerequisite 71024209)****(1 credit hour)**

Includes measurement of drug concentration in the blood to determine and regulate the dose and effectiveness by computer.

**71025111 Industrial Pharmacy (Prerequisite 71023103)****(3 credit hours)**

A study of basic theoretical and applied processes of mixing and milling methods, formation of granules, mitigation and preparation of solid powder compacts, identification of minute systems for different methods and their evaluation in terms of porosity density, analysis of the size of the minutes and measurement of surface area as well as physical studies related to the required information prior to the installation of drugs and preparations and study of heat transfer and evaporation Methods of designing liquid and semi-solid pharmaceutical forms and the physical and chemical factors that affect the industrial design of production of these forms as well as their stability. In addition to the study of capsules and micro-process packaging.

**71025112 Practical Industrial Pharmacy (Prerequisite (71025111)****(1 Credit Hours)**

The practical material includes experiments to identify the manufacture of different pharmaceutical compounds, (identification of operating units (milling, mixing, granulation, grain pressing, capsule filling and tablet compression

**71025113 Pharmaceutical Economics ( 71023207) (2 credit hours)**

To study ways and means to evaluate the cost of medical and pharmacological interventions with a focus on economic value and analysis of decisions and models used in the identification of sources. Applications on technical evaluation of health and clinical policies and practices, drug pricing policies, price control and drug costing.

**71032105 Microbiology (Prerequisite 71031201)****(2 credit hours)**

The study of biological processes and genetics in bacteria, growth of bacteria and their cultivation, classification of bacteria, viruses, fungus, diseases caused by bacteria to the human body. And the study of basic principles related to immunology, immunology, allergies and body resistance to various diseases.

**71033106 Pharmacology-1 (Prerequisite 71032205)****(3 credit hours)**

The course provides knowledge of pharmacologic principles and their application in the therapeutic use of drugs. An in-depth discussion of topics of current importance in pharmacology of commonly occurring diseases is emphasized. The principles of the selection of proper drugs in the management of various diseases of major organ systems are discussed. Topics include: Autonomic drugs, Cardiovascular-renal drugs, Drugs with important actions on smooth muscle, drugs acting on the blood and drugs used to treat disease of inflammation. Basic pharmacologic principles and the pharmacologic actions of the major drug classes will be discussed in relation to physiologic systems, with emphasis on the application of these agents. Learning processes include lectures, case discussion and assignment/Quizzes.

**71033207 Pharmacology-2 (Prerequisite 71033106)****(3 credit hours)**

The course provides knowledge of pharmacologic principles and their application in the therapeutic use of drugs. An in-depth discussion of topics of current importance in pharmacology of commonly occurring diseases is emphasized. The principles of the selection of proper drugs in the management of various endocrine diseases are discussed. Topics include: Pituitary and hypothalamus, thyroid, adrenal corticosteroids, pancreatic diabetes mellitus, and bone-mineral homeostasis. Basic pharmacologic principles and the pharmacologic actions of the major drug classes will be discussed in relation to physiologic systems, with emphasis on the application of these agents.

**71033208 Practical Pharmacology-2 (Prerequisite 71033207)****(1 credit hour)**

The course includes a study of the effect of different drugs on animals by computer applications.

**71033210 Pharmaceutical Microbiology (Prerequisite 71033209)****(3 credit hours)**

This course is intended to teach the students types of antibiotics, the clinical use of antibiotics, antibiotic resistance phenomena, chemical disinfectants, antiseptics, and preservatives, sterilization control and sterility assurance, Microbial spoilage and preservation of pharmaceutical products, sterility testing, manufacture of antibiotics, sterile pharmaceutical products.

**71033211 Practical Pharmaceutical Microbiology (Prerequisite 71033210) (1 credit hour)**

This course includes practical experiments in the use of microscopes to study microbes, isolating, dyeing and cultivating bacteria in different ways, studying biochemical activities in bacteria, isolating and identifying common fungi and parasites.

**71034112 Clinical Pharmacy and therapeutics (Prerequisite 71033206)****(3 credit hours)**

The course includes a study of various medical conditions and a focus on the choice of appropriate treatment, study of side effects, drug interactions, and appropriate doses including the study of heart disease, gastrointestinal tract, respiratory system, arthritis, chronic headaches and migraines.

**71034213 Pharmacology-3 (Prerequisite 71033207)****(3 credit hours)**

The course provides students with the knowledge of pathophysiology, clinical manifestations, complications, goal of pharmacotherapy, patient education of selected malignant and central nervous system disorders as well as an in-depth discussion of chemotherapeutic agents used for infectious diseases. Further, the of mechanism(s) of



action, pharmacokinetics, clinically significant side effects & drug interactions, contraindications and clinical uses of medications used in the treatment of such disorders will be discussed.

