Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY for MEDICALS & APPLIEED SCIENCES

Faculty of Clinical Pharmacy

Clinical Pharmacy Program Specification Document

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1. Basic and general Information about the program	
Program Title	Clinical Pharmacy 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	Five years.
Mode of delivery	Regular
Teaching Institution	Faculty of Clinical Pharmacy
System of study	Semester-Based System
Duration of study	Complete 174 credit hours for Clinical Pharmacy Program.
Final Award/s available	Bachelor's degree
Award title	Bachelor of Clinical Pharmacy
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 the Ministry of Higher Education and Scientific Research, Republic of Yemen, and university rules.
Other requirements	N/A
Coordinator	Dr. Ali Alyahawi (Ass. Professor of Clinical Pharmacy & Therapeutics)
Last date of accreditation	N/A

2. Program Overview:

This program is a unique and excellent Pharmacy program in which the graduate obtains the Bachelor of Clinical Pharmacy. These graduates are distinguished by their knowledge, theoretical and practical skills, and their abilities to work effectively among the health care team. The Bachelor of Clinical Pharmacy program is five years of academic study & hospital training. The graduate student from this program should complete 174 credits hours.

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 Eemploying 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.

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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 achieving 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 the 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 in 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. 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. Accreditation Bodies & Similar Programs:

1. Egypt, NAQAAE (2018). National Academic Reference Standards, Pharmacy, First Edition
2. Accreditation Council for Pharmacy Education (2015), USA
3. **Lebanese International University**, School of Pharmacy & Medical Sciences, Department of Clinical Pharmacy, Bachelor of Clinical Pharmacy. **https://ye.liu.edu.lb/Academics/School%20of%20Pharmacy%20&%20Medical%20Sciences.php**
4. **China Pharmaceutical University**, School of Basic Medicine & Clinical Pharmacy, Department of Clinical Pharmacy, B. Sc. in Clinical Pharmacy. **https://cpu.cucas.cn/program/Clinical-Pharmacy-20348.html**
5. **Mansura University**, Faculty of Pharmacy, Department of Pharmacy, Bachelor of Clinical Pharmacy **http://pharfac.mans.edu.eg/index.php?lang=en**
6. **Alexandria University**, Faculty of Pharmacy, Bachelor of Pharmacy (Clinical Pharmacy). **https://pharmacy.alexu.edu.e**
7. **The University of Manchester**, Faculty of Biology, Medicine and Health, BSc Clinical Pharmacy (dual award from China Pharmaceutical University (CPU) and The University of Manchester). UK, **https://www.bmh.manchester.ac.uk/study/pharmacy/bsc-clinical-pharmacy/**

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6. Mission & Aims of the Program.

Program Mission:

The program aims to provide pharmaceutical education in all aspects of pharmacy practice using principles of comprehensive pharmaceutical care that develop and improve the professional skills necessary to prepare and qualify graduates who are able to provide solutions to medication problems and improve the health and quality of care locally and regionally.

Program Objectives:

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.

7. Graduate Attributes of the program

Upon successful completion of an undergraduate Clinical Pharmacy program, the graduates will be able to:

1. Demonstrate scientific knowledge and principles of chemical, biomedical, microbiological, physiological, pathological, behavioral, and other basic sciences related to the pharmacy profession.
2. Integrate knowledge from fundamental sciences necessary for handling, disposing of, preparing, compounding, and analyzing parenteral nutrition, I.V admixtures, and small-batch preparation.
3. Provide legally and ethically patient education, appropriate advice, and counseling services about safe, rational, cost-effective use of natural/ synthetic medicines, complementary therapies, and over-the-counter products using endorsed professional protocols.
4. Demonstrate the responsibilities and roles of the pharmacist in contributing to the health care system of society considering pharmacovigilance, pharmacoeconomics and pharmacoepidemiological factors, and legal, ethical, and professional rules.

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5. Apply patient-centered care as the medication expert (collect and interpret evidence, identify drug-related problems, prioritize and formulate assessments and recommendations, implement, monitor, and adjust plans, and document activities).
6. Work as part of a team with self-assurance, interpersonal collaboration, and communication, leadership time management, professionalism, critical thinking, creativity, innovation, problem-solving, entrepreneurship, and decision-making ability.
7. Demonstrate self-commitment to independent and lifelong learning through evaluating medical literature, conducting pharmaceutical research in pharmacy settings, and updating information.
8. Track the continuous updates concerning new therapeutic guidelines, regulations, and evidence-based medicine that are recently introduced

8. Program Intended Learning Outcomes (PILOs)

❖ PILOs of Knowledge and Understanding Skills:

Upon successful completion of an undergraduate Clinical Pharmacy program, the graduates will be able to:
A1. Recognize the fundamental knowledge from scientific knowledge and principles of chemical, biomedical, microbiological, physiological, pathological, behavioral, and other basic & clinical sciences related to the pharmacy profession.
A2. Demonstrate essential knowledge about the physicochemical and pharmacokinetic properties of medicines and their influence on compounding, evaluation, analysis, route of administration, and dosage regimen.
A3. Recognize broad knowledge about the mechanism of action, effectiveness, use, safety, side effects, and interactions of natural and synthetic medicines.
A4. Define the pharmacist's roles in medication therapy management services including non-prescription medications, natural health products, and devices.
A5. Recognize the advanced concepts of professionalism (ethics, policies, laws, regulations requirements, management pharmacovigilance, pharmacoepidemiology, pharmacoeconomic, pharmacoinformatic, …..etc) to optimize therapeutic outcomes.
A6. Recognize the requirements of research and sources of information related to medicines and pharmaceutical care.

