Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY for MEDICALS & APPLIEED SCIENCES

Faculty of Clinical Pharmacy

Doctor of Pharmacy (Pharm.D.) Program Specification Document

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Contents

PROGRAM SPECIFICATION DOCUMENT---------- 3

ANNEX- 1, MATRIX OF MAPPING PROGRAM PILO'S WITH COURSES ----------11

ANNEX- 2, ALIGNMENT OF FACULTY OBJECTIVES WITH PROGRAM INTENDED LEARNING OUTCOMES FOR PHARM.D. PROGRAM:----------18

ANNEX- 3, ANNEX- 3, ALIGNMENT OF PROGRAM INTENDED LEARNING OUTCOMES (PILOS) TO PROGRAM OBJECTIVES ----------19

ANNEX- 4, SURVEY OF SIMILAR ACCREDITED PROGRAMS AT NATIONAL AND INTERNATIONAL UNIVERSITIES (BENCHMARKS) ----------38

ANNEX-5, SURVEY OF PILOS FOR SIMILAR ACCREDITED PROGRAMS AT NATIONAL AND INTERNATIONAL UNIVERSITIES----------40

ANNEX- 6, SURVEY OF NUMBER OF COURSES AND CREDIT HOURS OF SIMILAR PROGRAMS ----------54

ANNEX-7, COMPARISON OF PROGRAM WITH SIMILAR PROGRAMS ----------56

ANNEX-8, COMPARISON OF PROGRAM COURSES AND SIMILAR PROGRAMS COURSES--57

ANNEX- 9, ALIGNMENT OF PROGRAM PILOS WITH NARS STANDARDS----------87

ANNEX- 10, CVS FOR THE PREPARATION COMMITTEE----------91

1. Basic and general Information about the program	
Program Title	Doctor of Pharmacy (Pharm. D.) Program
Awarding Institution	21 September University for Medical & Applied Sciences
Institution responsible for the program	Faculty of Clinical Pharmacy
Program type	Single
Language of Instruction	English
Year of study in the program	Six years.
Mode of delivery	Regular, minimum attendance 75%
Teaching Institution	Faculty of Clinical Pharmacy
System of study	Semester Based System
Duration of study	Complete 209 credit hours (5 Academic Years + One Hospital Rotation)
Final Award/s available	Bachelor's degree
Award title	Bachelor of Doctor of Pharmacy (Pharm. D.) degree
Prerequisite Qualification for admission to the program	Secondary School Certificate (Scientific Section)
Average Grade for Joining the program	As per the admission rules made by Ministry of Higher Education and Scientific Research, Republic of Yemen, and university rules.
Other requirements	N/A
Coordinator	**Dr. Ali Alyahawi**
Last date of accreditation	N/A

2. Program Overview:

This program is unique and excellent Pharmacy program in which the graduate obtains the bachelor of Doctor of Pharmacy degree (Pharm. D.). The graduates are distinguished by their knowledge, theoretical and practical skills, and their abilities to work effectively among the health care team. Pharm D program is a 6- year level courses, including five years of academic study and one year of residency in different types of specialized hospitals. The graduate student from this program should be completed 209 credits hours.

Promising Jobs:

After completion of the program, graduates are qualified to practice as pharmacists in any of the following areas:

- Hospitals
- Community pharmacies
- Pharmaceutical Companies
- Research and Development
- Government's health and environmental agencies
- Pharmacovigilance
- Pharmaceutical Industries
- Academia
- Clinics

3. Vision, Mission & Aims of the University:

University Vision:

A Contemporary University with a Sense of National Responsibility and Faith Identity

University Mission:

Leadership of transformation/upturning headway in managing and providing the health care with all partners via having the distinction standard in education and applied and medical researches that meet the needs of Yemeni people and regional influence

University Strategic Objectives:

1- Ensuring the application of quality standards and having the distinction standards in medical and applied sciences, scientific research and community service.

2- Adopting student-centered learning, the partnership with them for life, consolidating the principles of national responsibility and faith identity, looking after them and developing their capabilities after graduation and during work.

3- Attracting and Employing scientists, cadres and talents to gain minds and put an end for the "brain drain" in a way that promotes and ensures the availability of thinkers, businessmen and good citizens.

4- Developing the distinguished academic infrastructure continuously and establishing modern research and service centers with high efficiency that can give a real effect locally and regionally.

5- Enhancing the university status as a preferred partner for local, regional and international partnership through implementing creative styles of education, exchanging researches and knowledge, and providing real and effective outcomes for developing professional practices to benefit from them locally and regionally.

4. Vision, Mission & Aims of the Faculty of Clinical Pharmacy:

Faculty Vision:

A contemporary college of clinical pharmacy, capable of competitiveness Locally and Regionally.

Faculty Mission:

Preparing distinguished pharmacists scientifically and practically qualified through modern academic programs and achieve excellence in pharmacy education, pharmaceutical research, and community service to meet the requirements of Yemeni society in a professional context.

Faculty Objectives:

1-	Produce graduates capable of provision of high-quality pharmacy care services.
2-	Graduate pharmacists with all scientific knowledge and skills needed to make therapeutic decisions and evaluate drug information based on evidence-based principles.
3-	Qualifying pharmacist capable of manufacturing and analyzing all forms of pharmaceutical preparations with their various sources in accordance with GLP and GMP standards.
4-	Graduate pharmacists with all basic information to manage human and material resources effectively and communicate ethically with health care workers based on scientific principles.
5-	Graduate pharmacists with basic skills of the scientific research and the use of medication in the health care system.
6-	Effective contribution to community service and meeting the requirements of the labor market.

5. Program Standards& Benchmarks.

A. Academic Standards:

1. National Academic Reference Standards for Undergraduate Pharmacy Education Program (Doctor of Pharmacy/ PharmD), April 2022 (First Edition)
2. Criteria for Accrediting in Yemen council of academic accreditation .

B. Government Rules and Regulations:

1. Act No. 13/2005 of the Law of private universities, higher institutes and colleges, Yemen.
2. The executive regulations of Act No. 13/2005 of the Law of private universities, higher institutes and colleges, Yemen.

C. Similar Programs:

1- Hadramout University, Faculty of Medicine and Health Science, Department of Clinical Pharmacy, Program, Doctor of Pharmacy. https://hu.edu.ye/medfac/en/pharmacy/

2- University of Science and Technology, Faculty of Pharmacy, Department of Clinical Pharmacy, Doctor of Pharmacy Program, Yemen. HTTPS://UST.EDU/USTY/AR/COMPONENT/K2/ITEM/1895-2016-05-04-13-13-51

3- Jordan University of Science & Technology (JUST), Faculty of Pharmacy, Department of Clinical Pharmacy, Doctor of Pharmacy Program. https://www.just.edu.jo/FacultiesandDepartments/FacultyofPharmacy/Pages/viewplan.aspx?planno=456

4- Al King Faisal University, Faculty of Pharmacy, Doctor of Pharmacy Program. https://www.kfu.edu.sa/en/Colleges/clinical_pharmacy/Pages/Program.aspx

5- Eastern Mediterranean University, Faculty of Pharmacy, Pharm.D. Program, Cyprus https://pharmacy.emu.edu.tr/en/programs/pharmacy-(pharm-d-)

6- Long Island University, The Arnold & Marie Schwartz College of Pharmacy and Health Sciences, Doctor of Pharmacy (Pharm.D.), USA **https://liu.edu/pharmacy**

6. Mission & Aims of the Program.

Program Mission:

To prepare competent pharmacists to serve as medication experts and capable of providing high quality pharmaceutical care services through achieving excellence and innovation in pharmacy education, pharmaceutical research, and community service to meet the requirements of the health and quality of care locally and globally.

Aims of the Program:

1. Graduate distinguished pharmacists with professional essential skills such as teamwork, leadership, creative thinking, and work ethics.
2. Providing students with basic and professional knowledge leading to the Pharm D degree
3. Provide students with professional abilities to provide patient-centered care through the provision of safe and effective medicines
4. Provision of continued pharmaceutical education and participation in the field of scientific publications
5. Participate in process of improving professional qualification and competency locally, regionally, and internationally.

7. Graduate Attributes of the program

Upon successful completion of an undergraduate Doctor of Pharmacy (Pharm. D.) program, the graduates will be able to:

1. Develop, integrate, and apply knowledge from the foundational and clinical sciences related to pharmacy education and practice.
2. Provide a patient-centered care as the medication expert.
3. Identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution through evaluating medical literature, conducting pharmaceutical research in pharmacy settings, and updating information.

4. Work ethically and legally as part of a team with leadership and communication skills.
5. Express self-awareness for continuous professional improvement.

8. Program Intended Learning Outcomes (PILOs)

❖ PILOs of Knowledge and Understanding Skills:

Upon successful completion of an undergraduate Doctor of Pharmacy degree (Pharm. D.) program, the graduates will be able to:
A1. Define the fundamentals of scientific knowledge and principles of biomedical, pharmaceuticals, social, behavioral, administrative, therapeutics, and other basic sciences related to the pharmacy profession.
A2. Illustrate the physicochemical and pharmacokinetic properties of medicines and their influence on compounding, evaluation, analysis, route of administration, and dosage regimen.
A3. Identify broad knowledge about the mechanism of action, effectiveness, use, safety, side effects, and interactions of therapeutic agents as well as the complementary therapies.
A4. Recognize the advanced concepts of professional (ethics, policies, laws, regulations requirements, management, pharmacovigilance, Pharmacoepidemiology, pharmacoeconomic, pharmacoinformatic, research studies, sources of information…. etc) to optimize the therapeutic outcomes.
A5. Describe the role of pharmacists in patient care; dispensing, designing, implementing, monitoring, evaluating, and adjustment of medication therapy plans that are patient-specific and evidence-based to achieve maximum clinical effectiveness.

❖ PILOs of Intellectual Skills:

Upon successful completion of an undergraduate Doctor of Pharmacy degree (Pharm. D.) program, the graduates will be able to:
B1. Integrate the physicochemical properties of medicines to compounding, preparation, and analysis of parenteral nutrition, I.V admixtures, and small-batch preparation.
B2. Predict the drug properties including the bio-pharmaceutics, pharmacokinetics, pharmacodynamics and their applications.

B3. Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, pharmacoepidemiology, and pharmacoeconomic factors to enhance the healthcare systems.
B4. Formulate an appropriate pharmacotherapy care plan and monitoring strategies to solve practice problems and improve patient safety and efficacy through utilization of pharmacodynamic, pharmacokinetic parameters of medicines as well as diseases pathophysiology and research outcomes.
B5. Compare various therapeutic options using scientific research and evidence-based practice to optimize efficacy, safety, and cost for each drug-related problem.

❖ PILOs of Professional Skills and Practices:

Upon successful completion of an undergraduate Doctor of Pharmacy degree (Pharm. D.) program, the graduates will be able to:

C 1. Deal safely and effectively with biotechnological, radio-pharmaceuticals, and synthetic/natural pharmaceutical materials/products used in pharmaceutical preparations.
C 2. Compound/prepare extemporaneous, cytotoxic, I.V admixture, parenteral nutrition, and small-batch pharmaceutical preparation taking into account the physicochemical properties of drug structures.
C 3. Contribute to creating/improving national drug policies, laws, and regulations related to the health care systems.
C 4. Implement patient-oriented pharmaceutical care legally and ethically in a variety of patient care settings in collaboration with patients and other health care professionals according to professional standards, appropriate therapeutic guidelines, and research outcomes.
C 5. Contribute to pharmaceutical research studies and clinical trials needed to enhance professional decisions to optimize medicine use in specific medical conditions

❖ PILOs of General and Transferable Skills:

Upon successful completion of an undergraduate Doctor of Pharmacy degree (Pharm. D.) program, the graduates will be able to:

D 1. Display ethically and legally leadership, time management, critical thinking, problem-solving, communication, tame-work, independence, creativity, innovation, entrepreneurial, delegation, and organizational skills
D 2. Develop life-long learning, in particular an awareness of the need for continuing education, research, scholarship, and professionalism in the field of pharmaceutical practice.

D 3. Use digital pharmacy health improvement and educational technologies efficiently.

9. Annex- 1, Matrix of Mapping Program PILO's with Courses

Year	Term	Course Name	Course Code	CH	Program Intended Learning Outcomes (PILOs)															
					A. Knowledge and understanding					B. Intellectual Skills					C. Practical & Professional Skills					D. Transferrable Skills		
					A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3
1	1	Islamic Culture	06.11.205	2																		
		English Language 1	06.11.203	2	☑																	
		Arabic language 1	06.11.201	2																		
		Human Biology	03.01.209	3	☑					☑												
		Fundamentals of Nursing	04.01.217	1																		
		Fundamentals of Health Management	05.02.224	2																		
		General Chemistry	02.04.243	3	☑					☑												
		Medical Physics	06.11.208	3	☑		☑			☑												
		National culture	06.11.206	2																		

This template of program specifications was prepared by CAQA, Yemen, 2018.