**71035216 Over the counter drugs (Prerequisite 71033106) (2 credit hours)**

Study how to help patients to select and use the over-the-counter medicines to achieve optimal self-care using these medications.

**71035115 Toxicology (Prerequisite 71033207) (2 credit hours)**

The course aims at introducing students to ways of poisoning chemicals, overdoses and the mechanism of their effect on the body. It also aims to provide information about treatment methods resulting from poisoning of these substances.

**71042101 Pharmaceutical calculation and compounding of dosage forms (Prerequisite 71051103) (2 credit hours)**

It deals with methods of synthesis and preparation of various pharmaceutical forms of solutions, pendants, emulsions and ointments. As well as all the information and methods of calculations necessary to produce any form of pharmaceutical.

**71013218 Pharmaceutical calculations and compounding of dosage forms (Prerequisite 71042101) (1 credit hour)**

Practical application of methods to prepare a number of pharmaceutical forms. It also deals with the definition of the principles of pharmacological synthesis and the origins of packing and the use of properties of different substances and components in the synthesis of pharmaceutical forms and their impact on the final product.

**71044101 Medicinal plants (Prerequisite 71033207) (3 credit hours)**

The course aims at introducing students to various medicinal plants and their medicinal uses and their effects on most body systems. The focus is on the medicinal plants available in the Jordanian market, where their effective ingredients, reasons and precautions are discussed.

**71045203 Advanced Pharmacy Technology (Prerequisite 71025111) (3 credit hours)**

This material depends on the system of operations within the factory of drying, grinding, mixing, separation, filtration, polymerization and distillation processes. In addition to quantitative movement processes, heat transfer, fluid flow, cooling system and moisture system. This article includes the study of the equipment and materials used in packaging as well as the processes and technology of packaging and the function and the need for packaging of all kinds, measuring the internal conditions in the factory as the factory ventilation system and temperature, humidity, insulation engineering and sterilization technology, and concepts of good industrial production.

**71045207 Pharmaceutical Marketing (Prerequisite 71025111) (3 credit hours)**

Study the principles, concepts and elements of pharmaceutical marketing and identify the assets of the management of pharmaceutical projects. As well as communication skills as well as modern concepts in marketing and environmental impacts.

**71014219 Drug Design (Prerequisite 71014118)****(3 credit hours)**

The subject deals with the most commonly used approaches in the design and development of new pharmaceutical agents based on the available information related to the structure activity relationships, the physicochemical characteristics, pharmacokinetic, pharmacodynamic properties of drugs. Also describes the importance of studying the receptor and enzyme structure in the design of suitable chemical scaffolds for agonist and antagonist activity. The rest of the course will focus on the use of different modeling software and chemical drawing to study the drug-target interaction. Part of the class will focus on drug metabolism and its role in drug design, as well as the prodrug concept

**إسعافات أولية ( 3ساعات معتمدة)****71035221 First Aid (No Prerequisite)****(3 credit hrs.)**

This course provides students with the basic skills and knowledge that assist them to identify the traumas and accidents and intervene accordingly at the accident scene. It also introduces the students with the skills to assess the emergency incident and implement the first aid procedures that will prevent further complications using the accessible resources until the victim is transferred to the hospital

**71025116 Advanced Pharmacy practice (Prerequisite 71034112)****(3 credit hrs.)**

This course introduces you to your professional responsibilities as pharmacists. The course is intended to provide you with a systematic approach to patient-centered pharmaceutical care that will be applied and practiced throughout the curriculum.

**71015221 Research project ( No Prerequisite)****(3 credit hrs.)**

The one credit hour course is directed to empower the research capacities of 6th year Pharm. D. students. The main purpose of this course is to introduce students to quantitative and qualitative methods for conducting meaningful inquiry and research. They will gain an overview of research intent and design, methodology and technique, format and presentation, and data management and analysis informed by commonly used statistical methods. The course will develop each student's ability to use this knowledge to become more effective as clinical pharmacists.

**71035223 Toxic and Hallucinogenic Plants (Prerequisite 71012209 و 71035115) (3 credit hrs.)**

This course aims at acquainting students with basic knowledge of toxic, hallucinogenic and narcotic plants. The course involves two parts; the first part deals with toxic plants mainly those who are endemic to Jordan. Focus mainly on the toxic part(s), toxic constituents, symptoms of poisoning, treatment and precautions. The second part 2 deals with hallucinogenic and narcotic plants. Concentration on the narcotic and hallucinogenic materials, their effect on the brain, their side effects on the health in general.

**71025117 Pharmaceutical statistics (Prerequisite 52021101)****(3 credit hrs.)**

Pharmaceutical statistics provides an introduction to selected important topics in biostatistical concepts. This course represents an introduction for undergraduate students to the field and provides knowledge for kind of





statistical studies and their graphical presentation. 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.