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A7. Recognize 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 Clinical Pharmacy program, the graduates will be able to:
B1. Integrate the physicochemical properties of medicines to compounding and preparation and analysis of total parenteral nutrition I.V admixtures and small-batch preparation.
B2. Predict the drug properties, including absorption, distribution, metabolism, excretion, and interaction with targets in the body, from molecular structure.
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. Presume research topics in all pharmaceutical fields to improve drug utilization, health outcomes, and wellness.
B5. Compare various therapeutic options based on evidence medicine of efficacy, safety, and cost for each drug-related problem.
B6. Formulate an appropriate pharmacotherapy care plan and monitoring strategies for preventing and solving encountered drug-related problems through the utilization of pharmacodynamic, pharmacokinetic properties of medicines as well as diseases pathophysiology and patient clinical data.

❖ PILOs of Professional Skills and Practices:
Upon successful completion of an undergraduate Clinical Pharmacy program, the graduates will be able to:
C1. Deal safely and effectively with synthetic/natural pharmaceutical materials/products used in pharmaceutical preparations.
C2. Compound/prepare extemporaneous, cytotoxic, I.V admixture, total parenteral nutrition, and small-batch pharmaceutical preparation considering the physicochemical properties of drug structures.
C3. Contribute to strategies of medication management including monitoring and improving medicines use.
C4. Utilize scientific literature, results of pharmaceutical research, and information interpretation to enhance professional decisions.
C5. 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 and appropriate therapeutic guidelines.
C6. Contribute to pharmaceutical research studies and clinical trials needed to optimize medicine use in specific medical conditions

❖ PILOs of General and Transferable Skills:
Upon successful completion of an undergraduate Clinical Pharmacy program, the graduates will be able to:
D1. Develop leadership, time management, critical thinking, problem-solving, communication, independence, creativity, innovation, entrepreneurial, delegation, and organizational skills
D2. Demonstrate skills in documenting and recording relevant information, findings, decisions, recommendations, and other information accurately and concisely, taking due account of privacy and confidentiality.
D3. Develop life-long learning, in particular an awareness of the need for continuing education, research, scholarship, and professionalism in the field of pharmaceutical practice.

9. Annex-1, Curriculum Map

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	A6	A7	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	D1	D2	D3
1		Islamic Culture	06.11.205	2																					
	1	English Language	06.11.203	4	☑																				
		Arabic language	06.11.201	4																					
		General Chemistry	02.04.243	2	☑		☑					☑												☑	
		Medical Physics	06.11.208	2	☑		☑					☑													
		Medical Terminology	04.01.218	2	☑		☑																		
		Fundamentals of Nursing	04.01.217	3	☑													☑					☑	☑	
		Medical Ethics	05.02.224	2	☑						☑	☑													
	2	Biochemistry-I	03.01.207	2	☑		☑						☑	☑				☑							☑	
		Histology	01.01.202	3	☑							☑													
		Fundamentals of Nutrition	03.01.208	2	☑							☑						☑	☑						
		Anatomy	01.01.201	3	☑							☑													
		Computer Skills	05.03.221	3	☑																			☑	
		Communication skills	05.01.220	2					☑															☑	☑	☑
		Physiology-I	01.01.203	2	☑							☑													
		General Microbiology	03.02.210	3	☑								☑						☑					☑	☑	
2	1	Biochemistry-II	03.01.213	3	☑		☑						☑	☑				☑							☑	
		Molecular Biology	03,01,315	2	☑								☑						☑					☑	☑	
		Fundamental of Immunology	03.02.211	2	☑							☑						☑						☑	
		General Pathology	01.01.205	3	☑						☑						☑	☑						☑	☑	

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		Parasitology	03.04.212	3	☑						☑	☑					☑	☑								
		Physiology II	01.01.206	2	☑												☑									
		Pharmacology-I	02.03.236	2	☑		☑				☑		☑							☑						
	2	Biochemistry-III	03.01.216	3	☑		☑						☑	☑				☑							☑	
		Pharmaceutical Organic Chemistry-I	02.04.244	3	☑			☑					☑					☑	☑					☑		
		Medical statistics	05.02.222	2	☑					☑					☑		☑							☑	☑	☑
		Pharmaceutical Analytical Chemistry	02.04.246	3	☑	☑						☑	☑					☑	☑					☑		
		Physical Pharmacy	02.02.227	3	☑							☑	☑						☑							
		Pharmaceutical analytical chemistry (2)	02.04.247	3	☑	☑				☑		☑	☑		☑			☑	☑					☑		
		Pharmaceutics-I	02.02.229	3	☑		☑	☑			☑			☑	☑		☑	☑	☑		☑		☑			☑
3	1	Pharmacognosy	02.04.249	3			☑	☑				☑	☑	☑				☑	☑							
		Pharmaceutical Organic Chemistry-II	02.04.245	3	☑			☑					☑					☑	☑					☑	☑	
		Pharmacology-II	02.03.237	3	☑		☑				☑		☑							☑						
		Clinical Nutrition	02.01.211	2	☑							☑						☑	☑							
		Phytochemistry	02.04.264	3			☑	☑				☑	☑	☑				☑	☑							☑
	2	Pharmacology-III	02.03.238	3	☑		☑				☑		☑							☑				☑		☑
		Medicinal Chemistry-I	02.04.248	3		☑	☑				☑	☑	☑			☑			☑	☑			☑			