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		English Language II	06.11.204	2	☑																
		Medical Terminology	04.01.218	2	☑		☑														☑
		Human Anatomy	01.01.201	3	☑					☑											
	2	Histology	01.01.202	3	☑					☑											
		Computer Skills	05.03.221	3	☑																
		Arabic Language 2	06.11.202	2	☑																
		The Arab Israeli Conflict	06.11.207	2	☑																
		Communication skills	05.01.220	2		☑														☑	☑	
		Introduction to Pharmacy	02.01.275	1		☑															☑
2	1	Human Physiology-I	01.01.203	2	☑					☑											
		Physical Pharmacy	02.02.227	3	☑					☑											
		Pharmaceutical Organic Chemistry-I	02.04.244	3		☑		☑			☑					☑					☑
		Biochemistry-I	03.01.207	2	☑					☑					☑						☑
		Pharmaceutical Analytical Chemistry	02.04.246	3				☑				☑				☑				☑	☑
		Pharmacognosy-I	02.04.249	3					☑				☑	☑				☑	☑		☑ ☑

		Pharmaceutical Calculations	02.02.228					☑				☑	☑				☑	☑			☑
		Medical statistics	05.02.222	2				☑				☑	☑							☑	☑
	2	Human Physiology II	01.01.206	2	☑				☑												
		Pharmaceutics-I	02.02.229	3			☑		☑			☑	☑			☑				☑	
		Pharmaceutical Organic Chemistry-II	02.04.245	3	☑		☑			☑					☑						☑
		Biochemistry-II	03.01.213	2	☑					☑					☑						☑
		Pharmacognosy-II	02.04.252	3					☑				☑	☑				☑	☑		☑	☑
		Pharmacology-I	02.03.236	2	☑				☑		☑		☑	☑				☑	☑			☑
3	1	Basic Microbiology	03.02.210	3	☑					☑					☑					☑		☑
		Phytochemistry	02.04.253	3					☑				☑	☑				☑	☑		☑	☑
		Medicinal Chemistry-I	02.04.248	3			☑				☑				☑	☑				☑	☑	☑
		Pharmaceutics-II	02.02.231	3			☑		☑			☑	☑			☑					☑	
		Pharmacology-II	02.03.237	3	☑				☑		☑		☑	☑				☑	☑			☑
		Public Health	01.02.204	2	☑					☑							☑	☑				☑
		Pharmacology-III	02.03.238	3	☑				☑		☑		☑	☑				☑	☑			☑

		Pharmaceutics-III	02.02.234				☑				☑						☑					☑
		Medicinal Chemistry-II	02.04.250	3			☑				☑				☑	☑				☑	☑	☑
	2	Immunology	03.02.211	2	☑					☑					☑					☑		☑
		Parasitology	03.04.212	3	☑				☑				☑	☑				☑	☑	☑		
		General Pathology	01.01.205	3	☑					☑												☑
		Pharmacology-IV	02.03.239	2	☑				☑		☑		☑	☑				☑	☑			☑
		Pharmacy Management	05.01.219	1					☑				☑	☑				☑	☑	☑	☑	☑
		Clinical Biochemistry-I	03.01.215	2	☑						☑				☑			☑	☑			☑
		Pharmacotherapy-I	02.01.212	2	☑				☑				☑	☑			☑	☑		☑	☑	☑
		Case Studies in Pharmacotherapy-I: "case-based seminars"	02.01.265	1	☑				☑				☑	☑			☑	☑		☑	☑	☑
	1	Pharmaceutical Care- I	02.01.217	1	☑				☑		☑		☑	☑				☑	☑	☑	☑	☑
4		Pharmacogenomics	02.01.270	2	☑				☑			☑	☑				☑	☑		☑		☑
		Medicinal Chemistry-III	02.04.274	3			☑				☑				☑	☑				☑	☑	☑
		Research Methodology	05.02.223	2					☑				☑	☑				☑	☑	☑	☑	☑
		Biopharmaceutics & Pharmacokinetics	02.01.214	2					☑				☑	☑				☑	☑			☑

		Clinical Pharmacokinetics	02.01.223					☑					☑	☑				☑	☑			☑
		Clinical Nutrition	02.01.211	2	☑				☑			☑	☑					☑		☑		☑
		Clinical Biochemistry 2	03.01.216	2	☑						☑				☑			☑	☑			☑
		Community Pharmacy	02.01.216	2	☑			☑			☑									☑	☑	
		Pharmacotherapy-II	02.01.215	2	☑				☑				☑	☑			☑	☑		☑	☑	☑
	2	Case Studies in Pharmacotherapy-II: "case-based seminars"	02.01.266	1	☑				☑				☑	☑			☑	☑		☑	☑	☑
		Pharmaceutical Care-II	02.01.271	1	☑				☑		☑		☑	☑				☑	☑	☑	☑	☑
		Community Pharmacy Clerkship*	02.01.274	3	☑				☑		☑		☑	☑				☑	☑	☑	☑	☑
		Pharmaceutical Instrumental Analysis	02.04.251	3				☑				☑	☑	☑		☑	☑	☑	☑	☑		☑
5		Pharmacotherapy-III	02.01.218	2	☑				☑				☑	☑			☑	☑		☑	☑	☑
		Case Studies in Pharmacotherapy-III: "case-based seminars"	02.01.267	1	☑				☑				☑	☑			☑	☑		☑	☑	☑
		Pharmacoeconomics and Health Outcomes	02.02.233	2					☑				☑	☑				☑	☑		☑	☑
		Drug Information and Evidence-Based Practice	02.02.232	1					☑				☑	☑				☑	☑			☑
	1	Clinical Toxicology	02.03.242	3	☑		☑					☑		☑	☑				☑	☑		☑
		Pharmaceutical Biotechnology	02.03.241	2	☑							☑				☑	☑				☑	

		Pharmaceutical Quality Assurance & Drug Promotion	02.02.235						☑				☑	☑				☑	☑	☑	☑	☑
		Hospital Pharmacy	02.01.213	2	☑			☑	☑			☑	☑	☑			☑	☑	☑	☑		☑
	2	Pharmacotherapy-IV	02.01.220	2	☑				☑				☑	☑			☑	☑		☑	☑	☑
		Case Studies in Pharmacotherapy-IV: "Case-based seminars"	02.01.268	1	☑				☑				☑	☑			☑	☑		☑	☑	☑
		Pharmacotherapy-V	02.01.222	2	☑				☑				☑	☑			☑	☑		☑	☑	☑
		Case Studies in Pharmacotherapy-V: "case-based seminars"	02.01.269	1	☑				☑				☑	☑			☑	☑		☑	☑	☑
		Medication Safety and Health Information Technology	02.04.276	2					☑			☑	☑	☑	☑			☑	☑		☑	☑
		Ethics and Pharmacy regulations	05.02.224	2		☑			☑				☑	☑				☑	☑	☑	☑	
		Complementary and alternative medicine	02.01.273	2					☑													☑
		Practical-based Research Project	02.01.226	1					☑				☑	☑				☑	☑			
6		Hospital Training Internal Medicine-I	02.05.252	7	☑		☑	☑	☑		☑	☑	☑	☑			☑	☑	☑	☑	☑	☑
		Hospital Training Ambulatory Care	02.05.253	3	☑		☑	☑	☑		☑	☑	☑	☑			☑	☑	☑	☑	☑	☑
	1	Hospital Training: Paediatric	02.05.254	3	☑		☑	☑	☑		☑	☑	☑	☑			☑	☑	☑	☑	☑	☑
		Hospital Training Hospital Pharmacy	02.05.255	2	☑		☑	☑	☑		☑	☑	☑	☑			☑	☑	☑	☑	☑	☑

		Hospital Training Oncology care	02.05.256		☑		☑	☑	☑		☑	☑	☑	☑			☑	☑	☑	☑	☑	☑
	2	Hospital Training Hospital Training Internal Medicine-II	02.05.257	7	☑		☑	☑	☑		☑	☑	☑	☑			☑	☑	☑	☑	☑	☑
		Hospital Training Intensive Care Unit	02.05.258	2	☑		☑	☑	☑		☑	☑	☑	☑			☑	☑	☑	☑	☑	☑
		Hospital Training Surgery	02.05.259	3	☑		☑	☑	☑		☑	☑	☑	☑			☑	☑	☑	☑	☑	☑
		Hospital Training Gynecology & Obstetrics	02.05.260	3	☑		☑	☑	☑		☑	☑	☑	☑			☑	☑	☑	☑	☑	☑
		Hospital Training Psychiatric	02.05.261	2	☑		☑	☑	☑		☑	☑	☑	☑			☑	☑	☑	☑	☑	☑

10. Annex- 2, Alignment of Faculty Objectives with Program Intended Learning Outcomes for Pharm.D. Program:

Program PILOs	Faculty Objectives					
	FObj1	FObj2	FObj3	FObj4	FObj5	FObj6
A1	√	√		√		
A2	√	√	√			
A3	√	√				
A4	√			√		
A5	√	√		√		
B1	√		√			
B2	√	√	√			
B3	√			√	√	√
B4	√	√			√	
B5	√	√			√	√
C1	√		√	√		
C2	√		√	√		√
C3	√	√		√		√
C4	√	√			√	
C5	√	√		√	√	√
D1	√	√		√	√	√
D2	√	√			√	
D3	√	√		√	√	√

11. Annex- 3, Alignment of Program Intended Learning Outcomes (PILOS) to Program Objectives (POs)

#	Program Objectives	Program Intended Learning Outcomes (PILOs)																
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3
1.	Graduate distinguished pharmacists with professional essential skills such as teamwork, leadership, creative thinking, and work ethics.	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
2.	Providing students with basic and professional knowledge leading to the clinical pharmacy degree		√	√	√	√	√	√	√	√	√	√				√	√	√	√
3.	Provide students with professional abilities to provide patient-centered care through the provision of safe and effective medicines	√	√			√		√	√		√	√				√	√	√	
4.	Provision of continued pharmaceutical education and participation in the field of						√		√							√	√	√	√

	scientific publications																		
5.	Participate in the process of improving professional qualification and competency locally, regionally, and internationally.	√				√				√	√			√	√	√	√	√	√

12. Themes of Courses of Study and their Weightage

No.	Themes	Compulsory Courses		Elective Courses		Percentage of Cr. Hrs.
		No. of Courses	Cr. Hrs.	No. of Courses	Cr. Hrs.	
1	Univ. Requirements	8	17	-	-	7.2 %
2	Faculty Requirements	8	19			7.7 %
3	Department Requirements	43	103+3CH Community Pharmacy Training	-	-	45.4 %
4	Program Requirements	30	31+ 35 CH Clinical Training	-	-	39.6 %
Field Training included in Department & Program Courses (Community Pharmacy & Clinical Clerkship)		11	38	-	-	22.7 %
Total Program Cr. Hrs.		85	209	-	-	100%

Study Plan for the Bachelor of Clinical Pharmacy (209 CH)

A. University Requirements (17 Credit hours)							
No.	Course Code	Course Name	Theoretical	Seminar	Practical	Training	CH
1	06.11.205	Islamic Culture	2				2
2	06.11.203	English Language 1	2				2
3	06.11.201	Arabic language 1	2				2
4	06.11.206	National culture	2				2
5	06.11.204	English Language II	2				2
6	06.11.202	Arabic Language 2	2				2
7	06.11.207	The Arab Israeli Conflict	2				2
8	05.03.221	Computer Skills	2		2		3
	Total		16		2		17
Total of Credit Hours			17				

B. Faculty Requirements (19 Credit hours)							
No.	Course Code	Course Name	Theoretical	Seminar	Practical	Training	Total
1	03.01.209	Human biology	2		2		3
2	02.04.243	General Chemistry	2		2		3
3	06.11.208	Medical physics	2		2		3
4	04.01.218	Medical terminology	2				2
5	05.02.222	Medical Statistics	2				2
6	05.02.223	Research Methodology	2				2
7	05.02.224	Fundamentals of Health Management	2				2
8	05.01.220	Communication skills	2				2
	Total		16		6		19
Total of Credit Hours			19				

C. Requirements for Faculty Departments (106 Credit hours)							
No.	Course Code	Course Name	Theoretical	Seminar	Practical	Training	Total
1.	01.01.201	Human Anatomy	2		2		3
2.	01.01.202	Histology	2		2		3
3.	02.01.275	Introduction to Pharmacy	1				1
4.	04.01.217	Fundamentals of Nursing			2		1
5.	02.02.228	Pharmaceutical Calculations	1				1
6.	01.01.203	Human Physiology-I	2				2
7.	02.02.227	Physical Pharmacy	2		2		3
8.	01.02.204	Public Health	2				2
9.	02.04.244	Pharmaceutical Organic Chemistry-I	2		2		3
10.	03.01.207	Biochemistry-I	2				2
11.	02.04.246	Pharmaceutical Analytical Chemistry	2		2		3
12.	02.04.249	Pharmacognosy-I	2		2		3
13.	01.01.206	Human Physiology-II	2				2
14.	02.02.229	Pharmaceutics-I	2		2		3
15.	02.04.245	Pharmaceutical Organic Chemistry-II	2		2		3
16.	03.01.213	Biochemistry-II	2		2		3
17.	02.04.263	Pharmacognosy-II	2		2		3
18.	02.04.251	Pharmaceutical Instrumental Analysis	2		2		3
19.	02.03.236	Pharmacology-I	2				2
20.	03.02.210	Basic Microbiology	2		2		3
21.	02.04.248	Phytochemistry	2		2		3
22.	02.02.231	Medicinal Chemistry-I	2		2		3
23.	02.03.237	Pharmaceutics-II	2		2		3
24.	02.03.238	Pharmacology-II	2		2		3
25.	02.02.234	Pharmacology-III	2		2		3
26.	02.04.250	Pharmaceutics-III	2		2		3
27.	03.02.211	Medicinal Chemistry-II	2		2		3
28.	03.04.212	Immunology	2				2
29.	01.01.205	Parasitology	2		2		3
30.	02.03.239	General Pathology	2		2		3
31.	02.04.248	Pharmacology-IV	2				2
32.	05.01.219	Pharmacy Management	1				1
33.	02.04.274	Medicinal Chemistry-III	3				3

34.	02.01.214	Biopharmaceutics & Pharmacokinetics	2				2
35.	02.02.233	Pharmacoeconomics & Health Outcomes	2				2
36.	02.04.275	Complementary & Alternative Medicine	2				2
37.	02.01.213	Hospital Pharmacy	2				2
38.	02.01.216	Community Pharmacy	2				2
39.	02.03.242	Clinical Toxicology	2		2		3
40.	02.03.241	Pharmaceutical Biotechnology	2				2
41.	02.02.235	Pharmaceutical Marketing & Drug promotion	2				2
42.	05.02.224	Ethics and Pharmacy regulations	2				2
43.	02.01.273	Community Pharmacy Clerkship*				3	3
		Total	**80**		**46**	**3**	**106**
		Total of Credit Hours	**106**				

D. Pharm. D. Program Requirements (31 Credit hours)

No.	Course Code	Course Name	Theoretical	Seminar	Practical	Training	Total
1.	02.02.232	Drug Information & Evidence-Based Practice	1				1
2.	03.01.215	Clinical Biochemistry-I	2				2
3.	02.01.212	Pharmacotherapy-I	2				2
4.	02.01.265	Case Studies in Pharmacotherapy-I: "Case-based seminars"		2			1
5.	02.01.217	Pharmaceutical Care-I		2			1
6.	02.01.270	Pharmacogenomics	2				2
7.	02.01.223	Clinical Pharmacokinetics	2				2
8.	02.01.211	Clinical Nutrition	2				2
9.		Clinical Biochemistry-II	2				2
10.	02.01.215	Pharmacotherapy-II	2				2
11.	02.01.266	Case Studies in Pharmacotherapy II: "case-based seminars"		2			1
12.	02.01.271	Pharmaceutical care-II		2			1
13.	02.01.218	Pharmacotherapy-III	2				2

