

Faculty of Pharmacy

Pharos University in Alexandria



Program Specification
Bachelor's Degree in Pharmacy

(2016)

إعتماد مجلس وحدة 19/11/2020

إعتماد مجلس كلية 23/11/2020



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University: Pharos University in Alexandria
Faculty: Faculty of Pharmacy

Competency-Based Program Specification

(A) Basic Information:

1- Program Title: Bachelor's Degree in Pharmacy

2- Program Type: Single Double Multiple

3- Department (s) according to the bylaw of 2016:

- 1- Department of Pharmaceutical Chemistry (PC).
- 2- Department of Pharmacognosy and Natural products (PG).
- 3- Department of Pharmacology & Therapeutics (PL).
- 4- Department of Microbiology & Immunology (PM).
- 5- Department of Clinical Pharmacy & Pharmacy Practice (PN).
- 6- Department of Pharmaceutics & Pharmaceutical Technology (PP)

- **Program Coordinator: Prof. Dr. Rasha El-Bayaa**
- **Date of program approval: 23/11/2020**
- **External Reviewer: Prof. Dr. Salwa Elmeligie**

(B) Special Information:

1. Program Aims:

The principal aim of the program of Faculty of Pharmacy, Pharos University in Alexandria, is to:

- a) Graduate competent pharmacists in the local, national and international markets.
- b) Provide pharmacy students with multidisciplinary well-structured program, including basic, pharmaceutical, medical, pharmacy practice, social, behavioral, pharmaceutical management, health and environmental elements.
- c) Promote students to acquire advanced knowledge, practice experience and skills that enable them to solve different problems concerning pharmaceutical health care, drug industry and community services as well as contributing in academic research institutes.
- d) Prepare graduates to assume positions as educators and scientists in academic, industry, and/or government settings.

Graduate attributes:

Faculty of Pharmacy, Pharos University in Alexandria strives to ensure that graduates of the program acquire and demonstrate the following attributes:

1. Perform efficiently, professionally, legally and ethically in different areas of pharmacy practice.
2. Demonstrate prudence in handling chemicals and pharmaceutical, natural products as well as microbes by applying basic of aseptic techniques.
3. Deliver pharmaceutical care to patients in community pharmacies and in hospital settings.
4. Adhere to good laboratory practice in performing chemical, analytical, microbiological and biological procedures and techniques.
5. Adhere to good manufacturing practices in formulating, preparing and storing pharmaceutical and natural products.
6. Participate in delivering education services to the public with other health care professionals aiming to promote health, control infection and prevent disease.
7. Demonstrate good understanding of the etiology, pathophysiology and management of different diseases in accordance with evidence-based medicine.
8. Propose good judgment in resolving drug-related problems and promoting rational use of medicines, as well as Planning, designing, and conducting research using appropriate methodologies.
9. Develop competence in assuring quality of raw material and pharmaceutical as well as natural products including physical, chemical, microbiological and biological quality control.
10. Be committed to life-long learning, and strive continuously to update their knowledge in profession-related areas.
11. Demonstrate good communication and computation skills, time management, problem solving, critical thinking, decision-making proper documentation and drug filling system and team-working spirit.
12. Be committed to further develop presentation, documentation, promotion, marketing and business administration skills.

2. National Academic Reference Standards (NARS) 2017:

By completion of the program, students should achieve the following 12 competencies that cover 4 competency domains. These domains cover all essentials for practicing pharmacy profession including both drug-oriented and patient-oriented disciplines. A number of Key Elements are included in each competency, with a total of 42 key elements for all competencies. These key elements will reflect each competency in practice.

The competency domains are the followings:

- Domain 1: Fundamental Knowledge
- Domain 2: Professional and Ethical Practice
- Domain 3: Pharmaceutical Care
- Domain 4: Personal Practice

DOMAIN 1- FUNDAMENTAL KNOWLEDGE

1-1- COMPETENCY Integrate knowledge from basic and applied pharmaceutical and clinical sciences to standardize materials, formulate and manufacture products, and deliver population and patient-centered care.

KEY ELEMENTS

- 1-1-1-** Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.
- 1-1-2-** Utilize the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.
- 1-1-3-** Integrate knowledge from fundamental sciences to handle, identify, extract, design, prepare, analyze, and assure quality of synthetic/natural pharmaceutical materials/products.
- 1-1-4-** Articulate knowledge from fundamental sciences to explain drugs' actions and evaluate their appropriateness, effectiveness, and safety in individuals and populations.
- 1-1-5-** Retrieve information from fundamental sciences to solve therapeutic problems.
- 1-1-6-** Utilize scientific literature, and collect and interpret information to enhance professional decision.
- 1-1-7-** Identify and critically analyze newly emerging issues influencing pharmaceutical industry and patient health care.

DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE

2-1- COMPETENCY Work collaboratively as a member of an inter-professional health care team to improve the quality of life of individuals and communities, and respect patients' rights.

KEY ELEMENTS:

2-1-1. Perform responsibilities and authorities in compliance with the legal and professional structure and role of all members of the health care professional team.

2-1-2. Adopt ethics of health care and pharmacy profession respecting patients' rights and valuing people diversity.

2-1-3. Recognize own personal and professional limitations and accept the conditions of referral to or guidance from other members of the health care team.

2-2- COMPETENCY Standardize pharmaceutical materials, formulate and manufacture pharmaceutical products, and participate in systems for dispensing, storage, and distribution of medicines.

KEY ELEMENTS:

2-2-1. Isolate, design, identify, synthesize, purify, analyze, and standardize synthetic/natural pharmaceutical materials.

2-2-2. Apply the basic requirements of quality management system in developing, manufacturing, analyzing, storing, and distributing pharmaceutical materials/ products considering various incompatibilities.

2-2-3. Recognize the principles of various tools and instruments, and select the proper techniques for synthesis and analysis of different materials and production of pharmaceuticals.

2-2-4. Adopt the principles of pharmaceutical calculations, biostatistical analysis, bioinformatics, pharmacokinetics, and bio-pharmaceutics and their applications in new drug delivery systems, dose modification, bioequivalence studies, and pharmacy practice.

2-3- COMPETENCY Handle and dispose biologicals and synthetic/natural pharmaceutical materials/products effectively and safely with respect to relevant laws and legislations.

KEY ELEMENTS:

2-3-1. Handle, identify, and dispose biologicals, synthetic/natural materials, biotechnology-based and radio-labeled products, and other materials/products used in pharmaceutical field.

2-3-2. Recognize and adopt ethical, legal, and safety guidelines for handling and disposal of biologicals, and pharmaceutical materials/products.



2-4- COMPETENCY Actively share professional decisions and proper actions to save patient's life in emergency situations including poisoning with various xenobiotics, and effectively work in forensic fields.

KEY ELEMENTS:

2-4-1- Ensure safe handling/use of poisons to avoid their harm to individuals and communities.

2-4-2- Demonstrate understanding of the first aid measures needed to save patient's life.

2-4-3- Take actions to solve any identified medicine-related and pharmaceutical care problems.

2-4-4- Assess toxicity profiles of different xenobiotics and detect poisons in biological specimens.

2-5- COMPETENCY Contribute in pharmaceutical research studies and clinical trials needed to authorize medicinal products.

KEY ELEMENTS:

2-5-1- Fulfill the requirements of the regulatory framework to authorize a medicinal product including quality, safety, and efficacy requirements.

2-5-2- Retrieve, interpret, and critically evaluate evidence-based information needed in pharmacy profession.

2-5-3- Contribute in planning and conducting research studies using appropriate methodologies.

2-6- COMPETENCY Perform pharmacoeconomic analysis and develop promotion, sales, marketing, and business administration skills.

KEY ELEMENTS:

2-6-1- Apply the principles of business administration and management to ensure rational use of financial and human resources.

2-6-2- Utilize the principles of drug promotion, sales, marketing, accounting, and pharmacoeconomic analysis.

DOMAIN 3: PHARMACEUTICAL CARE

3-1- COMPETENCY Apply the principles of body functions to participate in improving health care services using evidence-based data.

KEY ELEMENTS:

3-1-1- Apply the principles of body function and basis of genomics in health and disease states to manage different diseases.

3-1-2- Apply the principles of public health and pharmaceutical microbiology to select and assess proper methods of infection control.

3-1-3- Monitor and control microbial growth and carry out laboratory tests for identification of infections/diseases.

3-1-4- Relate etiology, epidemiology, pathophysiology, laboratory diagnosis, and clinical features of infections/diseases and their pharmacotherapeutic approaches.