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		Pharmaceutics-II	02.02.231	3	☑		☑	☑			☑			☑	☑		☑	☑	☑		☑		☑		☑			
		Pharmaceutical Instrumental Analysis	02.04.251	3	☑	☑				☑		☑	☑		☑			☑	☑		☑		☑	☑	☑	☑		
		Biopharmaceutics	02.02.230	2		☑						☑	☑															
4	1	Therapeutics (1)	02.01.212	3	☑		☑	☑	☑		☑		☑	☑		☑	☑		☑	☑		☑	☑	☑				
		Hospital Pharmacy	02.01.213	2			☑	☑			☑		☑	☑			☑	☑		☑	☑						☑	
		Pharmaceutics-III	02.02.234	3	☑		☑	☑			☑			☑	☑		☑	☑	☑		☑		☑		☑		☑	☑
		Community Pharmacy	02.01.216	4	☑				☑				☑				☑			☑	☑			☑				
		Medicinal Chemistry II	02.04.250	3		☑	☑				☑	☑	☑			☑			☑	☑			☑		☑	☑		
		Pharmacology-IV	02.03.239	2	☑		☑				☑		☑							☑				☑		☑		
		Therapeutics (2)	02.01.215	3	☑		☑	☑	☑		☑		☑	☑		☑	☑		☑	☑		☑	☑		☑	☑		
		Pharmaceutical Care	02.01.217	2					☑	☑	☑			☑			☑					☑		☑	☑	☑		
	2	Basic Pharmacokinetics	02.01.214	2	☑	☑											☑						☑		☑			
		Research Methodology	05.02.223	2		☑				☑					☑		☑				☑		☑	☑	☑	☑		
		Drug Information Resources	02.02.232	2		☑				☑				☑	☑		☑							☑	☑	☑		
		Clinical Biochemistry-I	03.01.215	2	☑		☑						☑	☑				☑							☑			
5	1	Clerkship-I	02.01.221	5	☑		☑	☑	☑		☑		☑	☑		☑	☑		☑	☑		☑	☑	☑	☑	☑		
		Pharmaceutical promotion and marketing	02.02.235	2					☑					☑		☑				☑	☑			☑	☑	☑		

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		Therapeutics (3)	02.01.218	3	☑		☑	☑	☑		☑		☑	☑		☑	☑		☑	☑		☑	☑	☑	☑	☑
		Pharmacology-V	02.03.240	2	☑		☑				☑		☑							☑				☑		☑
		~~Clinical. Immunology~~	~~03.02.216~~	~~2~~	☑		☑				☑	☑						☑						☑		
		Clinical. Microbiology	03.02.215	2	☑		☑						☑					☑								
		Pharmacy Practice (1)	02.01.219	2			☑	☑	☑	☑	☑					☑	☑			☑	☑			☑	☑	☑
		Pharmacoepidemiology and Pharmacoeconomics	02.02.233	2					☑					☑						☑	☑			☑	☑	☑
		Clinical Pharmacokinetics	02.01.223	3	☑	☑											☑						☑		☑	
		Toxicology	02.03.242	2	☑		☑		☑		☑			☑		☑			☑							
		Therapeutics (4)	02.01.220	3	☑		☑	☑	☑		☑		☑	☑		☑	☑		☑	☑		☑	☑	☑	☑	☑
	2	Therapeutics (5)	02.01.222	2	☑		☑	☑	☑		☑		☑	☑	☑	☑	☑		☑	☑		☑	☑	☑	☑	☑
		Clerkship (2)	02.01.225	5	☑		☑	☑	☑		☑		☑	☑		☑	☑		☑	☑		☑	☑	☑	☑	☑
		Research Project	02.01.226	2		☑				☑					☑		☑				☑		☑	☑	☑	☑
		Pharmacy Practice (2)	.01.22402	2			☑	☑	☑	☑	☑					☑	☑			☑	☑			☑	☑	☑
		Pharmaceutical Biotechnology	02.03.241	2	☑		☑				☑	☑						☑						☑	☑	☑

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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	√	√		√		
A6	√				√	√
A7	√	√			√	√
B1	√		√			
B2	√	√	√			
B3	√			√	√	√
B4	√	√			√	
B5	√	√			√	√
B6	√	√		√	√	√
C1	√		√	√		
C2	√		√	√		√
C3	√	√		√		√
C4	√	√			√	
C5	√	√		√	√	√
C6	√	√			√	√
D1	√	√		√	√	√
D2	√	√			√	
D3	√	√		√	√	√

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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	A6	A7	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	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.	√				√	√	√				√	√	√			√	√	√	√	√	√	√

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12. Annex-4, 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	5	15	-	-	8.6 %
2	Faculty Requirements	7	16			9.2 %
3	Department Requirements	38	94+2 CH Community Pharmacy Training	-	-	55.2 %
4	Program Requirements	18	37+ 10 CH Clinical Training	-	-	27 %
Field Training included in Department & Program Courses (Community Pharmacy & Clinical Clerkship)		2	12	-	-	6.9 %
Total Program Cr. Hrs.		68	174	-	-	100%

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13.Study Plan for the Bachelor of Clinical Pharmacy: (174 CH)

A. University Requirements (15 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	4				4
3	06.11.201	Arabic language	4				4
4	05.03.221	Computer Skills	2		2		3
5	06.11.208	Medical Physics	2				2
	Total		14		2		**15**
Total of Credit Hours			**15**				

B. Faculty Requirements (16 Credit hours)							
No.	Course Code	Course Name	Theoretical	Seminar	Practical	Training	Total
1	03.01.210	General Microbiology	2		2		3
2	04.01.217	Fundamentals of Nursing	2		2		3
3	05.01.220	Communication skills	2				2
4	04.01.218	Medical terminology	2				2
5	05.02.222	Medical Statistics	2				2
6	05.02.224	Medical ethics	2				2
7	05.02.223	Research Methodology	2				2
	Total		14		4		**16**
Total of Credit Hours			**16**				

C. Requirements for Faculty Departments (94 Credit hours)							
No.	Course Code	Course Name	Theoretical	Seminar	Practical	Training	Total
1.	01.01.202	Histology	2		2		3
2.	02.04.243	General Chemistry	2				2
3.	01.01.201	Anatomy	2		2		3
4.	03,01,315	Molecular Biology	2				2
5.	03.01.208	Fundamentals of Nutrition	2				2
6.	01.01.203	Physiology-I	2				2
7.	02.02.227	Physical Pharmacy	2		2		3
8.	03.02.211	Fundamental of Immunology	2				2