14.	02.01.267	Case Studies in Pharmacotherapy III: "Case-based seminars"		2			1
15.	02.01.220	Pharmacotherapy-IV	2				2
16.	02.01.268	Case Studies in Pharmacotherapy-IV: "Case-based seminars"		2			1
17.	02.01.222	Pharmacotherapy-V	2				2
18.	02.01.269	Case Studies in Pharmacotherapy-V: "Case-based seminars"		2			1
19.	02.04.276	Medication Safety and Health Information Technology	2				2
20.	02.01.226	Practical-based Research Project	1				
	Total		**23**	**14**			**31**
Total credit hours			**31**				

E. **Pharm. D. Program Training Courses Requirements (35 Credit hours)**							
No.	Course Code	Course Name	Theoretical	Seminar	Weekly practical hours	Total practical hours	Practical (credit hours)
1.	02.05.252	**Hospital Training,** Internal Medicine-I			36	252	7
2.	02.05.253	**Hospital Training,** Ambulatory care			36	108	3
3.	02.05.254	**Hospital Training,** Pediatric			36	108	3
4.	02.05.255	**Hospital Training,** Hospital Pharmacy			36	72	2
5.	02.05.256	**Hospital Training,** Oncology care			36	108	3
6.	02.05.257	**Hospital Training,** Internal Medicine-II			36	252	7
7.	02.05.258	**Hospital Training,** Intensive Care Unit			36	72	2
8.	02.05.259	**Hospital Training,** Surgery			36	108	3
9.	02.05.260	**Hospital Training,** Gynecology & Obstetrics			36	108	3

10.	02.05.261	**Hospital Training.** Psychiatric			36	72	**2**
Total credit hours			**35**				

F. Distribution of Courses according to Semesters

#	Course Code	**Level 1 / Semester 1** Course Name	**Credit Hours** Theoretical	Seminar	Practical	Training	Total Credit Hours
1	06.11.205	Islamic Culture	2				**2**
2	06.11.203	English Language I	2				**2**
3	06.11.201	Arabic language 1	2				**2**
4	03.01.209	Human Biology	2		2		**3**
5	04.01.217	Fundamentals of Nursing			2		**1**
6	05.02.224	Fundamentals of Health Management	2				**2**
7	02.04.243	General Chemistry	2		2		**3**
8	06.11.208	Medical Physics	2		2		**3**
9	06.11.206	National culture	2				**2**
Total			16		8		**20**
Total of Credit Hours			**20**				

#	Course Code	**Level 1 / Semester 2** Course Name	**Credit Hours** Theoretical	Seminar	Practical	Training	Total
1	06.11.204	English Language II	2				**2**
2	04.01.218	Medical Terminology	2				**2**
3	01.01.201	Human Anatomy	2		2		**3**
4	01.01.202	Histology	2		2		**3**
5	05.03.221	Computer Skills	2		2		**3**
6	06.11.202	Arabic Language 2	2				**2**
7	06.11.207	The Arab Israeli Conflict	2				**2**
8	05.01.220	Communication skills	2				**2**
9	02.01.275	Introduction to Pharmacy	1				**1**
Total			17		6		**20**
Total of Credit Hours			**20**				

#	Course Code	**Level 2 / Semester 1** Course Name	**Credit Hours** Theoretical	Seminar	Practical	Training	Total
1	01.01.203	Human Physiology-I	2				**2**
2	02.02.227	Physical Pharmacy	2		2		**3**

3	02.04.244	Pharmaceutical Organic Chemistry-I	2		2		3
4	03.01.207	Biochemistry-I	2				2
5	02.04.246	Pharmaceutical Analytical Chemistry	2		2		3
6	02.04.249	Pharmacognosy-I	2		2		3
7	02.02.228	Pharmaceutical Calculations	1				1
8	05.02.222	Medical statistics	2				2
Total			15		8		19
Total of Credit Hours			**19**				

#	Course Code	Level 2 / Semester 2 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1	01.01.206	Human Physiology II	2				2
2	02.02.229	Pharmaceutics-I	2		2		3
3	02.04.245	Pharmaceutical Organic Chemistry-II	2		2		3
4	03.01.213	Biochemistry-II	2				2
5	02.04.252	Pharmacognosy-II	2		2		3
6	02.03.236	Pharmacology-I	2				2
Total			12		6		15
Total of Credit Hours			**15**				

#	Course Code	Level 3 / Semester 1 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1	03.02.210	Basic Microbiology	2		2		3
2	02.04.253	Phytochemistry	2		2		3
3	02.04.248	Medicinal Chemistry-I	2		2		3
4	02.02.231	Pharmaceutics-II	2		2		3
5	02.03.237	Pharmacology-II	2		2		3
6	01.02.204	Public Health	2				2
Total			12		10		17
Total of Credit Hours			**17**				

#	Course Code	Level 3 / Semester 2 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1	02.03.238	Pharmacology-III	2		2		3
2	02.02.234	Pharmaceutics-III	2		2		3
3	02.04.250	Medicinal Chemistry II	2		2		3
4	03.02.211	Immunology	2				2
5	03.04.212	Parasitology	2		2		3
6	01.01.205	General Pathology	2		2		3

Total	12		10		17
Total of Credit Hours	**17**				

#	Course Code	**Level 4 / Semester 1**	**Credit Hours**				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	02.03.239	Pharmacology-IV	2				**2**
2	05.01.219	Pharmacy Management	1				**1**
3	03.01.215	Clinical Biochemistry-I	2				**2**
4	02.01.212	Pharmacotherapy-I	2				**2**
5	02.01.265	Case Studies in Pharmacotherapy-I: "case-based seminars"		2			**1**
6	02.01.217	Pharmaceutical Care- I		2			**1**
7	02.01.270	Pharmacogenomics	2				**2**
8	02.04.274	Medicinal Chemistry-III	3				**3**
9	05.02.223	Research Methodology	2				**2**
10	02.01.214	Biopharmaceutics & Pharmacokinetics	2				**2**
Total			16	6			**19**
Total of Credit Hours			**19**				

#	Course Code	**Level 4 / Semester 2**	**Credit Hours**				Total
		Course Name	Theoretical	Seminar	Practical	Training	
1	02.01.223	Clinical Pharmacokinetics	2		2		**3**
2	02.01.211	Clinical Nutrition	2				**2**
3	03.01.216	Clinical Biochemistry 2	2				**2**
4	02.01.216	Community Pharmacy*	2				**2**
5	02.01.215	Pharmacotherapy-II	2				**2**
6	02.01.266	Case Studies in Pharmacotherapy-II: "case-based seminars"		2			**1**
7	02.01.271	Pharmaceutical Care-II		2			**1**
8	02.01.274	Community Pharmacy Clerkship*				3	**3**
9	02.04.251	Pharmaceutical Instrumental Analysis	2		2		**3**
Total			12	4	4		**19**
Total of Credit Hours			**19**				

***300 hours (contact hours) training in a community pharmacy**

#	Course Code	Level 5 / Semester 1 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1	02.01.218	Pharmacotherapy-III	2				2
2	02.01.267	Case Studies in Pharmacotherapy-III: "case-based seminars"		2			1
3	02.02.233	Pharmacoeconomics and Health Outcomes	2				2
4	02.02.232	Drug Information and Evidence-Based Practice	1				1
5	02.03.242	Clinical Toxicology	2		2		3
6	02.03.241	Pharmaceutical Biotechnology	2				2
7	02.02.235	Pharmaceutical Marketing & Drug Promotion	2				2
8	02.01.213	Hospital Pharmacy	2				2
Total			13	2	2		15
Total of Credit Hours			**15**				

#	Course Code	Level 5 / Semester 2 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1	02.01.220	Pharmacotherapy-IV	2				2
2	02.01.268	Case Studies in Pharmacotherapy-IV: "Case-based seminars"		2			1
3	02.01.222	Pharmacotherapy-V	2				2
4	02.01.269	Case Studies in Pharmacotherapy-V: "case-based seminars"		2			1
5	02.04.276	Medication Safety and Health Information Technology	2				2
6	05.02.224	Ethics and Pharmacy regulations	2				2
7	02.01.273	Complementary and alternative medicine	2				2
8	02.01.226	Practical-based Research Project	**1**				
Total			11	4			13
Total of Credit Hours			**13**				

***300 hours (contact hours) Training in a Community Pharmacy**

Pharm. D. Program: Hospital Training						
#	Course Code	Level 6 / Semester 1	Credit Hours*			
		Course Name	Theoretical	Weekly practical hours	Total practical hours	Practical (credit hours)
1	02.05.252	**Hospital Training:** Internal Medicine-I		36	252	7
2	02.05.253	**Hospital Training:** Ambulatory care		36	108	3
3	02.05.254	**Hospital Training:** Pediatric		36	108	3
4	02.05.255	**Hospital Training:** Hospital Pharmacy		36	72	2
5	02.05.256	**Hospital Training:** Oncology care		36	108	3
***One credit hour = one week hospital training (from 8:0 AM to 2:0 PM/5 days/ week)**						
Total of Credit Hours			**18**			

#	Course Code	Level 6 / Semester 2	Credit Hours*			
		Course Name	Theoretical	Weekly practical hours	Total practical hours	Practical (credit hours)
1	02.05.257	**Hospital Training:** Internal Medicine-II		36	252	7
2	02.05.258	**Hospital Training:** Intensive Care Unit		36	72	2
3	02.05.259	**Hospital Training:** Surgery		36	108	3
4	02.05.260	**Hospital Training:** Gynecology & Obstetrics		36	108	3
5	02.05.261	**Hospital Training:** Psychiatric		36	72	2
***One credit hour = one week hospital training (from 8:0 AM to 2:0 PM/5 days/ week)**						
Total of Credit Hours			**17**			

G. Distribution of Total Credit Hours (209 CH)

Level	Term	University Requirements		Faculty Requirements		Department Requirements		Program Requirements		Program Electives		Training		Total CH		Total CH/ Level
		No. of Courses	Credit Hours	No. of Courses	Credit Hours	No. of Courses	Credit Hours	No. of Courses	Credit Hours	No. of Courses	Credit Hours	No. of Courses	Credit Hours	No. of Courses	Credit Hours	
First	First	4	8	4	11	1	1	-	-	-	-	-	-	9	20	40
	Second	4	8	2	3	3	9			-	-	-	-	9	20	
Second	First	-	-	1	2	7	17			-	-	-	-	8	19	34
	Second	-	-	-	-	6	15			-	-	-	-	6	15	
Third	First	-	-	-	-	6	17			-	-	-	-	6	17	34
	Second	-	-	-	-	6	17			-	-	-	-	6	17	
Fourth	First	-	-	1	2	5	11	4	6	-	-	-	-	10	19	38
	Second	-	-	-	-	2	9	7	9	-	-	-	-	9	19	
Fifth	First	-	-	-	-	3	6	5	8	-	-			8	14	28
	Second	-	-	-	-	2	4	4	6	-	-	2*	4	8	14	
Sixth	First											5	18	5	18	35
	Second											5	17	5	17	
Total		**8**	**16**	**8**	**19**	**41**	**106**	**20**	**27**	**-**	**-**	**12**	**39**	**92**	**209**	**209**
Percentage		**7.7%**		**9%**		**50.7%**		**13 %**		**-**		**18.7%**		**100%**		

***: Graduation Research Project**

13. Teaching and Learning Strategies:

A. Teaching Tools:

- Active Lectures (supported with discussion),
- Group learning and Problem-based learning,
- Seminars, journal clubs and workshops,
- Practical classes,
- Field training,
- Simulated software program
- Field visits to industries,
- Computer and web-based learning,
- Use of communication and information technology,
- Project work,
- Directed self-study.

B. Assessment Tools:

- Short essays,
- Written assessments, such as multiple-choice questions (MCQs),
- Faculty assessment by structured observation through checklists and rating scales,
- Seminar assessment,
- Multi-source assessments, such as student self-assessment,
- Simulations, such as computer-based clinical scenarios,
- summative practical assessments,
- Graduate project.
- laboratory and other written reports,
- Work samples, such as, logbooks and portfolios.

A. Teaching Strategies:

It includes description of teaching strategies to achieve learning out comes of the program (lecture, seminar, laboratory, groups, etc. with description of how to use them and average of each of in every course

Teaching Strategy	Description of how it will be used
Lectures	It is the most frequently employed teaching method to convey knowledge and explain theories to students in large groups (50-100) or in sessions, which consist of more than one group gathered in one classroom.
Seminars	These are mainly used with small groups of students in which they find better chances for discussing and negotiating the different concerns of their studies.
Lab experiments	Students doing practices in medical labs individually or in small groups.
Training	This is a practical kind of course where the students are required to plan and execute some field visits to hospitals, corporations or institutions where the process of clinical pharmacy is essential.
Discussion	This is done by allowing the students to ask questions during the lecture and respond to them by the lecturer or other students for the purpose of establishing and clarify the subject of the lecture strongly and increase the concentration and absorption of the student and the attention and not to enter the boredom.
Presentations	Helps the students to be more confident with themselves and make them to show the others what knowledge they have acquired. It can be followed in many types of courses and tasks.
Self-learning	Self-learning is the process by which learners teach themselves using any materials or resources to achieve clear goals without the direct help of the teacher
Case study	Case studies are defined as the scientific documentation of a single clinical observation which is so important study design in advancing medical scientific knowledge especially of rare disease.
Office Hours	Office hours are hours determined by the faculty member (professor of the course) to which the student studies. The hours allocated by the professor to meet with his students to help them and answer their queries in the event of any questions they may not be enough time for the lecture to answer it.
Case Studies	The case study is defined as an in-depth descriptive presentation of a particular position or model for the purposes of educational research or for training and education purposes.