3-2- COMPETENCY Provide counseling and education services to patients and communities about safe and rational use of medicines and medical devices.

KEY ELEMENTS:

3-2-1- Integrate the pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, adverse drug reactions and drug interactions.

3-2-2- Apply the principles of clinical pharmacology and pharmacovigilance for the rational use of medicines and medical devices.

3-2-3- Provide evidence-based information about safe use of complementary medicine including phytotherapy, aromatherapy, and nutraceuticals.

3-2-4- Provide information about toxic profiles of drugs and other xenobiotics including sources, identification, symptoms, and management control.

3-2-5- Educate and counsel patients, other health care professionals, and communities about safe and proper use of medicines including OTC preparations and medical devices.

3-2-6- Maintain public awareness on social health hazards of drug misuse and abuse.



DOMAIN 4: PERSONAL PRACTICE

4-1- COMPETENCY: Express leadership, time management, critical thinking, problem solving, independent and team working, creativity and entrepreneurial skills.

KEY ELEMENTS:

4-1-1- Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.

4-1-2- Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.

4-1-3- Demonstrate creativity and apply entrepreneurial skills within a simulated entrepreneurial activity.

4-2- COMPETENCY Effectively communicate verbally, non-verbally and in writing with individuals and communities.

KEY ELEMENTS:

4-2-1- Demonstrate effective communication skills verbally, non-verbally, and in writing with professional health care team, patients, and communities.

4-2-2- Use contemporary technologies and media to demonstrate effective presentation skills.

4-3- COMPETENCY Express self-awareness and be a life-long learner for continuous professional improvement.

KEY ELEMENTS:

4-3-1- Perform self-assessment to enhance professional and personal competencies.

4-3-2- Practice independent learning needed for continuous professional development.



3. Academic Standards of Program Specification:

- The Faculty adopted the Academic Standards of the National Authority for Quality Assurance and Accreditation of Education (NAQAAE), NARS 2009, in a faculty council on 6/2/2017
- NARS 2009 was previously discussed and adopted in all departments' councils.
- Comparative study between graduate attributes and ILOs of pharmacy program (Bylaw 2016) versus NARS 2009 is available as attached extension.
- In April 2017, NAQAAE accredited a new version for Competency-Based NARS, so the faculty started to take action towards NARS 2017.
- Competency-Based NARS 2017 was discussed and adopted in all departments' councils and finally adopted in a faculty council on 7/10/2019
- Gap Analysis between Pharmacy Program Bylaw 2016 & Competency-Based NARS 2017 was carried out by a committee in Quality Assurance Unit (QAU) composed of staff members from all departments.
- The outcome of this meeting was an action plan which was accredited in a faculty council on 10/2/2020
- The action plan included updating teaching and learning strategy and assessment methods, to be in line with Competency-Based NARS 2017.
- QAU started to organize workshops to train and increase the awareness of staff members about Competency-Based NARS 2017 and the updated teaching and learning strategy and assessment methods.
- As a major procedure done by the committee of programs development was establishing a new bylaw aligned with NARS 2017 and it was approved by the committee of the Pharmaceutical Sector in September 2019.
- All previous documents are available as external extensions.

4. External References for Standards (Benchmarks):

NA

5. Program Structure and Contents:

Program: Five years

No. of credit hours: Compulsory	158	Elective	8
University Requirements	14	Summer training	360 training hours

Sciences	Faculty Program (%)	NARS 2009 Requirements (%)
Basic	13.4	10.0 - 15.0
Pharmaceutical	36.6	35.0 - 40.0
Medical	22.7	20.0 - 25.0
Pharmacy Practice	11.6	10.0 - 15.0
Health & Environmental	5.8	5.0 - 10.0
Behavioral & Social	2.3	2.0 - 4.0
Pharmacy Management	2.9	2.0 - 4.0
Discretionary	4.7	Up to 8.0
Total	100.0	

Practical/Summer Training:

360 hr (equivalent to 18 cr.hr.) in a Pharmaceutical institution

Program course Levels (in credit-hours system):

- Semester 1/ First year: required to pass 16 units distributed as follows: -
Compulsory: 12 Cr. Hs Elective: 0 University Requirement : 4
- Semester 2/First year: required to pass 18 units distributed as follows:-
Compulsory: 13 Cr. Hs Elective: 0 University Requirement: 5
- Semester 3/ Second year: required to pass 18 units distributed as follows:-
Compulsory: 16 Cr. Hs Elective: 0 University Requirement: 2
- Semester 4/ Second year: required to pass 17 units distributed as follows:-
Compulsory: 15 Cr. Hs Elective: 0 University Requirement: 2
- Semester 5/ Third year: required to pass 19 units distributed as follows:-
Compulsory: 19 Cr. Hs Elective: 0 University Requirement: 0
- Semester 6/ Third year: required to pass 19 units distributed as follows:-
Compulsory: 19 Cr. Hs Elective : 0 University Requirement: 0
- Semester 7/ Fourth year: required to pass 19 units distributed as follows:-
Compulsory: 17 Cr. Hs Elective: 2 Cr. Hs University Requirement: 0
- Semester 8/ Fourth year: required to pass 19 units distributed as follows:-
Compulsory: 17 Cr. Hs Elective: 2 Cr. Hs University Requirement : 0
- Semester 9/ Fifth year: required to pass 18 units distributed as follows:-
Compulsory: 15 Cr. Hs Elective: 2 Cr. Hs University Requirement : 1
- Semester 10/ Fifth year: required to pass 17 units distributed as follows:-
Compulsory: 15 Cr. Hs Elective: 2 Cr. Hs University Requirement : 0

Program Curriculum:

a. Compulsory Courses:

First Level

First Semester (Fall)

No.	Course Code	Course Title	CrH	Pr	Lec	Tut	Lab	CH
1	PC 101	Physical & Inorganic Chemistry	3	-	2	1	2	5
2	PC 102	Organic Chemistry I	2	-	1	1	2	4
3	PL 101	Biophysics	2	-	1	0	2	3
4	PL 102	Cell Biology	1	-	1	1	0	2
5	PL 103	Anatomy & Histology	3	-	2	0	2	4
6	PP 101	Pharmacy Orientation	1	-	1	0	0	1
7	UEC 01	Computer Skills & Programing Concepts I	2	-	1	0	2	3
8	UGE 01	English I	2	-	0	2	2	6
Total Hours			16		9	7	12	28

Second Semester (Spring)

No.	Course Code	Course Title	CrH	Pr	Lec	Tut	Lab	CH
1	PC 103	Organic Chemistry II	3	PC 102	2	1	2	5
2	PC 104	Analytical Chemistry I	3	PC 101	2	1	2	5
3	PG 101	Pharmacognosy I	3	-	2	1	2	5
4	PL 104	Psychology	1	-	1	1	0	2
5	PL 105	Physiology	3	PL 103	3	1	0	4
6	UCS 01	Communication Skills I	1	-	0	0	2	2
7	UEC 02	Computer Skills & Programing Concepts II	2	UEC 01	1	0	2	3
8	UGE 02	English II	2	UGE 01	0	2	2	6
Total Hours			18		11	9	12	32



Second Level

First Semester (Fall)

No.	Course Code	Course Title	CrH	Pr	Lec	Tut	Lab	CH
1	PC 205	Organic Chemistry III	2	PC 103	1	1	2	4
2	PC 206	Analytical Chemistry II	3	PC 104	2	1	2	5
3	PG 202	Pharmacognosy II	3	PG 101	2	0	2	4
4	PM 203	Virology & Parasitology	2	PL 102	2	1	0	3
5	PM 201	Pharmaceutical Microbiology	3	PL 102	2	0	2	4
6	PP 202	Physical Pharmacy	3	PC 101	2	1	2	5
7	UGE 03	English III	2	UGE 02	0	2	2	6
Total Hours			18		11	8	12	31

Second Semester (Spring)

No.	Course Code	Course Title	CrH	Pr	Lec	Tut	Lab	CH
1	PG 203	Phytochemistry I	3	PG 202	2	1	2	5
2	PL 206	Biochemistry I	3	PC 103	2	1	2	5
3	PM 202	Medical Microbiology	3	PM 201	2	0	2	4
4	PM 204	Genetics & Immunology	2	-	2	0	0	2
5	PN 201	Pharmacy Ethics	1	-	1	0	0	1
6	PP 203	Pharmaceutics I	2	PP 202	1	0	2	3
7	PP 204	Terminology	1	-	1	0	0	1
8	UGA 03	Arabic Language Skills	2	-	2	0	0	2
Total Hours			17		13	2	8	23



