

B.Sc. in Pharmacy

Study Plan

■ University Compulsory Courses

Page (64)

■ University Elective Courses

Pages (64 & 65)

■ Faculty Compulsory Courses

Line No.	Code	Course	
102222	MED222B	BIOCHEMISTRY	3
103720	MED372	PATHOPHYSIOLOGY	3
302211	PHAR221A	PHARMACEUTICAL ORGANIC CHEMISTRY (1)	3
302221	PHAR222A	PHARMACEUTICAL ORGANIC CHEMISTRY (2)	3
302242	PHAR224B	PHARMACEUTICAL ORGANIC CHEMISTRY LABORATORY	1
302251	PHAR225A	PHARMACEUTICAL ANALYTICAL CHEMISTRY	3
302260	PHAR226	PHARMACEUTICAL INSTRUMENTAL ANALYSIS	3
302271	PHAR227A	PHARMACEUTICAL ANALYTICAL CHEMISTRY LABORATORY	1
302511	PHAR251A	BASIC MICROBIOLOGY	3
303211	PHAR321A	MEDICINAL CHEMISTRY (1)	3
303222	PHAR322B	MEDICINAL CHEMISTRY (2)	2
303410	PHAR341	PHARMACOLOGY (1)	3
303421	PHAR342A	PHARMACOLOGY 2	3
303511	PHAR351A	PHARMACEUTICS (1)	3
303531	PHAR353A	PHARMACY PRACTICE LABORATORY (1)	1
303543	PHAR354C	PHARMACEUTICS(2)	3
303561	PHAR356A	PHARMACY PRACTICE LABORATORY(2)	1
303610	PHAR361	CLINICAL BIOCHEMISTRY	3
304212	PHAR421B	MEDICINAL CHEMISTRY(3)	2
304221	PHAR422A	MEDICINAL CHEMISTRY(4)	2
304412	PHAR441B	PHARMACOLOGY (3)	3
304511	PHAR451A	PHARMACEUTICS(3)	3
304541	PHAR454A	PHARMACY PRACTICE LABORATORY (3)	1
304562	PHAR456B	BIOPHARMACEUTICS AND PHARMACOKINETICS	3
304610	PHAR461	IMMUNOLOGY AND VACCINES	2
304620	PHAR462	PHARMACEUTICAL MICROBIOLOGY AND BIOTECHNOLOGY	3
304640	PHAR464	PHARMACEUTICAL MICROBIOLOGY AND BIOTECHNOLOGY LABORATORY	1
305620	PHAR562	CLINICAL NUTRITION	2
901021	MATH102A	CALCULUS(FOR BIO.SCI.STUDENTS)	3
911031	CHEM103A	GENERAL CHEMISTRY	3
911072	CHEM107B	GENERAL CHEMISTRY LAB	1
921031	PHY103A	GENERAL PHYSICS	3
931030	BIO103	GENERAL BIOLOGY	3
931070	BIO107	GENERAL BIOLOGY (PRACTICAL)	1
1731160	CS116	SELECTED PROGRAMMING LANGUAGES	3

16 C.H

9 C.H

84 C.H

■ Faculty Elective Courses

9 C.H

Line No.	Code	Course	
305040	PHAR504	SELECTED TOPICS (1)	1
305050	PHAR505	SELECTED TOPICS (2)	2
305311	PHAR531A	ADVANCED CHEMISTRY OF NATURAL PRODUCTS	3
305322	PHAR532B	TOXIC PLANTS	3
305710	PHAR571	ADVANCED PHARMACEUTICAL BIOTECHNOLOGY	3
305720	PHAR572	ADVANCED PHARMACEUTICAL MICROBIOLOGY	3
305730	PHAR573	COMMUNICATION SKILLS IN PHARMACY	3
305740	PHAR574	ADVANCED PHYSICAL PHARMACY	3
305750	PHAR575	ADVANCED PHARMACEUTICAL TECHNOLOGY	3
305760	PHAR576	COSMETIC PREPARATIONS	3
305770	PHAR577	ADVANCED INDUSTRIAL PHARMACY	3
305780	PHAR578	HISTORY OF PHARMACY AND THERAPY	3
305790	PHAR579	DRUG REGISTRATION AND APPROVAL	3
305810	PHAR581	ADVANCED MEDICINAL CHEMISTRY	3
305820	PHAR582	DRUG DESIGN AND SYRTHESIS	3
305830	PHAR583	NUCLEAR PHARMACY	3
305840	PHAR584	RADIATION TECHNOLOGY	3
305850	PHAR585	QUALITY CONTROL	3
305910	PHAR591	ADVANCED PHARMACY PRACTICE	3
305920	PHAR592	PHARMACOECONOMICS	3
305930	PHAR593	CLINICAL PHARMACOLOGY	3
305940	PHAR594	ADVANCED THERAPVTICS	3
305950	PHAR595	MOLECULAR PHARMACOLOGY	3
305960	PHAR596	PHYSICAL EXAMINATION	3
305970	PHAR597	PHARMACOGENETICS	3