B. Assessment Strategies.

Assessment Strategy	Its description (in which course it will be used and in which rate)
Written examinations	Mid-term test is conducted between 6th to 8th Class and final exam is conducted at the end of each course.
Oral exams	For selected courses
Technical or practical reports /Presentations	As indicated in the course specification

Assignments including problem-solving exercises	The entire assignments including problem-solving exercises of coursework activities during the teaching period of each course. (Which includes group and individual work, tests and presentations, etc.)
Individual and group project work	As indicated in the course specification
Quizzes	For all courses except for project
Home work	For all courses except for project

C. Project Assessment: Each project will be assessed by a committee of three members as follows:

Items	Marks Distribution
Project supervisor	**70 %**
Internal examiner: a member of the department teaching staff.	**15 %**
External examiner: a qualified external examiner (either from other departments of the college or from another university)	**15%**
Total	**100%**

14. Alignment of Program Intended Learning Outcomes (PILOs) to Teaching Strategies and Assessment Methods:

(A) Alignment of Program Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:

PILOs	Teaching Strategies	Assessment Methods
A1, A2, A3, A4, A5	o Lectures. o Exercises in lectures and seminars o Presentations and discussions in class	o Written examinations o Quizzes o Home work o Assignments

(B) Alignment of Program Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:		
PILOs	Teaching Strategies	Assessment Methods
B1, B2, B3, B4, B5	o Tutorials o Exercises in lectures and seminars o Group work and problem-solving learning. o presentations and discussions in class o Brainstorming	o Written examinations o Technical or practical reports /Presentations o Assignments including problem-solving exercises. o Individual and group project work o Quizzes o Individual and group project work o Home work

(C) Alignment of Program Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:		
PILOs	Teaching Strategies	Assessment Methods
C1, C2, C3, C4, C5	o Guided individual reading. o Group work and problem-solving learning. o Tutorials/ seminars. o Presentations and discussions in class	o Written examinations o Technical or practical reports /Presentations o Assignments including problem-solving exercises o Individual and group project work o Quizzes o Individual and group project work

(D) Alignment of Program Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:		
PILOs	Teaching Strategies	Assessment Methods
D1, D2, D3	o Guided individual reading. o Group work and problem-solving learning. o Tutorials/ seminars. o Presentations and discussions in class	o Written examinations o Technical or practical reports /Presentations o Assignments including problem-solving exercises o Individual and group project work o Quizzes

		○ Individual and group project work

15. Admission Requirements:

1. Admissions to the program shall be made as per the University admission guidelines and admission rules set by the Ministry of Higher Education and Scientific Research
2. General Secondary school certificate (Science Section) or any equivalent certificate with grade as specified in the admission rules made by Ministry of Higher Education and Scientific Research.
3. Pass the admission test and personal interview.
4. Any necessary requirement for specialization, decided by the Scientific Section.

16. Attendance requirements and graduation

1. Student attendance should not be less than 75% in each course.
2. Student will graduate after successfully passing all program requirements.
3. Total credit hours for the program is 209 credit hours.
4. Minimum score for any student to pass any credit hours course is 50% degree.

17. Grading System

From 90% to 100% from total marks	Excellent
From 80% to less than 90%	Very Good
From 65% to less than 80%	Good
From 50% to less than 65%	Pass
Less than 50%	Poor/Fail

18. Facilities required for running the program

Sources of learning:

1. Lecture rooms with facilities
2. Labs with facilities
3. Training in different hospital departments
4. Library study room and electronic library (books as write in each course specification)
5. Internet and professional information access

19. Program Assessment:

	Type of the Sample who Assess the program	Instruments used	Sample
1	**Final Year Students**	Surveys as Program ILOs Questionnaire sheet	20
2	**Graduates from the program**	Program ILOs Questionnaire sheet	10
3	**Center of Development & Quality Assurance**	Internal Evaluation (yearly)	All Items
4	**Stake holders**	Surveys or Periodic meeting using Program ILOs Questionnaire sheet	10
5	**One faculty member from other University as External Evaluator**	Program evaluation tool + Course evaluation tool	4
6	**Others methods**	As Required	Other methods

20. Program Policies:

Based on University Regulations

1.	**(Class Attendance):** A student should attend not less than 75 % of total hours of the subject; otherwise, he/she will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring a proof statement from university Clinic. If the absent is more than 25% of a course total contact hour, student will be required to retake the entire course again.
2.	**(Tardy) :** For late in attending the class, the student will be initially notified. If he repeated lateness in attending class he/she will be considered as absent.
3.	**(Exam Attendance/Punctuality) :** A student should attend the exam on time. He/she is permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam.
4.	**(Assignments & Projects) :** Assignments and projects are given as per course specification; the student has to submit all the assignments for checking on time, mostly one week after given the assignment.
5.	**(Cheating) :** For cheating in exam, a student will be considered as fail. In case the cheating is repeated three times during his/her study the student will be disengaged from the faculty.
6.	**(Plagiarism) :** Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee proofed a plagiarism of a student, he/she will be disengaged from the faculty. The final disengagement of the student from the faculty should be confirmed from the Student Council Affair of the university or according to the university roles.
7.	**(Other policies) :** - Mobile phones are not allowed to use during a class lecture. It must be closed; otherwise, the student will be asked to leave the lecture room. - Mobile phones are not allowed in class during the examination. - Lecture notes and assignments might be given directly to students using soft or hard copy.

21. Annex- 4, Survey of Similar Accredited Programs at National and International Universities (Benchmarks)

Program No.	The Academic Program	The University	Website	The Faculty	The Department	The Country	Degree Award at Program Completion	Program Accrediting Body	Year of Accreditation	Study Duration
Current Program	Doctor of Pharmacy	21 UMAS	-	Faculty of Pharmacy	Faculty of Pharmacy	Yemen	-	Higher Ministry of Republic of Yemen	2017	6
The 1st Program	Doctor of Pharmacy	University of Hadramout	https://hu.edu.ye/Department/Index/4019?parentId=1011&entity=%D9%83%D9%84%D9%8A%D8%A9	Faculty of Medicine and Health Science	Department of Clinical Pharmacy	Yemen	Doctor of Pharmacy	Ministry of Higher Education	2012	6
The 2nd Program		University of Science and Technology	HTTPS://UST.EDU/USTY/AR/COMPONENT/K2/ITEM/1895-2016-05-04-13-13-51	Faculty of Pharmacy	Department of Clinical Pharmacy	Yemen	Doctor of Pharmacy	Ministry of Higher Education	2016	6
The 3rd Program	Doctor of Pharmacy	Jordan University of Science & Technology (JUST)	www.just.edu.jo/FacultiesandDepartments/FacultyofPharmacy/Departments/ClinicalPharmacy/Pages/Welcome.aspx	Faculty of Pharmacy	Department of Clinical Pharmacy	Jordan	Doctor of Pharmacy	Accreditation Council for Pharmacy Education	2018	6

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Rector

21. Annex- 4, Survey of Similar Accredited Programs at National and International Universities (Benchmarks)

Program No.	The Academic Program	The University	Website	The Faculty	The Department	The Country	Degree Award at Program Completion	Program Accrediting Body	Year of Accreditation	Study Duration
The 4th Program	Doctor of Pharmacy	The King Faisal University	https://www.kfu.edu.sa/en/Colleges/clinical_pharmacy/Pages/Program.aspx program-bac	College of Clinical Pharmacy	Department of Pharmacy Practice	KSA	Doctor of Pharmacy	ACPE	2014	5
The 5th Program	Doctor of Pharmacy	Eastern Mediterranean University	https://pharmacy.emu.edu.tr/en/programs/pharmacy-(pharm-d-)	Faculty of Pharmacy	Faculty of Pharmacy	Turkey, Cyprus	Doctor of Pharmacy	Cyprus Agency of Quality Assurance, WHO, PCN	2012	6
The 6th Program	Doctor of Pharmacy	Long Island University	https://liu.edu/pharmacy	The Arnold & Marie Schwartz College of Pharmacy and Health Sciences,	Pharmacy Practice	USA	Doctor of Pharmacy	ACPE	June 2024	6

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22. Annex- 5, Survey of PILOs for Similar Accredited Programs at National and International Universities

Program PILOs	Similar Accredited Programs						Accreditation Bodies	
	University of Hadramout, Yemen	University of Science and Technology, Yemen	Jordan University of Science & Technology (JUST), Jordan	Al King Faisal University, KSA	Eastern Mediterranean University, Cyprus	Long Island University, USA	Egypt, NAQAAE (2018). National Academic Reference Standards, Pharmacy, First Edition	ACPE, USA, 2015
Knowledge and Understanding: **A1. Define the fundamentals of scientific knowledge and principles of biomedical, pharmaceuticals, social, behavioral, administrative, therapeutics, and other basic sciences related to the pharmacy profession.** **A2. Illustrate the physicochemical and pharmacokinetic properties of medicines and their influence on compounding, evaluation, analysis, route of administration, and dosage regimen .** **A3. Identify broad knowledge about the mechanism of action, effectiveness, use, safety, side effects, and interactions of therapeutic agents as well as the**	A1 . يتعرف على المفاهيم والنظريات الأساسية في مجال علم الصيدلة A2 . يناقش المبادئ والمفاهيم المتعلقة بالممارسات الصيدلانية السريرية والطبية الحيوية 3A . يتعلم ويقيم المبادئ العلمية الحديثة في مجال الصيدلة لضمان جوده الرعاية الصحية B1 . يقيم المعلومات والبيانات المطلوبة لتشخيص وحل المشكلات المتعلقة بالدواء	C. Program Intended Learning Outcomes A. Knowledge and Understanding Program Outcomes Biomedical Sciences: A1. Define the fundamentals of the biomedical sciences including structure of the body, normal and abnormal body function, basis of genomes and different biochemical pathways and their relations with different diseases. Pharmaceutical Sciences: A2. List the sources, purification methods, physico-chemical properties, molecular structure and design of substances used in medicine	Domain 1: Foundational knowledge: 1.1 Learner: Develop, integrate, and apply knowledge from the foundational sciences to evaluate the scientific literature, explain drug action, solve therapeutic problems, and advance population health and patient centered care. Domain 2: Essentials for Practice and Care: 2.1 Caregiver (Patient-centered-care): Provide patient-centered care as the medication expert	1 .Knowledge 1.1 Describe essential biomedical, pharmaceutical, social, behavioral, administrative and clinical sciences knowledge related to the development and use of medications, natural remedies, and other therapies for prevention and treatment of diseases. (almost all Pharmaceutical and Biomedical Courses) 1.2 Describe the concepts and principles of various	Expected Competencies for Pharm D. Graduates In the field of pharmacy, collaborate with people from related disciplines during the data collection, interpretation, application, and announcement stages, acting in accordance with social, scientific, cultural, and ethical norms. Acquire knowledge and application ability on pharmaceutical field, Identify the problems about	Domain 1–Foundational Knowledge 1.1 Learner (Learner): Develop, integrate, and apply knowledge from the foundational sciences (i.e., pharmaceutical, social/behavioral/administrative, health, and clinical sciences) to evaluate the scientific literature, explain drug action, solve therapeutic problems, and advance population health and patient-centered care. Learning Outcomes 1.1.1. Develop and demonstrate depth and breadth of knowledge in pharmaceutical, social/behavioral/administrative, health, and clinical sciences. 1.1.2. Articulate how knowledge in foundational sciences is integral to clinical reasoning; evaluation of future advances in medicine and pharmacy; supporting health and wellness initiatives; and delivery of contemporary pharmacy services.	A-KNOWLEDGE AND UNDERSTANDING A1. Show understanding of the fundamentals of the basic and biomedical sciences including physics, mathematics, chemistry, structure of human body, normal and abnormal body functions, basis of genomes and different biochemical pathways and their relations to different diseases. A2. Explain the fundamentals of social and behavioral sciences relevant to pharmacy, ethics of health care and its impact on their relationship with patients and other healthcare professionals. A3. Explain the physicochemical properties of pharmaceutical products and their relationship to molecular structure and the design of medicinal agents. A4. Describe the analytical methods, principles, design, development, and validation of pharmaceutical products. A5. Identify the actions of the medicines within living systems,	Standard 1: Foundational Knowledge The professional program leading to the Doctor of Pharmacy degree (hereinafter "the program") develops in the graduate the knowledge, skills, abilities, behaviors, and attitudes necessary to apply the foundational sciences to the provision of patient-centered care. Key Element: 1.1. Foundational knowledge – The graduate is able to develop, integrate, and apply knowledge from the foundational sciences (i.e., biomedical, pharmaceutical, social/behavioral/administrative, and clinical sciences) to evaluate the scientific literature, explain drug action, solve therapeutic problems, and advance population health and patient-centered care Standard 2: Essentials for Practice and Care The program imparts to the graduate the knowledge, skills,

Head of Department Quality Unit Dean of the Faculty Center of Development & Quality Assurance