Third Level

First Semester (Fall)

No.	Course Code	Course Title	CrH	Pr	Lec	Tut	Lab	CH
1	PC 307	Instrumental Analysis	3	PC 104	2	1	2	5
2	PG 304	Phytochemistry II	3	PG 203	2	0	2	4
3	PL 308	Biochemistry II	3	PL 206	2	1	2	5
4	PL 309	Pharmacology I	3	PL 105	2	0	2	4
5	PM 305	Public Health	2	PM 202	2	0	0	2
6	PN 302	Pharmacy Law and Legislations	1	-	1	0	0	1
7	PP 305	Pharmaceutics II	4	PP 202	3	1	2	6
Total Hours			19		14	3	10	27

Second Semester (Spring)

No.	Course Code	Course Title	CrH	Pr	Lec	Tut	Lab	CH
1	PC 308	Medicinal Chemistry I	3	PC 103, PC 307	2	1	2	5
2	PG 305	Phytotherapy	3	PG 202	3	1	0	4
3	PL 310	Pharmacology II	3	PL 309	2	1	2	5
4	PL 311	Pathophysiology	2	PL 105	2	1	0	3
5	PL 312	Toxicology	2	PL 309	2	1	0	3
6	PL 307	Biostatistics	2	-	2	1	0	3
7	PN 303	Drug Information	2	PP 305, PL 309	1	0	2	3
8	PP 306	Biopharmaceutics	2	PP 203, PP 305	1	1	2	4
Total Hours			19		15	7	8	30



Fourth Level

First Semester (Fall)

No.	Course Code	Course Title	CrH	Pr	Lec	Tut	Lab	CH
1	PC 409	Medicinal Chemistry II	3	PC 103, PC 307, PL 310	2	1	2	5
2	PL 413	Pharmacology III	2	PL 309	2	1	0	3
3	PL 414	Pharmacotherapeutics I	3	PL 310	3	1	0	4
4	PM 406	Drug & Molecular Biotechnology	2	PM 305	2	1	0	3
5	PN 404	Pharmaceutical Care I	1	PL 310	0	1	2	3
6	PN 405	Hospital Pharmacy	2	PP 305	2	1	0	3
7	PN 406	First Aid	1	-	1	1	0	2
8	PP 407	Drug Stability	3	PP 203, PP 305	2	0	2	4
9		Elective 1	2		2	1	0	2
Total Hours			19		16	8	6	29

Second Semester (Spring)

No.	Course Code	Course Title	CrH	Pr	Lec	Tut	Lab	CH
1	PC 410	Drug Design	2	PC 308	1	1	2	4
2	PL 415	Pharmacotherapeutics II	2	PL 309	2	1	0	3
3	PL 416	Nutrition & Health	2	PL 308	2	1	0	3
4	PN 407	Pharmaceutical Care II	2	PL 414	1	0	2	3
5	PN 408	Community Pharmacy	3	PN 303	2	1	2	5
6	PP 408	Pharmacokinetics	3	PP 306, PP 407	2	0	2	4
7	PP 409	Pharmaceutical Technology	3	PP 305	2	0	2	4
8		Elective 2	2		2	1	0	2
Total Hours			19		14	5	10	28



Fifth Level

First Semester (Fall)

No.	Course Code	Course Title	CrH	Pr	Lec	Tut	Lab	CH
1	PL 517	Pharmacotherapeutics III	2	PL 309	2	1	0	3
2	PN 509	Clinical Pharmacy I	3	PP 408	2	1	2	5
3	PN 510	Pharmacy Practice Experience I	1	PN 407	0	1	2	3
4	PN 511	Pharmacy Management & Pharmacoeconomics	3	-	3	1	0	4
5	PN 512	Sales, Marketing & Drug Promotion	2	-	2	1	0	3
6	PP 510	Pharmaceutics III	2	PP 408	2	1	0	3
7	PP 511	Unit Operation	2	PP 409	2	1	0	3
8	UCS 02	Communication Skills II	1	UCS 01	0	0	2	2
9		Elective 3	2		2	1	0	2
Total Hours			18		15	8	6	28

Second Semester (Spring)

No.	Course Code	Course Title	CrH	Pr	Lec	Tut	Lab	CH
1	PC 511	Analytical Quality Assurance & Control	3	PC 307	2	1	2	5
2	PL 518	Pharmacotherapeutics IV	3	PL 413	3	1	0	4
3	PN 513	Clinical Pharmacy II	3	PN 509	2	1	2	5
4	PN 514	Clinical Toxicology	1	PL 312	1	1	0	2
5	PN 515	Pharmacy Practice Experience II	2	PN 510	1	1	2	4
6	PP 512	Industrial Quality Assurance & GMP	3	PP 409	2	0	2	4
7		Elective 4 (Project)	2		0	4	0	4
Total Hours			17		11	9	8	28

I-General Courses:

Courses are divided into the following sections:

CrH	Credit Hour	CH	Contact Hour	CW	Course Work & Lab.
Lec	Lecture	Pr	Prerequisite	MTE	Mid-term Exam
Tut	Tutorial	TM	Total Mark	OE	Oral Exam
Lab	Laboratory	ET	Exam Time	FWE	Final written Exam

[A] Required General Courses:

No.	Course Code	Course Title	CrH	Lec	Tut	Lab	CH	Pr
1	UEC 01	Computer Skills & Programming Concepts (1)	2	1	0	2	3	-
2	UEC 02	Computer Skills & Programming Concepts (2)	2	1	0	2	3	UEC 01
3	UGE 01	English (1)	2	0	2	2	6	-
4	UGE 02	English (2)	2	0	2	2	6	UGE 01
5	UGE 03	English (3)	2	0	2	2	6	UGE 02
6	UCS 01	Communication Skills I	1	0	0	2	2	-
7	UCS 02	Communication Skills II	1	0	0	2	2	UCS 01
8	UGA 03	Arabic Language Skills	2	2	0	0	2	-

[B] Elective Courses:

In addition to the required general courses, student should select 3 courses (6 cr.) of the following:

No.	Course Code	Course Title	CrH	Pr	Mark Distribution					ET (hr)
					CW	MTE	FWE	OE	TM	
Category 1 (Pharmaceutical Courses)										
1	PC E12	Advanced Instrumental Analysis	2	PC 307	60	40	100	0	200	2
2	PC E13	Chemometrics in Pharmaceutical Analysis	2	PC 307	60	40	100	0	200	2
3	PG E06	Forensic Pharmacognosy	2	PG 304	60	40	100	0	200	2
4	PG E07	Applied Pharmacognosy	2	PG 304	60	40	100	0	200	2
5	PL E20	Bioevaluation & Drug Screening	2	PL 309	60	40	100	0	200	2
Category 2 (Medical Courses)										
6	PL E19	Addiction & Drug Abuse	2	PL 413	60	40	100	0	200	2
7	PL E21	Clinical Biochemistry	2	PL 308	60	40	100	0	200	2
8	PL E22	Complementary & Alternative Medicine	2	PL 311	60	40	100	0	200	2
9	PL E23	Pharmacotherapeutics for Special Population	2	PL 310	60	40	100	0	200	2
10	PM E07	Advanced Microbiology	2	PM 305	60	40	100	0	200	2
Category 3 (Clinical Pharmacy Courses)										
11	PN E16	Research Methods and Applied Data Analysis	2	PL 206, PN 303	60	40	100	0	200	2
12	PN E17	Critical Care Therapeutics	2	PL 415	60	40	100	0	200	2
13	PN E18	Dispensing Medications	2	PN 405	60	40	100	0	200	2
14	PN E19	Home Health Care	2	PN 405	60	40	100	0	200	2
Category 4 (Projects)										
15	PC E14	Project in Pharmaceutical Chemistry	2	PC 307, PC 308	100	-	-	100	200	-
16	PG E08	Project in Pharmacognosy & Natural Products	2	PG 305	100	-	-	100	200	-
17	PL E24	Project in Pharmacology & Therapeutics	2	PL310	100	-	-	100	200	-
18	PM E08	Project in Microbiology & Immunology	2	PM 406	100	-	-	100	200	-
19	PN E20	Project in Clinical Pharmacy & Pharmacy Practice	2	PN 509	100	-	-	100	200	-
20	PP E13	Project in Pharmaceutics & Pharmaceutical Technology	2	PP407, PP408	100	-	-	100	200	-