■ Specialization Compulsory Courses

44 C.H

Line No.	Code	Course	
102103	MED210C	GROSS ANATOMY AND HISTOLOGY	3
102105	MED210	GROSS ANATOMY & HISTOLOGY (LAB)	0
102304	MED230A	HUMAN PHYSIOLOGY	3
183111	PH311A	BIOSTATISTICS	2
302521	PHAR252A	PARASITES	2
303250	PHAR325	CHEMISTRY OF HETEROCYCLES	1
303270	PHAR327	PHARMACEUTICAL INSTRUMENTAL ANALYSIS LAB	1
303340	PHAR334	PHARMACOGNOSY AND PHYTOCHEMISTRY	3
303361	PHAR336A	PHARMACOGNOSY AND PHYTOCHEMISTRY LAB ORATORY	1
304010	PHAR401	PHARMACEUTICAL PRACTIAL TRAINING	3
304331	PHAR433A	PHYTOTHERAPY	3
304461	PHAR446A	THERAPEUTICS (1)	3
304581	PHAR458A	PHARMACEUTICAL TECHNOLOGY	3
304630	PHAR463	ETHICS AND PHARMACY PRACTICS	2

305471	PHAR547A	THERAPEUTICS (2)	3
305492	PHAR549B	CLINICAL CASES	1
305522	PHAR552B	MARKETING AND PHARMACOECONOMICS	3
305552	PHAR555B	DRUG DELIVERY SYSTEMS	3
305650	PHAR565	PROTEIN AND GENE THERAPY	2
305680	PHAR568	PATIENT COUNSELING	2

TOTAL **162 C.H**

**** For prerequisite & equivalent courses see
the Courses' Description.***

B.Sc. in Pharmacy

Courses' Description

PHAR226 Pharmaceutical Instrumental Analysis

3 C.H

This course introduces the student to spectral methods of analysis including UV-Visible, Infra-Red (IR), Nuclear Magnetic Resonance (NMR), and Mass Spectroscopy (MS). The course also covers other types of instrumental analyses such as chromatographic separation techniques. *Prerequisite: PHAR225*

PHAR251 Basic Microbiology

3 C.H

This course deals with basic biology of bacteria, viruses, fungi, and protozoa, with emphasis on their microbial genetics, metabolism, pathogenesis. Principles of immunobiology, and infection prevention and control are also covered. *Prerequisite: BIO103*

PHAR252 Parasites

2 C.H

This course includes an introduction to medical parasitology and the identification of the most important parasites that infest human. Detailed description of their life cycles and diseases associated with them and methods of treatment is also covered.

Prerequisite: PHAR251

PHAR321 Medicinal Chemistry I

3 C.H

This course introduces students to medicinal chemistry of drugs with special emphasis on the pharmacokinetic, pharmacodynamic and physicochemical properties in relation to biological activity. The effect of the chemical structure on drugs' interaction with different body receptors is demonstrated. The metabolism of drugs and factors affecting it is fully explained. The course also introduces the students to the basic principles of drug design. *Prerequisite: PHAR222*

PHAR322 Medicinal Chemistry 2

2 C.H

The course covers the medicinal chemistry of chemotherapeutic agents including antibacterial, antifungal, antiviral, antiparasitic and anticancer agents. The course also presents an introduction to nuclear pharmacy. *Prerequisite: PHAR321*

PHAR325 Chemistry of Heterocycles

1 C.H

This course discusses the structure, nomenclature and the properties of saturated and aromatic heterocyclic compounds with emphasis on pentacyclic, hexacyclic, and conjugated ones. Examples of natural and medicinal heterocyclic compounds are also provided.

