



Jordan University of Science and Technology
Faculty of Pharmacy

Study Plan for Doctor of Pharmacy (PharmD) Degree

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Vision:

Achieving excellence in Pharmaceutical education and Pharmaceutical care.

Mission:

Educating highly qualified Pharmacists that are equipped with efficient skills in their future careers.

Participating in the development of national programs of Pharmaceutical care and Pharmacy practice.

Providing the Jordanian community with high quality Pharmaceutical education, scientific research and Pharmaceutical services.

Objectives:

1. To provide students with the comprehensive scientific knowledge and skills needed for future Pharmacists in different aspects of Pharmaceutical sciences including clinical pharmacy and pharmacy practice in particular.
2. To provide students with high quality practical training in order to develop the students' skills in the field of Clinical Pharmacy and to equip the students with the necessary skills to deal directly with patients in cooperative environment with members of the medical team.
3. To provide the students with special professional knowledge and ethics needed for the profession of Pharmacy.
4. Graduating students with significant Pharmaceutical skills and knowledge needed to deliver the highest levels of pharmaceutical care for patients and providing the necessary knowledge for the optimal use of medicines.

Job Opportunities:

1. Public and private hospitals.
2. Community and hospital Pharmacies.
3. Pharmaceutical marketing/Science liaisons.
4. Drug information centers.
5. Pharmaceutical Industry.
6. Food and Drug administration.
7. Academia.
8. Pharmaceutical research and development.
9. Medical websites.
10. International and national health organizations.

Study Plan of Bachelor degree in Pharmacy

Numbering and coding system of courses of the study plan.

Course Coding

The following codes are used to designate courses:

Faculty	Level/year	Field	Sequence
PHAR	x	y	z

Course Numbering

- The Pharmacy courses are tabled and numbered in such a manner to recognize each course regarding its subject area, year or level, and semester offered.
- Ex. PHAR xyz: The **PHAR** symbol in the course number denotes Pharmacy and (xyz) is a 3-digits number:
 - A. The first digit denotes the year level of the course according to student’s study plan as follows:

Code	Level/year
1	First
2	Second
3	Third
4	Fourth
5	Fifth
6	Sixth

B. The second digit denotes the course field subject as follows:

Number	Specialization
0	Introductory and Basic Pharmaceutical Sciences
1	Clinical Pharmacy
2	Medicinal Chemistry and Pharmacognosy
3	Medicinal Chemistry and Pharmacognosy
4	Clinical Pharmacy
5	Pharmaceutical Technology
6	Clinical Pharmacy
7	Pharmaceutical Technology
8	Clinical Pharmacy
9	Clinical Pharmacy

C. The third digit denotes sequence of semester during which the course is offered according to the study plan. In way that odd numbers are given to the first and summer semesters while even numbers are given to second semesters.

Example: PHAR 351Pharmaceutics 1 means:

PHAR	3	5	1
PHARMACY	Level (Third year)	Field (Pharmaceutical Technology)	Sequence (First semester)

The Doctor of Pharmacy degree at JUST is awarded in accordance with the statute stated by JUST regulations for B.Sc. awarding issued by the Dean’s Council based on the adjusted 1987 law for awarding scientific degrees and certifications at JUST after completing (216) credit hours successfully.

The study plan composed of the following:

Classification	Credit hours		
	Compulsory	Elective	Total
University requirement	16	9	25
Faculty requirement	90	9	99
Specialty requirement	84	8	92
Total	190	26	216

A. University Requirements (25 Credit Hours)

1. Compulsory University Requirements: (16 Credit Hours)

Course No.	Course title	Credit hours	Theoretical	Practical
HSS 100	Culture and University Behavior	1	1	-
ARB 101	Arabic language	3	3	-
MS 100 ⁽¹⁾	Military Sciences	3	3	-
ENG 111 ⁽²⁾	English language 1	3	3	-
ENG 112 ⁽³⁾	English language 2	3	3	-
CIS 100 ⁽⁴⁾	Computer skills	3	2	1

Notice: All non-Arabic speaking international students in the University are required to study one course in Arabic language as a substitute for ARB 101 shown below:

Course No.	Course title	Credit hours	Theoretical	Practical
ARB 101A	Fundamentals of Arabic Language (for non-Arabic speaking students) as a substitute for the course ARB101 Arabic language)	3	3	-

- (1) This course is required from Jordanian students only; graded on Pass/Fail basis. Students graduating from Royal Military faculty and military candidate's school and equivalent institutes are exempted from taking this course. Non-Jordanian Arabic speaking students are required to take a substitute for this course from the elective courses and in this case the grade of this course is included in their grade point average (GPA).
- (2) A student who passes the Computer Skills Placement Test with a grade > 50% is exempted from CIS 100. Students who hold (Computer Driving License the Cambridge Diploma Certificate in Information and Technology are exempted from studying this course).
- (3) Pre-requisite: passing Eng 099 or passing English Language Placement Test with a grade > 50%.
- (4) Pre-requisite: Eng 111 or passing the English Language Placement Test with a grade > 80%. Students who have a TOEFL score of > 500 are exempted from both Eng 099 and Eng. 111.

2. Elective courses: (9 credit hours) selected from the following courses:

Course No.	Course title	Credit hours	Theoretical	Lab
NU100	Health Promotion	3	3	-
NF177	Food Preservation (In English Language)	3	3	-
AP200	Farm Animal Products and Production	3	3	-
ADS100	Dental and Oral Health (not for Dental and Allied Dental Sciences)	3	3	-
PHAR104	Drugs and Medicinal Plants in Jordan (not for Environment students)	3	3	-
PH104	Community Health and Nutrition	3	3	-

PH200	First Aid	3	3	-
VM211	Animal Health (not for Veterinary Medical and Agriculture students)	3	3	-
VM212	Pet Animal Care	3	3	-
VM213	Animal Behavior and care	3	3	-
ARB200	Appreciation of Literary Texts	3	3	-
HSS105	French Language	3	3	-
HSS106	German Language	3	3	-
HSS115	Islam and Contemporary Issues	3	3	-
HSS116	Islamic Economic System	3	3	-
HSS121	Principles of Sociology	3	3	-
HSS126	Principles of Psychology	3	3	-
HSS127	Educational Technology	3	3	-
HSS128	National Education	3	3	-
HSS131	Islamic Civilization	3	3	-
HSS132	The History of the City of Jerusalem	3	3	-
HSS133	Civilization and Contemporary Cultures	3	3	-
HSS135	Islamic Culture	3	3	-
HSS137	Human Rights	3	3	-
HSS141	Introduction to Economics (not for Information Technology Systems students)	3	3	-
HSS142	Library, Information and Research	3	3	-