Rector

complementary therapies. **A4. Recognize the advanced concepts of professional (ethics, policies, laws, regulations requirements, management, pharmacovigilance, Pharmacoepidemiology, pharmacoeconomic, pharmacoinformatic, research studies, sources of information.... etc) to optimize the therapeutic outcomes.** **A5. Describe the role of pharmacists in patient care; dispensing, designing, implementing, monitoring, evaluating, and adjustment of medication therapy plans that are patient-specific and evidence-based to achieve maximum clinical effectiveness.** **Cognitive/ Intellectual Skills:** **B1. Integrate the physicochemical properties of medicines to compounding, preparation, and analysis of parenteral**	وفق أسس علميه. B2 . يقيم نتائج الأنشطة الصيدلانية بمهاره وفقا لأفضل الممارسات المبنية على الأدلة B3 . يحل المشكلات المتعلقة بالبحث لتطوير وتقييم وتحسين الممارسات الصيدلانية والسريرية والإدارية C1 . يشارك بفعالية مع الطبيب المعالج في اختيار الدواء المناسب والجرعات للحالة السريرية وتقديم الاستشارة للحالة. C2 . يشرف بشكل مباشر على العلاج الدوائي للمرضى المرقدين وتقييم نتائج العلاج المعطي للمرضى	A3. Recall the properties of formulations additives, principles of medicines formulation and manufacturing techniques, and pharmaceutical analytical methods. A4. Identify the actions of medicines within living systems; pharmacokinetics and pharmacodynamics of drugs, therapeutic uses of medicines in humans, adverse reactions, interactions of medicines, and their significance in treatment. A5. Relate the etiology, epidemiology, laboratory diagnosis and clinical features of different diseases and their pharmacotherapeutic approaches. The behavioral, social, and administrative pharmacy sciences	(collect and interpret evidence, prioritize, formulate assessments and recommendations, implement, monitor and adjust plans, and document activities . 2.2 Manager (Medication use systems management): Manage patient healthcare needs using human, financial, technological, and physical resources to optimize the safety and efficacy of medication use systems. 2.3 Promoter (Health and wellness): Design prevention, intervention, and educational strategies for individuals and communities to manage chronic disease and	pharmacy practice settings . 1.3 Recognize the role of pharmacists according to legal, ethical, and professional standards in promoting health, and the prevention and treatment of diseases. 2 .Skills 2.1 Integrate pharmaceutical sciences with pharmacy applications (in practice, administration and research). 2.2 Engage in inter-professional healthcare education activities. 2.3 Evaluate scientific and professional literature critically to be utilized in evidence-based practice, conducting research and problem-solving.	pharmaceutical field, Express their knowledge from a scientific point of view, Adopt the culture of project-based working, Acquire professional and ethical responsibilities, Master in current health and therapy problems, Uses computer programs, technology, and teaching resources relevant to pharmacy, Comply with quality management procedures, and take part in quality management processes, Comply with relevant laws, regulations, legislations and professional	1.1.3. Integrate knowledge from foundational sciences to explain the way specific drugs or drug classes work and evaluate their potential value in individuals and populations. 1.1.4. Apply knowledge in foundational sciences to solve therapeutic problems and advance patient-centered care and population-based care. 1.1.5. Critically analyze and assimilate evidence from scientific literature related to drugs and disease to enhance clinical decision-making. 1.1.6. Identify, critically analyze, and assimilate emerging theories, information, and technologies that may impact patient-centered and population-based care. Domain 2–Essentials for Practice and Care 2.1. Patient-centered care (Caregiver): Provide patient-centered care as the medication expert (collect and interpret evidence, prioritize, formulate assessments and recommendations, foster patient support and empowerment, implement, monitor and adjust plans, and document activities). Learning Outcomes 2.1.1. Collect subjective and objective evidence related to the patient, medications, allergies/adverse reactions, and	therapeutic uses of medicines in human, adverse reactions, interactions of medicines, toxicity, and misuse or abuse. A6. Explain the basis of complementary and alternative medicine. A7. Identify the types of poisonous substances, sources, mechanisms of toxicity, analysis, clinical pictures, and management. A8. Describe the bio-pharmaceutics and pharmacokinetics of medicines and their applications. A9. Define the basis of health policy, pharmacoeconomics, pharmacoepidemiology, marketing, and administration with reference to pharmacy. A10. Describe the pharmacist's role in health care; dispensing, designing, implementing, monitoring, evaluation, and adjustment of medication therapy plans that are patient-specific and evidence-based to achieve maximum clinical effectiveness. A11. Identify the properties of different pharmaceutical dosage forms including novel drug delivery systems and biotechnology. A12. Describe the methods of bio-statistical analysis and pharmaceutical calculations.	abilities, behaviors, and attitudes necessary to provide patient-centered care, manage medication use systems, promote health and wellness, and describe the influence of population-based care on patient-centered care. Key Elements: 2.1. Patient-centered care – The graduate is able to provide patient-centered care as the medication expert (collect and interpret evidence, prioritize, formulate assessments and recommendations, implement, monitor and adjust plans, and document activities). 2.2. Medication use systems management – The graduate is able to manage patient healthcare needs using human, financial, technological, and physical resources to optimize the safety and efficacy of medication use systems. 2.3. Health and wellness – The graduate is able to design prevention, intervention, and educational strategies for individuals and communities to manage chronic disease and improve health and wellness. 2.4. Population-based care – The graduate is able to describe how population-based

Head of Department Quality Unit Dean of the Faculty Center of Development & Quality Assurance

Rector

nutrition, I.V admixtures, and small-batch preparation. **B2. Predict the drug properties including the bio-pharmaceutics, pharmacokinetics, pharmacodynamics and their applications.** **B3. Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, pharmacoepidemiology, and pharmacoeconomic factors to enhance the healthcare systems.** **B4. Formulate an appropriate pharmacotherapy care plan and monitoring strategies to solve practice problems and improve patient safety and efficacy through utilization of pharmacodynamic, pharmacokinetic parameters of medicines as well as diseases pathophysiology and research outcomes.**	وتوثيق السجل الدوائي بدقه. C3 . يطبق بروتوكولات موحده عند تقديم الرعاية الصيدلانية السريرية D1 . يتفاعل بفعالية مع الاخرين لفظيا وغير لفظيا D2 . يقود العمل الجماعي بروح الفريق الواحد مراعيا المسؤولية المهنية الأخلاقية والثقافيه.	A6. Review the fundamentals of social and behavioral sciences relevant to pharmacy, ethics of health care, health care systems, health policy and economics, pharmacy law, and causes and prevention of medical errors. Clinical Sciences and Practice Skills A7. Illustrate the pharmacist's role in health care; managing medicines: responding to symptoms, non-prescription drug use, compounding, dispensing, provision of medicine and patient information, documentation, reporting of adverse reactions of medicines, drug information, and drug abuse. B. Intellectual Skills B1. Integrate the relevant knowledge	improve health and wellness. 2.4 Provider (Population-based care): Describe how population-based care influences patient-centered care and influences the development of practice guidelines and evidence-based best practices. Domain 3: Approach to Practice and Care 3.1 Problem Solver: Identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution. 3.2 Educator: Educate all audiences by determining the most effective and enduring ways to impart	2.4 Apply basic drug development skills in relevant settings. 3 . Competencies 3.1. Autonomy and responsibility 3.1.1 . Demonstrate leadership skills, accountability, and acceptance of responsibility within a team in various settings. 3.1.2 . Advocate patient rights to safe and effective medication use in various settings. 3.1.3 .Practice reflective and independent thinking to effectively manage and respond to routine or unanticipated circumstances. 3.2. Practice 3.2.1 .Utilize appropriate information technologies to	ethical rules related with individual duties, rights and responsibilities, Serve as a role model for colleagues and a reference model for the society with their physical appearance, attitudes, behaviours and professional identity, Distinguish physiological functions and behaviours of healthy and unhealthy individuals and describe the relationship between individuals' health and their physical and social environments, Attend institutional, local, national and international training	disease(s), by performing patient assessment (including physical assessment, screenings, and risk assessments scores when needed) from chart/electronic health records, pharmacist records, and discussions with other health professionals and the patient/family/care-giver. 2.1.2. Interpret evidence and patient data. 2.1.3. Prioritize patient needs. 2.1.4. Formulate an evidence-based care plan, assessment, and recommendation. 2.1.5. Implement and/or recommend patient care plans. 2.1.6. Monitor the patient and adjust the care plan as needed. 2.1.7. Document patient care related activities. 2.2. Medication use systems management (Manager): Manage patient healthcare needs using human, financial, technological, and physical resources to optimize the safety and efficacy of medication use systems. Learning Outcomes 2.2.1. Compare and contrast the components of typical medication use systems in different pharmacy practice settings. 2.2.2. Describe the role of the pharmacist in impacting the safety and efficacy of each	B- COGNITIVE/INTELLECTUAL SKILLS: B1. Collect, interpret and asses relevant pharmaceutical and biomedical sciences to construct the pharmacophores of the structure and their effect on the stability, pharmacokinetic and pharmacodynamics profile of the drug. B2. Classify the synthetic and natural drugs according to their mechanism of action, systemic effect, therapeutic uses, contraindication and toxicity. B3. Design and evaluate different types of safe and effective pharmaceutical dosage forms. B4. Select appropriate Standard Operating Procedures (SOP) to conduct qualitative and quantitative analysis of pharmaceutical preparations. B5. Plan a modern system for administration of medical foundations and merge the ethics to business in the drug marketing B6. Develop and design suitable methods for extraction, isolation, purification, identification, and standardization of active substances from various sources. B7. Formulate and evaluate patient care plan about the rational use of medications to improve patient safety and	care influences patient-centered care and the development of practice guidelines and evidence-based best practices. Standard 3: Approach to Practice and Care The program imparts to the graduate the knowledge, skills, abilities, behaviors, and attitudes necessary to solve problems; educate, advocate, and collaborate, working with a broad range of people; recognize social determinants of health; and effectively communicate verbally and nonverbally. Key Elements: 3.1. Problem solving – The graduate is able to identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution. 3.2. Education – The graduate is able to educate all audiences by determining the most effective and enduring ways to impart information and assess learning. 3.3. Patient advocacy – The graduate is able to represent the patient's best interests. 3.4. Interprofessional collaboration – The graduate is able to actively participate and

Head of Department Quality Unit Dean of the Faculty Center of Development & Quality Assurance

Rector

B5. Compare various therapeutic options using scientific research and evidence-based practice to optimize efficacy, safety, and cost for each drug-related problem. **C. Practical and Professional Skills:** **C 1. Deal safely and effectively with biotechnological, radio-pharmaceuticals, and synthetic/natural pharmaceutical materials/products used in pharmaceutical preparations.** **C2.Compound/prepare extemporaneous, cytotoxic, I.V admixture, parenteral nutrition, and small-batch pharmaceutical preparation taking into account the physicochemical properties of drug structures.** **C 3. Contribute to creating/improving national drug policies, laws, and regulations related to the health care systems .** **C 4. Implement patient-oriented pharmaceutical care**		and understanding required to meet the needs of patients and other health care professionals B2. Propose medicine doses, dosage regimens related to normal and abnormal clinical situations. B3. Interpret prescription, medication orders, pharmaceutical information, clinical data, including patient records held within practice settings. B4. Select the appropriate methods of isolation, synthesis, purification, identification, standardization, and formulation of active substances from different origins. Professional and Practical Skills C1. Handle the chemical, biological, and pharmaceutical materials safely, taking into account	information and assess understanding. 3.3 Advocate (Patient Advocacy): Assure that patients' best interests are represented. 3.4 Collaborator (Interprofessional collaboration): Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs. 3.5 Includer (Cultural sensitivity): Recognize social determinants of health to diminish disparities and inequities in access to quality care. 3.6 Communicator:	optimize medication use and patient care. 3.2.2 . . Contribute to decision-making processes by providing accurate and relevant recommendations in various settings (clinical, administration, drug development). 3.2.3 . Interpret information obtained from different resources to provide creative solutions for complex problems. 3.2.4 . Communicate clearly and effectively with health care professionals, patients, caregivers, administrative and supportive personnel and the public in various settings.	programmes after graduation, Gain experience in working with other health disciplines, Communicate effectively in oral and written form, Critically evaluate advanced knowledge and skills acquired in the field of pharmacy, Conduct a study independently, using advanced pharmaceutical knowledge; and take responsibility as a team member in cooperation with other professional groups working in this field, Be aware of the ways to access scientific information, and keep up	component of a typical medication use system (i.e., procurement, storage, prescribing, transcription, dispensing, administration, monitoring, and documentation). 2.2.3. Utilize technology that is a component to or of the medication use system. 2.2.4. Identify and utilize human, financial, and physical resources to optimize the medication use system. 2.2.5. Manage medication needs of patients during transitions of care. 2.2.6. Apply standards, guidelines, best practices, and established processes related to safe and effective medication use. 2.2.7. Utilize continuous quality improvement techniques in the medication use process and participate in identifying system errors and, when possible, implement solutions. 2.2.8. Demonstrate the ability to compound extemporaneous and commercially available dosage forms, dispense, and administer medications in a variety of healthcare settings. 2.2.9. Apply legal, ethical, and professional standards within a medication use system.	efficacy. B8. Use appropriate research methods to solve practice problems. B9. Apply pharmaceutical calculation in different pharmaceutical practice. C- PRACTICAL AND PROFESSIONAL SKILLS: C1. Handle the chemical, biological, and pharmaceutical materials safely, taking into account their physical and chemical properties, including any specific hazards associated with their use, distribution, and storage. C2. Operate different pharmaceutical equipment and instruments and use emerging technologies in pre-formulation, formulation, packaging, storage and analysis of pharmaceutical products according to Good Laboratory Practice (GLP), Good Storage Practice (GSP) and cGMP guidelines. C3. Screen drug from different sources, bioassay, and carry out pharmacological and biopharmaceutical experiments. C4. Extract, isolate, purify, identify, standardize, formulate natural products and assure their rational use. C5. Advise the patients and health care professionals to optimize medicines use. C6. Employ the relevant ways of preparation and presentation of	engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs. 3.5. Cultural sensitivity – The graduate is able to recognize social determinants of health to diminish disparities and inequities in access to quality care. 3.6. Communication – The graduate is able to effectively communicate verbally and nonverbally when interacting with individuals, groups, and organizations. Standard 4: Personal and Professional Development The program imparts to the graduate the knowledge, skills, abilities, behaviors, and attitudes necessary to demonstrate self-awareness, leadership, innovation and entrepreneurship, and professionalism. Key Elements: 4.1. Self-awareness – The graduate is able to examine and reflect on personal knowledge, skills, abilities, beliefs, biases, motivation, and emotions that could enhance or limit personal and professional growth.