II- Basic Science Courses:

The following are required Basic Science courses:

B	Basic Sciences	HE	Health & Environment
P	Pharmaceutical Sciences	BS	Behavioral & Social
M	Medical Sciences	PM	Pharmacy Management
PP	Pharmacy Practice	D	Discretionary

No.	Course Title	Course Code	CrH	B	P	M	PP	HE	BS	PM	D
1	Analytical Chemistry I	PC 104	3	3							
2	Analytical Chemistry II	PC 206	3	3							
3	Analytical Quality Assurance & Control	PC 511	3		3						
4	Anatomy & Histology	PL 103	3			3					
5	Arabic Language Skills	UGA 03	2								2
6	Biochemistry I	PL 206	3			3					
7	Biochemistry II	PL 308	3			3					
8	Biopharmaceutics	PP 306	2		2						
9	Biophysics	PL 101	2	2							
10	Biostatistics	PL 307	2					2			
11	Cell Biology	PL 102	1	1							
12	Clinical Pharmacy I	PN 509	3				3				
13	Clinical Pharmacy II	PN 513	3				3				
14	Clinical Toxicology	PN 514	1					1			
15	Communication skills I	UCS 01	1						1		
16	Community Pharmacy	PN 408	3				3				
17	Computer Skills & Programming Concepts (1)	UEC 01	2	2							
18	Computer Skills & Programming Concepts (2)	UEC 02	2	2							
19	Drug & Molecular Biotechnology	PM 406	2		2						
20	Drug Design	PC 410	2		2						
21	Drug Information	PN 303	2				2				



No.	Course Title	Course Code	CrH	B	P	M	PP	HE	BS	PM	D
22	Drug Stability	PP 407	3		3						
23	English (1)	UGE 01	2								2
24	English (2)	UGE 02	2								2
25	English (3)	UGE 03	2								2
26	First Aid	PN 406	1					1			
27	Genetics & Immunology	PM 204	2			2					
28	Hospital Pharmacy	PN 405	2				2				
29	Industrial Quality Assurance & GMP	PP 512	3		3						
30	Instrumental Analysis	PC 307	3		3						
31	Medical Microbiology	PM 202	3			3					
32	Medicinal Chemistry I	PC 308	3		3						
33	Medicinal Chemistry II	PC 409	3		3						
34	Nutrition & Health	PL 416	2					2			
35	Organic Chemistry I	PC 102	2	2							
36	Organic Chemistry II	PC 103	3	3							
37	Organic Chemistry III	PC 205	2	2							
38	Pathophysiology	PL 311	2			2					
39	Pharmaceutical Microbiology	PM 201	3		3						
40	Pharmaceutical Care I	PN 404	1				1				
41	Pharmaceutical Care II	PN 407	2				2				
42	Pharmaceutical Technology	PP 409	3		3						
43	Pharmaceutics I	PP 203	2		2						
44	Pharmaceutics II	PP 305	4		4						
45	Pharmaceutics III	PP 510	2		2						
46	Pharmacognosy I	PG 101	3		3						
47	Pharmacognosy II	PG 202	3		3						
48	Pharmacokinetics	PP 408	3		3						
49	Pharmacology I	PL 309	3			3					
50	Pharmacology II	PL 310	3			3					
51	Pharmacology III	PL 413	2			2					
52	Pharmacotherapeutics I	PL 414	3			3					
53	Pharmacotherapeutics II	PL 415	2			2					
54	Pharmacotherapeutics III	PL 517	2			2					



No.	Course Title	Course Code	CrH	B	P	M	PP	HE	BS	PM	D
55	Pharmacotherapeutics IV	PL 518	3			3					
56	Pharmacy Management & Pharmacoeconomics	PN 511	3							3	
57	Pharmacy Orientation	PP 101	1		1						
58	Pharmacy Ethics	PN 201	1						1		
59	Pharmacy Law & Legislations	PN 302	1				1				
60	Pharmacy Practice Experience I	PN 510	1				1				
61	Pharmacy Practice Experience II	PN 515	2				2				
62	Physical & Inorganic Chemistry	PC 101	3	3							
63	Physical Pharmacy	PP 202	3		3						
64	Physiology	PL 105	3			3					
65	Phytochemistry I	PG 203	3		3						
66	Phytochemistry II	PG 304	3		3						
67	Phytotherapy	PG 305	3		3						
68	Psychology	PL 104	1						1		
69	Public Health	PM 305	2					2			
70	Sales, Marketing & Drug Promotion	PN 512	2							2	
71	Terminology	PP 204	1		1						
72	Toxicology	PL 312	2					2			
73	Unit Operations	PP 511	2		2						
74	Virology & Parasitology	PM 203	2			2					
75	Communication Skills II	UCS 02	1						1		
Total			172	23	63	39	20	10	4	5	8
Percentage of total				13.4	36.6	22.7	11.6	5.8	2.3	2.9	4.7

6. Program Courses Contents:

Courses offered or supervised by the Department of Pharmaceutical Chemistry (PC)

I. Required Courses:

Course Code or Number: PC 101

Course Title: Physical and Inorganic Chemistry

Cours Objectives:

- Introduction to physical measurements in chemistry.
- To build strong basic background in chemistry for further courses.
- To enhance scientific thinking and problem solving.
- To provide the student with the background needed to understand the different methods of analysis of cations and anions.
- To train the student on how to handle chemicals effectively and safely.

Course Code or Number: PC 102

Course Title: Organic Chemistry I

Course objective:

- To provide students with basic knowledge in the field of organic chemistry which will serve as a base for other courses that are offered during subsequent semesters
- To enlighten students with physical and chemical characters of organic compounds with different functional groups, their nomenclature, synthesis, general reactions, reaction-mechanisms and identification by physical and chemical techniques

Course Code or Number: PC 103

Course Title: Organic Chemistry II

Course objective:

- To provide the students with basic knowledge in the field of mechanistic organic chemistry and basic synthetic methods.
- Provides the students with information on organic chemistry including nomenclature of organic compounds, major reactions and preparation of various organic functional groups.

Course Code or Number: PC 104

Course Title: Analytical Chemistry I

Course objective:

- To provide the student with the basic principles of volumetric and gravimetric analysis.
- To Introduce the fundamentals underpinning pharmaceutical analysis, analytical quality control and instrumental analysis.
- To enhance scientific thinking and logical approach to problem solving.

Course Code or Number: PC 205

Course Title: Organic chemistry III

Course objective:

- To enlighten students on physical and chemical characters of organic compounds with different functional groups where students are able to recognize organic compounds of variable nature.
- The ability to synthesize compounds with different functionalities.

Course Code or Number: PC 206

Course Title: Analytical Chemistry II

Course objective:

- To build on the content of Analytical Chemistry I (PC 104) by introducing the fundamental aspects of oxidation-reduction titrations.
- To give an introduction to electroanalytical methods which utilize potentiometry, conductimetry, and similar techniques.

Course Code or Number: PC 307

Course Title: Instrumental Analysis

Course objective:

- This course gives an introduction to instrumental methods used in pharmaceutical analysis which utilize spectroscopic techniques used to determine the potency of medicinal compounds in drugs and the purity of drug substances.
- To develop a greater comprehension of lipid and water analysis.

Course Code or Number: PC 308

Course Title: Medicinal Chemistry I

Course objective:

- To provide the student with the principles of medicinal chemistry.
- To orient the student's attention to the importance of the pharmacokinetic and the pharmacodynamic properties of drugs.
- To provide the student with good understanding of drug-receptor interaction.

- To give the student a general knowledge about the chemical and biological aspects of chemotherapeutic drugs along with other drugs as diagnostic agents and vitamins.
- To familiarize the student with pharmacopoeial standards of drugs including possible sources of impurities and quantitation of some pharmaceutical compounds in bulk and dosage forms
- Laboratory sessions involving the detection of possible impurities and quantitation of some pharmaceutical compounds in bulk and dosage forms.

Course Code or Number: PC 409

Course Title: Medicinal Chemistry II

Course objective:

- To provide the student with information on drugs other than the chemotherapeutic agents given in the Medicinal Chemistry I course.
- To orient the student's attention to the profound relation between medicinal chemistry and other sciences as biochemistry, pharmacology, molecular biology and other disciplines that help in relating drug action to the pharmacokinetic and the pharmacodynamic properties of drugs.
- To provide the student, through the previously mentioned item, with good understanding of drug-receptor interaction.
- To give the student a thorough knowledge about fate and metabolism of drugs.
- To familiarize the student with invention, designing and developing of new drugs.

