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PREAMBLE

Pharos University in Alexandria (PUA) is the first non-governmental University founded in Alexandria, the second largest city in Egypt.

According to the Presidential Decree No. 252 issued in the year 2006, and Ministerial Decree No. 2300 dated 9/9/2006, PUA was licensed to start in the academic year 2006/2007 with 7 Faculties including the Faculty of Pharmacy & Drug Manufacturing. The Ministerial Decree No. 147 dated 24/6/2010 declared the equivalence of the Bachelor Degree in Pharmacy granted by PUA to the Bachelor Degree in Pharmacy granted by the Governmental Egyptian Universities.

The Faculty encompasses 20 labs serving the different Science Departments.The capacity of each lab. is 35 students and is equipped with the necessary instruments. There are 2 auditoria, 250-students capacity each, 6 lecture rooms, 120-student capacity each and 10 class rooms 45-students capacity each.

The Faculty embraces a modern library , an experimental animal house , a training pharmacy and a pilot manufacturing plant containing a manufacturing unit & quality control unit.
The Library contains a large collection of the most up-to-date text books, references and an adquate number of internet capable computers to allow the students to perform online search, review e-books, journals & other electronic media.

Recently a Clinical Pharmacy & Pharmacy Practice unit for training students by using more than 85 computers & a Pharmaceutical research unit including 7 laboratries for post graduate research equipped with the most sufisticated instrument to conduct scientific reasearch have been established. In addition there is a well-equipped auditorium for scientific discussions, workshops and international conferances in different pharmaceutical study areas.

Faculty Curriculum Committee

Prof.Dr. Maged G. El Ghazouly

Dean, Faculty of Pharmacy & Drug Manufacturing

Prof.Dr. Sobhi Soliman

Head of Analytical & Pheamaceutical Chemistry Department

Prof.Dr. Ahmed El Mallah

Vice Dean for Academic & Students affairs

Mission, Vision & Objectives

The Mission of the Faculty of Pharmacy & Drug Manufacturing is to:

- Introduce distinguished and updated program in pharmaceutical education. The faculty also aspires to provide the society with competent graduates who value professional ethics and are capable of playing an effective and distinguished role in the field of pharmaceutical care, drug industry and community services. The Faculty also values and encourages Scientific Research and collaboration with similar Faculties both in Egypt and abroad.

Vision:

- The Faculty of Pharmacy & Drug Manufacturing of Pharos University, as a teaching and research institution, aims to achieve a distinguished and leading position between its local and international counterparts and to be a leader in development of pharmacy career with offering services to community and environs.

The objectives of the Faculty are to:

- Achieve standards of reference for local and regional pharmacy education
- Introduce pharmacists capable of meeting challenges of multi-disciplinary research.
- Provide practical experience to pharmacists in solving different problems related to patient health care and drug availability in the market
- Intensify the absorption of novel drug information and the introduction of new technologies.
- Activate the role of pharmacist in the health care system that commensurate with his scientific experiences.
- Develop students` personal skills by encouraging students activities and enhance their scientific curiosity and urge them to a commitment to life-long learning.

Graduate Attributes

The Faculty of Pharmacy & Drug Manufacturing of Pharos University 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 infectious agents by applying the basis 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. Demonstrate 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. Demonstrate competence in assuring quality of raw materials and pharmaceuticals 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 development, presentation, documentation, promotion, marketing and business administration skills.

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.

Faculty Education System

- The Faculty of Pharmacy & Drug Manufacturing grants a Bachelor Degree in Pharmacy (**B.Ph.**), based on the credit-hour program. Generally, one credit hour is equivalent to one hour lecture or 2-hours laboratory, unless otherwise specified. The teaching is in English medium.
- The Academic Year is divided into three semesters (Fall, Spring, and Summer). The Fall and Spring Semesters are fifteen weeks each, while the summer semester is only six weeks. The summer training commences after the third level during summer.
- Summer training is a graduation requirement of the Faculty. Summer training starts after the third level during summer. The student has to practice 360 hours training in a variety of pharmaceutical disciplines, approved by the Faculty. These include community pharmacies, hospitals, clinical rounds, pharmaceutical industry, and other pharmaceutical organizations. Such training provides the students with experience in dealing with drug therapy, determining dosage forms, drug monitoring, preparing appropriate medication and counseling with patients on rational drug usage. Student's performance is evaluated at the end of the training period by the organization, where training was taking place, and supervised by the Faculty of Pharmacy & Drug Manufacturing.
- Courses are offered by the Faculty in the summer semester in which students can register in not more than 8 credit hours, according to the regulations of the faculty, and without contradiction with their summer training.
- The flexibility of the system, however, allows the students to increase or decrease their study i.e. credit hours may extend from a minimum of 12 to a maximum of 21 credit hours in the fall or spring semester.

Faculty of Pharmacy & Drug Manufacturing Departments

The Faculty of Pharmacy & Drug Manufacturing comprises Six Departments. Between brackets are the corresponding symbols denoting the coding of the offered courses.

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)

Course Coding System

The course code consists of 2 letters and 3 digits.

1-The two letters denote the Faculty Code (P) and Department Code (C, G, L, M, N & P).

2-The first digit denotes the level, and the second & third digits denote the course serial number.

3-Elective courses are designated by the letter E in place of the first digit (level).

4-The University requirement courses are designated by the letter U.

Faculty Study Plan versus National Academic Reference Standards (NARS)

Sciences	Faculty Program (%)	NARS 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	

Faculty of Pharmacy & Drug Manufacturing Curriculum

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.

Abbreviations

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. University Requirements (U)

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	4	2	6	-
4	UGE 02	English (2)	2	0	4	2	6	UGE 01
5	UGE 03	English (3)	2	0	4	2	6	UGE 02
6	UC 01	Communication Skills	2	1	2	0	3	-
7	UGA 03	Arabic Language Skills	1	2	0	0	2	-

B. Faculty Requirements

The following are the courses offered according to the respective Department:

I . Department of Pharmaceutical Chemistry (PC)

A. Required Courses:

No.	Course Code	Course Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									CW	MTE	FWE	OE	TM	
1	PC 101	Physical & Inorganic Chemistry	3	2	1	2	5	-	90	60	150	_	300	2
2	PC 102	Organic Chemistry I	2	1	1	2	4	-	60	40	100	_	200	2
3	PC 103	Organic Chemistry II	3	2	1	2	5	PC 102	90	30	150	30	300	2
4	PC 104	Analytical Chemistry I	3	2	1	2	5	PC 101	90	30	150	30	300	2
5	PC 205	Organic Chemistry III	2	1	1	2	4	PC 103	60	40	100	_	200	2
6	PC 206	Analytical Chemistry II	3	2	1	2	5	PC 101	90	30	150	30	300	2
7	PC 307	Instrumental Analysis	3	2	1	2	5	PC 104	90	30	150	30	300	2
8	PC 308	Medicinal Chemistry I	3	2	1	2	5	PC 103 PC 307	90	30	150	30	300	2
9	PC 409	Medicinal Chemistry II	3	2	1	2	5	PC 103 PC 307 PL 310	90	30	150	30	300	2
10	PC 410	Drug Design	2	1	1	2	4	PC 308	60	40	100	_	200	2
11	PC 511	Analytical Quality Assurance& Control	3	2	1	2	5	PC 307	90	30	150	30	300	2
B. Elective Courses:														
12	PC E12	Advanced Instrumental Analysis	2	2	1	0	3	PC 307	60	40	100	_	200	2
13	PC E13	Chemometrics in Pharmaceutical Analysis	2	2	1	0	3	PC 307	60	40	100	_	200	2
14	PC E14	Project in Pharmaceutical Chemistry	2	0	4	0	4	PC 307 PC 308	100	_	_	100	200	_

II. Department of Pharmacognosy & Natural Products (PG)

A. Required Courses:

No.	Course Code	Course Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									CW	MTE	FWE	OE	TM	
1	PG 101	Pharmacognosy I	3	2	1	2	5	-	90	30	150	30	300	2
2	PG 202	Pharmacognosy II	3	2	0	2	4	PG 101	90	30	150	30	300	2
3	PG 203	Phytochemistry I	3	2	1	2	5	PG 202	90	30	150	30	300	2
4	PG 304	Phytochemistry II	3	2	0	2	4	PG 203	90	30	150	30	300	2
5	PG 305	Phytotherapy	3	3	1	0	4	PG 202, PL 309	90	60	150	_	300	2
B. Elective Courses:														
6	PG E06	Forensic Pharmacognosy	2	2	1	0	3	PG 304	60	40	100	_	200	2
7	PG E07	Applied Pharmacognosy	2	2	1	0	3	PG 304	60	40	100	_	200	2
8	PG E08	Project in Pharmacognosy & Natural Products	2	0	4	0	4	PG 305	100	_	_	100	200	_