HSS151	Introduction to Administration (not for Information Technology Systems students)	3	3	-
HSS161	Contemporary Problems	3	3	-
HSS166	Human and Science	3	3	-
HSS211	Sociology (In English language)	3	3	-
HSS212	Arab Society (In English language)	3	3	-
HSS213	Individual and Society (in English language)	3	3	-
HSS216	International global System (In English language)	3	3	-
HSS221	Introduction to Psychology (In English Language)	3	3	-
HSS222	Creativity and Problem solving	3	3	-
HSS224	Leadership and Communication Skills	3	3	-
HSS231	The History of Science for Islam	3	3	-
HSS250	The History of Music (In English Language)	3	3	-
HSS 242	Information and Research (in English language)	3	3	-
HSS250	The History of Music (in English language)	3	3	-
HSS429	Behavior Management in Children	3	3	-
ES103	Environment Protection (not for Environment students)	3	3	-
PT100	Wellness and Lifestyle (not for Physical and Occupational Therapy)	3	3	-
CHE191	Introduction to Nanotechnology	3	3	-
NR200	Natural Resources and Man (not for Agriculture students)	3	3	-
NR 207	Plant Earth Problems & Solutions (not for Agriculture students)	3	3	-

ME102	Introduction to Renewable Energy (not for mechanical engineering students)	3	3	-
ME211	Introduction to Automobile Mechanics (not for mechanical engineering students)	3	3	-
PP200	Home Gardens (not for Agriculture students)	3	3	-
PP201	Bees Keeping (not for Agriculture students)	3	3	-
PP202	Jordan's Natural Plants (not for Agriculture students)	3	3	-

B. Faculty Requirements: (99 credit hours) distributed as follows:

1. Mandatory courses (90 credit hours)

Course No.	Course title	Credit hours	Theoretical	Lab	Prerequisite or co-request
BIO103	General Biology	3	3	-	-
BIO107	General Biology Practical	1	-	1	BIO103 or Co-requisite
MATH102A	Calculus 2 (for biological sciences students)	3	3	-	-
PHY103	General Physics	3	3	-	-
CHEM103	General Chemistry	3	3	-	-
CHEM107	General Chemistry Lab	1	-	1	CHEM103 or Co-requisite
MED210	Anatomy and Histology	3	2	-	BIO103
MED210	Anatomy and Histology Practical	-	-	0	Co-requisite with MED210
CHEM217	Organic Chemistry	3	3	-	CHEM103
CHEM 218	Organic Chemistry Laboratory	1	-	1	CHEM 217 or Co-requisite
PHAR222	Pharmaceutical Organic Chemistry	3	3	-	CHEM217
PHAR225	Pharmaceutical Analytical Chemistry	3	3	-	CHEM013
MED 230A	Human Physiology	3	3	-	BIO 103
CHEM262	Biochemistry	3	3	-	CHEM217

PH311	Biostatistics	2	2	-	MATH 102A
PHAR321	Medicinal Chemistry 1	3	3	-	PHAR222
PHAR322	Medicinal Chemistry 2	3	3	-	PHAR321
PHAR323	Pharmaceutical Instrumental Analysis	3	3	-	CHEM233
PHAR329	Pharmaceutical Analytical chemistry & Instrumental Analysis lab	1	-	1	PHARM323 or Co-requisite
PHAR341	Pharmacology 1	3	3	-	MED372
PHAR342	Pharmacology 2	3	3	-	PHAR341
PHAR351	Pharmaceutics 1	3	3	-	PHAR222
PHAR353	Pharmacy Practice Laboratory 1	1	-	1	PHAR351 or Co-requisite
PHAR354	Pharmaceutics 2	3	3	-	PHAR 351
PHAR356	Pharmacy Practice Laboratory 2	3	-	1	PHAR 354 or Co-requisite
PHAR361	Clinical Biochemistry	3	3	-	MED372
PHAR366	Drug Information Resources	1	1	-	PHAR341
MED 372	Pathophysiology (For Pharmacy students)	3	3	-	MED 230
PHAR421	Medicinal Chemistry 3	3	3	-	PHAR322
PHAR441	Pharmacology 3	3	3	-	PHAR342
PHAR451	Pharmaceutics 3	3	3	-	PHAR354
PHAR453	Pharmaceutical Microbiology	3	3	-	MED372
PHAR454	Pharmacy Practice Laboratory 3	1	-	1	PHAR451 or Co-requisite
PHAR456	Biopharmaceutics and Pharmacokinetics	3	3	-	PHAR451
PHAR460	Pharmaceutical Biotechnology	3	3	-	PHAR453
PHAR464	Pharmaceutical Microbiology and Biotechnology Lab	1	-	1	PHAR460 or Co-requisite
PHAR461	Immunology and Vaccines	2	2	-	MED372
PHAR462	Clinical Nutrition	2	2	-	PHAR361
Total		90	82	8	

2. Elective courses: Students have to choose courses equivalent to (9) credit hours from the faculty of Pharmacy elective courses as follows:

Course No.	Course title	Credit hours	Theoretical	Lab	Prerequisite (or Co)
PHAR504	Selected Topics 1	1	1	-	Dean's approval
PHAR505	Selected Topics 2	2	2	-	Dean's approval
PHAR521	Advanced Medicinal Chemistry	3	3	-	PHAR421
PHAR522	Drug Design	3	3	-	PHAR421
PHAR523	Nuclear Pharmacy	3	3	-	PHAR421
PHAR524	Radiation Technology	3	3	-	PHAR421
PHAR525	Advanced Chemistry of Natural Products	3	3	-	PHAR421
PHAR526	Quality Control	3	3	-	PHAR451
PHAR527	Toxic Plants	3	3	-	PHAR421
PHAR528	Alternative Medicine	3	3	-	PHAR433
PHAR554	Advanced Pharmaceutical Technology	3	3	-	PHAR451
PHAR 556	Advanced Industrial Pharmacy	3	3	-	PHAR451
PHAR558	Pharmaceutical Regulatory Affairs	3	3	-	PHAR451
PHAR559	Drug Stability	3	3	-	PHAR451
PHAR571	Advanced Pharmaceutical Biotechnology	3	3	-	PHAR460
PHAR573	Advanced Pharmaceutical Microbiology	3	3	-	PHAR460
PHAR574	Gene & Protein Therapy	3	3	-	PHAR460
PHAR575	Advanced Natural Pharmacy	3	3	-	PHAR451
PHAR576	Cosmetic preparations	3	3	-	PHAR451
PHAR577	History of Pharmacy and Therapy	3	3	-	PHAR451
PHAR578	Drug registration & Approval	3	3	-	PHAR451
PHAR579	Communication skills in Pharmacy	3	3	-	PHAR446
PHAR580	Pharmaceutical Intellectual Property	3	3	-	PHAR451
PHAR585	Pharmacy Management	3	3	-	PHAR466

PHAR586	Pharmacoepidemiology	3	3	-	PHAR466
PHAR590	Advanced Pharmacology	3	3	-	PHAR 441
PHAR591	Advanced Pharmacy Practice	3	3	-	PHAR466
PHAR592	Advanced Therapeutics (for Pharmacy students)	3	3	-	PHAR446
PHAR 593	Molecular Pharmacology	3	3	-	PHAR 441
PHAR594	Clinical Examination	3	3	-	PHAR446
PHAR595	Pharmacogenetics	3	3	-	PHAR441
PHAR596	Hospital Pharmacy	3	3	-	PHAR401
PHAR597	Clinical Pharmacology	3	3	-	PHAR441