Prerequisite: PHAR222

PHAR327 Pharmaceutical Instrumental Analysis lab , 3 practical hours

1 C.H

This lab. trains students on methods of instrumental analysis. The lab. includes the spectral methods of analysis including UV-Visible, Infra-Red (IR), and chromatographic separation. The lab. Introduces the students with Nuclear Magnetic Resonance (NMR), and Mass Spectroscopy (MS). These methods are used in lab. along with other analytical ways in applications for analysis of pharmaceutical preparations.

Pre- or co-requisite: PHAR226

PHAR334 Pharmacognosy and Phytochemistry

3C.H

This course involves an introduction to pharmacognosy and phytochemistry and includes the study of chemical groups such as glycosides, alkaloids, volatile oils, terpenes and others. The course provides an extensive study of medicinal plants including their scientific names,

natural products of each plant group, the existence, parts used and their medical use. The course also deals with methods of isolation, characterization of active compounds and their biological activities.

Pre- or co-requisite: PHAR222

PHAR336 Pharmacognosy and Phytochemistry Lab

1 C.H

This course deals with the most important practical methods to identify and examine medicinal plants. The Lab. trains the student on isolation, identification of natural products present in medicinal plants.

Pre- or co-requisite: PHAR334

PHAR341 Pharmacology 1

3 C.H

This course discusses the basic principles of pharmacology. An introduction to drugs' pharmacokinetic and pharmacodynamic principles, pharmacology of drugs acting on the central nervous system (CNS), the autonomic nervous system (ANS), opioids, local anesthetics, autacoids and non-steroidal anti-inflammatory drugs are included.

Prerequisite: MED372

PHAR342 Pharmacology 2

3 C.H

This course covers the pharmacology of drugs acting on the cardiovascular, renal, respiratory and gastrointestinal systems. *Prerequisite: PHAR341*

PHAR351 Pharmaceutics 1

3 C.H

This course integrates the principles of physical pharmacy and traditional and modern pharmaceutical dosage forms. Covered topics are oral solutions, otic, nasal and ophthalmic preparations, and sterile pharmaceutical dosage forms. *Prerequisite: PHAR222*

PHAR353 Pharmacy Practice Laboratory 1

1 C.H
(3 practical hours)

This course is the first in the series of pharmacy practice labs that connect the theoretical courses in pharmacy with pharmacy practice. This course discusses the methods to evaluate vital signs, and medical prescriptions (types and reading). It also covers the practical methods for preparing, evaluating and dispensing pharmaceutical solutions with proper patient counseling. *Pre- or co-requisite: PHAR351*

PHAR354 Pharmaceutics 2

3 C.H

This course integrates the principles of physical pharmacy and traditional and modern pharmaceutical dosage forms. Covered topics are suspensions, emulsions, aerosols, and dermatological and rectal route preparations. *Prerequisites: PHAR351*

PHAR356 Pharmacy Practice Laboratory 2

1 C.H
(3 practical hours)

This course is the second in the series of pharmacy practice labs that connect the theoretical courses in pharmacy with pharmacy practice. This course discusses practical methods for preparing semi-solid pharmaceutical preparations such as creams and suppositories, and dispersed pharmaceutical preparations such as suspensions and emulsions. The course includes evaluating and dispensing these dosage forms with proper patients counseling.