III. Department of Pharmacology & Therapeutics (PL)

A. Required Courses:

No.	Course Code	Course Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									CW	MTE	FWE	OE	TM	
1	PL 101	Biophysics	2	1	0	2	3	-	60	40	100	_	200	2
2	PL 102	Cell Biology	1	1	1	0	2	-	30	20	50	_	100	1
3	PL 103	Anatomy & Histology	3	2	0	2	4	-	90	60	150	_	300	2
4	PL 104	Psychology	1	1	1	0	2	-	30	20	50	_	100	1
5	PL 105	Physiology	3	3	1	0	4	PL 103	90	60	150	_	300	2
6	PL 206	Biochemistry I	3	2	1	2	5	PC 103	90	30	150	30	300	2
7	PL 307	Biostatistics	2	2	1	0	3	-	60	40	100	_	200	2
8	PL 308	Biochemistry II	3	2	1	2	5	PL 206	90	30	150	30	300	2
9	PL 309	Pharmacology I	3	2	0	2	4	PL 105	90	30	150	30	300	2
10	PL 310	Pharmacology II	3	2	1	2	5	PL 309	90	30	150	30	300	2
11	PL 311	Pathophysiology	2	2	1	0	3	PL 105	60	40	100	_	200	2
12	PL 312	Toxicology	2	2	1	0	3	PL 309	60	20	100	20	200	2
13	PL 413	Pharmacology III	2	2	1	0	3	PL 309	60	40	100	-	200	2
14	PL 414	Pharmacotherapeutics I	3	3	1	0	4	PL 310	90	30	150	30	300	2
15	PL 415	Pharmacotherapeutics II	2	2	1	0	3	PL 309	60	20	100	20	200	2
16	PL 416	Nutrition & Health	2	2	1	0	3	PL 308	60	40	100	_	200	2
17	PL 517	Pharmacotherapeutics III	2	2	1	0	3	PL 309	60	20	100	20	200	2
18	PL 518	Pharmacotherapeutics IV	3	3	1	0	4	PL 413	90	30	150	30	300	2
B. Elective Courses:														
19	PL E19	Addiction & Drug Abuse	2	2	1	0	3	PL 413	60	40	100	_	200	2
20	PL E20	Bioevaluation & Drug Screening	2	2	1	0	3	PL 309	60	40	100	_	200	2
21	PL E21	Clinical Biochemsitry	2	2	1	0	3	PL 308	60	40	100	_	200	2
22	PL E22	Complementary & Alternative Medicine	2	2	1	0	3	PL 311	60	40	100	_	200	2
23	PL E23	Pharmacotherapeutics for Special Population	2	2	1	0	3	PL 310	60	40	100	_	200	2
24	PL E24	Project in Pharmacology & Therapeutics	2	0	4	0	4	PL 310	100	_	_	100	200	-

IV. Department of Microbiology and Immunology (PM)

A. Required Courses:

No.	Course Code	Course Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									CW	MTE	FWE	OE	TM	
1	PM 201	Pharmaceutical Microbiology	3	2	0	2	4	PL 102	90	60	120	30	300	2
2	PM 202	Medical Microbiology	3	2	0	2	4	PM 201	90	60	120	30	300	2
3	PM 203	Virology & Parasitology	2	2	1	0	3	PL 102	60	40	100	-	200	2
4	PM 204	Genetics &Immunology	2	2	0	0	2	PM 202	60	20	100	20	200	2
5	PM 305	Public Health	2	2	0	0	2	PM 202	60	20	100	20	200	2
6	PM 406	Drug & Molecular Biotechnology	2	2	1	0	3	PM 305	60	40	100	-	200	2
B. Elective Courses:														
7	PM E07	Advanced Microbiology	2	2	1	0	3	PM 305	60	40	100	-	200	2
8	PM E08	Project in Microbiology & Immunology	2	0	4	0	4	PM 406	100	-	-	100	200	-

V. Department of Clinical Pharmacy & Pharmacy Practice (PN)

A. Required Courses:

No.	Course Code	Course Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									CW	MTE	FWE	OE	TM	
1	PN 201	Pharmacy Ethics	1	1	0	0	1	-	30	20	50	_	100	1
2	PN 302	Pharmacy Law & Legislations	1	1	0	0	1	-	30	20	50	_	100	1
3	PN 303	Drug Information	2	1	0	2	3	PP 305, PL 309	60	40	100	_	200	2
4	PN 404	Pharmaceutical Care I	1	0	1	2	3	PN 303	100	_	_	_	100	_
5	PN 405	Hospital Pharmacy	2	2	1	0	3	PP 305	60	20	100	20	200	2
6	PN 406	First Aid	1	1	1	0	2	-	30	20	50	_	100	1
7	PN 407	Pharmaceutical Care II	2	1	0	2	3	PL 414	200	_	_	_	200	_
8	PN 408	Community Pharmacy	3	2	1	2	5	PN 303	90	30	150	30	300	2
9	PN 509	Clinical Pharmacy I	3	2	1	2	5	PP 408	90	30	150	30	300	2
10	PN 510	Pharmacy Practice Experience I	1	0	1	2	3	PN 407	100	_	_	_	100	_
11	PN 511	Pharmacy Management & Pharmacoeconomics	3	3	1	0	4	-	90	30	150	30	300	2
12	PN 512	Sales, Marketing & Drug Promotion	2	2	1	0	3	-	60	40	100	_	200	2
13	PN 513	Clinical Pharmacy II	3	2	1	2	5	PN 509	90	30	150	30	300	2
14	PN 514	Clinical Toxicology	1	1	1	0	2	PL 312	30	20	50	_	100	1
15	PN 515	Pharmacy Practice Experience II	2	1	1	2	4	PN 510	100	_	100	_	200	2
B. Elective Courses:														
16	PN E16	Research Methods and Applied Data Analysis	2	2	1	_	3	PL 206, PN 303	60	40	100	_	200	2
17	PN E17	Critical Care Therapeutics	2	2	1	_	3	PL 415	60	40	100	_	200	2
18	PN E18	Dispensing Medications	2	2	1	_	3	PN 405	60	40	100	_	200	2
19	PN E19	Home Health Care	2	1	1	2	4	PN 405	60	40	100	_	200	2
20	PN E20	Project in Clinical Pharmacy & Pharmacy Practice	2	0	4	0	4	PN 509	100	_	_	100	200	_

VI. Department of Pharmaceutics & Pharmaceutical Technology (PP)

A. Required Courses:

No.	Course Code	Course Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									CW	MTE	FWE	OE	TM	
1	PP 101	Pharmacy Orientation	1	1	1	0	2	-	30	20	50	_	100	1
2	PP 202	Physical Pharmacy	3	2	1	2	5	PC 101	90	60	150	-	300	2
3	PP 203	Pharmaceutics I	2	1	0	2	3	PP 202	60	20	100	20	200	2
4	PP204	Terminology	1	1	0	0	1	-	30	20	50	_	100	1
5	PP 305	Pharmaceutics II	4	3	1	2	6	PP 202	120	80	160	40	400	2
6	PP 306	Biopharmaceutics	2	1	1	2	4	PP 203 PP 305	60	40	100	-	200	2
7	PP 407	Drug Stability	3	2	0	2	4	PP 203 PP 305	90	60	150	-	300	2
8	PP 408	Pharmacokinetics	3	2	0	2	4	PP 306 PP 407	90	30	150	30	300	2
9	PP 409	Pharmaceutical Technology	3	2	0	2	4	PP 306	90	30	150	30	300	2
10	PP 510	Pharmaceutics III	2	2	1	0	3	PP 408	60	20	100	20	200	2
11	PP 511	Unit Operations	2	2	1	0	3	PP 409	60	40	100	-	200	2
12	PP 512	Industrial Quality Assurance & GMP	3	2	0	2	4	PP 409	90	30	150	30	300	2

B. Elective Courses:

13	PP E13	Project in Pharmaceutics & Pharmaceutical Technology	2	0	4	0	4	PP407 PP408	100	_	_	100	200	-

C. Elective Courses

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	-

Each Student should study 4 of the elective courses. The student should select one course from each category.

- Evaluation of graduation project:

  50% of the total mark (100 marks) are assigned by the supervisor to include

Collecting the references, collecting and interpretation of data, writing and preparing a presentation for the project

50% of the total mark (100 marks) are assigned by an oral committee including the supervisor and nominated specialists for discussion during the presentation.

List of Courses According to NARS Study Areas

Abbreviations

B	Basic Sciences	**HE**	Health & Environment
P	Pharmaceutical Sciences	**BS**	Behavioral & Social
M	Medical Sciences	**PM**	Pharmacy Manage-ment
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	ArabicLanguage 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	UC 01	2						2		
16	Community Pharmacy	PN 408	3				3				
17	Computer Skills & Program-ming Concepts (1)	UEC 01	2	2							
18	Computer Skills & Program-ming 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					
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		

No.	Course Title	Course Code	CrH	B	P	M	PP	HE	BS	PM	D
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	PP204	1		1						
72	Toxicology	PL 312	2					2			
73	Unit Operations	PP 511	2		2						
74	Virology & Parasitology	PM 203	2			2					
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**

- Total number of credit hours is 180 including 8 credit hours elective courses.

Faculty Study Plan

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	UC 01	Communication Skills	2	-	1	2	0	3
7	UEC 01	Computer Skills & Programing Concepts I	2	-	1	0	2	3
8	UGE 01	English I	2	-	0	4	2	6
Total Hours			17		9	9	12	30

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	PP 101	Pharmacy Orientation	1	-	1	0	0	1
7	UEC 02	Computer Skills & Programing Concepts II	2	UEC 01	1	0	2	3
8	UGE 02	English II	2	UGE 01	0	4	2	6
Total Hours			18		12	9	10	31

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	4	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 203, 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		Elective 3	2		2	1	0	2
Total Hours			17		15	7	4	26

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	1	4	4
Total Hours			17		11	6	12	28

Total Credit Hours 180

Courses are offered in the summer semester according to the need of the students.