C. Program requirements: (84) credit hours allocated from the faculty of Pharmacy as follows:

1. Mandatory courses (49 credit hours)

Course No.	Course title	Credit hours	Theoretical	Lab	Prerequisite (or Co)
PHAR332	Chemistry of Natural Products (for PharmD students)	3	3	-	PHAR222
MED231	Pathology	3	2	-	MED210
MED231	Pathology (Practical)	0	-	0	co-requisite with
PHAR344	Introduction to Therapeutics (for PharmD students)	1	1	-	PHAR341
PHAR431	Phytotherapy (for PharmD students)	3	3	-	PHAR332
PHAR442	Therapeutics- Immunology, Hematology and Oncology (for PharmD students)	3	3	-	PHAR364 and
PHAR443	Therapeutics- Neurological and Psychiatric Disorders (for PharmD students)	3	3	-	PHAR344
PHAR444	Therapeutics- Cardiovascular System (for PharmD students)	2	2	-	PHAR442 or co-
PHAR445	Therapeutics- Respiratory and Gastrointestinal Systems (for PharmD students)	2	2	-	PHAR342 and co-
PHAR447	Clinical Cases 1 (for PharmD students)	1	-	1	PHAR445 or co-
PHAR448	Clinical Cases 2 (for PharmD students)	1	-	1	PHAR444 or co-
PHAR468	Pharmaceutical marketing and Pharmacoeconomics (for PharmD students)	2	2	-	PHAR341
PHAR515	Drug Literature Evaluation (for PharmD students)	2	2	-	PHAR366
PHAR517	Drug Literature Evaluation Practical (for PharmD students)	1	-	1	PHAR515 or co-

PHAR541	Therapeutics- Endocrine and Renal Systems (for PharmD students)	2	2	-	PHAR441 and
PHAR542	Therapeutics- Pediatric Health (for PharmD students)	2	2	-	PHAR541
PHAR543	Therapeutics- Infectious Diseases (for PharmD students)	2	2	-	PHAR541 or co-
PHAR544	Therapeutics- Woman and Man Health (for PharmD students)	2	2	-	PHAR542 or co-
PHAR545	Clinical Cases 3 (for PharmD) students)	1	-	1	PHAR543 or co-
PHAR546	Clinical Cases 4 (for PharmD)students)	1	-	1	PHAR544 or co-
PHAR548	Therapeutics- Comprehensive (for PharmD students)	2	2	-	PHAR542 or co-
PHAR551	Pharmaceutics 4 (for PharmD students)	2	2	-	PHAR451
PHAR553	Clinical Pharmacokinetics (for PharmD students)	3	3	-	PHAR456
PHAR557	Pharmacy Practice Laboratory 4	1	-	1	PHAR551 or co-
PHAR561	Pharmacy Ethics and Law	1	1	-	PHAR362
PHAR564	Early Practice Experience (for PharmD students)	2	2	-	PHAR546 or co-
PHAR568	Clinical Seminar (for PharmD students)	1	1	-	PHAR517
TOTAL		49	42	6	

2. Mandatory practical training (35 credit hours)

Course No.	Course title	Credit hours	Weeks	Prerequisite
PHAR402	Community Pharmacy* (for PharmD students)	3	8	Passing 130 credit hours
PHAR640	Clinical Training: Internal Medicine 1 (for PharmD students)	4	4	The successful completion of all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.
PHAR641	Clinical Training: Hospital Pharmacy (for PharmD students)	4	4	
PHAR642	Clinical Training: Ambulatory Care (for PharmD students)	4	4	
PHAR643	Clinical Training: Internal Medicine 2 (for PharmD students)	4	4	
PHAR644	Clinical Training: Pediatrics (for PharmD students)	4	4	
PHAR645	Clinical Training: Critical Care (for PharmD students)	4	4	
PHAR646	Clinical Training: Oncology (for PharmD students)	4	4	
PHAR647	Clinical Training: Cardiology (for PharmD students)	4	4	
TOTAL		35	40	

* 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. Students are eligible for this training only after successfully completing 130 credit hours.

D- Elective specialization requirements :(8 credit hours)

Elective practical training: (8 credit hours)

Course No.	Course title	Credit hours	Weeks	Prerequisite
PHAR670	Clinical Training: Clinical Nutritional Support	4	4	The successful completion of all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.
PHAR671	Clinical Training: Geriatrics	4	4	
PHAR672	Clinical Training: Pharmaceutical Industry	4	4	
PHAR673	Clinical Training: Pharmaceutical Academic Education	4	4	
PHAR674	Clinical Training: Pharmacy Management	4	4	
PHAR675	Clinical Training: Clinical Pharmaceutical Research	4	4	
PHAR676	Clinical Training: Disease State Management/Care	4	4	
PHAR677	Clinical Training: Pharmaceutical Home Care	4	4	
PHAR678	Clinical Training: Neurology	4	4	
PHAR679	Clinical Training: Nuclear Medicine	4	4	
PHAR680	Clinical Training: Respiratory Diseases	4	4	
PHAR681	Clinical Training: Endocrine Diseases	4	4	
PHAR682	Clinical Training: Pain Management	4	4	
PHAR683	Clinical Training: Pharmaceutical Dental Care	4	4	
PHAR690	Clinical Training: Dermatology	4	4	
PHAR691	Clinical Training: Gynecology and Obstetrics	4	4	
PHAR692	Clinical Training: Psychiatry	4	4	
PHAR693	Clinical Training: Drug Information	4	4	
PHAR694	Clinical Training: Surgery	4	4	
PHAR695	Clinical Training: Renal Diseases	4	4	

PHAR696	Clinical Training: Infectious Diseases	4	4	
PHAR697	Clinical Training: Poisoning Center	4	4	
PHAR698	Clinical Training: Gastrointestinal Diseases	4	4	
PHAR699	Clinical Training: Comprehensive Pharmaceutical care	4	4	
TOTAL		50	43	

Study Plan

FIRST YEAR											
First semester						Second semester					
Course No.	Course name	Total credits	Weekly hours		Prerequisite/ Co-requisite	Course No.	Course name	Total credits	Weekly hours		Prerequisite/ Co-requisite
			Lecture	Lab					Lecture	Lab	
BIO 103	General Biology	3	3	-	--	HSS 100	Culture and University Behavior	1	1	-	--
BIO 107	General Biology Practical	1	-	2	BIO 103 (or Co)	ARB 101	Arabic Language	3	3	-	--
CIS 100	Computer Skills	3	2	1	--	PHY 103	General Physics	3	3	-	--
MATH 102A	Calculus 2 (for biological sciences students)	3	3	-	--	ENG 112	English Language 2	3	3	-	ENG 111*
CHEM 103	General Chemistry	3	3	-	--	MS 100	Military Sciences	3	3	-	--
CHEM 107	General Chemistry lab	1	-	2	CHEM 103 (or Co)	CHEM 217	Organic Chemistry	3	3	-	CHEM103
ENG 111	English Language 1	3	3	-	Passing ENG 099	218CHEM	Organic Chemistry Lab	1	-	3	217CHEM (or Co)
Total		17	14	5		Total		17	16	2	