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9.	01.01.205	General Pathology	2		2		3
10.	03.04.212	Parasitology	2		2		3
11.	01.01.206	Physiology-II	2				2
12.	02.03.236	Pharmacology-I	2				2
13.	02.04.244	Pharmaceutical Organic Chemistry-I	2		2		3
14.	03.01.312	Biochemistry-I	2		2		3
15.	02.04.246	Pharmaceutical Analytical Chemistry-I	2		2		3
16.	02.04.247	Pharmaceutical Analytical Chemistry-II	2		2		3
17.	02.04.249	Pharmacognosy-I	2		2		3
18.	02.02.229	Pharmaceutics-I	2		2		3
19.	02.04.245	Pharmaceutical Organic Chemistry-II	2		2		3
20.	03.01.313	Biochemistry-II	2		2		3
21.	03.01.316	Biochemistry-III	2		2		3
22.	02.04.251	Pharmaceutical Instrumental Analysis	2				2
23.	02.02.230	Biopharmaceutics	2				2
24.	02.04.264	Phytochemistry	2				2
25.	02.04.248	Medicinal Chemistry-I	2		2		3
26.	02.02.231	Pharmaceutics-II	2		2		3
27.	02.03.237	Pharmacology-II	2				2
28.	02.03.238	Pharmacology-III	2				2
29.	02.02.234	Pharmaceutics-III	2		2		3
30.	02.04.250	Medicinal Chemistry-II	2		2		3
31.	02.01.213	Hospital Pharmacy	2				2
32.	02.01.216	Community Pharmacy#	2			2	4
33.	02.03.239	Pharmacology-IV	2				2
34.	02.03.240	Pharmacology-V	2				2
35.	02.02.233	Pharmacoepidemiology and Pharmacoeconomics	2				2
36.	02.02.235	Pharmaceutical promotion and marketing	2				2
37.	02.01.214	Basic Pharmacokinetics	2				2
38.	02.03.242	Toxicology	2				2
	Total		76		36	2	**96**
Total of Credit Hours			**96**				

#: 360 contact hrs. (6 hrs./ 5 days/ week)

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D. Clinical Pharmacy Program Requirements (47 Credit hours)							
No.	Course Code	Course Name	Theoretical	Seminar	Practical	Training Contact hrs	Total Credit hrs
1.	02.02.232	Drug Information Resources	2				2
2.	03.01.215	Clinical Biochemistry	2				2
3.	02.01.211	Clinical Nutrition	2				2
4.	02.01.212	Therapeutics (1)	2		2		3
5.	02.01.215	Therapeutics (2)	2		2		3
6.	02.01.218	Therapeutics (3)	2		2		3
7.	02.01.217	Pharmaceutical Care	2				2
8.	02.01.221	Clerkship-I				252 hrs.	5
9.	02.03.241	Pharmaceutical Biotechnology	2				2
10.	02.01.223	Clinical Pharmacokinetics	2		2		3
11.	03.02.216	Clinical. Immunology	2				2
12.	03.02.215	Clinical. Microbiology	2				2
13.	02.01.219	Pharmacy Practice (1)	2				2
14.	02.01.224	Pharmacy Practice (2)	2				2
15.	02.01.220	Therapeutics (4)	2		2		3
16.	02.01.222	Therapeutics (5)	2				2
17.	02.01.225	Clerkship-II				252 hrs.	5
18.	02.01.226	Research Project	1		2		2
	Total		29		10	10	47
Total credit hours			47				

D.

E. Distribution of Courses according to Semesters							
#	Course Code	**Level 1 / Semester 1** Course Name	Credit hours				Total Credit Hours
			Theoretical	Seminar	Practical	Training	
1	06.11.205	Islamic Culture	2				**2**
2	06.11.203	English Language	4				**4**
3	06.11.201	Arabic language	4				**4**
4	06.11.208	Medical Physics	2				**2**
5	02.04.243	General Chemistry	2				**2**
6	04.01.218	Medical Terminology	2				**2**
7	04.01.217	Fundamentals of Nursing	2		2		**3**
8	05.02.224	Medical Ethics	2				**2**
Total			20		2		**21**
Total of Credit Hours			**21**				

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#	Course Code	Level 1 / Semester 2 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1	03.01.207	Biochemistry-I	2		2		3
2	01.01.202	Histology	2		2		3
3	03.01.208	Fundamentals of Nutrition	2				2
4	05.03.221	Computer Skills	2		2		3
5	01.01.201	Anatomy	2		2		3
6	05.01.220	Communication skills	2				2
7	01.01.203	Physiology-I	2				2
Total			14		8		18
Total of Credit Hours			**18**				

#	Course Code	Level 2 / Semester 1 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1.	03.02.210	General Microbiology	2		2		3
2.	03.01.213	Biochemistry-II	2		2		3
3.	03,01,315	Molecular Biology	2				2
4.	03.02.211	Fundamental of Immunology	2				2
5.	01.01.205	General Pathology	2		2		3
6.	03.04.212	Parasitology	2		2		3
7.	1.01.206	Physiology II	2				2
Total			14		8		18
Total of Credit Hours			**18**				

#	Course Code	Level 2 / Semester 2 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1.	02.03.236	**Pharmacology-I**	2				2
2.	03.01.216	Biochemistry-III	2		2		3
3.	02.04.244	Pharmaceutical Organic Chemistry-I	2		2		3
4.	05.02.222	Medical statistics	2				2
5.	02.04.246	Pharmaceutical Analytical Chemistry	2		2		3
6.	02.02.227	Physical Pharmacy	2		2		3
Total			12		8		16
Total of Credit Hours			16				

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#	Course Code	Level 3 / Semester 1 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1.	02.04.247	Pharmaceutical analytical chemistry (2)	2		2		3
2.	02.02.229	Pharmaceutics-I	2		2		3
3.	02.04.249	Pharmacognosy	2		2		3
4.	02.04.245	Pharmaceutical Organic Chemistry-II	2		2		3
5.	02.03.237	Pharmacology-II	2				2
6.	02.01.211	Clinical Nutrition	2				2
Total			12		8		16
Total of Credit Hours			**16**				