Course Description

I. Department of Pharmaceutical Chemistry (PC)

I. Required Courses

Course Title	Physical and Inorganic Chemistry								
Course Code	PC 101	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	None								
Department	Pharmaceutical Chemistry								

Course objective:

- 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 content:

- The different states of matter laws, properties and the concentration terms.
- Thermochemistry, thermodynamics, spontaneity, chemical kinetics and reaction rate.
- Equilibrium reactions including gases, acids, bases, precipitates and complexes.
- Types of chemical reactions .
- Identification of cations and anions either separately or in mixtures.

Learning outcomes:

On successful completion of this course the student should be able to:

- Comprehend concentration calculations.
- Understand equilibria based on appropriate constants.
- Understand the concepts of thermochemistry and thermodynamics.
- Identify different cations and anions through chemical activity.
- Calculate reaction rate and rate constant.
- Handle different types of glassware and possible instruments.

Course Title	Organic Chemistry I								
Course Code	PC 102	Credit Hours	2	Lecture	1	Tutorial	1	Practical	2
Pre-requisite	None								
Department	Pharmaceutical Chemistry								

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 content:

- Nomenclature, synthesis, halogenations of alkanes, energy of reaction and energy profile.
- Classification, structural, stereoisomerism, Conformation of ethane and n butane, Geometrical, cis and trans or E and Z isomerism, Optical isomerism, enantiomers, diastereomers and mesoisomer, resolution of racemic modification and atropisomers
- Nomenclature, synthesis and stability of alkenes.
- Addition reactions (free radical and electrophilic additions), heat of hydrogenation, Markovnikov's rule, stereochemistry of addition.
- Free radical substitution.
- Addition to alkynes, hydration and tautomerism, acidity of terminal hydrogen.
- Nomenclature, synthesis and physical properties of alkylhalides
- Nucleophilic substitutions, SN1 and SN2 mechanisms.
- Elimination reactions (E1 and E2, Saytzeff and Hoffmann products).
- Classification of alcohols, nomenclature, synthesis and physical properties of alcohols and ethers.
- Benzene and Aromaticity: Kekule' structure, Hückel's rule for aromaticity.
- Nomenclature of benzene derivatives.
- Electrophilic aromatic substitution.

Learning outcomes:

On successful completion of this course the student should be able to:

- Be aware of the physical and chemical characters of organic classes with different functional groups, their nomenclature, synthesis and general reactions.

Course Title	Organic Chemistry II								
Course Code	PC 103	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PC 102								
Department	Pharmaceutical Chemistry								

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 content:

- Aldehydes and Ketones: Addition reaction (alcohols, HCN and Grignard reagent).
- Condensation with ammonia derivatives and enamine formation.
- Cannizzaro and aldol reaction (crossed and intermolecular), Claisen Schmidt condensation.
- Halogenation (acid catalyzed and base-induced, haloform reaction).
- Oxidation and reduction.
- Carboxylic acids and carboxylic acids derivatives: Acidity and effect of substituents (electrophilic factors and hydrogen bonding).
- Reactivity of carboxylic acid derivatives (acid halides, anhydrides, esters and amides) towards nucleophiles and examples of some reactions.
- Acetoacetic and malonic esters and their reactions.
- α, β-unsaturated compounds and Micheal addition.
- Aromatic nitrocompounds: Reduction in alkaline, neutral or acidic media, activation towards nucleophiles.
- Amines: Classification, nomenclature, basicity and synthesis of different classes of amines, Reactions as nucleophiles with different electrophiles reagents, Differentiation between the three classes (Hinsberg reaction), Quaternary ammonium salts.
- Diazonium salt: Structure and stability at different pH's, Reaction in which nitrogen is replaced and coupling reactions, Importance as key intermediates for several conversions.

Learning outcomes:

On successful completion of this course the student should be able to:

- Understand the fundamentals of mechanistic organic chemistry and basic synthestic methods and to determine the nomenclature of organic compounds.

Course Title	Analytical Chemistry I								
Course Code	PC 104	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PC 101								
Department	Pharmaceutical Chemistry								

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 content:

- The fundamentals of quantitative chemical analysis, pH calculations, volumetric methods of analysis, ionic equilibrium ,volumetric calculations, strengths of acids and bases, indicators, buffer solutions , hydrolysis of salts and primary standard materials.
- Derivation of titration curves of strong acids, strong bases, weak acids and weak bases.
- Applications of neutralization titrations to elemental analysis by Kjeldahl method.
- Determination of strong acids and bases ,weak acids and bases,ammonium salts, carbonates, hydrogen carbonates, phosphoric acid, nitrates, nitrites, amino acids and organic functional groups.
- Precipitation titrations, complex-formation titration(EDTA) and gravimetry.
- Nonaqueous titrations, reasons for its application, classification of solvents, autoprotolysis, titrants, primary standards, indicators and applications to the determination of organic bases, sulphonamides, barbiturates and alkaloidal salts.
- The laboratory sessions involve neutralization titrations, precipitation titrations, complex-formation titration, gravimetric analysis and potentiometric determination of pH values of solutions, pKa value of weak acids and Kb value of conjugate bases.

Learning outcomes:

On successful completion of this course the student should be able to:

- Understand the fundamentals of quantitative chemical analysis and titrations.
- Comprehend volumetric and pH calculations.
- Comprehend buffer solutions, buffer action, buffer capacity and hydrolysis of salts.
- Appreciate knowledge obtained from titration curves and select suitable indicator.
- Determine an unknown concentration by applying neutralization, precipitation, complex-formation and nonaqueous titrations.
- Application of gravimetric analysis.

Course Title	Organic chemistry III								
Course Code	PC 205	Credit Hours	2	Lecture	1	Tutorial	1	Practical	2
Pre-requisite	PC 103								
Department	Pharmaceutical Chemistry								

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 content:

- Phenols and quinones: Sources and synthesis, Acidity and effect of substituents, Ester and ether formation, Quinones as α, β-unsaturated carbonyl compounds
- Sulfonic acids and derivatives: Acidity, Synthesis and importance of sulfonamides.
- Heterocyclic chemistry:
    - Nomenclature of heterocyclic compounds (isolated and fused rings).
    - Synthesis and reactions of some five and six membered heterocyclic rings.
    - Detailed study of aromatic heterocyclic rings including derivatives of pharmaceutical importance.

Learning outcomes:

On successful completion of this course the student should be able to:

- Recognize organic compounds of variable nature and to synthesize compounds with different functionalities.

Course Title	Analytical Chemistry II								
Course Code	PC 206	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PC 104								
Department	Pharmaceutical Chemistry								

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 content:

- Oxidation-reduction reactions, electrochemical cells, electrode potentials, potential of electrochemical cells and concentration cells.
- Theory of oxidation-reduction titrations, equilibrium constants for redox reactions, redox titration curves and oxidation-reduction indicators.
- Applications of oxidation-reduction titrations, application of standard reductants and standard oxidants.
- Potentiometric methods, reference electrodes, liquid junction potential, indicator electrodes and membrane electrodes.
- Instruments for measuring cell potentials, direct potentiometric measurements, potentiometric titrations and measurement of pH.
- Conductimetry and conductimetric titrations and similar techniques.
- The laboratory sessions involve redox titrations using potassium permanganate, potassium dichromate, iodine and potassium bromate as well as pH measurement and conductimetry.

Learning outcomes:

On successful completion of this course the student should be able to:

- Demonstrate the practical skills required for an analyst.
- Understand the fundamentals of redox titrations.
- Be aquainted with oxidizing and reducing agents
- Apply redox titrations to determine unknown concentrations of oxidants and reductants.
- Understand the working components and applications of potentiometry, conductimetry, and similar techniques.
- Appreciate the use of electroanalytical methods for quantitation.

Course Title	Instrumental Analysis								
Course Code	PC 307	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PC 104								
Department	Pharmaceutical Chemistry								

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 content:

- Molecular ultraviolet / visible absorption spectroscopy, properties of electromagnetic radiation and theory of molecular absorption.
- Applications of molecular-absorption spectroscopy, instrumental quantitative analysis .
- Molecular- fluorescence spectroscopy, theory, relationship of concentration and fluorescence, instrument and applications.
- Atomic spectroscopy based upon flames, sources of atomic spectra, flame absorption spectroscopy and flame emission spectroscopy.
- Refractometry and polarimetry and their applications.
- Analysis of lipids and drinking water.
- The laboratory sessions involve spectrophotometric analysis and lipid and water analysis.

Learning outcomes:

On successful completion of this course the student should be able to:

- Understand the working components and application of Ultraviolet / Visible absorption spectroscopy, Fluorescence spectroscopy, Flame absorption and emission spectroscopy, Refractometry and Polarimetry.
- Discuss the principles behind the spectroscopic techniques used to determine medicinal compunds.
- Appreciate analysis of lipids and drinking water.
- Describe and apply instrumental analytical methods for drug substance and drug products.

Course Title	Medicinal Chemistry I								
Course Code	PC 308	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PC 103, PC 307								
Department	Pharmaceutical Chemistry								

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 content:

- Introduction to the principles of medicinal chemistry.
- Local anti-infective agents
- Urinary tract anti-infectives, anti-mycobacterial agents and antibacterial sulfonamides.
- Antibiotics.
- Antiprotozoals, anthelmintics and antifungals.
- Antivirals.
- Antineoplastic agents.
- Diagnostic agents.
- Vitamins.