Course Code or Number: PC 410

Course Title: Drug Design

Course objective:

- To provide the student with the basic principles of invention, designing and developing of new drugs.

Course Code or Number: PC 511

Course Title: Analytical Quality Assurance & Control

Course objective:

- This course gives an introduction to the principles of quality assurance, quality control, validation of analytical procedures, equipment qualification, system suitability testing, drug degradation, forced degradation and sample degradation.

II. Elective Courses:

Course Code or Number: PC E12

Course Title: Advanced Instrumental Analysis

Course objective:

- To build on the content of Instrumental Analysis by developing a better comprehension of the principles of instrumental techniques in determination of medicinal compounds.

Course Code or Number: PC E13

Course Title: Chemometrics in Pharmaceutical Analysis

Course objective:

- To introduce the basic knowledge of chemometrics.
- To understand the methods used in the field of chemometrics.
- To learn statistical tests for comparison of data sets.
- To highlight important distributions.
- To understand the usage of analysis of variance and regression diagnostics.
- To enable the student to become more creative and select an appropriate chemometric method to solve an analytical problem.

Course Code or Number: PC E14

Course Title: Project in Pharmaceutical Chemistry

Course objective:

- Introduce the students to searching scientific literature
- Train the students to formulate research projects
- Develop the ability of the students to write scientific articles and analyze data in the field of analytical pharmaceutical chemistry, medicinal chemistry and organic chemistry.

Courses offered or supervised by the Department of Pharmacognosy & Natural Products (PG)

I. Required Courses:

Course Code or Number: PG 101

Course Title: Pharmacognosy I

Course objective:

- The student will develop a solid knowledge that can be employed in the homeopathic system of medicine and development of research skills in chemical screening of plants.
- Students will be acquainted with modern techniques of Characterization of active constituent in medicinal plants.

Course Code or Number: PG 202

Course Title: Pharmacognosy II

Course objective:

- Identify the different plant organs both morphologically and histologically.
- Classify the different drugs according to their origins, active constituents or uses.
- Understand the substitutes or adulterants for each drug.
- Identify each drug from its morphology, structure and powder.
- Realize the difference between the drugs.
- Understand the role of each drug in the disease treatment.
- Understand the specification required by the pharmacopeias for each drug.
- Identify the drugs by the mean of chemical tests.
- Able to judge the herbal formulation.
- Application of herbs in the treatment of diseases.

Course Code or Number: PG 203

Course Title: Phytochemistry I

Course objective:

- The course introduces the student to the biogenetical origin of secondary metabolites.
- The general method of isolation and characterization of different types of plant constituents.
- The course enables the student to categorize the different types of secondary metabolites, predict therapeutic and toxic effects based on the chemical structure of the constituents.
- Propose structure modification that yields the production of more effective and less toxic products.

- Predict the use of natural products for the production of synthetic analogues with similar or more potent pharmacological activity.
- The course allows the student to have the basic methods for extraction, isolation, purification and identification of the natural compounds and their quantitative analysis.

Course Code or Number: PG 304

Course Title: Phytochemistry II

Course objective:

- To help the students acquire the knowledge and skills that enable him/her to understand, describe and deal with the chemistry of the biologically active products of plants of animal origin and the different methods for their evaluation.
- To help students acquire knowledge about recent chromatographic techniques in isolation and identification of natural products.

Course Code or Number: PG 305

Course Title: Phytotherapy

Course objective:

- To help the students know guidelines for prescribing herbal medicinal drugs on the basis of the pharmacological properties of these drugs including therapeutic uses, mechanism of action, dosage, adverse reactions, contraindications & drug interactions.
- The course also allows students understand pharmacotherapeutic principles applied to the treatment of different diseases, pharmacovigilance and rational use of drugs.
- Understand basis of complementary and alternative medicine with emphasis on herbal remedies, nutritional supplements, homeopathies & their effect on maintaining optimum health and prevention of chronic diseases.

II. Elective Courses:

Course Code or Number: PG E06

Course Title: Forensic Pharmacognosy

Course objective:

- The crime scene examination process and scene preservation.
- Poisonous plants and their natural products that constitute health hazards, or intended for criminal uses to produce abortion, loss of mental control, hallucination, heart arrest, etc.
- Drug dependence, narcotic analgesics, psychoenergetics, hallucinogens, etc ; Other types of evidence such as animal and human hairs, textile fibers, toxic fungi and mycotoxins.
- The technologies used for identification of illicit drugs and trace evidence.
- Examples of these technologies include GC, L GC-MS, HPLC, capillary electrophoresis, etc.

Course Code or Number: PG E07

Course Title: Applied Pharmacognosy

Course objective:

- Applying knowledge and scientific data acquired from previous courses of pharmacognosy and phytochemistry to evaluate qualitatively and quantitatively any crude drug to be used as herbal tea or as galenical product in pharmaceutical firm.
- Also to acquire knowledge how to order to produce highly evaluated crude drugs and how to store them in proper way.
- To elucidate the chemical structure of any active constituent or natural product of any newly discovered crude drug.

Course Code or Number: PG E08

Course Title: Project in Pharmacognosy and Natural Products

Course objective:

- Development of skills for searching and obtaining scientific literatures.
- The ability to collect, categorizes, summarizes and analyzes data.
- Training of the students to write and present the results and data in the form of a scientific article or report.
- Awareness of the back to nature and folkloric use of herbals and natural drugs.

Courses offered or supervised by Pharmacology and Therapeutics (PL)I. Required Courses:

Course Code or Number: PL 101

Course Title: Biophysics

Course objective:

- This course prepares the students to understand the subjects of Physiology and Physical Pharmacy. It explains the physical basis of (a) selected biological and physiological processes. (b) Relevant pharmaceutical subjects. (c) Investigative methods in medicine and (d) biological and chemical measurements.

Course Code or Number: PL 102

Course Title: Cell Biology

Course objective:

- To provide the students with detailed subcellular structure and biological function of each organelle.
- To give the student a full account of cell membrane structure and function.
- To introduce the students to the phases of the cell cycle.
- To help the students acquire bibliographic skills.

Course Code or Number: PL 103

Course Title: Anatomy and Histology

Course objective:

- This course introduces the student to the structures of the various organ systems of the human body and their relationship to function. It prepares the student for the study of human physiology, pathology, pathophysiology and pharmacotherapy of human diseases

Course Code or Number: PL 104

Course Title: Psychology

Course objective:

- To help students understand different principles, theories and vocabulary of psychology as a science.
- To provide students with basic concepts of social psychology, medical sociology and interpersonal communication which relate to the pharmacy practice system that involves patients, pharmacists, physicians, nurses and other health care professionals.

Course Code or Number: PL 105

Course Title: Physiology

Course objective:

- The student will acquire basic knowledge about the physiology of different body systems.

Course Code or Number: PL 307

Course Title: Biostatistics

Course objective:

- This is an elementary course in statistical methods for biological, pharmaceutical and clinical topics. It addresses issues for proposing/designing an experiment, as well as exploratory and inferential techniques for analyzing and modeling scientific data. Topics include probability models, exploratory graphics, descriptive techniques, statistical designs, hypothesis testing, confidence intervals, and simple/multiple regression.
- Introducing the student to the basis of mathematics required in pharmaceutical sciences.

Course Code or Number: PL 206

Course Title: Biochemistry I

Course objective:

- The basic molecular composition of the human body.
- Naming biomolecules (carbohydrates, lipid, protein, vitamins and nucleic acids) and characterizing their structure in relation to function.
- The role of nucleic acids and genetic code in directing the process of protein synthesis.
- The role of enzymes in catalyzing biochemical reactions.

Course Code or Number: PL 308

Course Title: Biochemistry II

Course objective:

- To provide the students with basic principles of bioenergetics, biological oxidation and various metabolic processes that take place in the human body.
- To introduce the students to the correlation between metabolic defects and occurrence of disease.
- To train the students in the methods used in the analysis of biological fluids.

Course Code or Number: PL 309

Course Title: Pharmacology I

Course objective:

- This is the first course in a series of Pharmacology courses that, together, are intended to provide general and comprehensive coverage of the Pharmacology for Pharmacy students. The course aims to teach the students principles of pharmacokinetics and pharmacodynamics of drugs, and pharmacogenetics. In addition to pharmacology of autonomic nervous system and autacoids.