Head of Department Quality Unit Dean of the Faculty Center of Development & Quality Assurance

Rector

legally and ethically in a variety of patient care settings in collaboration with patients and other health care professionals according to professional standards, appropriate therapeutic guidelines, and research outcomes. **C 5. Contribute to pharmaceutical research studies and clinical trials needed to enhance professional decisions to optimize medicine use in specific medical conditions** **D. General and Transferable Skills:** **D 1. Display ethically and legally leadership, time management, critical thinking, problem-solving, communication, tame-work, independence, creativity, innovation, entrepreneurial, delegation, and organizational skills** **D 2. Develop life-long learning, in particular an awareness of the need for continuing education, research, scholarship, and professionalism in the field of**		their physical and chemical properties, including proper operation of pharmaceutical instruments. C2. Execute the planning, design and carrying out of pharmaceutical research investigations, from the problem-recognition stage through to the evaluation and appraisal of results and findings. C3. Employ the relevant way of analysis, preparation, determination of quality, and presentation of medicines, by manufacture and extemporaneous dispensing. C4. Advise the patient and health care professionals on the safe and effective use of medicines as well as developing and supporting therapeutic plans with continuous	Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization. Domain 4: Personal and Professional Development 4.1 Self-aware: Examine and reflect on personal knowledge, skills, abilities, beliefs, biases, motivation, and emotions that could enhance or limit personal and professional growth. 4.2 Leader: Demonstrate responsibility for creating and achieving shared goals, regardless of position. 4.3 Innovator (Innovation and Entrepreneurship): Engage in innovative activities by using	3.2.5 . Construct patient-centered evidence-based pharmaceutical care plans. 3.3. Attribute 3.3.1. Embrace the interprofessional approach to healthcare practices. (IPE) 3.3.2 .Display integrity, trustworthiness, confidence, self-awareness and the potential of entrepreneurship in various settings. 3.3.3. Demonstrate empathy, professional attitude, ethical behavior, social and cultural awareness and proper judgement in various settings.	with the literature in the field, Provide appropriate and effective treatment of health problems, integrate data from patient and medical records to treatment, to develop a plan for treatment using evidence based medicine ,	2.2.10. Apply the principles of human resource management to manage pharmacy personnel. 2.2.11. Demonstrate knowledge of and an ability to use medical informatics. 2.2.12. Demonstrate the ability to apply a systems approach to improve patient (medication) safety. 2.3. Health and wellness (Promoter): Design prevention, intervention, and educational strategies for individuals and communities to manage disease and improve health and wellness. Learning Outcomes 2.3.1. Describe systematic preventive care, using risk assessment, risk reduction, screening, education, and immunizations. 2.3.2. Provide prevention, intervention, and educational strategies for individuals and communities to improve health and wellness. 2.3.3. Participate with interprofessional healthcare team members in the management of and health promotion for patients. 2.3.4. Evaluate personal, social, economic, and environmental conditions to maximize health and wellness. 2.4. Population-based care (Provider): Describe the way in	medicines including extemporaneous, Total Parenteral Nutrition (TPN), and Intravenous (I.V.) admixtures. C7. Apply administrative and pharmacoeconomic rules in pharmacy and ethically use marketing skills for promoting the pharmaceutical and cosmetic products. C8. Conduct research studies and utilize the results in different pharmaceutical fields. D – GENERAL / TRANSFERABLE SKILLS: D1. Interact and communicate effectively and ethically with patients, public, and health care professionals. D2. Apply financial, management, decision-making, time management, organization, sales and marketing skills. D3. Appraise the importance of team work and the need to work within personal limitations. D4. Take responsibility for adaptation to change in pharmacy practice. D5. Retrieve the essential references of evidence-based practice to achieve maximum clinical effectiveness.	4.2. Leadership – The graduate is able to demonstrate responsibility for creating and achieving shared goals, regardless of position. 4.3. Innovation and entrepreneurship – The graduate is able to engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals. 4.4. Professionalism – The graduate is able to exhibit behaviors and values that are consistent with the trust given to the profession by patients, other healthcare providers, and society.

Head of Department Quality Unit Dean of the Faculty Center of Development & Quality Assurance

Rector

pharmaceutical practice. **D 3. Use digital pharmacy health improvement and educational technologies efficiently.**		monitoring with the capability to refer patients to other health care professionals when required. C5. Implement class room training in hospital setting practice by providing interventions and recommendations about treatment strategies directly to preceptors during clinical training. Intended Learning Outcomes D. General Skills D1. Interact effectively with patients, the public and health care professionals; including both written and oral communications. D2. Retrieve information in relation to primary and secondary information sources, to analyze the published literature. D3. Adopt ethical, legal and safety guidelines while	creative thinking to envision better ways of accomplishing professional goals. 4.4 Professional: Exhibit behaviors and values that are consistent with the trust given by the profession by patients, other healthcare providers, and society. Domain 5: Pharmaceutical product expert 5.1 Manufacturer: Carries out compounding procedures to produce an effective and safe medicine (Compounder) and implements quality control measures and tests (Quality Manager)			which population-based care influences patient-centered care and influences the development of practice guidelines and evidence-based best practices. Learning Outcomes 2.4.1. Assess the healthcare status and needs of a targeted patient population. 2.4.2. Develop and provide an evidence-based approach to care that considers the cost, care, access, and satisfaction needs of a targeted patient population. 2.4.3. Participate in actual or simulated population health management by evaluating and adjusting interventions to improve health. Domain 3–Approach to Practice and Care 3.1. Problem Solving (Problem Solver): Identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution. Learning Outcomes 3.1.1. Identify and define all relevant problems. 3.1.2 Select between the primary as well as secondary problems. 3.1.3. Define goals and alternative goals. 3.1.4. Explore multiple solutions by organizing, prioritizing, and defending each possible solution.		

		maintaining the code of practice. D4. Develop financial, teamwork, management, decision-making, time management, organization, sales and marketing skills				3.1.5. Anticipate positive and negative outcomes by reviewing assumptions, inconsistencies, and unintended consequences. 3.1.6 Recommend and/or implement the most viable solution, including monitoring parameters, to measure intended and unintended consequences. 3.1.7. Reflect on the solution implemented and its effects to improve future performance. 3.2. Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding. Learning Outcomes 3.2.1. Conduct a learning needs assessment of constituents who would benefit from pharmacist-delivered education (e.g., patients/caregivers, technicians and interns, pharmacy students, fellow pharmacists, other healthcare providers, legislators). 3.2.2. Develop learning objectives. 3.2.3. Select the most effective techniques/strategies to achieve learning objectives. 3.2.4. Demonstrate the ability to coordinate educational efforts with other healthcare providers, when appropriate, to ensure a		

					consistent, comprehensive, and team-based encounter. 3.2.5. Ensure instructional content contains the most current information relevant for the intended audience. 3.2.6. Demonstrate the ability to deliver educational messages via various techniques such as one-on-one discussions, oral presentations, and written materials. 3.2.7. Assess audience comprehension of the educational session. 3.3. Patient Advocacy (Advocate): Assure that patients' best interests are represented. Learning Objectives 3.3.1. Empower patients to take responsibility for, and control of, their health. 3.3.2. Assist patients in navigating through the healthcare system. 3.3.3. Assist patients in obtaining the resources and care required in an efficient and cost-effective manner (e.g., triage to social and/or other healthcare services). 3.4. Interprofessional collaboration (Collaborator): Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs.		

					Learning Outcomes 3.4.1. Establish a climate of shared values and mutual respect necessary to meet patient care needs. 3.4.2. Define clear roles and responsibilities for team members to optimize outcomes for specific patient care encounters. 3.4.3. Communicate in a manner that values team-based decision making and shows respect for contributions from other areas of expertise. 3.4.4. Foster accountability and leverage expertise to form a highly functioning team (one that includes the patient, family, and community) and promote shared patient-centered problem solving. 3.5 Cultural Sensitivity (Includer): Recognize social determinants of health to diminish disparities and inequities in access to quality care. Learning Outcomes 3.5.1. Recognize the collective identity and norms of different cultures without overgeneralizing (i.e., recognize and avoid biases and stereotyping). 3.5.2. Demonstrate an attitude that is respectful of different cultures.		

					3.5.3. Assess a patient's health literacy and modify communication strategies to meet the patient's needs. 3.5.4. Safely and appropriately incorporate patients' cultural beliefs and practices into health and wellness care plans. 3.6. Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization. Learning Outcomes 3.6.1. Interview and/or counsel patients/care givers using an organized structure, specific questioning techniques (e.g., motivational interviewing), and medical terminology adapted for the audience. 3.6.2. Actively listen and ask appropriate open and closed-ended questions to gather information. 3.6.3. Use available technology and other media to assist with communication as appropriate. 3.6.4. Use effective interpersonal skills to establish rapport and build trusting relationships. 3.6.5. Communicate assertively, persuasively, confidently, and clearly. 3.6.6. Demonstrate empathy when interacting with others.		

					3.6.7. Deliver and obtain feedback to assess learning and promote goal setting and goal attainment. 3.6.8. Develop professional documents pertinent to organizational needs (e.g., monographs, policy documents). 3.6.9. Document patient care activities clearly, concisely, and accurately using appropriate medical terminology, standardized qualitative and quantitative methods, and/or uniform coding systems. 3.6.10. Participate in the examination of a practice site's commitment, capacity, and efforts to meet the communication needs of the populations served by the practice environment. Domain 4–Personal and Professional Development 4.1 Self-awareness (Self-aware)–Examine and reflect on personal knowledge, skills, abilities, beliefs, biases, motivation, and emotions that could enhance or limit personal and professional growth. Learning Outcomes 4.1.1. Use metacognition to regulate one's own thinking and learning. 4.1.2. Maintain motivation, attention, and interest (e.g.,		

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Rector

					habits of mind) during learning and work-related activities. 4.1.3. Identify, create, implement, evaluate, and modify plans for personal and professional development for the purpose of individual growth. 4.1.4. Approach tasks with a desire to learn. 4.1.5. Demonstrate persistence and flexibility in various situations; engaging in help seeking behavior when appropriate. 4.1.6. Strive for accuracy and precision by displaying a willingness to recognize, correct, and learn from errors. 4.1.7. Use constructive coping strategies to manage stress. 4.1.8. Seek personal, professional, or academic support to address personal limitations. 4.1.9. Display positive self-esteem and confidence when working with others. 4.1.10. Demonstrate the ability to be a self-directed lifelong learner. 4.2. Leadership (Leader): Demonstrate responsibility for creating and achieving shared goals, regardless of position. Learning Outcomes 4.2.1. Identify, compare, and contrast the characteristics that		

					reflect leadership versus management. 4.2.2. Identify the history (e.g., successes and challenges) of a team before implementing changes. 4.2.3. Develop relationships, value diverse opinions, and utilize individuals' strengths and weaknesses to promote teamwork. 4.2.4. Persuasively communicate goals to the team to help build consensus. 4.2.5. Empower team members by actively listening, gathering input or feedback, and fostering collaboration. 4.3. Innovation and Entrepreneurship (Innovator): Engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals. Learning Outcomes 4.3.1. Demonstrate initiative when confronted with challenges. 4.3.2. Develop new ideas and approaches to improve quality or overcome barriers to advance the profession. 4.3.3. Demonstrate creative decision-making when confronted with problems or challenges.		

					4.3.4. Assess personal strengths and weaknesses in entrepreneurial skills. 4.3.5. Apply entrepreneurial skills within a real or simulated entrepreneurial activity. 4.3.6. Conduct a risk-benefit analysis for implementation of an innovative idea or simulated entrepreneurial activity. 4.4. Professionalism (Professional): Exhibit behaviors and values that are consistent with the trust given to the profession by patients, other healthcare providers, and society. Learning Outcomes 4.4.1. Demonstrate altruism, integrity, trustworthiness, diligence, flexibility, patience, humility, and respect in all interactions. 4.4.2. Display preparation, initiative, and accountability consistent with a commitment to excellence. 4.4.3. Deliver patient-centered care in a manner that is legal, ethical, and compassionate and free of conflict of interest. 4.4.4. Demonstrate an awareness that one's professionalism is constantly evaluated by others. 4.4.5. Engage in the profession of pharmacy by demonstrating a commitment to its continual improvement.		

						4.4.6. Display respect for patient privacy, confidentiality, and autonomy.									

23. Annex- 6, Survey of Number of Courses and Credit Hours of Similar Programs

University		University of Science and Technology, Yemen		Hadramout University, Yemen		JUST, Jordan		King Faisal University, KSA		Eastern Mediterranean University, Turkey		Long Island University, USA		Average	
Total Courses and Cr. Hrs.		Cr. Hrs.	Courses	Cr. Hrs.	Courses	Cr. Hrs.	Courses	Cr. Hrs.	Courses	Cr. Hrs.	Courses			Cr. Hrs.	Courses
University Requirements	Compulsory	25	10	16	8	25	9	8	4	-	-	--	--	18.5	8
	Electives	--	--	--	--	-	-	--	--	--	--	--	--	-	-
	Percentage	---%	--%	--%	--%	--%	--%	--%	--%	--%	--%	--	--	--%	--%
Faculty Requirements	Compulsory	40	14	7	3	41	17	31	13	-	-	--	--	30	12
	Electives	--	--	--	--	--	--	-	--	--	--	--	--	-	--
	Percentage	---%	--%	%	%	-- %	--%	--%	--%	--%	--%	--	--	--%	--%
Department Requirements	Compulsory	-	-	147	34	-	-	54	20	-	-	69	21	90	25
	Electives			--	--	--	--	--	--	-	-	--	--	-	-
	Percentage	---%	--%	--%	--%	--%	--%	--%	--%	--%	--%	-	-	--%	--%
Program Requirements	Compulsory	137	63	46	26	150	62	89	26	-	-	110	45	106	44
	Percentage	---%	--%	%	%	--%	--%	--%	--%	--%	--%	-	-	--%	--%

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Rector

University		University of Science and Technology, Yemen		Hadramout University, Yemen		JUST, Jordan		King Faisal University, KSA		Eastern Mediterranean University, Turkey		Long Island University, USA		Average	
	Electives	--	--	--	--	-	-	--	--	--	--	--	--	--	--
	Percentage	---%	--%	--%	--%	--%	--%	--%	--%	--%	--%	--	--	--%	--%
	Graduation Project	-	-	1	1	-	-	-	-	--	--	--	--	--	--
	Percentage	---%	--%	0.5 %	1.4 %	--%	--%	--%	--%	--%	--%	--	--	--%	--%
	Training	-	-	--	--	6	2	-	--	--	--	40	8	4	2
	Percentage	---%	--%	--%	--%	--%	--%	--%	--%	--%	--%	18.3	10.8	--%	--%
	Industrial Training	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Percentage	---%	--%	--%	--%	--%	--%	--%	--%	--%	--%	--	--	--%	--%
	Practical Skills	--	--	--	--	--	--	-	-	-	-	--	--	--	--
	Percentage	---%	--%	--%	--%	--%	--%	--%	--%	--%	--%	--	--	--%	--%
Other Courses		--	--	--	--	--	--	--	--	--	--		--	--	--
Total		Cr. Hrs.	Courses	Cr. Hrs.	Courses	Cr. Hrs.	Courses	Cr. Hrs.	Courses	Cr. Hrs.	Courses	Cr. Hrs.	Courses	207	
		202	84	217	72	210	84	178	61	218	74	219	74		

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24. Annex- 7, Comparison of Program with Similar Programs

University	21 September University	UST, Yemen	University of Hadramout, Yemen	JUST, Jordan	The King Faisal University, KSA	Eastern Mediterranean University Turkey	Long Island University, USA
No of Courses	89	84	72	84	61	74	74
Total Cr. Hrs.	209	202	217	210	178	218	219
Total Years	5 years + 1 year Internship (6 Years)	5 years + 1 year Internship (6 Years)	6 Years	6 Years	5 Years	6 Years	2+4 (6 Years)