Learning outcomes:

On successful completion of this course the student should be able to:

- Differentiate between different routes of drug distribution in body, absorption and forces of attraction to receptors.
- Relate drug's structure to biological activity.
- Identify drugs from their chemical nomenclature.
- Provide the chemical nomenclature of given drug's structure.
- Suggest a possible route for the synthesis of a given pharmaceutical compound.
- Suggest a convenient method for the quantitation of a drug in its bulk or dosage form.
- On completion of the course, the student will be eligible to follow the next courses.

Course Title	Medicinal Chemistry II								
Course Code	PC 409	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PC 103, PC 307 ,PL 310								
Department	Pharmaceutical Chemistry								

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 content:

- Drugs used to treat pain, inflammation and arthritis
- Opioid analgesics and antagonists
- Drugs affecting the immune systems
- Drugs affecting the central nervous system
- Drugs affecting neurotransmission
- Drugs affecting the cardiovascular system
- Drugs affecting the hormonal systems
- Drugs affecting the respiratory system
- Drugs affecting the gastrointestinal system
- Drugs used to manage neuromuscular disorders

Learning outcomes:

On successful completion of this course the student should be able to:

- Differentiate between different routes of drug distribution in body, absorption and forces of attraction to receptors.
- Relate drug's structure to biological activity.
- Identify drugs from their chemical nomenclature.
- Provide the chemical nomenclature of given drug's structure.
- Suggest a possible route for the synthesis of a given pharmaceutical compound.
- Suggest a convenient method for the quantitation of a drug in its bulk or dosage form.
- Suggest suitable synthetic steps for isosteric substitutions on drug molecule to modify or to enhance certain biological action.
- On completion of the course, the student will be eligible to follow the next courses .

Course Title	Drug Design								
Course Code	PC 410	Credit Hours	2	Lecture	1	Tutorial	1	Practical	2
Pre-requisite	PC 308								
Department	Pharmaceutical Chemistry								

Course objective:

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

Course content:

- Drug discovery, development and finding a lead.
- Drug design to optimizing target interaction by drug modification (variation of substituents, extension of structure, chain expansion or contraction, ring expansion or contraction, ring variation, rings fusion, simplification of structure, rigidification of structure) & optimizing access to the target by: improving absorption, increasing drug resistance to chemical and enzymatic degradation, increasing drug selectivity to target.
- Targeting drugs.
- Prodrugs, soft drugs and hard drugs.
- QSAR.
- Computer aided drug design.

Learning outcomes:

On successful completion of this course the student should be able to:

- Understand the fundamentals of drug discovery and development.
- Be acquainted with different techniques used for drug design.
- Apply drug design for the synthesis of drugs, soft drugs and prodrugs.
- Be familiar with computer programs intended for drug design.

Course Title	Analytical Quality Assurance & Control								
Course Code	PC 511	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PC 307								
Department	Pharmaceutical Chemistry								

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.

Course content:

- Total quality management (TQM)
- Quality assurance (QA), quality control (QC) and good analytical practice (GAP).
- Sampling basis, sampling procedures, sampling tools and protocols for sample preparation.
- Validation and revalidation of analytical procedures.
- Validation characteristics: accuracy, precision, repeatability, intermediate precision, reproducibility, linearity, range, detection limit, quantitation limit, robustness, ruggedness and system suitability testing.
- Equipment qualification involving design, installation, operational and performance qualifications.
- Pharmacopoeial calibration and standardization of analytical instruments.
- System suitability testing and quality control check.
- Documentation,quantification, reference standards, good chemical storage and hazard avoidance.
- Routes of drug degradation and stability indicating assay methods.

Learning outcomes:

On successful completion of this course the student should be able to:

- Master principles of quality assurance and quality control of drugs.
- Describe and apply different protocols of sample collection and preparation.
- Appreciate reasons for validation and revalidation of analytical procedures.
- Comprehend equipment qualification and pharmacopoeial calibration of instruments.
- Understand the role of analytical chemistry in the study of drug degradation and impurities.
- Master forced degradation and predict shelf degradation.

II. Elective Courses

Course Title	Advanced Instrumental Analysis								
Course Code	PC E12	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PC 307								
Department	Pharmaceutical Chemistry								

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 content:

- Physical principles of pharmaceutical analysis.
- Introduction to chromatography: HPLC and GC.
- Spectroscopic methods: UV/Visible, IR, near IR and Raman.
- Nuclear Magnetic Spectroscopy and Mass Spectroscopy.
- Polarimetry and refractometry.
- Potentiometry, pH meter, ion selective electrodes voltammetry and conductimetry.

Learning outcomes:

On successful completion of this course the student should be able to:

- Identify and appreciate the roles of instrumental components of gas and high performance liquid chromatographs.
- Understand the principles behind the spectroscopic techniques used to determine the concentration and the structure of medicinal compounds.
- Apply polarimetry and refractometry in analysis of drugs.
- Describe and apply analytical methods that utilize electroanalytical techniques.
- Participate in the operation of quality assurance and quality control of pharmaceuticals.

Course Title	Chemometrics in Pharmaceutical Analysis								
Course Code	PC E13	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PC 307								
Department	Pharmaceutical Chemistry								

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 content:

- Introduction to chemometrics.
- The principles and theories of chemometric methods.
- Data organization for multivariate methods.
- Basic approach for developing and applying multivariate calibrations.
- Multiple linear regression methods, classical least squares.
- Inverse least squares and Q-matrix.
- Factor based methods, principal component regression and partial least squares.
- Multiway methods of analysis.
- Application of chemometric methods of pharmaceutical analysis.

Learning outcomes:

On successful completion of this course the student should be able to:

- Understand the principles and theories of different chemometric methods.
- Organize data for multivariate methods.
- Develop and apply multivariate calibration.
- Apply chemometric methods to pharmaceutical analysis.
- Appreciate the use of electroanalytical methods for quantitation.

Course Title	Project in Pharmaceutical Chemistry			
Course Code	PC E14	Credit Hours	2	
Pre-requisite	PC 307,PC 308			
Department	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.

Course content:

- Projects in special problems in analytical pharmaceutical chemistry, medicinal chemistry and organic chemistry are assigned to the students.

Learning outcomes:

On successful completion of this course the student should be able to:

- Formulate a research project on a given problem.
- Search the literature in a given topic.
- Acquire skills to obtain information from scientific articles, journals, reference books & the internet.
- Master the basis of writing scientific papers.
- Acquire team-work attitude.

II - Department of Pharmacognosy & Natural Products (PG)

I. Required Courses

Course Title	Pharmacognosy I								
Course Code	PG 101	Credit hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	None								
Department	Pharmacognosy and Natural Products								

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 content:

- Introduction to pharmacognosy & materic medica.
- Cell differentiation and cell contents.
- Drugs derived from leaves, their characters in either entire or powdered form, constituents, uses and chemical tests.
- Drugs derived from barks and woods, their characters in either entire or powdered form, constituents, uses and chemical tests.
- Drugs derived from flowers, their characters in either entire or powdered form, constituents, uses and chemical tests.
- Drugs derived from seeds, their characters in either entire or powdered form, constituents, uses and chemical tests.

Learning outcomes:

On successful completion of this course the student should be able to:

- Have the knowledge and acquires skills that help her/him to recognize and identify different commercial and pharmaceutical starches, barks, leaves, woods, flowers and seed drugs in entire and powdered forms.
- Recognize morphology, histology, monographs, powder identification and the possible ways of adulteration of these drugs when occur in powdered form by the help of microscopical examination and the recommended and specific chemical tests.
- Acquire knowledge about active constituents, uses, pharmaceutical preparation as well as the quality control of herbal drugs in particular regards to contamination and ability to differentiate between genuine and adulterated drugs.

Course Title	Pharmacognosy II								
Course Code	PG 202	Credit hours	3	Lecture	2	Tutorial	0	Practical	2
Pre-requisite	PG 101								
Department	Pharmacognosy and Natural Products								

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 content:

- Introduction to fruits, Umbileferous fruits, Capsicum, Colocynth, Black pepper, Wheat….etc.
- Herbs: Hyoscyamus, Mentha, Thyme, Lobelia, Cannabis ….etc.
- Subterranean Organs: Ipecacuanha, Liquorice, Senega, Rauwolfia, Rhubarb, Valerian, Ginger…etc.
- Unorganized: resins, Colophony, Scammony; oleoresin, Copaiba; oleo gumresin, Asafoetida, Myrrh; balsams, Benzoin, Tolu balsam; dried latex; dried juices; extracts; gums.

Learning outcomes:

On successful completion of this course the student should be able to:

- Acquire the knowledge and skill that helps her/him to recognize and identify, fruits, herbs, subterranean organs, drugs derived from animal origin and unorganized drugs in entire and powder form.
- Recognize the principles of quality control of these drugs including microbiological and other contamination.
- Recognize the possible ways of adulteration of these drugs particularly when occuring in powdered form by the help of microscopical examination and the recommended and specific chemical tests.

Course Title	Phytochemistry I								
Course Code	PG 203	Credit hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PG 202								
Department	Pharmacognosy and Natural Products								

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 content:

- Volatile oils: distribution, chemical structure, physico-chemical properties, methods of isolation and identification and medicinal uses.
- Carbohydrates and their derivatives and glycosides: distribution, chemical structure, physico-chemical properties, methods of isolation and identification and medicinal uses.

Learning outcomes:

On successful completion of this course the student should be able to:

- Have basic methods for extraction, isolation, purification and identification of natural compounds.
- Quantitative analysis of natural compounds.