Course Code or Number: PL 310

Course Title: Pharmacology II

Course objective:

- The aim of the course is to teach the students the basic pharmacology of cardiovascular system(CVS), renal system, respiratory and gastrointestinal tract and drugs modulating these systems

Course Code or Number: PL 311

Course Title: Pathophysiology

Course objective:

- This course introduces the student to the basic mechanisms of diseases with emphasis on the pathophysiological mechanisms involved in the genesis of the disease and the development of its signs and symptoms. It prepares the student to understand the mechanisms by which drugs (and other lines of management) exert their therapeutic effects in disease as taught in the Pharmacology and Clinical Pharmacy courses.

Course Code or Number: PL 312

Course Title: Toxicology

Course objective:

- This course provides the student with toxicological knowledge and concepts. The Topics cover the ways of assessment of drug toxicity and detection of toxic substances in body. The course also provides the students with kinds of pollution and genetic toxicology.

Course Code or Number: PL 413

Course Title: Pharmacology III

Course objective

- The aim of this course is to provide current information on the pharmacology of central nervous system, endocrine system and drugs acting on skin.

Course Code or Number: PL 414

Course Title: Pharmacotherapeutics I

Course objective

- This course prepares the students to understand the pharmacotherapeutics of Cardiovascular disorders: Heart Failure, Hypertension, Arrhythmias, Ischemic Heart Diseases, Thromboembolism, Stroke. Nephrology: Acute Renal Failure, Chronic Kidney Disease, Hemodialysis and Peritoneal Dialysis, Drug-Induced Kidney Disease, Electrolyte & Acid-Base Disorders. Urologic disorders: Erectile Dysfunction, Management of Benign Prostatic Hyperplasia, Urinary Incontinence.

Course Code or Number: PL 415

Course Title: Pharmacotherapeutics II

Course objective

- This course prepares the students to understand the pharmacotherapeutics of pulmonary diseases, rheumatology & bone disorders and gastroenterology.

Course Code or Number: PL 416

Course Title: Nutrition and Health

Course objective

- This course introduces the general principles of nutrition and its relation to health and disease.

Course Code or Number: PL 517

Course Title: Pharmacotherapeutics III

Course objective

- This course prepares the students to understand the pharmacotherapeutics of Infectious diseases and selected malignant diseases, in addition to Dermatology and ENT & Eye diseases

Course Code or Number: PL 518

Course Title: Pharmacotherapeutics IV

Course objective

- This course prepares the students to understand the pharmacotherapeutics of neurologic & psychiatric disorders, endocrinology disorders and women health care in addition to immunologic & hematologic disorders.

II. Elective Courses:

Course Code or Number: PL E19

Course Title: Addiction and Drug Abuse

Course objective

- Drug addiction is becoming a major problem in our world today. This course deals with the socio-psychological, biological, genetic and pharmacological aspects of the problem and strategies for prevention and treatment.

Course Code or Number: PL E20

Course Title: Bioevaluation and Drug Screening

Course objective

The course provides theoretical bases and practical procedures for biological screening and assaying of natural and synthetic products. A description of selected procedures using in vitro and in vivo preparation and their interpretation are discussed both in theoretical and practically. The course encompasses screening of drugs acting on autonomic nervous system, cardiovascular, central nervous system, skeletal muscle and anti-inflammatory drugs and hormones.

Course Code or Number: PL E21

Course Title: Clinical Biochemistry

Course objective

To make the students able to:

- Exhibit knowledge of human body chemistry levels under healthy and abnormal conditions.
- Evaluate the suitability of clinical specimens and the laboratory test outcomes and correlate test results with patient
- Demonstrate safe laboratory practices.
- Construct and write technical reports after careful analysis of the data.
- Explain and perform procedures routinely found in a clinical chemistry laboratory, including electrolytes, acid-base balance, acute phase proteins, liver, kidney, cardiac and endocrine functions.

Course Code or Number: PL E22

Course Title: Complementary and Alternative Medicine

Course objective

- Complementary and alternative medicine (CAM) is a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine. CAM is mainly applied to stress related and chronic diseases. CAM includes but is not limited to homeopathic medicine, chiropractic medicine, the prescribing of megavitamins, magnetic therapy, Ayurveda, aromatherapy, naturopathy, and medicine of different cultures (Chinese, Indian, Arabic, African medicine Dietary supplements are also a subset

of CAM. This course will critically review a range of complementary medicinal products including herbals, nutraceuticals (foods claimed to have a medicinal effect), homoeopathics (heavily diluted preparations) and ethnopharmaceuticals. Emphasis will be on critical appraisal of the clinical evidence published in the biomedical literature and other sources concerning their efficacy, safety and interactions with conventional medicines. The students will learn the issues most relevant to the practice of pharmacy.

Course Code or Number: PL E23

Course Title: Pharmacotherapeutics for Special Population

Course objective

- This course aimed to promote health, prevent and treat diseases in pediatric-geriatric aged group in addition to drug therapy for pregnant and lactating patients.

Course Code or Number: PL E24

Course Title: Project in Pharmacology and Therapeutics

Course objective

- To help the students develop the ability to be constructive independent researchers and make them aware of the latest aspects in the field of pharmacology. It also helps them to develop effective oral communication skills in a group setting, as well as to demonstrate their integrative capacity and mastery of background literature.

Courses offered or supervised by the Department of Microbiology and Immunology (PM)

I. Required Courses:

Course Code or Number: PM 201

Course Title: Pharmaceutical Microbiology

Course objective

- Provide an introduction to microbial diversity and structure with special emphasis to organelles targeted by antibiotics along with microbial metabolism and genetics
- Develop the skills required for safe handling, controlling and monitoring of microorganisms
- Identify types of pharmaceutical and non-pharmaceutical antiseptics, disinfectants and preservatives used to combat emerging infectious diseases and microbiological challenges that affect the pharmaceutical industry along with their uses and applications ; Recognize different antibiotics and how they influence the course of different diseases ; Correlate the clinical picture with laboratory information of the antibiotic sensitivity testing ; Describe fermentation processes and their applications in pharmaceutical industry.

Course Code or Number: PM 202

Course Title: Medical Microbiology

Course objective

- Recognize bacteria implicated in human diseases along with their underlying pathogenesis and epidemiology
- Correlate the clinical picture with laboratory information to establish a diagnosis
- Identify and recall pathogenic fungi along with some human fungal diseases
- The practical study involves the development of skills required for safe handling and identification of infectious agents

Course Code or Number: PM 203

Course Title: Virology & Parasitology

Course objective

- The course will provide the students with specialized skills to enable them to demonstrate detailed knowledge and understanding of the structural components, life cycles, transmission, immune response, and pathogenesis of viral and parasitic infections in humans and their relevance for human health and control.
- Define parasitism and different types of hosts and parasites.
- Develop the ability to correlate the clinical picture with laboratory information to establish a diagnosis.
- Enable the students to know the different categories of antiviral and antiparasitic drugs, their doses, side effects, mode of action and the duration for treatment.

Course Code or Number: PM 305

Course Title: Public Health

Course objective

- Identify the challenges of emerging diseases in the community.
- Recognize the importance of basic infection control practices and prevention of transmission of infectious agents in the healthcare settings and the community.
- Describe the standard methods used for determining the sanitary quality of water, food and milk (suitability for use and degree of contamination).
- Identify the fundamentals of occupational safety.
- Describe the impact of environmental changes on the community.
- Discuss the fundamentals of public health pharmacy.

Course Code or Number: PM 204

Course Title: Genetics & Immunology

Course objective

- Describe the basic fundamentals of the immune system, including its cells and their functions, as well as the structures and functions of genetic materials and their applications in the clinical field.

- Classify the hypersensitivity reactions, including their etiology, laboratory diagnosis and treatment modalities.
- Identify immunotherapy drugs and their applications in the therapy of immune disorders
- Recall the types of immunization.
- Recognize the different basics of classical and molecular genetics
- Describe microbial genetics and genotyping
- Interpret the flow of genetic information and how drugs may interfere
- Develop the ability to correlate between hereditary constitution and response to drugs

Course Code or Number: PM 406

Course Title: Drug & Molecular Biotechnology

Course objective

- Provide students with an in-depth understanding in rapidly developing areas of pharmaceutical and molecular biotechnology.
- Comprehend the pharmacist's role in biotechnology.
- Describe techniques of drug production by means of wild type or genetically engineered biological systems.
- Expose students to methods for production of commercial products including recombinant proteins.
- Discuss the clinical, economical and ethical aspects of biotechnological drugs.