* Or scoring 80% or more in the English Language Level Exam

SECOND YEAR											
First semester						Second semester					
Course No.	Course name	Total credits	Weekly hours		Prerequisite/ Co-requisite	Course No.	Course name	Total credits	Weekly hours		Prerequisite/ Co-requisite
			Lecture	Lab					Lecture	Lab	
MED 210	Anatomy and Histology	3	2	-	BIO 103	PHAR 225	Pharmaceutical Analytical Chemistry	3	3	-	CHEM 103
MED 210	Anatomy and Histology	0	-	2	MED 210	MED 231	Pathology	3	2	-	MED 210
MED 230	Human Physiology	3	3	-	BIO 103	MED 231	Pathology (Practical)	0	-	2	
PHAR 222	Pharmaceutical Organic Chemistry	3	3	-	CHEM 217	CHEM 262	Biochemistry	3	3	-	CHEM 217
	University Elective	3	3	-	--	MED 372	Pathophysiology (For Pharmacy students)	3	3	-	MED 230
	University Elective	3	3	-	--	PH 311	Biostatistics	2	2	-	MATH 102A
							University Elective	3	3	-	--
Total		15	14	2		Total		17	17	0	

THIRD YEAR											
First semester						Second semester					
Course No.	Course name	Total credits	Weekly hours		Prerequisite/ Co-requisite	Course No.	Course name	Total credits	Weekly hours		Prerequisite/ Co-requisite
			Lecture	Lab					Lecture	Lab	
PHAR 321	Medicinal Chemistry 1	3	3	-	PHAR 222	PHAR 322	Medicinal Chemistry 2	3	3	-	PHAR 321
PHAR 323	Pharmaceutical Instrumental Analysis	3	3	-	PHAR222 PHAR225	PHAR 332	Chemistry of natural products	3	3	-	PHAR 222
PHAR 320	Pharmaceutical Analytical Chemistry and Instrumental Analysis lab	1	-	2	PHAR 323 (or Co)	PHAR 342	Pharmacology 2	3	3	-	PHAR 341
PHAR 341	Pharmacology 1	3	3	-	MED 372	PHAR 354	Pharmaceutics 2	3	3	-	PHAR 352
PHAR 351	Pharmaceutics 1	3	3	-	PHAR 222	PHAR 356	Pharmacy practice lab 2	1	-	2	PHAR 3514(or Co)
PHAR 353	Pharmacy practice lab 1	1	-	2	PHAR 351 (or Co)	PHAR 361	Clinical Biochemistry	3	3	-	MED 372
PHAR 453	Pharmaceutical Microbiology	3	3	-	MED 372	PHAR 366	Drug Information Resources	1	1	-	PHAR 341
						PHAR 341	Introduction to Therapeutics	1	1		PHAR 341
Total		17	15	4		Total		18	17	2	

FOURTH YEAR											
First semester						Second semester					
Course No.	Course name	Total credits	Weekly hours		Prerequisite/ Co-requisite	Course No.	Course name	Total credits	Weekly hours		Prerequisite/ Co-requisite
			Lecture	Lab					Lecture	Lab	
PHAR 421	Medicinal Chemistry 3	3	3	-	PHAR 322	PHAR 442	Therapeutics- Immunology, Hematology and Oncology (for PharmD students)	3	3	-	PHAR 441
PHAR 431	Phytotherapy	3	3	-	PHAR 332	PHAR 444	Therapeutics- Cardiovascular System (for PharmD students)	2	2	-	PHAR 442 (or Co)
PHAR 441	Pharmacology 3	3	3	-	PHAR 342	PHAR 448	Clinical Cases 2 (for PharmD students)	1	-	2	PHAR 444 (or Co)
PHAR 443	Therapeutics- Neurological and Psychiatric Disorders (for PharmD students)	3	3	-	PHAR 344	PHAR 454	Pharmacy practice lab 3	1	-	2	PHAR 451 (or Co)
PHAR 445	Therapeutics- Respiratory and Gastrointestinal Systems (for PharmD students)	2	2	-	PHAR342	PHAR 456	Biopharmaceutics and Pharmacokinetics	3	3	-	PHAR 452
PHAR447	Clinical Cases 1 (for PharmD students)	1	-	2	PHAR 445 (or Co)	PHAR 460	Pharmaceutical Biotechnology	3	3	-	PHAR 453
PHAR 451	Pharmaceutics 3	3	3	-	PHAR 454	PHAR 464	Pharmaceutical Microbiology and Biotechnology lab	1	-	2	PHAR 460 (or Co)
				-		PHAR 461	Immunology and Vaccines	2	2	-	MED 372
						PHAR 468	Pharmaceutical Marketing & Pharmacoeconomics	2	2	-	PHAR 342
Total		18	17	2		Total		18	15	6	

Summer semester				
Course No.	Course Name	Credit Hours	Weeks	Pre-requisite
PHAR402	Community Pharmacy*	3	8	Passing 130 credit hours
Total		3	8	

*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 except graduating students whom may register a course or a seminar or both along the training course. Students are eligible for this training only passing 130 credit hours.

FIFTH YEAR											
First semester						Second semester					
Course No.	Course name	Total credits	Weekly hours		Prerequisite/ Co-requisite	Course No.	Course name	Total credits	Weekly hours		Prerequisite/ Co-requisite
			Lecture	Lab					Lecture	Lab	
PHAR 515	Drug Literature Evaluation (for PharmD students)	2	2	-	PHAR 366	PHAR 542	Therapeutics- Pediatrics Health (for PharmD students)	2	2	-	PHAR 541
PHAR 517	Drug Literature Evaluation Practical (for PharmD students)	1	-	2	PHAR 515 (or Co)	PHAR 544	Therapeutics- Woman and Man Health (for PharmD students)	2	2	-	PHAR 542 (or Co)
PHAR 541	Therapeutics- Endocrine and Renal Systems (for PharmD students)	2	2	-	PHAR 441 PHAR 344	PHAR 548	Therapeutics- Comprehensive (for PharmD students)	2	2	-	PHAR 542 (or Co)
PHAR 543	Therapeutics- Infectious Diseases (for PharmD students)	2	2	-	PHAR 541 (or Co)	PHAR 546	Clinical cases 4 (for PharmD students)	1	-	2	PHAR 544
PHAR 545	Clinical Cases 3 (for PharmD students)	1	-	2	PHAR 543 (or Co)	PHAR 564	Early Practice Experience (for PharmD students)	2	2	-	PHAR 5426(or Co)
PHAR 551	Pharmaceutics 4	1	1	-	PHAR 541	PHAR 568	Clinical Seminar (for PharmD students)	1	1	-	PHAR 517
PHAR 553	Clinical Pharmacokinetics	3	3	-	PHAR 456	PHAR 562	Clinical Nutrition	2	2	-	PHAR 361
PHAR 557	Pharmacy practice Lab 4	1	-	3	PHAR 551 (or Co)		Faculty Elective	3	3	-	
PHAR 561	Pharmacy Ethics & Law	2	2	-	PHAR 468		Faculty Elective	3	3	-	
Total		15	15	7		Total		18	17	2	