#	Course Code	Level 3 / Semester 2 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1.	02.04.264	Phytochemistry	2				2
2.	02.03.238	Pharmacology-III	2				2
3.	02.04.248	Medicinal Chemistry-I	2		2		3
4.	02.02.231	Pharmaceutics-II	2		2		3
5.	02.04.251	Pharmaceutical Instrumental Analysis	2				2
6.	02.02.230	Biopharmaceutics	2				2
Total			12		4		14
Total of Credit Hours			**14**				

#	Course Code	Level 4 / Semester 1 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1	02.01.212	Therapeutics (1)	2		2		3
2	02.01.213	Hospital Pharmacy	2				2
3	02.02.234	Pharmaceutics-III	2		2		3
4	02.01.216	Community Pharmacy*	2			2	4
5	02.04.250	Medicinal Chemistry II	2		2		3
6	02.03.239	Pharmacology-IV	2				2
Total			12		6	2	17
Total of Credit Hours			**17**				

***360 contact hours training in a community pharmacy setting (hrs. (6 hrs./ 5 days/ week)**

#	Course Code	Level 4 / Semester 2 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	

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1.	02.01.215	Therapeutics (2)	2		2		**3**
2.	02.01.217	Pharmaceutical Care	2				**2**
3.	02.01.214	Basic Pharmacokinetics	2				**2**
4.	05.02.223	Research Methodology	2				**2**
5.	02.02.232	Drug Information Resources	2				**2**
6.	03.01.215	Clinical Biochemistry	2				**2**
Total			**12**		**2**		**13**
Total of Credit Hours			**13**				

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#	Course Code	Level 5 / Semester 1 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1	02.01.221	Clerkship-I**				252 hrs.	5
2	02.02.233	Pharmacoepidemiology and Pharmacoeconomics	2				2
3	02.01.218	Therapeutics (3)	2		2		3
4	02.03.240	Pharmacology-V	2				2
5	03.02.216	Clinical. Immunology	2				2
6	03.02.215	Clinical Microbiology	2				2
7	02.01.219	Pharmacy Practice (1)	2				2
8	02.02.235	Pharmaceutical promotion and marketing	2				2
Total			14		2	5	20
Total of Credit Hours			**20**				

#	Course Code	Level 5 / Semester 2 Course Name	Credit Hours				Total
			Theoretical	Seminar	Practical	Training	
1	02.01.223	Clinical Pharmacokinetics	2		2		3
2	02.03.242	Toxicology	2				2
3	02.01.220	Therapeutics (4)	2		2		3
4	02.01.222	Therapeutics (5)	2				2
5	02.01.225	Clerkship- II **				252 hrs.	5
6	02.01.226	Research Project	2				2
7	02.01.224	Pharmacy Practice (2)	2				2
8	02.03.241	Pharmaceutical Biotechnology	2				2
Total			14		4	5	21
Total of Credit Hours			**21**				

Clerkship I & II **: Total Hospital wards rotations: 504 contact hrs.

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F. Distribution of Total Credit Hours (174 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	12	3	7	1	2	-	-	-	-	-	-	8	21	39
	Second	1	3	1	2	5	13	-	-	-	-	-	-	7	18	
Second	First	-	-	1	3	6	15	-	-	-	-	-	-	7	18	34
	Second	-	-	1	2	5	14	-	-	-	-	-	-	6	16	
Third	First	-	-	-	-	5	14	1	2	-	-	-	-	6	16	30
	Second	-	-	-	-	6	14			-	-	-	-	6	14	
Fourth	First	-	-	-	-	5	14	1	3	-	-	-	-	6	17	30
	Second	-	-	1	2	1	2	4	9	-	-	-	-	6	13	
Fifth	First	-	-	-	-	3	6	5	14	-	-	-	-	8	20	41
	Second	-	-	-	-	1	2	7	19	-	-	-	-	8	21	
Total		**5**	**15**	**7**	**16**	**38**	**96**	**18**	**47**	**-**	**-**	**-**	**-**	**68**	**174**	**174**
Percentage		**8.62%**		**9.2%**		**55.17%**		**27.01 %**		**-**		**-**		**100%**		

*: Graduation Research Project

14. Teaching and Learning Strategies:

A. Teaching Tools:

- Active Lectures (supported with discussion),
- Group learning
- Seminars, journal clubs and workshops,
- Practical classes (Case-based seminars)
- Assignments
- Student Presentations
- Field training (, Clinical & Community Pharmacy Training)
- Simulated software program.
- Computer and web-based learning,
- Use of communication and information technology,
- Project work,
- Directed self-study.

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B. Assessment Tools.

- Student presentation (Seminar assessment)
- Short essays,
- Written assessments, such as multiple-choice questions (MCQs),
- Faculty assessment by structured observation through checklists and rating scales,
- Multi-source assessments, such as student self-assessment,
- Simulations, such as computer-based clinical scenarios,
- Clinical evaluation (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, ect. 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.

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	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 the project
Homework	For all courses except for the 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%**

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15. 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. Recognize the fundamental knowledge from scientific knowledge and principles of chemical, biomedical, microbiological, physiological, pathological, behavioral, and other basic & clinical sciences related to the pharmacy profession.	o Lectures. o Exercises in lectures and seminars o Presentations and discussions in class	o Written examinations o Technical or practical reports /Presentations o Quizzes o Homework
A2. Demonstrate the essential knowledge about physicochemical and pharmacokinetic properties of medicines and their influence on compounding, evaluation, analysis, route of administration, and dosage regimen.	o Lectures. o Exercises in lectures and seminars o presentations and discussions in class	o Written examinations o Technical or practical reports /Presentations o Quizzes o Home work
A3. Recognize broad knowledge about the mechanism of action, effectiveness, use, safety, side effects, and interactions of natural and synthetic medicines.	o Lectures. o Exercises in lectures and seminars o presentations and discussions in class	o Written examinations o Technical or practical reports /Presentations o Quizzes o Home work
A4. Define the pharmacist's roles in medication therapy management services including non-prescription medications, natural health products, and devices.		
A5. Recognize the advanced concepts of professional (ethics, policies, laws, regulations requirements, management pharmacovigilance, pharmacoepidemiology, pharmacoeconomic, pharmacoinformatic, ...etc) to optimize the therapeutic outcomes.		
A6. Recognize the requirements of research and sources of information related to medicines and pharmaceutical care.	o Lectures. o Exercises in lectures and seminars o presentations and discussions in class	o Written examinations o Technical or practical reports /Presentations o Quizzes o Home work
A7. Recognize 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.		