**71025114 Pharmaceutics 3 (Prerequisite 71023103)**

**(3 credit hours)**

This course integrates the principles of physical pharmacy, and traditional and modern pharmaceutical dosage forms. This course covers solid pharmaceutical dosage forms such as tablets, hard and soft gelatin capsules, powders and granules.

This course covers the physical, chemical and biopharmaceutical Principles involved in the design and formulation that could affect drug performance and development of an efficient dosage form. The material in this course is designed to familiarize students with the new drug delivery systems, provides a framework to formulate a strategy to deliver drugs to their site of action, and optimizes their effects. It will provide the students with the opportunities and challenges associated with new drug delivery systems.

**71025115 Drug delivery systems (Prerequisite 71024209)**

**(3 credit hours)**

This course covers the development of different dosage forms that improve drug delivery to the human body based on the physico-chemical properties of drugs.

**71045206 Gene therapy (Prerequisite 71044202)**

**(3 credit hours)**

The course intends to give basic knowledge about the composition and function of the human genome as well as the importance of genetic factors for origin of diseases, abnormalities and developmental disorders in humans, partly for variation of normal properties.

**71035118 Parasitology (Prerequisite 71051105)**

**(3 credit hours)**

This course is designed to familiarize the pharmacy students with various parasites of unicellular or multicellular organization which infect humans, including amebas, flagellates, hemoflagellates malaria, nematodes, filariae, cestodes, trematodes, ecto-parasites and their factors. The basic biology of these parasites, as well as the life cycles, morphological features, host-parasites interactions, geographical distribution, reservoir hosts, methods of transmission pathology, immunology, treatment and techniques used in identification will be covered also.

**71015222 Topics in pharmaceutical sciences (No prerequisite)**

**(3 credit hours)**

This course comprises topics in pharmaceutical sciences not covered in detail especially the newest ones.

**71035217 Clinical pharmacology (Prerequisite 71034112 and 71035115) (3 credit hours)**

This course introduces the theoretical background that enables students to provide safe and effective care related to drugs and natural products to persons throughout the lifespan. It includes the foundational concepts of principles of pharmacology, nonopioid analgesics, and antibiotics, as well as additional classes of drugs. Students will learn to make selected clinical decisions in the context of nursing regarding using current, reliable sources of information, understanding of pharmacokinetics and pharmacodynamics, developmental physiologic considerations, monitoring and evaluating the effectiveness of drug therapy, teaching persons from diverse populations regarding safe and



effective use of drugs and natural products, intervening to increase therapeutic benefits and reduce potential negative effects, and communicating appropriately with other health professionals regarding drug therapy.

**71035219 Clinical Nutrition (Prerequisite 71013216 and 71013113) (3 credit hours)**

This course includes principles of nutrition and its practical applications in addition to the vital roles of different nutritional elements in keeping good health and for planning balanced diet meals for patients, as well as the biochemical analysis required for determining the nutritional status of patients.

**52021101 Calculus-1 (No prerequisite) (3 credit hours)**

This course covers the basic mathematics topics that students in the scientific fields are supposed to know. Such as derivation and derivation rules and applications, one-variable conjugations, endings and communication, time-related equations, mean value theory and applications. Limited integration and applications such as space and volume of rotation. The basic theoretician in calculus, integration is unlimited. And their derivatives and their integration. Logarithmic associations and derivatives

**71051103 General Chemistry for Pharmacy Students (No prerequisite) (3 credit hours)**

This course covers concepts and principles in general chemistry, chemical calculations, chemical reactions in aqueous solutions, periodic table and electron structure of the atom, chemical bonding types, physical properties of solutions, speed of chemical reactions, equilibrium in chemical solutions.

**71051104 Practical General Chemistry for Pharmacy Students (Prerequisite 71051103) (1 credit hour)**

The course includes experiments on the following subjects: laboratory safety conditions, chemical observations, volumetric analysis, oxidation and reduction, aggregate properties, thermal chemistry, equilibrium.

**71051105 General biology for Pharmacy Students (No prerequisite) (3 credit hours)**

This course is intended to cover different aspects of biology including a description of the characteristics of life, taxonomic classification, the system by which all organisms are categorized, water and its properties, a description of the various types of microscopes and their uses, study of cell structure and function, introduction into metabolism, the chemical nature of the DNA and RNAs and their roles in gene expression (from gene to protein), cell cycle (mitosis and meiosis), recombinant DNA technology.

**71051102 General Physics for Pharmacy Students (No prerequisite) (3 credit hours)**

This material includes one-way motion, Newton's laws, circular motion, work, energy, ability, amount of motion, elasticity properties of materials, heat, thermodynamics, thermal properties of matter, fluids, field and voltage. Lenses, radiation, material composition