Summer semester				
Course No.	Course name	Credit hours	No. of weeks	Pre-requisite
PHAR640	Clinical Training: Internal Medicine 1 (for PharmD students)	4	4	The successful completion of all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.
PHAR641	Clinical Training: Hospital Pharmacy(for PharmD students)	4	4	
Total		8	8	

SIXTH YEAR									
First semester					Second semester				
Course No.	Course name	Total credits	Weeks	Prerequisite	Course No.	Course name	Total credits	Weeks	Prerequisite
PHAR 643	Clinical Training: Internal Medicine 2 (for PharmD students)	4	4	The successful completion of all courses: theoretical (both obligatory and elective), and practical as stated in the curriculum	PHAR 642	Clinical Training: Ambulatory Care (for PharmD students)	4	4	The successful completion of all courses: theoretical (both obligatory and elective), and practical as stated in the curriculum.
PHAR 645	Clinical Training: Critical Care (for PharmD students)	4	4		PHAR 644	Clinical Training: Pediatrics (for PharmD students)	4	4	
PHAR 647	Clinical Training: Cardiology (for PharmD students)	4	4		PHAR 646	Clinical Training: Oncology (for PharmD students)	4	4	
	Clinical Training: Elective 1 (for PharmD students)	4	4			Clinical Training: Elective 2 (for PharmD students)	4	4	
Total		16	16		Total		16	16	

Course Description

PHAR222: Pharmaceutical Organic Chemistry (3 credit hours)

Review of organic functional groups with emphasis on the physicochemical properties of biological importance such as carboxylic acid and its derivatives, amines, sulfuric acids and sulfonic acids, sulfonamides, carbonates and urea's. Chemistry of aliphatic and aromatic heterocycles with emphasis on five and six membered ring and fused rings heterocycles. Stereochemistry of organic compounds; chirality, enantiomers and diastereomers, conformational and geometrical isomerism, and the stereoselectivity in nature.

Prerequisite: CHEM217

PHAR225: Pharmaceutical Analytical Chemistry (3 credit hours)

Conventional analytical methods including quantitative and qualitative analysis, stoichiometric calculations, concepts of chemical equilibrium, titrimetric methods including: acid-base titration, compleximetric titration, precipitation reactions and titrations, concerning on the methods used in pharmaceutical products analysis. In addition, this course gives information about the pharmacopeias and the methods used in these pharmacopeias for the analysis of pharmaceutical preparations.

Prerequisite: CHEM 103

PHAR321: Medicinal Chemistry I (3 credit hours)

Medicinal chemistry of drugs with special emphasis on the pharmacokinetic, pharmacodynamic. Effect of the chemical structure on drugs' interaction with different body receptors is demonstrated. Metabolism of drugs and factors affecting it, medicinal chemistry of drugs acting on the central nervous system (CNS), the autonomic nervous system (ANS), and medicinal chemistry of opioids.

Prerequisite: PHAR222

PHAR322: Medicinal Chemistry 2 (3 credit hours)

Cardiovascular system, and drugs used for management of diabetes, non-steroidal anti-inflammatory drugs, steroidal hormones, and other steroid derivatives, anti-hyperlipidemic drugs, anti-histamines, local anesthetics and drugs used for peptic ulcer disease.

Prerequisite: PHAR321

PHAR323: Pharmaceutical Instrumental Analysis (3 credit hours)

Spectral methods of analysis including: Ultra violet/ visible radiation(UV/Visible), Infra-Red (IR), Nuclear Magnetic Resonance (NMR), and Mass Spectroscopy (MS). Types of instrumental analyses such as chromatographic separation techniques such as High performance liquid chromatography and gas chromatography and their applications in the quality control of pharmaceutical preparations.

Prerequisite: PHAR225

PHAR329: Pharmaceutical Analytical Chemistry and Instrumental Analysis lab (1 credit hour, 2 practical hours)

Different methods of conventional and Instrumental analysis are used for quantitative and qualitative analysis, and quality control of some pharmaceutical preparations. These methods including: titrimetric analysis such as acid-base titration, compleximetric titration, precipitation reactions and titrations, ultraviolet/visible radiation (UV/Vis.), Infra red (IR), Nuclear Magnetic Resonance (NMR), and Spectroscopy (MS), chromatographic methods such as High performance liquid chromatography (HPLC) and others.

Pre- or co-requisite: PHAR323

PHAR332: Chemistry of Natural Products (3 credit hours)

Basic information about classes of natural products, secondary metabolites, and their distribution, plants and microorganisms as sources for natural drugs. Methods for discovering natural drugs and the importance of these drugs in pharmaceutical care are also included.

Prerequisite: PHAR222

PHAR341: Pharmacology 1 (3 credit hours)

Basic principles of pharmacology. 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, and non-steroidal anti-inflammatory drugs.

Prerequisite: MED372

PHAR342: Pharmacology 2 (3 credit hours)

Pharmacology of drugs acting on the cardiovascular, renal, respiratory and gastrointestinal systems

Prerequisite: PHAR341

PHAR344: Introduction to Therapeutics (1 credit hour)

Discussion of the basic principles of therapeutics

Prerequisite: PHAR341

PHAR351: Pharmaceutics 1 (3 credit hours)

Integration of the principles of physical pharmacy and traditional and modern pharmaceutical dosage forms. Oral solutions, otic, nasal and ophthalmic preparations, and sterile pharmaceutical dosage forms.

Prerequisite: PHAR222

PHAR353: Pharmacy Practice Laboratory 1 (1 credit hour, 2 practical hours)

The first in the series of pharmacy practice labs that connect the theoretical courses in pharmacy with pharmacy practice. Methods to evaluate vital signs, and medical prescriptions (types and reading). Practical methods for preparing, evaluating and dispensing pharmaceutical solutions with proper patient counseling.

Pre- or co-requisite: PHAR351

PHAR354: Pharmaceutics 2 (3 credit hours)

Integration of the principles of physical pharmacy and traditional and modern pharmaceutical dosage forms. Suspensions, emulsions, aerosols, and dermatological and rectal route preparations.

Prerequisites: PHAR351

PHAR356: Pharmacy Practice Laboratory 2 (1 credit hour, 2 practical hours)

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

Pre- or co-requisite: PHAR354

PHAR361: Clinical Biochemistry (3 credit hours)

Biological and metabolic disturbances related to various disease states. Diagnostic procedures that help in evaluating the efficiency of different body organs.

Prerequisites: MED372

PHAR366: Drug Information Resources (1 credit hour)

Various resources for information about drugs, and methods of searching for drug-related information in a fast and efficient manner.

Pre- or Co- requisite: PHAR341

PHAR402: Community Pharmacy (3 credit hours)

Training for 8 consecutive weeks in a registered community pharmacy inside Jordan. Pharmacy department, drug brand names, Pharmacy management and patient counseling will be covered.

Prerequisite: Students are eligible for this training only after passing 130 credit hours.

PHAR421: Medicinal Chemistry 3 (3 credit hours)

Medicinal chemistry of chemotherapeutic agents including antibacterial, antifungal, antiviral, antiparasitic and anticancer agents.