25. Annex- 8, Comparison of Program Courses and Similar Programs Courses

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
1	Islamic Culture				2	Islamic Culture				4	Islamic Culture -I, 2	2, 2			2+2	Islamic Culture				3	Islamic Faith	2			2						
2	English Language 1				2	English Language 1				4	English language –I	2			2	English Language				3						Communication in English - I				3	English Composition	3
3	Arabic language 1				2	Arabic language				4	Arabic language 1	2		-	2	Arabic Language				3												
4	Human Biology				3	Biology 1 & 2				3+3	Botany	2		2	3	General Biology				3	Molecular Biology	2			2	Introduction to Molecular Biology and Genetics	2		3	3	General Biology 1 & 2	4 + 4
5	Fundamentals of Nursing				1						First aid	2			2						First Aid and Emergency Medicine			1	1	First Aid and Medical Devices	1		1	1	Principles of Physical Assessment and Medicatio	2 + 3

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Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P / T	C H		L	T	P	C H		L	T	P / T	C H		L	T	P / T	C H		L	T	P / T	CH		L	T	P / T	C H		
																															n Administration + Public Health & Patient Safety	
6	Fundamentals of Health Management				2																											
7	General Chemistry				3	General Chemistry I & II				3 + 3	General Chemistry	2		2	3	General Chemistry				4						General Chemistry	4		1	5	General and Inorganic Chemistry	3 + 4
8	Medical Physics				3						Physical pharmacy–I	2			2	General Physics				3						Principles of Physics	2		1	3	Physics for Pharmacy	4

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Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
9	National culture				2											Social Responsibility				3	Contemporary Cultural issues	2			2						Philosophy or History	3
10	English Language II				2	English Language II				4																Academic English - I				3	English Literature (Eng 61, 62, 63, or 64)	3
11	Medical Terminology				2																					Medical Terminology	2			2		
12	Human Anatomy				3	Anatomy				3	Anatomy	2		2	3	Gross Anatomy And Histology				3	Anatomy & Histology-1 & II	1		1	2	Anatomy and Histology	2		2	3	Physiology/Anatomy	4
13	Histology				3						Histology	2		2	3	Gross Anatomy And				3	Anatomy & Histology-1 & II	1		1	2						Physiology/Anatomy	4

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Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
																Histology																
14	Computer Skills				3	Computer Skills				3	Computer Sciences	2			2											COMPUTER	2		2	3		
15	Arabic Language 2				2						Arabic Language 2	2			2																	
16	The Arab Israeli Conflict				2																											
17	Communication skills				2	Communication skills				1	Communication Skills	2			2	General Skills				2											Oral Communication	3
18	Introduction to Pharmacy				1						Introduction to Pharmacy	2			2						Pharmacy Orientation										1

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Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
19	Human Physiology-I				2	Physiology-I				2	Physiology-I	2			2	Human Physiology				3	Physiology-1	2		1	3	Physiology - I	4			4	Physiology/Anatomy	4
20	Physical Pharmacy				3	Physical Pharmacy				3	Physical pharmacy- II	2			2	Pharmaceutics 1 (For Pharm D Students)				3	Physical Pharmacy	2		1	3	Physical Pharmacy – I & II	2 +2			2 +2	Pharmaceutics I (Basic theories in pharmaceutics)	2
21	Pharmaceutical Organic Chemistry-I				3	Organic Chemistry-I				3	Pharmaceutical Organic Chemistry- I	2		2	3	Organic Chemistry				4	Pharmaceutical Organic Chemistry-1	3		1	4	Organic Chemistry - I	4		1	5	Organic Chemistry	4
22	Biochemistry-I				2	Biochemistry-I				3	Biochemistry-I	2			2	Biochemistry				3	Biochemistry-1	2			3	Biochemistry	2		2	3	Biochemistry	3
23	Pharmaceutical Analytic				3	Pharmaceutical Analytic				3	Pharmaceutical	2 +2		2+2	3 +3	Pharmaceutical				3	Pharmaceutical Analytical Chemistry	2		1	3	Analytical Chemistry – I & II	3+3		2 +2	4+4		

Head of Department Quality Unit Dean of the Faculty Center of Development & Quality Assurance

Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
	al Chemistry					al Chemistry					Analytical Chemistry I & II					Analytical Chemistry (For Pharm D Students)															
24	Pharmacognosy-I				3	Pharmacognosy-I				3	Botany + Pharmacognosy-I	2+2		2+2	3+3						Pharmacognosy	2		1	3	Pharmacognosy - I	2	2		3		
25	Pharmaceutical Calculations				1						Pharmaceutical calculation–I & II	2+2			2+2						Fundamentals of Pharmaceutics	2		1	3						Pharmaceutical calculations	2
26	Medical statistics				2	Biostatistics				2	General Statistics	2			2	Biostatistics				2						Biostatistics	2	3		3	Statistics + Biostatistics	3+2

Head of Department Quality Unit Dean of the Faculty Center of Development & Quality Assurance

Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
27	Human Physiology II				2	Physiology II				3	Physiology-II	2			2						Physiology-2	2			1	Physiology - II	3	2		4	Physiology/Anatomy	4
28	Pharmaceutics-I				3	Pharmaceutical Technology-1				3	Pharmaceutics-I	2		2	3	Pharmaceutics 2 (For Pharm D Students)				3	Pharmaceutical Dosage Forms	2		1	3	Pharmaceutical Technology - I	3	2		4	Pharmaceutics I-V (Dosage forms and principles of compounding)	3
29	Pharmaceutical Organic Chemistry-II				3	Organic Chemistry-II				3	Pharmaceutical Organic Chemistry- II	2		2	3	Pharmaceutical Organic Chemistry (For Pharm D Students)				4	Pharmaceutical Organic Chemistry-2	2		1	3	Organic Chemistry - II	3		2	4	Organic Chemistry	4

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Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P / T	CH		L	T	P	CH		L	T	P / T	CH		L	T	P / T	CH		L	T	P / T	CH		L	T	P / T	CH		
30	Biochemistry-II				2	Biochemistry-II				3	Biochemistry-II	2			2						Biochemistry-II	2		1	3							
31	Pharmacognosy-II				3	Pharmacognosy-II				2	Pharmacognosy -II	2		2	3											Pharmacognosy - II	2		3	3		
32	Pharmacology-I				2	Pharmacology-I				2	Pharmacology-I	2		2	3	Pharmacology 1(For Pharm D Students)				3	Pharmacology -1	2			2	Pharmacology - I	3			3	Principles of Pharmacology/Medicinal Chemistry /Toxicology	2.5
33	Basic Microbiology				3	Microbiology & Immunology				3	Microbiology I	2			2						Microbiology	3		1	4	Medical Microbiology	3	1		4	Microbiology	4
34	Phytochemistry				3	Phytochemistry I & II				2 + 3						Chemistry Of Natural Product				3												

Head of Department Quality Unit Dean of the Faculty Center of Development & Quality Assurance

Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P / T	C H		L	T	P	C H		L	T	P / T	C H		L	T	P / T	C H		L	T	P / T	CH		L	T	P / T	C H		
																s (For Pharm D Students)																
35	Medicinal Chemistry-I				3	Pharmaceutical Chemistry-I				2	Medicinal chemistry: I-IV	2		2	3	Medicinal Chemistry 1 (For Pharm D Students)				3	Medicinal Chemistry-I	3			3	Pharmaceutical Chemistry - I	2	2		3	Principles of Pharmacology/Medicinal Chemistry /Toxicology	2.5
36	Pharmaceutics-II				3	Pharmaceutical Technology-II				3	Pharmaceutics-II	2		2	3	Pharmaceutics 3 (For Pharm D Students)				3						Pharmaceutical Technology - II	3	3		4	Pharmaceutics I-V (Dosage forms and principles of compounding)	3

Head of Department Quality Unit Dean of the Faculty Center of Development & Quality Assurance

Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
37	Pharmacology-II				3	Pharmacology-II				3	Pharmacology -IV	2			2	Pharmacology 1(For Pharm D Students)				3	Pharmacology-2	2		2	3	Pharmacology - II	3			3		
38	Public Health				2	Public Health				1																Public Health	2			2	Principles of Physical Assessment and Medication Administration + Public Health & Patient Safety	2 + 3
39	Pharmacology-III				3	Pharmacology-III				3						Pharma				3	Pharmacology-3	3			3	Pharmacology - III	2	1		2		

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Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P / T	C H		L	T	P	C H		L	T	P / T	C H		L	T	P / T	C H		L	T	P / T	CH		L	T	P / T	C H		
																cology 1II (For Pharm D Students)																
40	Pharmaceutics-III				3	Pharmaceutical Technology-1I				3	Pharmaceutics 3	2		2	3	Pharmaceutics 4 (For Pharm D Students)				1						Pharmaceutical Technology - III	2	3		3	Pharmaceutics I-V (Dosage forms and principles of compounding)	3
41	Medicinal Chemistry II				3	Pharmaceutical Chemistry-II				2	Medicinal chemistry: I-IV	2		2	3	Medicinal Chemistry 11 (For Pharm D				3	Medicinal Chemistry-2	3			3	Pharmaceutical Chemistry - II	2	3		3		

Head of Department Quality Unit Dean of the Faculty Center of Development & Quality Assurance

Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
																Students)																
42	Immunology				2	Microbiology & Immunology				3	Immunology and genetics	2		2	3	Immunology And Vaccines (For Pharm D Students)				2	Immunology	2			1	Immunology	4			4	Pathophysiology/immunology	3
43	Parasitology				3	Pharmaceutical Microbiology				3	Microbiology-II	2		2	3											Virology and Parasitology	3		2	4		
44	General Pathology				3	Pathology				2	Pathology	2			2	General Pathology				3	Pathophysiology-1 & II	2 + 2			2 + 2	Pathology	2			2	Pathophysiology/immunology	3
45	Pharmacology-IV				2	Pharmacology-IV				2	Pharmacology -IV	2		2	3						Pharmacology -4	3			3							

Head of Department Quality Unit Dean of the Faculty Center of Development & Quality Assurance

Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
46	Pharmacy Management				1	Pharmacy Management				1	Hospital Pharmacy and Pharmacy Administration	2		3	3						Pharmacy management	2			2						Practice Management	2
47	Clinical Biochemistry-I				2																Clinical Biochemistry & Nutrition	2		1	3	Clinical Biochemistry	2			2		
48	Pharmacotherapy-I				2	Therapeutics: I-VII				2	Pharmacotherapy: I-IV	2		3	3	Therapeutics: I-X (For Pharm D Students) Students)				3	Therapeutics-I	4		1	5	Pharmacotherapy - I	3			3	Modular Organ Systems Therapeutics Sequence: I-VIII	2.5-4

Head of Department Quality Unit Dean of the Faculty Center of Development & Quality Assurance

Rector

#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
49	Case Studies in Pharmacotherapy-I: "case-based seminars"				1	ICBL-1-IV				1						Clinical Cases: 1-IV (For Pharm D Students)				1												
50	Pharmaceutical Care- I				1	Pharmacy Practice-I				1	Pharmaceutical care	2		3	3	Pharmacy Practice Laboratory: I-IV (For Pharm D Students)				1	Pharmaceutical Care-1			1	1	Pharmacy Practice	2			2	Introduction to Pharmacy Practice	3
51	Pharmacogenomics				2																										Human Genetics +	2 +2

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
																															Pharmaco genomics	
52	Medicinal Chemistry-III				3	Pharmaceutical Chemistry-I				3	Medicinal chemistry: I-IV	2		2	3	Medicinal Chemistry III (For Pharm D Students)				3	Medicinal Chemistry-3	2			2	Pharmaceutical Chemistry - III	2	3		3		
53	Research Methodology				2	Research Methodology				2	Research methodology and Biostatistics	2			2						Research Methodology & Biostatistics	2		1	3							
54	Biopharmaceutics &				2	Biopharmaceutics +				2 + 2	Biopharmaceutics and	2 + 2			2 + 2	Biopharmaceutics And Pharma				3	Bio-pharmaceutics	2		1	3						Pharmaceutics III (Biopharmaceutic	3

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P / T	C H		L	T	P	C H		L	T	P / T	C H		L	T	P / T	C H		L	T	P / T	CH		L	T	P / T	C H		
	Pharmac okinetics					Pharmac okinetics					Pharm acokin etics -I & II					cokinet ics (For Pharm D Student s)															s/pharmac okinetics)	
55	Clinical Pharmac okinetics				3	Clinical Pharmac okinetics				2	Clinica l Pharm acokin etics	2		2	3	Clinical Pharma cokinet ics (For Pharm D Student s)				3	Clinical Pharmacokine tics	2		1	3						Clinical Pharmaco kinetics	2
56	Clinical Nutrition				2	Clinical Nutrition				2	Nutriti on	2			2	Clinical Nutritio n(For Pharm D Student s)				2	Parenteral Nutrition	1			1	Nutrition and Dietary Treatment	3			3		

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
57	Clinical Biochemistry 2				2																											
58	Community Pharmacy				2																Self-care & Nonprescription Drugs	2			2							
59	Pharmacotherapy-II				2	Therapeutics: I-VII				2	Pharmacotherapy: I-IV	2		3	3	Therapeutics: I-X (For Pharm D Students) Students)				3	Therapeutics-2	4		1	5	Pharmacotherapy - II	3			3	Modular Organ Systems Therapeutics Sequence: I-VIII	2.5-4
60	Case Studies in Pharmacotherapy-II: "case-				1	ICBL-1-IV				1						Clinical Cases: 1-IV (For Pharm D				1												

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
	based seminars "															Students)																
61	Pharmaceutical Care-II				1	Pharmacy Practice-I				1	Pharmaceutical care	2		3	3	Pharmacy Practice Laboratory: I-IV (For Pharm D Students)				1	Pharmaceutical Care-1I & 3	2+2		1	3+2							
62	Community Pharmacy Clerkship*				3	Pharmacy Practice Training				2	Community Pharmacy Practice				3						Introductory Pharmacy Practice Experience in Community Pharmacy. (For 5 weeks, 200 hours)			2	2	Pharmacy Practice Clerkship**				6	Community Practice Introductory Pharmacy Practice Experience+ Community	4+5

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P / T	C H		L	T	P	C H		L	T	P / T	C H		L	T	P / T	C H		L	T	P / T	CH		L	T	P / T	C H		
																															Practice (5 weeks)	
63	Pharmaceutical Instrumental Analysis				3	Instrumental Analysis				3						Pharmaceutical Instrumental Analysis (For Pharm D Students)				4						Instrumental Analytical Methods	3	1		3		
64	Pharmacotherapy-III				2	Therapeutics: I-VII				2	Pharmacotherapy: I-IV	2		3	3	Therapeutics: I-X (For Pharm D Students) Students)				3	Therapeutics-3	4		1	5						Modular Organ Systems Therapeutics Sequence: I-VIII	2.5 -4