Pre- or co-requisite: PHAR354

PHAR361 Clinical Biochemistry

3 C.H

This course discusses the biological and metabolic disturbances related to various disease states. It also covers diagnostic procedures that help in evaluating the efficiency of different body organs. *Prerequisite: MED372*

PHAR401 Community Pharmacy 3 C.H

In this course students are trained for 8 consecutive weeks in a registered community pharmacy inside Jordan. Students are not allowed to have training outside Jordan. Students are not allowed, under any circumstances, to register for courses along with the training. *Prerequisite: Students are eligible for this training only after passing 120 C.H.*

PHAR421 Medicinal Chemistry 3 2 C.H

The course covers the medicinal chemistry of drugs acting on the central nervous system (CNS), the autonomic nervous system (ANS), the cardiovascular system, and drugs used for management of diabetes. *Prerequisite: PHAR322*

PHAR422 Medicinal Chemistry 4 2 C.H

The course covers the medicinal chemistry of opioids, non-steroidal anti-inflammatory drugs, steroidal hormones, & other steroid derivatives, anti-hyperlipidemic drugs, anti-histamines, local anesthetics and drugs used for peptic ulcer disease. *Prerequisite: PHAR421*

PHAR433 Phytotherapy 3 C.H

The course discusses locally and internationally registered plant medications that is used in therapy of diseases and disorders of different body systems including the nervous, cardiovascular, gastrointestinal, respiratory, renal, endocrine, dermatological and musculoskeletal systems. The course focuses on the medical uses of drugs, method and duration of use, drug interactions, and adverse effects. *Prerequisite: PHAR334*

PHAR441 Pharmacology 3 3 C.H

This course discusses the pharmacology of chemotherapeutic agents including antibacterial, antifungal, antiviral, antiparasitic and anticancer agents. This course also discusses the pharmacology of hormones and drugs acting on the endocrine system. *Prerequisite: PHAR342*

PHAR446 Therapeutics 1 3 C.H

This course includes medications used for neurological and psychiatric disorders, infectious diseases, immunological and hematological diseases, and tumors in relation to the pathophysiologic conditions of the patient. The course discusses concepts of drug action, therapeutic uses, goals of treatment, therapeutic plan, patient counseling, drug monitoring and evaluation of the therapeutic outcomes. Students learn methods of interacting and supporting other members of the medical care team by developing and evaluating patient's therapeutic plans, and offering alternative therapeutic options/plans when needed. *Prerequisite: PHAR441*

PHAR451 Pharmaceutics 3 3 C.H

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. *Prerequisite: PHAR354*

PHAR454 Pharmacy Practice Laboratory 3 1 C.H (3 practical hours)

This course is the third in the series of pharmacy practice labs that connect the theoretical courses in pharmacy with pharmacy practice. This course covers practical methods for preparing different types of solid pharmaceutical dosage forms. The course also includes

evaluating and dispensing these dosage forms with the proper patient counseling. *Pre- or co-requisite: PHAR451*
PHAR456 Biopharmaceutics and Pharmacokinetics 3 C.H

This course covers the physico-chemical and biological factors involved in the absorption, distribution, and elimination of drugs as well as method of calculating drug levels in blood and urine after single or multiple dosing orally or intravenously. The concepts of bioavailability and bioequivalence are also discussed. *Prerequisite: PHAR451*

PHAR458 Pharmaceutical Technology 3 C.H

This course covers methods for the development and delivery of modern pharmaceutical formulations such as solutions, disperse systems, solid dosage forms and sterile dosage forms based on the physico-chemical properties of drugs. *Prerequisite: PHAR451*

PHAR461 Immunology and Vaccines 2 C.H

This course covers the basic principles of immunology and their relation to diseases and therapy. The course also discusses different types of vaccines, and their mechanisms of action. *Prerequisite: MED372*

PHAR462 Pharmaceutical Microbiology and 3 C.H Biotechnology

This course discusses mechanisms of action and the biological properties of antibiotics and chemical compounds that are used clinically to treat different types of microbial diseases. The course also covers the development of microorganism's resistance, and the methods for preventing or reducing such resistance. The course discusses various methods of sterilization. Principles of biotechnology, recombinant DNA technology, and some biotechnologically produced drugs are also covered. *Prerequisite: PHAR361*

PHAR463 Ethics and Pharmacy Practice 2 C.H

This course discusses the ethics of pharmacy profession; the principles of pharmacy management, the pharmaceutical marketing and the methods of communicating with patients and medical care team. The course also deals with current laws that govern the practice of pharmacy profession and the registration of drugs in Jordan. *Pre- or co-requisite: PHAR351*