Prerequisite: PHAR322

PHAR431: Phytotherapy (3 credit hours)

Locally and internationally registered plant medications that are used in therapy of diseases and disorders of different body systems including the nervous, cardiovascular, gastrointestinal, respiratory, renal, endocrine, dermatological and musculoskeletal systems. Medical uses of herbal drugs, method and duration of use, drug interactions, and adverse effects.

Prerequisite: PHAR332

PHAR441: Pharmacology 3 (3 credit hours)

Pharmacology of chemotherapeutic agents including antibacterial, antifungal, antiviral, antiparasitic and anticancer agents. Pharmacology of hormones and drugs acting on the endocrine system.

Prerequisite: PHAR342

PHAR442: Therapeutics- Immunology, Hematology and Oncology (for PharmD students; 3 credit hours)

Pharmacotherapy of immunological and hematological diseases, and cancers in relation to the pathophysiologic conditions of the patient. Concepts of drug action, therapeutic uses, goals of treatment, therapeutic plan, patient counseling, drug monitoring and evaluation of the therapeutic outcomes. 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: PHAR364 and PHAR441

PHAR443: Therapeutics- Neurological and Psychiatric Disorders (for PharmD students; 3 credit hours)

Pharmacotherapy of neurological and psychiatric disorders in relation to the pathophysiologic conditions of the patient. Concepts of drug action, therapeutic uses, goals of treatment, therapeutic plan, patient counseling, drug monitoring and evaluation of the therapeutic outcomes. 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: PHAR344

PHAR444: Therapeutics- Cardiovascular System (for PharmD students; 2 credit hours)

Pharmacotherapy of cardiovascular diseases in relation to the pathophysiologic conditions of the patient. Concepts of drug action, therapeutic uses, goals of treatment, therapeutic plan, patient counseling, drug monitoring and evaluation of the therapeutic outcomes. 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- or co-requisite: PHAR442

PHAR445: Therapeutics- Respiratory and Gastrointestinal Systems (for PharmD students; 2 credit hours)

Pharmacotherapy of respiratory and gastrointestinal diseases in relation to the pathophysiologic conditions of the patient. Concepts of drug action, therapeutic uses, goals of treatment, therapeutic plan, patient counseling, drug monitoring and evaluation of the therapeutic outcomes. 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: PHAR342

Co-requisite: PHAR443

PHAR447: Clinical Cases 1 (for PharmD students; 1 credit hour)

Develop clinical skills necessary to solve problems related to supplying patients with cost-effective and safe treatment. Discussion of clinical cases of patients suffering from psychiatric, neurological, respiratory and gastrointestinal diseases.

Pre- or co-requisite: PHAR445

PHAR448: Clinical Cases 2 (for PharmD students; 1 credit hour)

Developing clinical skills necessary to solve problems related to supplying patients with cost-effective and safe treatment. Discussion of clinical cases of patients suffering from hematological and immune disorders, cancer, diseases of the cardiovascular system, and cases pertaining to women and men health.

Pre- or co-requisite: PHAR444

PHAR451: Pharmaceutics 3 (3 credit hours)

Integration of the principles of physical pharmacy, and traditional and modern pharmaceutical dosage forms. Solid pharmaceutical dosage forms such as tablets, hard and soft gelatin capsules, powders and granules.

Prerequisite: PHAR354

PHAR453: Pharmaceutical Microbiology (3 credit hours)

Mechanisms of action and biological properties of antibiotics and chemical compounds that are used clinically to treat different types of microbial diseases. Development of microorganism's resistance, and methods for preventing or reducing such resistance, methods of sterilization.

Prerequisite: MED372

PHAR454: Pharmacy Practice Laboratory 3 (1 credit hour, 2 practical hours)

The third in the series of pharmacy practice labs that connect the theoretical courses in pharmacy with pharmacy practice. Practical methods for preparing different types of solid pharmaceutical dosage forms, and evaluating and dispensing these dosage forms with the proper patient counseling.

Pre- or co-requisite: PHAR451

PHAR456: Biopharmaceutics and Pharmacokinetics (3 credit hours)

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. Concepts of bioavailability and bioequivalence

Prerequisite: PHAR451

PHAR460: Pharmaceutical Biotechnology (3 credit hours)

Principles and foundations of biotechnology and genetic engineering. Isolation of the gene and inserting it into a gene vector to create recombinant DNA molecules that will facilitate the production of different drugs using biotechnology.

Prerequisite: PHAR453

PHAR461: Immunology and Vaccines (2 credit hours)

Basic principles of immunology and their relation to diseases and therapy. Different types of vaccines, and their mechanisms of action.

Prerequisite: MED372

PHAR464: Pharmaceutical Microbiology and Biotechnology Laboratory (1 credit hour, 2 practical hours)

Methods of culturing, staining and identifying bacteria. Bacterial metabolism. The way bacteria are affected by antibiotics. Essentials of sterilization and quantifying microorganism growth and the methods of producing antibiotics using biotechnological techniques.

Pre- or co-requisite: PHAR460

PHAR468: Pharmaceutical Marketing and Pharmacoeconomics (2 credit hours)

Methods for managing personnel/employees and various processes in pharmaceutical institutions

Pre- or Co- requisite: PHAR341

PHAR504: Selected Topics 1 (1 credit hour)

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 credit hours)**
A selected topic in pharmaceutical sciences will be assigned to students to fulfill certain academic requirements.
Prerequisites: Dean's approval
- PHAR509: History of Pharmacy and Therapy (3 credit hours)**
History and development of pharmacy profession and the contribution of Islamic civilization to the Pharmaceutical sciences.
Prerequisite: PHAR451
- PHAR515: Drug Literature Evaluation (for PharmD students; 2 credit hours)**
Types, components of clinical drug studies including their design, conduction, and related ethical principles. Example studies are discussed to teach students methods of analyzing and evaluating published scientific articles and reports related to drugs and clinical cases.
Prerequisite: PHAR366
- PHAR517: Drug Literature Evaluation Practical (for PharmD students; 1 credit hour)**
Discussion of published scientific articles/reports to develop students skills in evaluating, analyzing scientific literature, to be able to extract useful clinical and drug-related information/conclusions.
Pre- or co- requisite: PHAR515
- PHAR521: Advanced Medicinal Chemistry (3 credit hours)**
New trends in medicinal chemistry. Methods of developing new drugs and their possible metabolism.
Prerequisite: PHAR421
- PHAR522: Drug Design (3 credit hours)**
Essential principles of drug design and synthesis. Studying methods of high-throughput synthesis and computer modeling
Biochemical basis for novel mechanisms of drug action.
Prerequisite: PHAR421
- PHAR523: Nuclear Pharmacy (3 credit hours)**
Essentials of nuclear pharmacy, method of preparing radioactive isotopes in nuclear reactors, methods of preparing radioactive pharmaceutical formulations used in treatment and diagnosis of diseases, quality control methods pertaining to these formulations.
Prerequisite: PHAR421

PHAR524: Radiation Technology (3 credit hours)

Various uses of pharmaceutical radiation technology with special emphasis on the uses of radioactive isotopes in the diagnosis, therapy of some pathological conditions.