(B) Alignment of Program Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods.		
PILOs	**Teaching Strategies**	**Assessment Methods**
B1. Integrate the physicochemical properties of medicines to compounding and preparation and analysis of total parenteral nutrition I.V admixtures and small-batch preparation.	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
B2. Predict the drug properties, including absorption, distribution, metabolism, excretion, and interaction with targets in the body, from molecular structure.	o Tutorials o Exercises in lectures and seminars o Group work and problem-solving learning. 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 o Home work
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.	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

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B4. Presume research topics in all pharmaceutical fields to improve drugs utilization, health outcomes, and wellness.	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
B5. Compare various therapeutic options based on evidence medicine of efficacy, safety, and cost for each drug-related problem. **B6.** Formulate an appropriate pharmacotherapy care plan and monitoring strategies for preventing and solving encountered drug-related problems through the utilization of pharmacodynamic, pharmacokinetic properties of medicines as well as diseases pathophysiology and patient clinical data.	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. Deal safely and effectively with synthetic/natural pharmaceutical materials/products used in pharmaceutical preparations.	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
C2. Compound/prepare	o Guided individual reading.	o Written examinations

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extemporaneous, cytotoxic, I.V admixture, total parenteral nutrition, and small-batch pharmaceutical preparation taking into account the physicochemical properties of drug structures.	o Group work and problem-solving learning. o Tutorials/ seminars. o Presentations and discussions in class	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
C3. Contribute to strategies of medication management including monitoring and improving medicines use. **C4.** Utilize scientific literature, results of pharmaceutical research, and information interpretation to enhance professional decisions.	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
C5. 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 and appropriate therapeutic guidelines.	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
C6. Contribute to pharmaceutical research studies and clinical trials needed to optimize medicine use in specific medical conditions	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

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(D) Alignment of Program Intended Learning Outcomes (Transferable Skills) to Teaching Strategies & Assessment Methods.		
PILOs	Teaching Strategies	Assessment Methods
D1. Develop leadership, time management, critical thinking, problem-solving, communication, independence, creativity, innovation, entrepreneurial, delegation, and organizational skills	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
D2. Demonstrate skills in documenting and recording relevant information, findings, decisions, recommendations, and other information accurately and concisely, taking due account of privacy and confidentiality.	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
D3. Develop life-long learning, in particular an awareness of the need for continuing education, research, scholarship, and professionalism in the field of pharmaceutical practice.	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

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16.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.

17.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 are 174 credit hours.
4. Minimum score for any student to pass any credit hours course is 50% degree.

18.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

19.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

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

Program PILOs	Similar Accredited Programs					Accreditation Bodies	
	Lebanese International University, Yemen	China Pharmaceutical University, China	Mansura University, Egypt	Alexandria University, Egypt	The University of Manchester, UK	Egypt, NAQAAE (2018). National Academic Reference Standards, Pharmacy, First Edition	ACPE, USA, 2015
A. Knowledge and Understanding: **A1.** Recognize the fundamental knowledge from scientific knowledge and principles of chemical, biomedical, microbiological, physiological, pathological, behavioral, and other basic & clinical sciences related to the	**A. Knowledge and Understanding** A1. Reviewing the knowledge facts and principles of both basic and medical sciences. A2. Identifying the role of each pharmaceuti	Students in this program study basic knowledge and practical skills in pharmacy and clinical pharmacy. The program provides students with basic training in clinical pharmacy research methods and practical skills and enables	**a. Knowledge and Understanding: By the completion of this program the student should be able to:** a1. Recall the principles of basic, pharmaceutical, medical, social, behavioral, management, health and environmental sciences as well as	NAQAAE (2018). National Academic Reference Standards	BSc Clinical Pharmacy (dual award from China Pharmaceutical University (CPU) and The University of Manchester)	**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	**1.StandardFoundational 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

pharmacy profession. **A2.** Demonstrate essential knowledge about the physicochemical and pharmacokinetic properties of medicines and their influence on compounding, evaluation, analysis, route of administration, and dosage regimen . **A3.** Recognize broad knowledge about the mechanism of action, effectiveness, use, safety, side effects, and interactions of natural and	cal science in the development and use of pharmaceuti cal products. A3. Discussing disease pathophysiol ogy and the patient's clinical presentation. A4. Relating the biologic effects of medicinal substances to their physicochem ical properties and their interactions with the living systems.	students to command the essential knowledge and skills in clinical pharmacy, drug evaluation (new drug evaluation and drug re-evaluation), pharmaceuti cal information and consulting services, design and practice of clinical drug treatment. The program is designed to prepare students for pharmacy services, education	pharmacy practice. a2. Define the physico-chemical properties of various natural and synthetic substances used in preparation of medicines and the properties of different pharmaceutica l dosage forms. a3 List the principles of different analytical techniques, using good laboratory practice (GLP) guidelines and validation procedures. a4. Describe the theories of			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, 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	apply knowledge from the foundational sciences (i.e., biomedical, pharmaceutical, social/behavioral/adminis trative, 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, abilities, behaviors, and attitudes necessary to provide patient-centered care, manage medication use systems, promote health and wellness, and describe the influence of