II. Elective Courses:

Course Code or Number: PM E07

Course Title: Advanced Microbiology

Course objective

- Identify the microbe and host Interactions.
- Develop diagnostic clinical microbiology skills.
- Develop diagnostic molecular microbiology skills.
- Provide a general background on ecological microbiology.
- Interpret the principles of quality assurance and laboratory safety.

Course Code or Number: PM E08

Course Title: Project in Microbiology & Immunology

Course objective

- Development of skills for searching and obtaining scientific literatures.
- Training the students to collect, summarize and analyze data.
- Training the students to present the data in the form of a scientific report.
- Building awareness of the essential roles of microbiology in pharmacy business.

Courses offered or supervised by the Department of Clinical Pharmacy & Pharmacy Practice (PN):

I. Required Courses:

Course Code or Number: PN 201

Course Title: Pharmacy Ethics

Course objective

- To discuss ethical principles of pharmacy practice and various ethical issues faced by pharmacists.

Course Code or Number: PN 302

Course Title: Pharmacy Law & Legislations

Course objective

- To provide students with scientific and legal background for national drug policy and regulations of pharmacy practice.

Course Code or Number: PN 303

Course Title: Drug Information

Course objective

- To retrieve, analyze and evaluate drug information on the tertiary, secondary and primary literature resources using a systematic approach.
- To provide appropriate responds to drug information requests.
- To be a professional drug information pharmacist.

Course Code or Number: PN 404

Course Title: Pharmaceutical Care I

Course objective

This course is the first of four courses that aims:

- To address the unmet health care needs of people under current health system.
- To practice patient-centered medication management in community pharmacy settings, hospital inpatient setting and long-term care facility.
- To promote the safe and appropriate use of drugs.
- To enable students to integrate and apply concepts from pathophysiology, pharmacology, clinical biochemistry, and therapeutics to selected patient case scenarios.

Course Code or Number: PN 405

Course Title: Hospital Pharmacy

Course objective

- The course objective is to teach the pharmacy student the concept of hospital pharmacy, the role of hospital pharmacists within the health team and the different technical services provided by the hospital pharmacist.

Course Code or Number: PN 406

Course Title: First Aid

Course objective

- This course teaches future pharmacists the knowledge & skills they need to recognize emergencies and give first aid

Course Code or Number: PN 407

Course Title: Pharmaceutical Care II

Course objective

This course is the second of four courses that aims:

- This course is designed to enable students to integrate and apply concepts from pathophysiology, pharmacology, clinical biochemistry, and therapeutics to selected patient case scenarios.
- While using the pharmaceutical care model, students will develop skills in critical appraisal, patient assessment, and clinical problem-solving.
- Team skills are also developed as students will work in small groups during case preparation and discussion.

Course Code or Number: PN 408

Course Title: Community Pharmacy

Course objective

- This course integrates the pharmaceutical, clinical and social sciences relevant to community pharmacy practice. It enables students to develop the skills that they will need to identify and solve problems in a range of different health-related situations they may encounter while working in a community pharmacy.
- This course provides a systematic and comprehensive approach to assessing and monitoring drug therapy in order to make appropriate OTC/herbal medication recommendations and to ensure that all therapeutic objectives are being achieved in the context of pharmaceutical care.

Course Code or Number: PN 509

Course Title: Clinical Pharmacy I

Course objective

This is the first of two courses which aim to:

- Develop professional knowledge and skills needed to enable the student to be a competent clinical pharmacist.

- Provide pharmaceutical care to patients with any encountered disease.
- Be confident in assuming his clinical and professional role as part of the multidisciplinary healthcare team.

Course Code or Number: PN 510

Course Title: Pharmacy Practice Experience I

Course objective

This is the first of two courses which aim:

- To integrate knowledge of clinical indices, laboratory data, medication use history and demographic information and skills acquired by the student to optimise drug therapy in response to the needs of individual patients.
- To be competent in the pharmaceutical care of patients with the most commonly encountered diseases and be confident in assuming his clinical and professional role as part of the multidisciplinary healthcare team.

Course Code or Number: PN 511

Course Title: Pharmacy Management & Pharmacoeconomics

Course objective

- To enable students understanding of basic concepts of management and its importance to the organization. It also overviews the dynamic environment and how the organization can respond to changes in its environment given the importance of social responsibility in such practices.
- To introduce cost-effectiveness analyses.
- To enable students to use pharmacoeconomic analysis in pricing decisions and formulary decision-making.

Course Code or Number: PN 512

Course Title: Sales, Marketing & Drug Promotion

Course objective

- To enable students to understand the essence of marketing and how sales is related to marketing, by tackling basic marketing concepts and relating them to the students' future job market.

Course Code or Number: PN 513

Course Title: Clinical Pharmacy II

Course objective

This is the second of two courses which aim:

- To develop profound professional skills.
- To use pharmacokinetic principles in optimizing drug therapy.
- To introduce the student to the research field regarding clinical trial designs.

Course Code or Number: PN 514

Course Title: Clinical Toxicology

Course objective

- The course aims to enhance knowledge and skills of Pharmacy students to deal with the toxicity of chemicals and drugs in clinical settings. It enables students to correlate signs and symptoms of toxicity with the laboratory data and to establish therapeutic measures for poisoning cases with the aim of improving patient outcomes.
- This course features a number of selected case studies and critical thinking exercises, all of which are cross-referenced to the clinical literature. They were selected for their interest and their ability to teach important aspects of toxicology.

Course Code or Number: PN 515

Course Title: Pharmacy Practice Experience II

Course objective

This is the second of two courses which aim:

- To provides continuous development of practice skills and behaviors introduced previously.
- To emphasizes active learning for integration and application of curricular content and incremental development of professional and general abilities.

II. Elective Courses:

Course Code or Number: PN E16

Course Title: Research Methods and Applied Data Analysis

Course objective

The aim of this course is to enable students to develop their theoretical, methodological and research skills to enhance their ability to conduct rigorous research and reach sound analytical conclusions, which can form the basis for the development of effective pharmacy research across a range of practice settings.

Course Code or Number: PN E17

Course Title: Critical Care Therapeutics

Course objective

This course covers the pharmacotherapeutic management of commonly encountered critical care diseases. Emphasis is placed on the efficacy, safety, and comparative value of drug therapy in this highly specialized practice area.

Course Code or Number: PN E18

Course Title: Dispensing Medications

Course objective

- To illustrate drug dispensing procedures including generic selection, labelling, packaging and containers.
- To provide comparative evaluation of the therapeutic indications, physicochemical, pharmaceutical, biopharmaceutical and pharmacokinetic aspects of commonly prescribed drugs, dosage forms, trade names and pharmaceutical criteria used for selection of products from different therapeutic groups are emphasized.
- To develops the theme that dispensing is not a single event but a process which draws on skills and knowledge from a variety of areas of pharmacy practice.

Course Code or Number: PN E19

Course Title: Home Health Care

Course objective

- After completion of the course, the student should recognize the pharmacist's role in home health care services including home fluid and electrolyte therapy, chemotherapy, antibiotics, pain control and parenteral and enteral nutrition.

Course Code or Number: PN E20

Course Title: Project in Clinical Pharmacy & Pharmacy Practice

Course objective

- This course is designed to develop the students' research skills. Students will learn how to compile a relevant and up-to-date bibliography and review of the relevant literature; how to collect data; analyze the results using statistical packages; logically interpret the data; discuss the findings and make justifiable conclusions. The students are required to present the project as an oral presentation and in written form.

**Courses offered or supervised by the Department of
Pharmaceutics & Pharmaceutical Technology (PP).**

I. Required Courses:

Course Code or Number: PP 101

Course Title: Pharmacy Orientation

Course objective

- To provide the basic information of all aspects of professional pharmacy, including the mission of pharmacy, role of pharmacist in society, the responsibility of pharmacist, the pharmacy careers and educational requirements.
- To give overview of pharmacy practice in the history.
- To describe patient-oriented pharmaceutical care.

- To list common pharmaceutical dosage forms and routes of drug administration.
- To read the prescription and determine the medication errors.
- To perform accurate calculations in pharmacy practice.
- To select and retrieve information from primary, secondary and tertiary literatures.

Course Code or Number: PP 202

Course Title: Physical Pharmacy

Course objective

- This course is designed to introduce students to the physical-chemical and biologic principles of drugs and delivery systems so that the pharmacist will be able to understand and predict the solubility, stability, and absorption of drugs, design and formulate efficient disperse drug delivery systems..