Prerequisite: PHAR421

PHAR525: Advanced Chemistry of Natural Products (3 credit hours)

Methods and techniques of isolation, identification and biosynthesis of naturally occurring compounds and their chemical reactions.

Prerequisites: PHAR421

PHAR526: Quality Control (3 credit hours)

Quality control systems for pharmaceutical operations in industry, methods of ensuring quality control of pharmaceutical preparations.

Prerequisite: PHAR451

PHAR527: Toxic Plants (3 credit hours)

Important toxic plants, their existence, the toxic symptoms, antidotes, drugs to treat intoxication.

Prerequisites: PHAR421

PHAR528: Alternative Medicine (3 credit hours)

Methods of alternative treatment and complementary medicine including phytotherapy, Chinese, German and Indian medicine, chiropractics, treatment with bee poison, functional therapy, macrobiotics.

Prerequisites: PHAR431

PHAR541: Therapeutics- Endocrine and Renal Systems (for PharmD students; 2 credit hours)

Pharmacotherapy of endocrine and renal systems diseases in relation to the pathophysiologic conditions of the patient. Concepts of drug action, therapeutic uses, goals of treatment, therapeutic plan, patient counseling, drug monitoring and evaluation of the therapeutic outcomes. 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: PHAR344 and PHAR441

PHAR542: Therapeutics- Pediatric Health (for PharmD students; 2 credit hours)

Pharmacotherapy of pediatric diseases in relation to the pathophysiologic conditions of the patient. Concepts of drug action, therapeutic uses, goals of treatment, therapeutic plan, patient counseling, drug monitoring and evaluation of the therapeutic outcomes. 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- or Co- requisite: PHAR541

PHAR543: Therapeutics- Infectious Diseases (for PharmD students; 2 credit hours)

Pharmacotherapy of infectious diseases in relation to the pathophysiologic conditions of the patient. Concepts of drug action, therapeutic uses, goals of treatment, therapeutic plan, patient counseling, drug monitoring and evaluation of the therapeutic outcomes. 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- or co-requisite: PHAR541

PHAR544: Therapeutics- Woman and Man Health (for PharmD students; 2 credit hours)

Pharmacotherapy of disease states special for woman such as (infertility, post-menopause, pregnancy, delivery, lactation, contraception), and cases special for men such as (prostate diseases, impotence and infertility), in relation to the pathophysiologic conditions of the patient. Concepts of drug action, therapeutic uses, goals of treatment, therapeutic plan, patient counseling, drug monitoring and evaluation of the therapeutic outcomes. 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- or co-requisite: PHAR542

PHAR545: Clinical Cases 3 (for PharmD students; 1 credit hour, 2 practical hours)

Developing clinical skills necessary to solve problems related to supplying patients with cost-effective and safe treatment. Discussion of clinical cases of patients suffering from endocrine, renal system and infectious diseases.

Pre- or co-requisite: PHAR543

PHAR546: Clinical Cases 4 (for PharmD students; 1 credit hour, 2 practical hours)

Developing clinical skills necessary to solve problems related to supplying patients with cost-effective and safe treatment. Discussion of clinical cases in pediatrics, and comprehensive and critical care clinical cases.

Pre- or co-requisite: PHAR544

PHAR548: Therapeutics- Comprehensive (for PharmD students; 2 credit hours)

Pharmacotherapy certain therapeutic situations that include diseases or disorders involving more than one system in the body especially critical care cases. A comprehensive view that takes into consideration the interactions of various diseases in the therapy of a patient.

Pre- or co-requisite: PHAR542

- PHAR551: Pharmaceutics 4 (for PharmD students;1 credit hour)**
Methods for the development and delivery of modern pharmaceutical formulations based on the physico-chemical properties of drugs.
Prerequisite: PHAR451
- PHAR553: Clinical Pharmacokinetics (for PharmD students; 3 credit hours)**
This course covers the applications of drug pharmacokinetics in clinical cases. The course discusses the effect of genetic factors, disease states, and medications on drug pharmacokinetics. Dose adjustment and methods of monitoring drug concentrations in the body are also included. *Prerequisite: PHAR456*
- PHAR554: Advanced Pharmaceutical Technology (3 credit hours)**
Important systems used in the production of different dosage forms such as solutions, semi solid preparations and sterile dosage forms.
Prerequisite: PHAR451
- PHAR556: Advanced Industrial Pharmacy (3 credit hours)**
Design of traditional and non-traditional dosage forms, and the physicochemical principles that alter its stability, different forms of capsule and tablet design. Liquid dosage forms and the industrial systems that are currently applied for the manufacturing of such dosage forms.
Prerequisite: PHAR451
- PHAR557: Pharmacy Practice Laboratory 4 (1credit hour, 2 practical hours)**
This course is the fourth in the series of pharmacy practice labs that connect the theoretical courses in pharmacy with the pharmacy practice. This course covers the practical methods for preparing sterile pharmaceutical preparations such as intravenous solutions. The course also deals with sterilization methods for parenteral preparations within clinical sittings. This course includes evaluating and dispensing these preparations with proper counseling for the patients and other health care team members.
Prerequisite: PHAR551
- PHAR558: Pharmaceutical Regulatory Affairs (3 credit hours)**
Topics on the drug approval process, current Good Manufacturing Practices, Good Clinical Practices, quality system compliance and the corresponding documentation requirements, and FDA inspection processes and enforcement options.
Prerequisite: PHAR451
- PHAR559: Drug Stability(3 credit hours)**
Factors that affect the stability, quality and general safety of pharmaceutical products.
Prerequisite: PHAR451

PHAR561: Ethics and Pharmacy Practice (2 credit hours)

Ethics of pharmacy profession; the principles of pharmacy management, pharmaceutical marketing and methods of Communicating with patients and medical care team. Current laws governing the practice of pharmacy profession and the registration of drugs in Jordan.

Prerequisite: PHAR362

PHAR562: Clinical Nutrition (2 credit hours)

Basic principles of clinical nutrition during both normal and diseased conditions. 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

PHAR564: Early Practice Experience (for pharmD students, 2 credit hours)

Essential clinical pharmacy skills in preparation for their experiential rotations in hospitals and clinics with emphasis on dealing with patients, medical charts, laboratory information, software used in clinical monitoring and institution database systems. An early practice experience (EPE) component that involves a patient workup under the mentorship of preceptors and 6th year pharmacy students on clinical rotations.

Pre- or co-requisite: PHAR546

PHAR568: Clinical Seminar (for PharmD students; 1 credit hour)

This course includes the discussion and evaluation of scientific articles and drug publications.

Prerequisite: PHAR517

PHAR571: Advanced Pharmaceutical Biotechnology (3 credit hours)

Techniques used in pharmaceutical biotechnology such as molecular biology, gene synthesis and genetic technology. Methods for the synthesis, purification, and formulation of proteins in pharmaceutical dosage forms are also discussed.

Prerequisite: PHAR460

PHAR572: Over the Counter Drugs (2 credit hours)

Medications dispensed without prescription and patient care pertaining for common symptoms, related diseases, treatments, and determining cases that should be seen by a physician.