synthetic medicines. **A4.** Define the pharmacist's roles in medication therapy management services including non-prescription medications, natural health products, and devices. **A5.** Recognize the advanced concepts of professionalism (ethics, policies, laws, regulations requirements, management pharmacovigilance, pharmacoepidemiology, pharmacoeconomic, pharmacoinformatic, …..etc) to	A5. Recalling the ethics and methods of scientific research. **B. Intellectual Skills** B1. Conceptualizing pharmaceutical care as the standard framework of clinical pharmacy services in various healthcare settings. B2. Integrating patient's demographic, social, and	and research in pharmacy-related fields, and drug research and development.	isolation, synthesis, purification, identification and standardization methods of chemicals and pharmaceutical compounds; as well as the fundamentals of drug design and development. a5. Identify the structure-activity relationship of group of pharmaceutical compounds. a6. Memorize the principles of operation of various instruments and techniques including manufacturing			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. **B-COGNITIVE/INTELLE**	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

optimize therapeutic outcomes. **A6.** Recognize the requirements of research and sources of information related to medicines and pharmaceutical care. **A7.** Recognize 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.	health data to discover drug-related problems. B3. Comparing alternative therapeutic plans for each drug-related problem based on evidence of effectiveness, safety, and cost. B4. Creating a patient-specific pharmaceutical care plan to achieve a definite outcome for each drug-related problem.		, packaging, labeling and storing processes in pharmaceutical industry. a7. Utilize and implement the basics of pharmacokinetics and biopharmaceutics and their application in therapeutic drug monitoring (TDM), dose modification and bioequivalence studies. a8. Distinguish appropriate good manufacturing practice (GMP) and Quality Control (QC)			**CTUAL 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.	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 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

B. Cognitive/ Intellectual Skills: **B1.** Integrate the physicochemical properties of medicines to compounding and preparation and analysis of total parenteral nutrition I.V admixtures and small-batch preparation. **B2.** Predict the drug properties, including absorption, distribution, metabolism, excretion, and interaction with targets in the body, from molecular structure. **B3.** Merge the	B5. Proposing research ideas based on practice gaps and improvement opportunities . **C. Professional and Practical Skills** C1. Providing pharmaceutical care professionally in various pharmacy practice settings. C2. Communicating effectively with patients		criteria to aseptic and sterile production facilities and other pharmaceutical industry. a9. Describe properties of different pharmaceutical dosage forms including novel drug delivery systems and radiopharmaceuticals. a10. Describe the principles of clinical, community and hospital pharmacy, including I.V. admixtures, total parenteral nutrition			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 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	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

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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.** Presume research topics in all pharmaceutical fields to improve drug utilization, health outcomes, and wellness. **B5.** Compare various	and other health care professionals. C3. Contributing in developing, implementing, and monitoring pharmaceutical care plans. C4. Counseling patients on the purpose and expectations of drug therapy. C5. Documenting pharmaceutical care steps in a patient's		(TPN) and drug distribution system. a11. Discuss the principles of immunology, public health, sources of infection, control of microbial contamination, sanitation, disinfection, sterilization methods and microbiological QC of pharmaceutical products. a12. Define the principles of body function in health and diseases states; as well as the			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	best interests. 3.4. Interprofessional collaboration – The graduate is able to actively participate and 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**

therapeutic options based on evidence medicine of efficacy, safety, and cost for each drug-related problem. **B6.** Formulate an appropriate pharmacotherapy care plan and monitoring strategies for preventing and solving encountered drug-related problems through the utilization of pharmacodynamic, pharmacokinetic properties of medicines as well as diseases pathophysiology and patient clinical data. **C. Practical and Professional**	medical record. C6. Responding to drug information requests in a systematic manner. . D. General and Transferable Skills D1. Advocating leadership by initiating and advocating change to develop new opportunities in response to problems they identify. D2. Developing		etiology, epidemiology, laboratory diagnosis, clinical features of different diseases; and their pharmacotherapeutic approaches. a13. Describe the role of new techniques, pharmaceutical trends and biotechnology in the discovery of new remedies. a14. Classify the pharmacological properties of drugs including mechanism of action,			optimize medicines use. C6. Employ the relevant ways of preparation and presentation of 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,	**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. 4.2. Leadership – The graduate is able to demonstrate responsibility for creating and achieving shared goals,

Skills: **C1.** Deal safely and effectively with synthetic/natural pharmaceutical materials/products used in pharmaceutical preparations. **C2.** Compound/prepare extemporaneous, cytotoxic, I.V admixture, total parenteral nutrition, and small-batch pharmaceutical preparation considering the physicochemical properties of drug structures. **C3.** Contribute to strategies of medication management	presentation, promotion, marketing, business administration, as well as numeric and computation skills. D3. Developing time management, critical thinking, problem solving, decision-making, and teamwork capabilities. D4. Communicating clearly by verbal and written means.		therapeutic uses, doses, biotransformation, contraindications, adverse drug reactions and drug interactions. a15. Summarize the principles of therapeutic, pharmacovigilance and the rational use of drugs. a16. List the bases of nutrition, phytotherapy, complementary and alternative medicines and quality control of herbal drugs. a17. Discuss the toxic			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.	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.

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including monitoring and improving medicines use. **C4.** Utilize scientific literature, results of pharmaceutical research, and information interpretation to enhance professional decisions . **C5.** 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 and			profile of various drugs and other xenobiotics including sources, identification, symptoms, management and control and first aid measures. a18. Use the methods of statistical analysis and pharmaceutical calculations. a19. Illustrate the principles of drug information, drug promotion and Pharmacoeconomics and the principles of sales, marketing, business				

appropriate therapeutic guidelines . **C6.** Contribute to pharmaceutical research studies and clinical trials needed to optimize medicine use in specific medical conditions. **D. General and Transferable Skills:** D1. Develop leadership, time management, critical thinking, problem-solving, communication, independence, creativity, innovation, entrepreneurial, delegation, and organizational skills D2. Demonstrate			administration , accounting and management including financial and human resources. a20. State the regulatory affairs, pharmacy laws and ethics of pharmacy profession and health care. a21. Define the proper pharmaceutical and medical terminology, abbreviations and symbols in health reports and pharmacy practice. a22. Recognize				