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P / T	C H		L	T	P	C H		L	T	P / T	C H		L	T	P / T	C H		L	T	P / T	CH		L	T	P / T	C H		
65	Case Studies in Pharmacotherapy-III: "case-based seminars"				1	ICBL-1-IV				1						Clinical Cases: 1-IV (For Pharm D Students)				1												
66	Pharmacoeconomics and Health Outcomes				2	Pharmacoeconomics and Pharmaepidemilogy				1						Pharmaceutical Marketing And Pharmacoeconomics (For Pharm D Students)				2	Pharmaco-economics + Pharmaco-epidemiology	1 + 1			1 +1	Pharmacoeconomics	3			3	Economics + Pharmacoeconomics and Pharmacoepidemiology	3 + 2

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
67	Drug Information and Evidence-Based Practice				1						Drug information & Literatures Evaluations	2			2	Drug Literature Evaluation (For Pharm D Students)				3	Drug Information Services	2		1	3						Drug Information and Literature Evaluation	3
68	Clinical Toxicology				3	Toxicology				2+2	Toxicology I & II	2+2			2+2						Clinical Toxicology	2			2	Pharmaceutical Toxicology	3	2		4	Principles of Pharmacology/Medicinal Chemistry /Toxicology	2..5
69	Pharmaceutical Biotechnology				2	Pharmaceutical Biotechnology				2	Pharmaceutical Biotec	2			2	Pharmaceutical Biotech				4	Pharmaceutical Biotechnology/	2			2	Pharmaceutical Biotechnolo	4			4		

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P / T	CH		L	T	P	CH		L	T	P / T	CH		L	T	P / T	CH		L	T	P / T	CH		L	T	P / T	CH		
											hnology					nology (For Pharm D Students)					Pharmacogenomics:					gy and Cell Culture						
70	Pharmaceutical Marketing & Drug Promotion				2	Pharmaceutical Marketing					Pharmaceutical marketing and promotion	2			2	Pharmaceutical Marketing And Pharmacoeconomics (For Pharm D Students)				2												
71	Hospital Pharmacy				2						Hospital Pharmacy	2		3	3						Institutional Pharmacy Practice	11				Hospital Pharmacy Practice	2			2	Pharmacy Profession and the Health	3

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P / T	C H		L	T	P	C H		L	T	P / T	C H		L	T	P / T	C H		L	T	P / T	CH		L	T	P / T	C H		
											and Pharmacy Administration																					Care System	
72	Pharmacotherapy-IV				2	Therapeutics: I-VII				2	Pharmacotherapy: I-IV	2		3	3	Therapeutics: I-X (For Pharm D Students) Students)				3	Therapeutics-4	4		1	5						Modular Organ Systems Therapeutics Sequence: I-VIII	2.5-4
73	Case Studies in Pharmacotherapy-IV: "Case-				1	ICBL-1-IV				1						Clinical Cases: 1-IV (For Pharm D				1												

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#	21 September University, Yemen					UST, Yemen					University of Hadramout, Yemen					JUST, Jordan					The King Faisal University, KSA					Eastern Mediterranean University Turkey					Long Island University, USA	
	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
	based seminars"															Students)																
74	Pharmacotherapy-V				2	Therapeutics: I-VII				2	Pharmacotherapy: I-IV	2		3	3	Therapeutics: I-X (For Pharm D Students) Students)				3										Modular Organ Systems Therapeutics Sequence: I-VIII	2.5-4
75	Case Studies in Pharmacotherapy-V: "case-based seminars"				1	ICBL-1-IV				1						Clinical Cases: 1-IV (For Pharm D Students)				1											

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P / T	C H		L	T	P	C H		L	T	P / T	C H		L	T	P / T	C H		L	T	P / T	CH		L	T	P / T	C H		
76	Medication Safety and Health Information Technology				2	Medication Therapy Mnagement				2																						
77	Ethics and Pharmacy regulations				2	Pharmacy Law & Ethics				1						Pharmacy Ethics And Law(For Pharm Dstudent)				2	Law & Ethics in Pharmacy Practice	1			1	History and Ethics of Pharmacy	1			1	Intro to Pharmacy Law and the Integrated Pharmaceutical Care Laboratory + Pharmacy Law and Ethics	1 + 3
78	Complementary				2	Complementary				1						Phytoth				3	Natural Products &	2			2	Pharmacognosy - III	2	3		3		

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
	and alternative medicine					and alternative medicine										erapy (For Pharm D Students)					Herbal Medicine											
79	Practical-based Research Project				1	Pharmaceutical Research Rotation				2	Pharm. D. Graduation Project			1	1	Clinical Seminar (For Pharm D Students)				1						Thesis Project – I & II				2+3	Senior Seminar	2.5
80	Hospital Training: Internal Medicine -I				7	Internal Medicine-I & Cardiology Rotation				4+4	Internal Medicine1				3	Clinical Training: Internal Medicine 1 (For Pharm D			4	4											Inpatient General Medicine (5 weeks)	5

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
																Students)																
81	Hospital Training: Ambulatory care				3	Ambulatory care Rotation				4						Clinical Training: Ambulatory Care (For Pharm D Students)			4	4											Ambulatory Care (5 weeks)	5
82	Hospital Training: Pediatric				3	Pediatric Rotation				4	Pediatric				3	Clinical Training: Pediatrics (For Pharm D Students)			4	4											Patient Care Focus APPE	5

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
83	Hospital Training: Hospital Pharmacy				2	Hospital Pharmacy				4	Hospital Pharmacy				3	Clinical Training: Hospital Pharmacy (For Pharm D Students			4	4	Introductory Pharmacy Practice Experience in Institutional Pharmacy (For 5 weeks, 200 hours).			2	2	Hospital Pharmacy Clerkship				6	Institutional Practice (5 weeks) + Non-Patient Care Focus APPE	5 + 5
84	Hospital Training: Oncology care				3	Oncology Rotation				4						Clinical Training: Oncology (For Pharm D Students)			4	4											Patient Care Focus APPE	5
85	Hospital Training: Internal									4 + 4	Internal				3	Clinical Training:			4	4											Patient Care	5

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P/T	CH		L	T	P	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		L	T	P/T	CH		
	Medicine-II					Internal Medicine-II + Infectious Diseases					Medicine 2					Internal Medicine 2 (For Pharm D Students)															Focus APPE	
86	Hospital Training: Intensive Care Unit					Intensive Care Unit				4	Critical Care				3	Clinical Training: Critical Care (For Pharm D Students)			4	4										Acute Care (5 weeks)	5
87	Hospital Training: Surgery										Surgery				3															Patient Care Focus APPE	5

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	Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Course Hours				Course	Cr. hrs
		L	T	P / T	C H		L	T	P	C H		L	T	P / T	C H		L	T	P / T	C H		L	T	P / T	CH		L	T	P / T	C H		
88	Hospital Training: Gynecology & Obstetrics															Clinical Training: Gynecology And Obstetrics			4	4											Patient Care Focus APPE	5
89	Hospital Training: Psychiatric										Psychiatrics				3	Clinical Training: Neurology And Psychiatry			4	4											Patient Care Focus APPE	5

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26. Annex- 9, Alignment of Program PILOs with NARS Standards: National Academic Reference Standards (NARS), Yemen, June 2022

#	Program Intended Learning Outcomes in National Academic Reference Standards (NARS), Yemen, June 2022	Program Intended Learning Outcomes (PILOs) رموز مخرجات التعلم للبرنامج PILOs																	
		A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5	D1	D2	D3
A 1	Define the fundamentals of scientific knowledge and principles of biomedical, pharmaceuticals, social, behavioral, administrative, therapeutics, and other basic sciences related to the pharmacy profession.	√																	
A 2	Illustrate the physicochemical and pharmacokinetic properties of medicines and their influence on compounding, evaluation, analysis, route of administration, and dosage regimen.		√																
A 3	Identify broad knowledge about the mechanism of action, effectiveness, use, safety, side effects, and interactions of therapeutic agents as well as the complementary therapies.			√															
A 4	Recognize the advanced concepts of professional (ethics, policies, laws, regulations requirements, management pharmacovigilance, Pharmacoepidemiology, pharmacoeconomic, pharmacoinformatic, research studies, sources of information…. etc) to optimize the therapeutic outcomes.				√														
A 5	Describe the role of pharmacists in patient care; dispensing, designing, implementing, monitoring, evaluating, and adjustment of medication therapy plans that are patient-specific and evidence-based to achieve maximum clinical					√													
B 1	Integrate the physicochemical properties of medicines to compounding, preparation, and analysis of parenteral nutrition, I.V admixtures, and small-batch preparation.						√												

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B 2	Predict the drug properties including the bio-pharmaceutics, pharmacokinetics, pharmacodynamics and their applications.							√												
B 3	Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, pharmacoepidemiology, and pharmacoeconomic factors to enhance the healthcare systems.								√											
B 4	Formulate an appropriate pharmacotherapy care plan and monitoring strategies to solve practice problems and improve patient safety and efficacy through utilization of pharmacodynamic, pharmacokinetic parameters of medicines as well as diseases pathophysiology and research outcomes.									√	√									
C 1	Deal safely and effectively with biotechnological, radio-pharmaceuticals, and synthetic/natural pharmaceutical materials/products used in pharmaceutical preparations.											√								
C 2	Compound/prepare extemporaneous, cytotoxic, I.V admixture, parenteral nutrition, and small-batch pharmaceutical preparation taking into account the physicochemical properties of drug structures.												√							
C 3	Contribute to creating/improving national drug policies, laws, and regulations related to the health care systems.													√						
C 4	Implement patient-oriented pharmaceutical care legally and ethically in a variety of patient care settings in collaboration with patients and other health care professionals according to professional standards, appropriate therapeutic guidelines, and research outcomes.														√	√				
D 1	Display ethically and legally leadership, time management, critical thinking, problem-solving, communication, tame-work, independence, creativity, innovation, entrepreneurial, delegation, and organizational skills																√			
D 2	Develop life-long learning, in particular an awareness of the need for continuing education, research, scholarship, and professionalism in the field of pharmaceutical practice.																	√		

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D 3	Use digital pharmacy health improvement and educational technologies efficiently.																		√

27. Graduate attributes: At the end of the program, the Pharm.D. graduates will have the following criteria:

1. Develop, integrate, and apply knowledge from the foundational and clinical sciences related to pharmacy education and practice.
2. Provide a patient-centered care as the medication expert.
3. Identify problems; explore and prioritize potential strategies; and design, implement, and evaluate a viable solution through evaluating medical literature, conducting pharmaceutical research in pharmacy settings, and updating information.
4. Work ethically and legally as part of a team with leadership and communication skills.
5. Express self-awareness for continuous professional improvement.

Pharm.D. program Learning Outcomes:

Knowledge and understanding: Upon successful completion of undergraduates Pharm.D. program, should be able to:

A1. Define the fundamentals of scientific knowledge and principles of biomedical, pharmaceuticals, social, behavioral, administrative, therapeutics, and other basic sciences related to the pharmacy profession.
A2. Illustrate the physicochemical and pharmacokinetic properties of medicines and their influence on compounding, evaluation, analysis, route of administration, and dosage regimen.

A3. Identify broad knowledge about the mechanism of action, effectiveness, use, safety, side effects, and interactions of therapeutic agents as well as the complementary therapies.
A4. Recognize the advanced concepts of professional (ethics, policies, laws, regulations requirements, management, pharmacovigilance, Pharmacoepidemiology, pharmacoeconomic, pharmacoinformatic, research studies, sources of information…. etc) to optimize the therapeutic outcomes.
A5. Describe the role of pharmacists in patient care; dispensing, designing, implementing, monitoring, evaluating, and adjustment of medication therapy plans that are patient-specific and evidence-based to achieve maximum clinical effectiveness.

Cognitive/ Intellectual Skills: Upon successful completion of undergraduates Pharm.D. program, should be able to:

B1. Integrate the physicochemical properties of medicines to compounding, preparation, and analysis of parenteral nutrition, I.V admixtures, and small-batch preparation.
B2. Predict the drug properties including the bio-pharmaceutics, pharmacokinetics, pharmacodynamics and their applications.
B3. Merge the pharmacological knowledge about natural and synthetic medicines with policies, information systems, workforces, service delivery, pharmacovigilance, pharmacoepidemiology, and pharmacoeconomic factors to enhance the healthcare systems.
B4. Formulate an appropriate pharmacotherapy care plan and monitoring strategies to solve practice problems and improve patient safety and efficacy through utilization of pharmacodynamic, pharmacokinetic parameters of medicines as well as diseases pathophysiology and research outcomes.
B5. Compare various therapeutic options using scientific research and evidence-based practice to optimize efficacy, safety, and cost for each drug-related problem.

Practical & Professional Skills: Upon successful completion of an undergraduates Pharm.D. program, should be able to:

C1. Deal safely and effectively with biotechnological, radio-pharmaceuticals, and synthetic/natural pharmaceutical materials/products used in pharmaceutical preparations.

C2. Compound/prepare extemporaneous, cytotoxic, I.V admixture, parenteral nutrition, and small-batch pharmaceutical preparation taking into account the physicochemical properties of drug structures.
C3. Contribute to creating/improving national drug policies, laws, and regulations related to the health care systems.
C4. Implement patient-oriented pharmaceutical care legally and ethically in a variety of patient care settings in collaboration with patients and other health care professionals according to professional standards, appropriate therapeutic guidelines, and research outcomes.
C5. Contribute to pharmaceutical research studies and clinical trials needed to enhance professional decisions to optimize medicine use in specific medical conditions

D. General and Transferable Skills: Upon successful completion of an undergraduate Pharm.D. program, graduates should be able to:

D1. Display ethically and legally leadership, time management, critical thinking, problem-solving, communication, tame-work, independence, creativity, innovation, entrepreneurial, delegation, and organizational skills
D2. Develop life-long learning, in particular an awareness of the need for continuing education, research, scholarship, and professionalism in the field of pharmaceutical practice.
D3. Use digital pharmacy health improvement and educational technologies efficiently.

Annex-10, CVs for the Preparation Committee

Attached separately.

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