Course Title	Phytochemistry II								
Course Code	PG 304	Credit hours	3	Lecture	2	Tutorial	0	Practical	2
Pre-requisite	PG 203								
Department	Pharmacognosy and Natural Products								

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 content:

- Alkaloids: definition of alkaloids and botanical sources- fundamental properties of alkaloids. Physical and chemical – Nomenclature and classification – Methods of extraction and isolation from plant material, crude drugs and pharmaceuticals and discussing the principles covering general methods used for identification, qualitative and quantitative determination of alkaloids.
- Study of representative example of different groups of alkaloids, the study includes chemical structures, structure activity relationships, specific properties, identity, test, assay and specific precaution concerning stability. Brief indication of the principal actions and uses.
- Marine Natural Products
- Miscellaneous isoprenoids and Bitters
- Principles of chromatography

Learning outcomes:

On successful completion of this course the student should be able to:

- Identify basic methods for extraction, isolation, purification and identification of natural compounds.
- Carry out qantitative analysis of natural compounds.

Course Title	Phytotherapy								
Course Code	PG 305	Credit hours	3	Lecture	3	Tutorial	1	Practical	0
Pre-requisite	PG 202 , PL 309								
Department	Pharmacognosy and Natural Products								

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.

Course content:

- Herbal drugs affecting cardiovascular, respiratory, nervous, urinary digestive and gynaecological systems
- Herbal drugs affecting skin and eye diseases as well as herbal drugs having non specific enhancement of resistance.
- Herbal drugs affecting wounds and other injuries.

Learning outcomes:

On successful completion of this course the student should be able to:

- Provide scientific information on the safety, efficacy, and quality control/quality assurance of widely used medicinal plants in order to facilitate their appropriate use.

II. Elective Courses

Course Title	Forensic Pharmacognosy								
Course Code	PG E06	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PG 304								
Department	Pharmacognosy and Natural Products								

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 content:

- Study of plants and their natural products that constitute health hazards, or intended for criminal uses to produce, abortion, loss of mental control, hallucination, death due to dehydration or heart arrest. Illegal poisoning of well-water and killing farm animals.
- Drug dependents, narcotics, analgesics psychoenergetics, euphoric. Mycotoxin as a serious threat to general health and safety of community, contamination of food material with poisonous fungi.
- Study of GC & HPLC

Learning outcomes:

On successful completion of this course the student should be able to:

- Recognize and apply appropriate theories, principles and concepts relevant to the forensic science ; Analyze and interpret information from a variety of sources ; Critically assess and evaluate the literature within the field of forensic science ; Plan and design practical activities using techniques and procedures appropriate to the field of forensic science.
- Plan, design, and communicate research work using media and advanced techniques ; Respond to change within the external and internal forensic science environments.
- Solve problems relevant to the field of forensic science using ideas and techniques ; Demonstrate the ability to work effectively as part of a group ; Develop appropriate effective written and oral communication skills ; Use organization skills (time management).

Course Title	Applied Pharmacognosy								
Course Code	PG E07	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PG 304								
Department	Pharmacognosy and Natural Products								

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 content:

- Application, qualitative and preparative chromatography, choice of suitable chromatographic system, Gas chromatography, pressurized liquid chromatography.
- Evaluation of drugs: Sampling, structural, physical and analytical standards, adulteration of drugs and their detection.
- Determination of structure of natural products: Physical and general data and their significance, infrared spectroscopy, nuclear magnetic resonance, their use for structure determination of natural products.
- Production of medicinal plants and wild plants versus cultivated plants: Genetic and ecologic affecting variability in drug activity, plant growth regulators.
- The role of enzymatic actions in production of drugs. Physicochemical and biological factors responsible for deterioration of drugs. General rules for preservation of drugs. Methods of controlling insects in crude vegetable drugs.

Learning outcomes:

On successful completion of this course the student should be able to:

- Evaluate any crude drugs both qualitatively and quantitatively as a starting material for production of herbal teas & galenicals.
- Produce a highly valuable crude drug using genetic engineering & enzymatic activity.
- Separate a mixture of plant constituents from an extract, and to elucidate their chemical structures ; Identify factors affecting storage of crude drugs as a final step in their production and how to protect them from insect's invasion ; Produce a survey on folkly used plants as student assignment using online research through the internet and some laboratory examination.

Course Title	Project in Pharmacognosy and Natural Products			
Course Code	PG E08	Credit Hours	2	
Pre-requisite	PG 305			
Department	Pharmacognosy and Natural Products			

Course objectives:

- 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.

Course Content:

- Projects in special problems in pharmacognosy & natural products are assigned to students.

Learning outcomes:

On Successful completion of the topics of the department and completion of this project the student should be able to:

- Acquire the skills of searching for any information from text books, scientific periodicals and different cites of internet.
- Collect, summarize and analyze data in any scientific field.
- Present scientific data in the form of report or thesis.
- Gain appropriate professional attitudes and problem solving skills.
- Acquire the skills of working in a group successfully.
- Prepare and perform scientific presentation and how to write scientific report.
- Evaluate any folkloric or traditional use of any plant or herbal mixture to cure any ailment or disease.

III- Department of Pharmacology and Therapeutics (PL)

I. Required Courses

Course Title	Biophysics								
Course Code	PL 101	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Pre-requisite	None								
Department	Pharmacology and Therapeutics								

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 content:

- Sources of electric energy
- Behavior in electric circuits
- Electric methods of measurements
- Control theory
- Thermodynamics
- Diffusion of molecules through solvent
- Transport of molecules and particles through membranes and osmosis
- Compartment systems and compartmental analysis
- Properties of solids and fluids
- Fundamentals of rheology and viscoelasticity
- Biophysics of transport and flow in biological systems
- Biophysics of the cardiovascular and respiratory systems, hearing and vision
- Fundamental law of radiology and interaction of radiation with matter
- Ultrasound , lasers, compound light and electron microscopes

Learning outcomes:

On successful completion of this course the student should be able to describe the physical principles underlying

- The electrical behavior of excitable cells
- The operation of the circulatory, renal and respiratory systems in terms of the relationships between the pressures, resistances and flow
- Transport of molecules in body fluids and gases in biological systems
- The required components for positive and negative feedback systems in the homeostatic control of human body functions, the basis and consequences of operation from the point of control theory
- The sense of vision and hearing Certain topics in physical pharmacy and biopharmaceutics.

Course Title	Cell Biology								
Course Code	PL 102	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Pre-requisite	None								
Department	Pharmacology and Therapeutics								

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 content:

- Cell Structure, function.
- Membrane Structure & Dynamics
- Membrane Pumps, carriers and channels
- Cell Cycle
- cellular bioenergetics
- Cancer : as a disease of cells

Learning outcomes:
On successful completion of this course, the students should be able to:

- Recall the structure & function of each subcellular organelle.
- Understand the molecular structure and architecture of the cell membrane to suit its function.
- Recall that cancer is a disease of cells of different types.
- Carry out some laboratory experiments to examine cell membrane integrity.
- Gain the skill to the proper use of light microscope
- Acquire the skills to differentiate between the 4 tissue types and to draw them.
- Acquire preliminary professional attitudes and problem solving and self learning skills.
- Acquire the attitude of working in teams.
- Committed to medical ethics.
- Acquire the ability to prepare and perform scientific presentations.
- Acquire the skill to use computer, internet and other sophisticated electronic tools.
- Develop the spirit of innovation and creativity through critical thinking.

Course Title	Anatomy and Histology								
Course Code	PL 103	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Pre-requisite	None								
Department	Pharmacology and Therapeutics								

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 content:

- The gross anatomy of the different systems of the human body (skeleton and joints, cardiovascular, respiratory, digestive, urogenital, nervous and endocrine systems) and the different organs that constitute them
- The histology of different cells and tissues that constitute the various organs (neurons, endocrine cells, different types of muscles and epithelia, blood cells, etc)
- The embryologic origin of the different organs of the body

Learning outcomes:

On successful completion of this course, the students should be able to:

- Describe the gross anatomy of the different systems of the human body (skeleton and joints, cardiovascular, respiratory, digestive, urogenital, nervous and endocrine systems) and the different organs that constitute them.
- Describe the histology of tissues and cells which constitute the various organs (neurons, endocrine cells, different types of muscles and epithelia, blood).

Course Title	Psychology								
Course Code	PL 104	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Pre-requisite	None								
Department	Pharmacology and Therapeutics								

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 content:

- Basic vocabulary, concepts, principles, and theories of the discipline.
- Biological bases of behavior.
- Sensation and perception.
- Learning and memory.
- Cognition, language, and intelligence.
- Motivation and emotion.
- Lifespan and personality development.
- Psychological disorders and Social psychology.

Learning outcomes:
On successful completion of this course, the students should be able to:

- Recall major important vocabulary, concepts, principles, and theories of the discipline that could be related to pharmacy practice.
- Recognize basics of leadership as an aspect of social power.
- Discuss all aspects of small group behavior and development of attitudes.
- Acquire preliminary skills of different ways of good communication.
- Compare between different types of psychological disorders.
- Discuss basic lines of psychological disorders treatment.