PHAR464 Pharmaceutical Microbiology 1 C.H and Biotechnology Laboratory

Students are trained on the methods of culturing, staining and identifying bacteria. Bacterial metabolism, the way bacteria are affected by antibiotics, the essentials of sterilization and quantifying microorganism growth and the methods of producing antibiotics using biotechnological techniques will also be covered. *Pre- or co-requisite: PHAR462*

PHAR504 Selected Topics 1 1 C.H

A selected topic in pharmaceutical sciences will be assigned to students to fulfill certain academic requirements. *Prerequisite: Dean's approval*

PHAR505 Selected Topics 2 2 C.H

A selected topic in pharmaceutical sciences will be assigned to students to fulfill certain academic requirements. *Prerequisites: Dean's approval*

PHAR531 Advanced Chemistry of Natural Products 3 C.H

The course focuses on methods and techniques of isolation, identification and biosynthesis of naturally occurring compounds and their chemical reactions. *Prerequisites: PHAR334*

PHAR532 Toxic Plants 3 C.H

This course deal with the most important toxic plants, their existence, the toxic symptoms, antidotes and drugs to treat intoxication. *Prerequisites:* PHAR334

PHAR547 Therapeutics 2 3 C.H

This course includes medications used for cardiovascular diseases, renal systems, respiratory, and gastrointestinal endocrine and in relation to the pathophysiologic conditions of the patient. The course discusses concepts of drug action, therapeutic uses, goals of treatment, therapeutic plan, patient counseling, drug monitoring and evaluation of the therapeutic outcomes. Students learn methods of interacting and supporting other members of the medical care team by developing and evaluating patient's therapeutic plans, and offering alternative therapeutic options/plans when needed. *Pre-requisite:* PHAR446

PHAR549 Clinical Cases 1 C.H (3 practical hours)

This course helps students to develop clinical skills necessary to solve problems related to supplying patients with cost-effective and safe treatment. This course covers clinical cases in pediatrics, women and men health-related issues. *Pre- or co-requisite:* PHAR547

PHAR552 Marketing & Pharmacoeconomics 3 C.H

This course covers the essential principles and applications of marketing strategies, pharmaceutical economy, design forms and determinants of the outputs of drug therapy with emphasis on the practical aspects of these principles. *Prerequisite:* PHAR463

PHAR555 Drug Delivery Systems 3 C.H

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. *Prerequisite:* PHAR458

PHAR562 Clinical Nutrition 2 C.H

This course covers the basic principles of clinical nutrition during both normal and diseased conditions. This course also discusses obesity and its relation with physical exercises, home parenteral nutrition, food-induced allergy, special nutrition for disease states, and the diagnosis of diseases related to vitamins and minerals deficiency. *Prerequisite:* PHAR361

PHAR565 Protein and Gene Therapy 2 C.H

This course covers the chemical, pharmaceutical and the therapeutic aspects of proteins and genes medications. *Prerequisite:* PHAR462

PHAR568 Patient Counseling 3 C.H

This course focuses on essential skills required to provide advice and guidance to patients concerning the treatment plan. This course provides the student with the basic information needed to help the patient treat frequently occurring health problems such as cold, constipation and diarrhea. *Prerequisite:* PHAR547

PHAR571 Advanced Pharmaceutical Biotechnology 3 C.H

This course covers techniques used in pharmaceutical biotechnology such as molecular biology, gene synthesis and genetic technology. The methods for the synthesis, purification, and formulation of proteins in pharmaceutical dosage forms are also discussed. *Prerequisite:* PHAR462

PHAR572 Advanced Pharmaceutical Microbiology 3 C.H

This course covers the properties of pathogens (bacteria and fungi) in their single (planctonic) and aggregate (biofilm) forms, the effect of antibiotics on both forms, comparison of antibiotic resistance in both cases and determination of best methods for eradication. The course also discusses the properties of toxins and proteins that are produced by various microorganisms leading to enhancement of their virulence and resistance to antibiotics. The methods of separation, analysis and characterization of these products are also covered. *Prerequisite:* PHAR462

PHAR573 Communications Skill in Pharmacy 3C.H

This course discusses the proper communication skills in the pharmaceutical environment. The course also discusses the specific requirements for communicating with elderly and patient with special needs to provide distinguished and specialized pharmaceutical services. The course covers the communication skills used in education, development of creative services, supervision, resolving conflicts and dealing with different groups of the society. *Prerequisite:* PHAR451