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skills in documenting and recording relevant information, findings, decisions, recommendations, and other information accurately and concisely, taking due account of privacy and confidentiality. D3. Develop life-long learning, in particular an awareness of the need for continuing education, research, scholarship, and professionalism in the field of pharmaceutical practice.			principal guidelines for treatment and management of various disorders associated with gastrointestinal, cardiovascular, respiratory systems, dermatological and pediatric diseases and oncology. **b. Intellectual Skills: By the completion of this program the student should be able to:** b1. Apply principles of pharmaceutical knowledge in formulation of safe and				

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			effective medicines and dealing with new drug delivery systems. B2. Recommend good manufacturing practice (GMP), good laboratory practice (GLP), good clinical practice (GCP) and good safety practice (GSP) guidelines in pharmaceutical technology, pharmaceutical research and pharmacy practice. b3. Determine suitable qualitative and				

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			quantitative analytical and biological methods of analysis and QC of drugs as raw material, in dosage forms and in biological fluids. b4. Predict possible incompatibilities and other prescription-related problems that may occur during drug dispensing. b5. Design appropriate methods for isolation, synthesis, purification, identification and				

			standardization of various natural compounds, chemicals and pharmaceutical compounds. b6. Apply the principles of bioinformatics and computer-aided tools and molecular modeling programs in the design of new molecular entities. b7. Specify clinical pharmacy practice requirements in prescribing drugs and handling of biopharmaceutical and other biotechnology products. b8				

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			Develop appropriate methods for infection control and promote public health awareness. b9. Appraise the pharmacotherapeutic principles in the proper selection and use of drugs in various disease conditions. b10. Adjust dosage and dose regimen of medication based on pharmacokinetic principles. b11. Assess possible drug interactions, adverse drug				

			reactions and other drug-related problems, as essential issues in clinical pharmacy practice. b12. Promote cost/effective pharmacotherapy by applying principles of drug information and pharmacoeconomics. b13. Interpret experimental data and published literatures, based on relevant chemical, pharmaceutical, statistical principles.				

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			b14. Evaluate evidence-based information needed in pharmacy practice decisions. b15. Estimate social health hazards and drug abuse, misuse and exposure to toxic agents. b16. Predict the physical and chemical properties and biological activity of organic compounds based on molecular structure. b17. Formulate a systemic approach for				

			the laboratory diagnosis of common clinical conditions and for identification of causative agents and organisms. b18. Correlate histological, physiological and pathological structure with the function of the human body; and integrate basic anatomical, biochemical and physiological facts with clinical data. b19. Analyze herbal drugs for the purpose of				

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			determination of adulteration to control quality of produced pharmaceutical agents. b20. Design a systemic approach for pharmacological and non-pharmacological management of gastrointestinal, cardiovascular, respiratory, dermatological, pediatrics' diseases and oncology. c. **Professional and Practical Skills: By the completion of this program**				

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			the student should be able to: c1. Utilize the proper pharmaceutical and medical terminologies, to communicate with other health care professionals. c2. Handle and dispose hazardous chemicals, biological and pharmaceutical preparations safely. c3. Employ proper and safe dispensing, dispersing, labeling, distribution and storing of medicines,				

			natural and syntheticchemicals and pharmaceutical preparation. c4. Apply appropriate methods for extraction, isolation, synthesis, purification, identification and standardization of active substances from different origins. c5. Prescribe medications based on proper understanding of etiology and pathophysiology of diseases, and drug chemistry.				

			c6. Monitor and control microbial infections, and carry out laboratory tests for diagnosis of various diseases. c7. Assess toxicity profiles of different xenobiotics and detect toxins in various biological samples. c8. Manage pharmaceutical instruments and equipment safely and efficiently and solve commonly encountered problems in				

			pharmaceutical manufacturing processes. c9. Persuade public awareness on rational use of drugs and social health hazards of drug abuse and misuse. c10. Counsel patients when dispensing OTC and prescription drugs to ensure safe and proper use of medicines. c11. Conduct experimental and research studies and present, analyze and interpret the results.				

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			c12. Employ proper documentation and drug filing system c13. Assess risks concerning drug-drug interaction, adverse reaction and incompatibilities in different pharmaceutical preparations. c14. Employ different qualitative and quantitative chemical and biological methods for quality control (QC) and assay of raw materials as well as sterility of pharmaceutica				

			l preparations. c15. Analyze the economic principles, and estimate costs and profits in a given process. c16. Utilize legal and ethical guidelines to ensure correct and safe supply of medical products to the general public. c17. Apply the concepts of clinical pharmacy and pharmaceutical care in different pharmacy practice settings. c18. Apply the rules and				

			regulations governing the practice of pharmacy. c19. Explain behavior and relationships between individuals and their family/ partners, immediate social groups and society on large scale c20. Formulate pharmaceutical care plans for patients suffering from different disorders with reference to their particular health issues and special considerations.				

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			d. General and Transferable Skills: By the completion of this program the student should be able to: d1 Communicate clearly by verbal and written means with patients and other health care professionals. d2 Retrieve and critically evaluate pharmaceutical information and clinical laboratory data from different sources to improve professional				

			competencies. d3 Interact effectively in team working. d4.. Exploit calculations and statistical methods as well as information technology (IT) tools. d5. Practice independent learning needed for continuous professional development. d6. Adopt professional ethical, legal and safety guidelines in pharmacy practice. d7. Develop management, financial, sales and marketing				

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			skills. d8 Present information clearly in written, electronic and oral forms. d9 Promote critical thinking, problem-solving, decision-making, and time managing capabilities. d10. Support patient, pharmaceutical and health care. d11. Plan strategies to fulfill workplace pharmaceutical needs.				

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20. Appendix:

Annex (1):

Matrix of mapping program of Pharm.D. ILOs with courses

Annex (2):

Alignment of Faculty Objectives with Program Intended Learning Outcomes for Pharm.D. Program

Annex (3)

Alignment of Program Intended Learning Outcomes (PILOS) to Program Objectives (POs)

Annex (4):

Themes of Courses of Study and their Weightage

Annex (5):

Survey of PILOs for Similar Accredited Programs at National and International Universities

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