Course Title	Physiology								
Course Code	PL 105	Credit Hours	3	Lecture	3	Tutorial	1	Practical	0
Pre-requisite	PL 103								
Department	Pharmacology and Therapeutics								

Course objective:

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

Course content:

- The structure and functions of the autonomic nervous system.
- Properties of cardiac muscle. Innervation of the heart & heart rate, Cardiac output, arterial blood pressure (ABP) .and Coronary circulation.
- Structure and functions of respiratory system; Diffusion and transport of gases.
- Control of breathing and hypoxia.
- Functions and regulations of pituitary, thyroid, parathyroid, adrenal glands and endocrine pancreas.
- Functions of the kidney, steps of urine formation and cell membrane transport
- Composition of Blood; RBCs and Erythropoiesis; White blood cells, Blood platelet and hemostasis
- Central nervous system function and neurotransmitters.
- Function of salivary glands; Gastric secretion. Intestinal motility and secretion.
- Pancreatic secretion; Functions of the liver and biliary system

Learning outcomes:

On successful completion of this course, the students should be able to:

- Describe the structure and functions of the autonomic nervous system.
- List different properties of cardiac muscle and define each one and discuss factors affecting IT.
- Identify physiological variations of heart rate and discuss different mechanisms of its control.
- Define cardiac output and ABP, discuss factors affecting them.
- Know the normal coronary blood flow and how it can be controlled and Mention the structure and functions of respiratory system
- Discuss mechanisms of the transport across cell membrane, and listing different functions of the kidneys and discuss steps of urine formation.
- Discuss diffusion and blood transport of O2 and CO2, Identify sites and functions of respiratory centers and chemoreceptors and list different endocrine glands of the body
- Mention functions and regulations of pituitary, thyroid, parathyroid, adrenal glands and pancreas.
- Define plasma proteins, enumerate their functions also define blood cells

Course Title	Biostatistics								
Course Code	PL 307	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	None								
Department	Pharmacology and Therapeutics								

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 content:

- Probability Theory.
- Distributions.
- Populations and samples.
- Experimental design.
- Graphical presentation of data.
- Descriptive statistics.
- Hypothesis generation and test of significance.
- Mathematics required in pharmaceutical sciences such as functions, grouping, limits and derivatives.

Learning outcomes:

On successful completion of this course, the students should be able to:

- Design an experiment and determine the appropriate sample size.
- Choose the best way to present data graphically.
- Analyze data using descriptive statistics.
- Discuss the concept of probability and its applications in biostatistics.
- Present data representing two populations and the influence of a treatment on a variable in a population. Perform the appropriate statistical analysis to test significance using the concept of the null hypothesis.
- Use computer statistical software for data presentation and statistical analysis

Course Title	Biochemistry I								
Course Code	PL 206	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PC 103								
Department	Pharmacology and Therapeutics								

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 content:

- Carbohydrates: Structure & function of of monosaccharides, disaccharides and polysaccharides.
- Structure and function of gylcosaminoglycans and proteoglycans.
- Lipids and structure of fatty acids, prostaglandins and related compounds, phospholipids structure of cholesterol, plasma lipoproteins and fat-soluble vitamins.
- Amino acids, protein structure and function.
- Globular proteins & Fibrous proteins.
- Enzymes, mechanism of catalysis, factors affecting the rate of enzyme-catalyzed reactions and enzyme inhibition.
- Water-soluble vitamins and coenzymes
- Fat soluble vitamins.
- Enzymes in clinical diagnosis and enzyme inhibitors used as drugs.
- DNA & RNA structure, replication and repair.
- RNA structure and protein synthesis.

Learning outcomes:

On successful completion of this course, the students should be able to:

- Recall the biomolecules that constitute the composition of the human body
- Appreciate the function of carbohydrates, lipids, proteins and nucleic acids in human body.
- Acquire preliminary skills to perform blood and urine laboratory analysis.
- Interpret the laboratory data obtained.
- Carry out experiments to identify normal and pathological components of body fluids (blood and urine) and to integrate between biochemical knowledge and clinical aspects to solve clinical problems.
- Acquire appropriate professional attitudes and self-learning and problem solving skills; Acquire the attitude of working in teams.
- Describe enzymes, mechanism of catalysis, factors affecting the rate of enzyme-catalyzed reactions and enzyme inhibition and enzymes in clinical diagnosis.
- Describe DNA & RNA structure, replication and repair. RNA and protein synthesis.

Course Title	Biochemistry II								
Course Code	PL 308	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PL 207								
Department	Pharmacology and Therapeutics								

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 content:

- Principles of bioenergetics, biological oxidation and ATP production.
- Citric acid cycle and mitochondrial respiratory chain (oxidative phosphorylation).
- Carbohydrate metabolism (glycolysis, gluconeogenesis, hexose monophosphate shunt, glycogenesis and glycogenolysis), and related clinical aspects.
- Lipid metabolism: fatty acid synthesis and degradation, ketogenesis, ketolysis, cholesterol biosynthesis, plasma lipoproteins, and related clinical correlations.
- Protein and amino acid metabolism: synthesis and degradation, urea cycle, fate of ammonia, and related clinical aspects.
- Nucleic acids biosynthesis & degradation and clinical correlations.
- Quantitative analysis of biological fluids and reporting abnormality for case diagnosis.

Learning outcomes:

On successful completion of this course, the students should be able to

- Recall the role of ATP generation, citric acid cycle reactions and mitochondrial oxidative phosphorylation.
- Describe the metabolism of carbohydrates, lipids, proteins and nucleotides.
- Identify the clinical aspects of intermediary metabolism.
- Recall the metabolism of nucleic acids and nucleotides, and disorders associated with defective metabolism.
- Perform and interpret blood and urine laboratory analysis for certain metabolites.
- Correlate the integration between the metabolic pathways and their hormonal regulation, Link metabolic abnormalities with the occurrence of diseases.
- Carry out some laboratory experiments used in clinical diagnosis of certain metabolic diseases; Integrate between biochemical knowledge and clinical aspects to solve clinical problems.
- Acquire good professional attitudes and self-learning. Problem solving and team-work skills.

Course Title	Pharmacology I								
Course Code	PL 309	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Pre-requisite	PL105								
Department	Pharmacology and Therapeutics								

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 content:

The contents of this first course are:

- Definition and scope of Pharmacology and its different branches
- Principles of pharmacokinetics and pharmacodynamics of drugs and introduction to pharmacogenetics
- Pharmacology of autonomic nervous system
- Pharmacology of autacoids (histamine, serotonin, angiotensin and other peptide autacoids, eicosanoids and nitric oxide) and their modulators.
- The role of histamine in allergy and gastric secretion, serotonin in migraine, prostanoids in pain, inflammation and fever and the role of angiotensin II in blood pressure regulation and hypertension

Learning outcomes:

On successful completion of this course, the students should be able to:

- Define the scope of Pharmacology and its different branches
- Understand pharmacokinetic and pharmacodynamic aspects of drugs
- Recognize concepts of pharmacogenetics and modulation of drug action and interactions
- Discuss advantages and disadvantages of different routes of administration
- Describe the processes of pharmacokinetics (drug absorption, distribution, metabolism, and elimination)
- Discuss the pharmacodynamics (different mechanisms by which a drug can produce its effects, dose-response curves, ED50 and drug potency and efficacy.
- Discuss the differences between full agonists, partial agonists, pharmacological antagonists, physiological antagonists, chemical antagonists.
- Describe the pharmacology of the autonomic nervous system (sympathetic and parasympathetic drugs and modulators)
- recognize related drug names, actions, pharmacologic effects, therapeutic uses, relevant pharmacokinetics and side effects.
- Describe the pharmacology of autacoids (histamine, serotonin, prostanoids, peptides and kinins) and drugs acting on their relevant receptors or modulating their levels.
- Evaluate the role of autacoids in health and disease conditions

Course Title	Pharmacology II								
Course Code	PL 310	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PL 309								
Department	Pharmacology and Therapeutics								

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 content:

- Relevant cardiovascular physiology and pathophysiology
- Drugs acting on the cardiovascular system (cardiotonic, antiarrhythmic, anti-anginal and anti-hypertensive drugs and drugs for shock
- Drugs affecting blood (anemia, antithrombotic, anticoagulants, antihyperlipidemics, blood volume expander).
- Drugs acting on the urogenital System (Diuretics, drugs for urinary incontinence and prostatic adrenal hyperplasia and drugs for sexual impotence.
- Drugs acting on the respiratory system (drugs for bronchial asthma, chronic obstructive lung disease and cough).
- Drugs acting on the gastrointestinal system (Drugs for peptic ulcer disorders, prokinetics, antispasmodics, antiemetics, laxatives, purgative, anti-diarrheal).

Learning outcomes:

On successful completion of this course, the students should be able to:

- Explain the genesis of electrical cardiac rhythm, the cardiac output, peripheral vascular resistance and the factors influencing them
- Classify the drugs used in the treatment of angina pectoris congestive heart failure, cardiac arrhythmias, hypertension and shock. List the most common drugs in each group and Describe pharmacokinetics, mechanism of action, effects on various body systems, side effects, drug interactions and contraindications and their clinical uses.
- Recognize drugs affecting urinary system. Name the common drugs in each class and describe pharmacokinetics, mechanism of action, effects on various body systems, side effects, interactions and contraindications and clinical uses for each.
- List the drugs used in bronchial asthma, chronic obstructive lung disease and cough. Describe pharmacokinetics, mechanism of action, effects on various body systems, side effects, drug interactions and contraindications and their clinical uses.
- List the drugs acting on the gastrointestinal system (Drugs for hyperacidity and peptic ulcer disorders, prokinetics, antispasmodics, antiemetics, laxatives, purgative, anti-diarrheal). Describe pharmacokinetics, mechanism of action, effects on various body systems, side effects, drug interactions and contraindications and their clinical uses.