PHAR574 Advanced Physical Pharmacy 3 C.H

This course discusses the physico-chemical characteristics affecting drug actions and the appropriate techniques used to study and evaluate these properties. *Prerequisite:* PHAR451

PHAR575 Advanced Pharmaceutical Technology 3 C.H

This course covers the latest developments in the pharmaceutical technologies and equipments used in drug manufacturing. *Prerequisite:* PHAR451

PHAR576 Cosmetic preparations 3 C.H

This course covers the methods used for the development of various types of cosmetic products starting from the idea of the preparation, its formulation, manufacturing, and evaluation for their quality and stability. Proper methods of storage and usage of cosmetic products are also discussed. *Prerequisite:* PHAR451

PHAR577 Advanced Industrial Pharmacy 3 C.H

This course covers the various technologies used in drug production, packaging, and scale up. *Prerequisite:* PHAR451

PHAR578 History of Pharmacy and Therapy 3 C.H

This course covers the history and development of pharmacy profession. *Prerequisite:* PHAR451

PHAR579 Drug Registration and Approval 3 C.H

This course discusses methods of drugs approval and registration. The course covers the phases of drug studies on animals and other clinical studies required. *Prerequisite:* PHAR451

PHAR581 Advanced Medicinal Chemistry 3 C.H

This course covers new trends in medicinal chemistry. The course discusses methods of developing new drugs and their possible metabolism. *Pre- or co-requisite:* PHAR421

PHAR582 Drugs Design 3 C.H

This course covers essential principles of drug design and synthesis. The course includes studying methods of high-throughput synthesis and computer modeling and the biochemical basis for novel mechanisms of drug action. *Prerequisite:* PHAR422

PHAR583 Nuclear Pharmacy 3 C.H

This course covers essentials of nuclear pharmacy, method of preparing radioactive isotopes in nuclear reactors, and methods of preparing radioactive pharmaceutical formulations used in treatment and diagnosis of diseases. The quality control methods pertaining to these formulations are also covered.

Prerequisite: PHAR422

PHAR584 Radiation Technology 3 C.H

This course covers the various uses of pharmaceutical radiation technology with special emphasis on the uses of radioactive isotopes in the diagnosis and therapy of some pathological conditions.

Pre- or co-requisite: PHAR421

PHAR585 Pharmaceutical Quality Control 3 C.H

This course covers quality control systems for pharmaceutical operations in industry and various methods of ensuring quality control of pharmaceutical preparations. *Pre- or co-requisite: PHAR451*

PHAR591 Advanced Pharmacy Practice 3 C.H

This course covers new developments and trends in the pharmacy practice, and discusses the mechanisms for their efficient application. *Prerequisite: PHAR451*

PHAR592 Pharmacoeconomics 3 C.H

This course covers the essential principles and applications of pharmaceutical economy, design forms and determinants of the outputs of drug therapy with emphasis on the practical aspects of these principles.

Prerequisite: PHAR451

PHAR593 Clinical Pharmacology 3 C.H

This course covers the essential principles of clinical pharmacology. It also covers clinical uses, adverse effects, precautions, drug interactions and contraindications for selected groups of drugs.

Prerequisite: PHAR441

PHAR594 Advanced Therapeutics (For Pharmacy Students) 3 C.H

This course discusses the therapeutics for some clinical cases and selected drugs in a comprehensive and detailed manner. *Prerequisite: PHAR446*

PHAR595 Molecular Pharmacology 3 C.H

This course discusses the essential principles of molecular pharmacology. It also covers types of receptors, second messengers and cellular mechanisms of drug action. Genes, nucleic acids structure, replication and the control on these processes as sites of drug action are also discussed. *Prerequisite: PHAR441*

PHAR596 Physical Examination 3 C.H

This course covers medical terminologies and procedures used during physical examination and extraction of patient's medical history. *Prerequisite: MED372*

PHAR597 Pharmacogenetics 3 C.H

This course discusses the essential principles of pharmacogenetics that enable students to interpret the variations in drug responses according to gender and race differences among patients. *Prerequisite: PHAR 441*

PHAR597 Pharmacogenetics 3 C.H