Course Code or Number: PP 203

Course Title: Pharmaceutics I

Course objective

- The course enables students to deal with principles and techniques involved in the design, formulation, manufacturing problems and quality control testing of solid dosage forms including powders, granules, tablets, capsules and suppositories.

Course Code or Number: PP 204

Course Title: Terminology

Course objective

The course will introduce students to different definition of pharmacy terms including

- prescription terminology
- medical terms used in diagnoses
- medical terms used in drug description.

Course Code or Number: PP 305

Course Title: Pharmaceutics II

Course objective

- The course is concerned with all manufacturing processes, packaging, storage and quality control testing of monophasic liquid dosage forms. Also, sterile pharmaceutical preparations including parenterals and ophthalmic products are studied. In-addition to the principles of manufacturing semi-solid pharmaceuticals and cosmetic products.

Course Code or Number: PP 306

Course Title: Biopharmaceutics

Course objective

- Exploration and examination of the physicochemical properties of drugs, dosage forms, and drug delivery systems in the physiological environment and their impact on product performance.

Course Code or Number: PP 407

Course Title: Drug Stability

Course objective

- Students will acquire knowledge & technical skills, which are appropriate for their functional levels in the industry and pre-formulation systems. Also the objective of the course is to introduce the kinetics of drug decomposition including rate and order of the reaction, determination of the half-life, expiry date and shelf-life by different methods, stabilization methods, and in-vitro possible drug/excipient interactions.

Course Code or Number: PP 408

Course Title: Pharmacokinetics

Course objective

- The course is designed to introduce the student to pharmacokinetic terminology and mathematical as well as conceptual aspects of basic pharmacokinetics. Particular emphasis will be placed on obtaining, understanding, and utilizing terms such as, clearance, apparent volume of distribution, elimination rate constant, and elimination half-life following different routes of drug administration. Prediction of plasma drug concentration based upon pharmacokinetic parameters after single and multiple intravenous and oral doses, as well as intravenous infusion will be stressed.

Course Code or Number: PP 409

Course Title: Pharmaceutical Technology

Course objective

- The course introduces the students to pharmaceutical formulations and manufacturing technology applied in the preparation of the main pharmaceutical dosage forms.
- Make the students familiar with the process ingredients, apparatus used, steps required and optimum conditions for manufacturing of various dosage forms.

Course Code or Number: PP 510

Course Title: Pharmaceutics III

Course objective

- To introduce the formulation principles and applications of novel and targeted drug delivery systems.
- To explore pharmaceutical aspects of therapeutic equivalence of drugs.
- To study pharmaceutical properties and formulation of radiopharmaceuticals and biotechnology derived pharmaceuticals and the delivery systems for nucleotides, peptides and proteins.

Course Code or Number: PP 511

Course Title: Unit Operations

Course objective

- The course is aimed at providing the students with the main ideas for thorough understanding of the different unit operations and differentiation from unit processes, and their applications in pharmaceutical industry with the emphasis on equipment and machinery used in the production of different pharmaceutical dosage forms. In addition, the students will be acquainted with the principles of mass production and scaling up of different dosage forms.

Course Code or Number: PP 512

Course Title: Industrial Quality Assurance & GMP

Course objective

- The course deals with the layout, general facilities, environmental factors and organization structure of a pharmaceutical firm. Introduction to the quality systems as it applies to the manufacture of medicinal products.
- The course explains the general sources causing product quality variation during manufacture of different pharmaceutical dosage forms including material handling, equipment, machines, buildings and facilities, methods and personnel qualifications.

II. Elective Courses:

Course Code or Number: PP E13

Course Title: Project in Pharmaceutics and Pharmaceutical Technology

Course objective

- This course is designed to provide students with the required skills to respond to requests of drug information. Students will learn how to find and retrieve drug information from any literature source using a systematic approach.
- Students will develop their research, communication, and intellectual skills. They will also develop their scientific writing as well as self-learning skills.

7. Program Admission Requirements:

Admission Requirements include:

- Students must hold the Egyptian High School Certificate, Science Section or an equivalent certificate accepted by the Supreme Council of Egyptian Universities.
- Students are nominated for admission to the Faculty according to the rules of the Supreme Council of Non-Governmental Universities.
- Foreign students are nominated for admission to the Faculty according to the general regulations of the Ministry of Higher Education.
- Students must fulfill all the requirements and comply with the rules of the Faculty.
- Full-time study is required by all students.

8. Regulations for Program Course Completion:

The students should successfully pass a total of 180 credit hours before graduation out of which 158 credit hours are core courses, 8 credit hours are elective courses, and 14 credit hours are University requirements. The student should also spend 360 hours as summer training supervised by the Faculty of Pharmacy & Drug Manufacturing. through a minimum of 5 years study (10 semesters). The total credit hours are distributed for the different courses as follows:

I. Basic Science Courses	23 Cr
II. Pharmaceutical Sciences Courses	63 Cr
III. Medical	39 Cr
IV. Pharmacy Practice	20 Cr
V. Health and Environment	10 Cr
VI. Behavioral and Social	4 Cr
VII. Pharmacy Management	5 Cr
VIII. Discretionary	8 Cr
IX. Elective Courses	8 Cr

- **Examinations Procedure:**

- The final grade awarded to student in a course is usually based on the grades for the midterm exam held during the semester in the 8th week added to the grade from the final examination at the end of each semester. These grades are distributed as follows:
 - 20% for the mid-semester evaluation if there is no oral exam.
 - 10% for the mid-semester evaluation if there is an oral exam.
 - 30% for course work (practical, tutorial, interactive).
 - 50% for the final written exam
 - 10% for oral exam.
- Each credit hour is allotted a total of 100 points.



• **Grading System:**

Grade		Numerical Average	Grade points
Excellent	A	$X \geq 90$	4.0
Excellent	A-	$85 \leq X < 90$	3.7
Very Good	B+	$80 \leq X < 85$	3.3
Very Good	B	$75 \leq X < 80$	3.0
Good	B-	$70 \leq X < 75$	2.7
Good	C+	$65 \leq X < 70$	2.3
Pass	C	$60 \leq X < 65$	2.0
Pass Conditional	C-	$56 \leq X < 60$	1.7
Pass Conditional	D+	$53 \leq X < 56$	1.3
Pass Conditional	D	$50 \leq X < 53$	1.0
Fail	F	$X < 50$	0.0

X = Percentage Grade.

Grades not included in the GPA:

(I) incomplete, (W) withdraw, (E) absent with excuse, (NE) absent with non-excuse.

Student gets an (E) or (NE) grade in a course if he/she does not attend the final examination in that course.

The current GPA is an average determined by calculating each grade awarded during one semester study and cumulative GPA is the GPA for the 10 semesters.

$$\text{Cumulative GPA} = \frac{\sum \text{Grade points} \times N^{\circ} \text{ Cr. Hrs}}{\sum \text{Cr. Hrs}}$$

• **Graduation Grade:**

A candidate's graduation grade is based on the cumulative GPA, which might be not less than 60%.

• **The number of repetition times:**

Students are allowed to re-register any course (i.e., fully re-scheduled) but not more than three times per academic decision (whether mandatory or elective course) and so to correct any repetition of estimates BL, F, NE, or DN

9. Teaching and Learning Methodology for Blended Learning:

Lectures	Tutorials
Laboratory Sessions	Group Presentations/ Discussions
Assignments	Case Studies
Site Visits	Field Projects
Graduation Projects	Simulation
Videos	Flipped Classrooms
Self-Learning	Cooperative Learning
Problem Solving	

10. Methods of Student's Evaluation:

Methods of evaluation are updated and tailored to be able to measure competencies that should be achieved and to meet the requirements of the new teaching and learning strategy of blended learning
Written exams
Oral exams
Laboratory exams
E-Quizzes
Assignments
Discussion forum
Online Practical Exams
Online Final Exams
Field Project
Graduation Project
Objective Structured Clinical Examination (OSCE)
Objective Structured Practical Examination (OSPE)
Self-assessment
Peer-assessment
E- Portfolio for each student



11. Evaluation of Program Learning Outcomes and Competencies:

Evaluator	Tool	Sample	% Contribution in Total Marks of Program Evaluation
5 th Year Students	Questionnaires and Periodic Meetings	Questionnaires (20%)	25%
Graduate students	Questionnaires and Periodic Meetings	Questionnaires (20%)	25%
Stakeholders (Employers)	Questionnaires and Periodic Meetings	One meeting / year	25%
External Evaluator	Reviewing of the specifications of the program and the courses according to the bylaw	At least one reviewer professor in the specialty	25%

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