Course Title	Pathophysiology								
Course Code	PL 311	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL105								
Department	Pharmacology and Therapeutics								

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 content:

- Introduction to general pathology (inflammation, injury and cancer)
- Definitions and distinctions between communicable and non-communicable diseases and between modifiable and non-modifiable risk factors
- The pathophysiology of common infections (bacterial, viral, parasitic)
- The pathophysiology of diseases of the cardiovascular system (hypertension, coronary artery disease, heart failure. shock and arrhythmias)
- The pathophysiology of diseases of the respiratory system (bronchial asthma and chronic obstructive lung disease)
- The pathophysiology of diseases of the digestive system (acid peptic disorders, diarrhea, constipation, irritable bowel disease, gallbladder disease and hepatic disorders)
- The pathophysiology of diseases of the renal system (renal insufficiency and failure, urinary incontinences and renal calculi), endocrine system (diabetes, thyroid disorders, infertility) and The pathophysiology of diseases of the blood. (anemias and disorders of white blood cell function and dyslipidemia) ;The pathophysiology of diseases of Central nervous system (CNS).

Learning outcomes:

On successful completion of this course the student should be able to:

- Discuss the general pathology and mechanisms of inflammation, injury and carcinogenesis; Define and list the distinctions between communicable and non-communicable diseases; List the modifiable and non-modifiable risk factors in human disease.
- Discuss the pathophysiology of common infections (bacterial, viral, parasitic).
- Discuss the pathophysiology of diseases of the cardiovascular systems respiratory & digestive.
- Recognize the Pathophysiology of renal, CNS & endocrine disorders.

Course Title	Toxicology								
Course Code	PL 312	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL 309								
Department	Pharmacology and Therapeutics								

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 content:

- The scope, branches and general principles of toxicology.
- The general strategies for the management of toxicity.
- Air, water and soil pollution and toxicity of insecticides and pesticides.
- Teratogenicity.
- Genetic toxicology.
- Strategies and methods of assessment of acute and chronic toxicity of chemical and drugs being considered for introduction.
- Tests to detect the presence of certain toxicants in body fluids and tissues.

Learning Outcomes:

On successful completion of this course, the students should be able to:

- Define the scope and branches of toxicology
- Review the factors that influence the toxicokinetics of toxic substances
- Explain the possible mechanisms of toxicity
- Describe the general strategies for the management of toxicity
- Review the main issues in air, water and soil pollution
- Describe the mechanisms of teratogenicity and discuss some examples
- Describe the mechanisms of genetic toxicology and discuss some examples.
- Describe the strategies and methods of assessment of acute and chronic toxicity of chemicals & drugs.

Course Title	Pharmacology III								
Course Code	PL 413	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL 309								
Department	Pharmacology and Therapeutics								

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 content:

- Drugs acting on the central nervous system (CNS) system: an overview of CNS physiology, pharmacology of general and local anesthetics, pre-anesthetic medication, drugs for pain, fever and inflammation, drugs for neurodegenerative diseases, anxiolytics, hypnotics, sedatives, antidepressants, neuroleptics, antiepileptics, anti-psychotics..
- Drugs acting on the endocrine system: hormones and related drugs of the pituitary gland, estrogenic and androgenic drugs, contraceptive medication, anti-diabetic drugs, drugs for hypo-and hyperthyroidism, parathyroid drugs and glucocortecoids.

Learning outcomes:

On successful completion of this course, the students should be able to:

- Review the different components of the central nervous system and identify their major physiological function.
- Classify drugs used in general and local anesthesia, pre-anesthetic medication, drugs for pain, fever and inflammation, drugs for neurodegenerative diseases, anxiolytics, hypnotics, sedatives, antidepressants, neuroleptics, antiepileptics, anti-psychotics.. List the most common drugs in each class. For each drug, describe pharmacokinetics, the mechanism(s) of action, effects on various body systems, side effects, and clinical uses.
- Describe briefly the individual glands constituting the endocrine system and list the hormones elaborated by each, outline the pathways for their synthesis and degradation and enumerate their physiological effects.
- Discuss the consequences of hypo- and hyper-activity of each gland,
- Discuss the pharmacology of drugs acting on each of the endocrine glands; describe the mechanism(s) of action, effects on various body systems, side effects, pharmacokinetics and clinical uses.
- Discuss the pharmacology of drugs acting on skin.

Course Title	Pharmacotherapeutics I								
Course Code	PL 414	Credit Hours	3	Lecture	3	Tutorial	1	Practical	0
Pre-requisite	PL 310								
Department	Pharmacology and Therapeutics								

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 content:

Cardiovascular disorders

- Thromboembolism
- Hyperlipidemias
- Heart Failure
- Arrhythmias
- Hypertension
- Ischemic Heart Diseases & Peripheral Arterial Diseases
- Stroke, Shock
- 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

Learning outcomes:

On successful completion of this course the student should be able to

- Describe Disease definition, epidemiology, etiology, pathophysiology.
- Understand signs and symptoms, diagnostic features with lab data for each disease.
- Manage guidelines for treatment and patient counseling regarding each disease.
- Discuss model case-based learning about different related diseases.

Course Title	Pharmacotherapeutics II								
Course Code	PL 415	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL 309								
Department	Pharmacology and Therapeutics								

Course objective:

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

Course content:

- Pulmonary disorders.
- Asthma & COPD.
- Drug-Induced Pulmonary Diseases & Cystic Fibrosis.
- Rheumatology & Bone disorders.
- Osteoporosis and Osteomalacia.
- Rheumatoid Arthritis, Osteoarthritis, Gout.
- Gastroenterology.
- Peptic Ulcer disease, GERD.
- Liver Diseases.
- Inflammatory Bowel Diseases.
- Nausea, Vomiting, Diarrhea and Constipation.

Learning outcomes:

On successful completion of this course the student should be able to

- Describe Disease definition, epidemiology, etiology, pathophysiology.
- Understand signs and symptoms, diagnostic features with lab data for each disease.
- Manage guidelines for treatment and patient counseling regarding each disease.
- Discuss model case-based learning about different related disorders.

Course Title	Nutrition and Health								
Course Code	PL 416	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL 308								
Department	Pharmacology and Therapeutics								

Course objective:

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

Course content:

- The composition of the human body and its relation to energy intake and expenditure.
- Forms and types of energy expenditure.
- The macronutrients (carbohydrates, proteins and fats).
- The micronutrients (vitamins and minerals).
- Nutritional requirements and energy Sources in the diet.
- Physical activity.
- Nutritional assessment.
- Nutritional guides available for health promotion.
- The role of nutrition and lifestyle in common disorders including malnutrition, overnutrition, obesity, cardiovascular diseases, anemias, osteoporosis and cancer.
- Adverse reactions to food (food intolerance and food allergy).
- Interactions of food and drugs.

Learning outcomes:

On successful completion of this course, the students should be able to:

- Describe the composition of the human body and discuss its relation to energy intake and energy expenditure.
- Describe the forms and types of energy expenditure.
- Define the basal metabolic rate and discuss the factors which influence it.
- State the energy cost of common types of physical activity.
- Describe the macronutrients (carbohydrates, proteins and fats) and micronutrients (vitamins and minerals).
- Evaluate the nutritional energy requirements and caloric needs of resting and working individuals.
- List the energy Sources in the diet.
- Discuss the concept of nutritional assessment.
- Describe the different nutritional guides available for health promotion and explain how to use them.
- Discuss the role of nutrition and lifestyle in common disorders including malnutrition, overnutrition, obesity, cardiovascular diseases, anemias, osteoporosis and cancer.
- Explain with examples the occurrence of adverse reactions to food and distinguish between food intolerance and food allergy.
- Explain with examples the mechanisms by which certain food components can interfere with the responses to certain drugs.

Course Title	Pharmacotherapeutics III								
Course Code	PL 517	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL 309								
Department	Pharmacology and Therapeutics								

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 content:

Infectious diseases

- Antimicrobial Regimen Selection; Central Nervous System Infections.
- Lower Respiratory Tract Infections; Upper Respiratory Tract Infections.
- Skin and Soft Tissue Infections; Infective Endocarditis.
- Tuberculosis; Gastrointestinal Infections & Intraabdominal Infections.
- Urinary Tract Infections and Prostatitis; Sexually Transmitted Diseases.
- Bone and Joint Infections ; Sepsis and Septic Shock.
- Antimicrobial Prophylaxis in Surgery.
- Human Immunodeficiency Virus Infection; Viral infections.
- Superficial Fungal Infections & Invasive Fungal Infections ; Parasitic Diseases
- Oncology.
- Cancer Treatment and Chemotherapy; Breast Cancer; Lung Cancer; Colorectal Cancer.
- Prostate Cancer & Ovarian Cancer.
- Lymphomas & Leukemias; Melanoma
- Dermatology, ENT & Eye.
- Glaucoma & other eye diseases; Allergy.
- Dermatologic Drug Reactions, Self-Treatable Skin Disorders, and Skin Cancer; Ear Disorders.
- Acne Vulgaris; Psoriasis; Atopic Dermatitis.

Learning outcomes:

On successful completion of this course the student should be able to

- Describe Disease definition, epidemiology, etiology, pathophysiology
- Understand signs and symptoms, diagnostic features with lab data for each disease
- Manage guidelines for treatment and patient counseling regarding each disease
- Discuss model case-based learning about different related diseases.

Course Title	Pharmacotherapeutics IV								
Course Code	PL 518	Credit Hours	3	Lecture	3	Tutorial	1	Practical	0
Pre-requisite	PL 413								
Department	Pharmacology and Therapeutics								

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.