Prerequisite: PHAR547

PHAR573: Advanced Pharmaceutical Microbiology (3 credit hours)

Properties of pathogens (bacteria and fungi) in their single (planktonic) and aggregate (biofilm) forms, effect of antibiotics on both forms, comparison of antibiotic resistance in both cases and determination of best methods for eradication. Properties of toxins and proteins that are produced by various microorganisms leading to enhancement of their virulence and resistance to antibiotics. Methods of separation, analysis and characterization of these products.

Prerequisite: PHAR460

PHAR574: Gene and Protein Therapy (3 credit hours)

Chemical, pharmaceutical and the therapeutic aspects of proteins and genes medications.

Prerequisite: PHAR460

PHAR575: Advanced Chemistry of Natural Products (3 credit hours)

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

Prerequisites: PHAR451

PHAR576: Cosmetic Preparations (3 credit hours)

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

PHAR578: Drug Registration and Approval (3 credit hours)

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

PHAR579: Communications Skill in Pharmacy (3 credit hours)

This course discusses the proper communication skills in the pharmaceutical environment. The course 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

- PHAR580: Pharmaceutical Intellectual Property (3 credit hours)**
Drug product life cycle, types and principles of intellectual property with an emphasis on the application of these principles within the pharmaceutical industry, importance of intellectual property to the PI, research and development (R&D) issues, data exclusivity, patent protection, trademarks, and Trade Related Aspects of Intellectual Property Rights (TRIPs) for pharmaceutical products, recording, ownership and registration of IP, strategies, planning and commercialization of IP.
Prerequisite: PHAR451
- PHAR586: Pharmacoepidemiology (3 credit hours)**
An introduction to pharmacoepidemiology as well as sections on data sources, methodology and applications, and evaluating the safety and effectiveness of medicines.
Prerequisite: PHAR444
- PHAR590: Advanced Pharmacology (3 credit hours)**
Advanced principles of pharmacology, an in-depth assessment of selected groups of drugs with specific emphasis on the sites and mechanisms of drug action and indications, contraindications, adverse effects and drug-drug interactions.
Prerequisite: PHAR441
- PHAR591: Advanced Pharmacy Practice (3 credit hours)**
Advances and new trends in the pharmacy practice, and the mechanisms for their efficient application.
Prerequisite: PHAR444
- PHAR593: Molecular Pharmacology (3 credit hours)**
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
- PHAR594: Clinical Examination (3 credit hours)**
This course covers medical terminologies and procedures used during physical examination and extraction of patient's medical history. *Prerequisite: PHAR444*
- PHAR595: Pharmacogenetics (3 credit hours)**
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

PHAR596: Hospital Pharmacy (3 credit hours)

Development, functions, organization and administration of pharmaceutical services within a hospital. Methods of drug distribution, inventory control and purchasing.

Prerequisite: PHAR 402

PHAR597: Clinical Pharmacology (3 credit hours)

Essential principles of clinical pharmacology, clinical uses, adverse effects, precautions, drug interactions and contraindications for selected groups of drugs.

Prerequisite: PHAR 441

PHAR640: Clinical Training: Internal Medicine 1 (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in an internal medicine department. This includes various activities such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department. The goal is to improve students' practical clinical skills that would enhance the positive contribution of clinical pharmacists in medical care at the hospital.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR641: Clinical Training: Hospital Pharmacy (for PharmD students; 4 credit hours, 4 practical weeks)

Four weeks in the hospital pharmacy departments, which covers inpatient and outpatient pharmacies, inventory, purchase and storage.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR642: Clinical Training: Ambulatory Care (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in outpatient clinics department. This includes various activities such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department. The goal is to improve students' practical clinical skills that would enhance the positive contribution of clinical pharmacists in medical care at the hospital.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR643: Clinical Training: Internal Medicine 2 (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in an internal medicine department. This includes various activities such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department. The goal is to improve students' practical clinical skills that would enhance the positive contribution of clinical pharmacists in medical care at the hospital.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR644: Clinical Training: Pediatrics (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in a pediatrics department. This includes various activities such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department. The goal is to improve students' practical clinical skills that would enhance the positive contribution of clinical pharmacists in medical care at the hospital.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR645: Clinical Training: Critical Care (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in a critical care department. This includes various activities such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department. The goal is to improve students' practical clinical skills that would enhance the positive contribution of clinical pharmacists in medical care at the hospital.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR646: Clinical Training: Oncology (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in an oncology department. This includes various activities such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department. The goal is to improve students' practical clinical skills that would enhance the positive contribution of clinical pharmacists in medical care at the hospital.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR647: Clinical Training: Cardiology (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in a cardiology department. This includes various activities such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department. The goal is to improve students' practical clinical skills that would enhance the positive contribution of clinical pharmacists in medical care at the hospital.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum

PHAR670: Clinical Training: Clinical Nutritional Support (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the areas of clinical nutritional support.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR671: Clinical Training: Geriatrics (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the areas of geriatrics.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR672: Clinical Training: Pharmaceutical Industry (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the areas of pharmaceutical industry.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR673: Clinical Training: Pharmaceutical Academic Education (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the areas of pharmaceutical academic education.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR674: Clinical Training: Pharmacy Management (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the areas of Pharmacy Management.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR675: Clinical Training: Clinical Pharmaceutical Research (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in clinical pharmaceutical research.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR676: Clinical Training: Disease State Management/Care (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of disease state management/care.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR677: Clinical Training: Pharmaceutical Home Care (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of pharmaceutical home care.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR678: Clinical Training: Neurology (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in clinical pharmaceutical care in the area of neurology.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR679: Clinical Training: Nuclear Medicine (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of clinical pharmaceutical care in nuclear medicine.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR680: Clinical Training: Respiratory Diseases (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of clinical pharmaceutical care for respiratory diseases.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR681: Clinical Training: Endocrine Diseases (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of clinical pharmaceutical care for endocrine diseases.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR682: Clinical Training: Pain Management (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of clinical pharmaceutical care for pain management.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR683: Clinical Training: Pharmaceutical Dental Care (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of pharmaceutical dental care.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR690: Clinical Training: Dermatology (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of clinical pharmaceutical care in dermatology.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR691: Clinical Training: Gynecology and Obstetrics (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of clinical pharmaceutical care in gynecology and obstetrics.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR692: Clinical Training: Psychiatry (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of clinical pharmaceutical care in psychiatry.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR693: Clinical Training: Drug Information (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in a drug information center.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR694: Clinical Training: Surgery (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of clinical pharmaceutical care in surgery.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR695: Clinical Training: Renal Diseases (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of clinical pharmaceutical care in renal diseases.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR696: Clinical Training: Infectious Diseases (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of clinical pharmaceutical care in infectious diseases.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR697: Clinical Training: Poisoning Center (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in a poisoning center.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR698: Clinical Training: Gastrointestinal Diseases (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of clinical pharmaceutical care in gastrointestinal diseases.

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.

PHAR699: Clinical Training: Comprehensive Pharmaceutical Care (for PharmD students; 4 credit hours, 4 practical weeks)

Four experiential training weeks in the area of comprehensive pharmaceutical care

Prerequisite: successfully completing all courses: theoretical (both obligatory and elective), and practical (including PHAR402 Community Pharmacy) as stated in the curriculum.