Course content:

Neurology

- Epilepsy & Status Epilepticus; Parkinson's Disease, Alzheimer's and Multiple Sclerosis.
- Pain Management & Headache Disorders; Psychiatric disorders, Schizophrenia.
- Childhood Disorders & Eating Disorders; Depressive Disorders & Bipolar Disorder.
- Substance-Related Disorders; Anxiety & Sleep Disorders.

Endocrinology

- Diabetes Mellitus; Thyroid Disorders; Adrenal Gland Disorders; Pituitary Gland Disorders.

Women Health Care

- Infertility, Pregnancy and Lactation: Therapeutic Considerations.
- Contraception, Menstruation-Related Disorders.
- Endometriosis; Hormone Therapy in Women.

Immunology

- Function and Evaluation of the Immune System.
- Systemic Lupus Erythematosus and Other Collagen-Vascular Diseases.
- Allergic and Pseudoallergic Drug Reactions
- Solid-Organ Transplantation.

Hematology, Hematopoiesis ; Anemias, Coagulation Disorders

- Drug-Induced Hematologic Disorders.

Learning outcomes:

On successful completion of this course the student should be able to

- Describe Disease definition, epidemiology, etiology, pathophysiology.
- Understand signs and symptoms, diagnostic features with lab data for each disease.
- Manage guidelines for treatment and patient counseling regarding each disease.
- Discuss model case-based learning about different related disorders.

II. Elective Courses

Course Title	Addiction and Drug Abuse								
Course Code	PL E19	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL 413								
Department	Pharmacology and Therapeutics								

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 content:

- Definitions and terminology
- Classes of commonly abused substances
- Risk factors for addiction
- General mechanisms involved in the development of addiction
- Pharmacology of some commonly abused substances
- Management of addiction
- Strategies to prevent addiction

Learning outcomes:

On successful completion of this course the student should be able to:

- Define the terms encountered in discussing addiction (substance abuse, tolerance, withdrawal, etc.)
- Classify commonly abused substances (alcohol, psychogenics, hallucinogens, narcotic analgesics, opiate antagonists, psychomotor and other stimulants, barbiturates, tranquilizers, antimanic, volatile solvents)
- Discuss the risk factors for addiction (educational, social, psychological and genetic factors)
- Explain the general mechanisms believed to be responsible for the development of addiction (functional alteration in brain function with emphasis on dopaminergic and serotoninergic pathways).
- Discuss the pharmacology of some commonly abused substances.
- Demonstrate understanding of the strategies commonly used in the management of addiction.
- Outline the general strategies that can be used to prevent addiction.

Course Title	Bioevaluation and Drug Screening								
Course Code	PL E20	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL 309								
Department	Pharmacology and Therapeutics								

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 content:

- The basic principles and different types involved in drug screening.
- Biological assays of drugs with an emphasis on best practices, regulatory requirements and streamlined approaches to shorten development times.
- The use of potency assay during clinical development
- Studying selected procedures for screening of drugs and biological assays both in vitro and in vivo preparation and their interpretation.
- Assay validation and preparation of data for biological license application (BLA).

Learning outcomes:

On successful completion of this course, the students should be able to:

- Understand biological assays of drugs with an emphasis on best practices, regulatory requirements and streamlined approaches to shorten your development times.
- Use the potency assay during clinical development
- Learn the approaches to establishing specifications and releasing clinical material
- Demonstrate assay validation and preparation of data for biological license application (BLA).
- Describe the basic principles involved in drug screening.

Course Title	Clinical Biochemistry								
Course Code	PL E21	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL 308								
Department	Pharmacology and Therapeutics								

Course objectives:
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 proteins liver , kidney, cardiac and endocrine functions.

Course Contents:

- Proper Sampling techniques and laboratory safety.
- Acid –base balance; definitions, pH, blood buffers & disorders (respiratory and metabolic).
- Electrolytes of clinical importance, including sodium, potassium and chloride.
- Disorders of carbohydrates metabolism (Diabetes mellitus).
- Biochemical aspects of renal function(renal function tests &the interpretation of each test).
- Plasma proteins of clinical significance, acute phase reactant proteins.
- Liver diseases (liver function tests).
- Tumor markers.
- Cardiac diseases (cardiac function tests)
- Endocrine functions including; background of their action ,clinical aspects of hormonal disorders.
- Thyroid gland(normal and abnormal thyroid function).

Learning Outcomes:
On successful completion of this course, the students should be able to:

- Describe human body metabolism under healthy and abnormal conditions
- Recall clinical investigations that are appropriate for the diagnosis and management of specificcific diseases also discuss the function of blood buffers, recall the Henderson/Hasselbach equation, calculatio ns and interpretation with gaining preliminary skills to perform blood and urine laboratory analysis and interpret the laboratory data obtained ; Carry out experiments to identify normal and pathological components of body fluids (blood and urine).
- Integrate between biochemical knowledge and clinical aspects to solve clinical problems.

Course Title	Complementary and Alternative Medicine								
Course Code	PL E22	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL 311								
Department	Pharmacology and Therapeutics								

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 content:

- Concepts in evidence based medicine as applied to complementary and alternative medicine.
- Safety of complementary and alternative medicine.
- Stress and chronic diseases /management by CAM.
- Life style interventions.
- Fundamentals of cancer biology/CAM in cancer.
- Herbal medicine and Nutraceuticals.
- Food supplements and Homeopathy.
- Aromatherapy.
- Oxygen therapy.
- Cell therapy.

Learning outcomes:

On successful completion of this course, the students should be able to:

- Classify different domains of CAM therapys and explain the role of CAM in chronic and stress related diseases also select the appropriate treatment of CAM
- Explain the concepts in evidence based medicine as applied to complementary and alternative medicine Evaluate the safety of complementary and alternative medicine and Use an evidence based approach, evaluate and discuss the clinical uses and benefit and safety and side effects of herbal medicine , nutraceuticals, food supplements, homeopathy and aromatherapy

Course Title	Pharmacotherapeutics for Special Population								
Course Code	PL E23	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL 310								
Department	Pharmacology and Therapeutics								

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 content:

- Introduction to pediatric and Geriatric pharmacology.
- Drugs related problems in these special population, pharmacokinetics and pharmacodynamics changes in these special population.
- Adverse drug reactions and interactions in these special population.
- Main cardiovascular diseases in these special population and their Treatment.
- Neurological disorders in these special population and management.

Learning outcomes:

On successful completion of this course, the students should be able to:

- Identify different physiological changes in pharmacokinetics and pharmacodynamics associated with the pediatric-age group.
- Explain major adverse drug reactions and interactions in in these special population
- Explain the lines of treatment of different infectious diseases.
- Identify endocrinological problems in these special population.
- Describe the different lines of treatment of nervous system and cardiovascular diseases in these special population.
- Explain major adverse drug reactions and interactions in these special population.

Course Title	Project in Pharmacology and Therapeutics			
Course Code	PL E24	Credit Hours	2	
Pre-requisite	PL 310			
Department	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.

Course content:

The Graduation Project has three parts: a research, writing thesis, and oral presentation. It is designed to introduce pharmacy students to the philosophy, methodology and performance of scientific research in the field of pharmacology to evaluate recent developments in the therapeutic management of several diseases.

Learning outcomes:

On successful completion of this course, the students should be able to:

- Develop a clear understanding of the research problem through searching and reading relevant literature.
- Interpret data and summarize the findings.
- Design and type the project's dissertation according to the guidelines set by the faculty.
- Present their project work in front of the faculty members and students.
- Develop skills of working in teams.

III. Department of Microbiology and Immunology (PM)

I. Required Courses

Course Title	Pharmaceutical Microbiology								
Course Code	PM 201	Credit hours	3	Lecture	2	Tutorial	0	Practical	2
Pre-requisite	PL 102								
Department	Microbiology and Immunology								

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 content:

- Characterization and classification of microorganisms.
- Microbial structure, growth, metabolism and genetics.
- Methods of sterilization and validation of the sterilization process.
- Antibiotics and their mechanisms of action.
- Disinfection and factors affecting the choice of a disinfectant.
- The microbiological quality control of pharmaceuticals.
- Introduction to fermentation technology and its applications.
- Practically, the course includes control of microbial growth, bacterial cultivation and counting methods, evaluation of antimicrobial agents, antibiotic assay and determination of MIC by agar diffusion method.

Learning outcomes:

On successful completion of this course the student should be able to:

- Define the basic features of microorganisms such as viruses, bacteria and fungi that cause infections in human
- Understand bacterial growth, metabolism and genetics
- Get acquainted with different methods of sterilization and disinfection
- Recognize different methods of bacterial cultivation and growth monitoring
- Describe the members of the antimicrobial chemotherapy world along with their mech-anism of action and spectrum of activity
- Determine the different antibiotics that can be used to treat different infectious agents and their mechanisms of action and structure-activity relationship
- Identify laboratory techniques used to determine methods of antimicrobial chemotherapy.
- Define high-quality manufacturing practice in the control of contaminationa in pharmaceutical industry.

Course Title	Medical Microbiology								
Course Code	PM 202	Credit hours	3	Lecture	2	Tutorial	0	Practical	2
Pre-requisite	PM 201								
Department	Microbiology and Immunology								

Course objectives:

- 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 content:

- Brief review of bacterial structure.
- Gram positive cocci and bacilli.
- Spore forming bacilli.
- Enteric Gram negative bacilli.
- Vibrio & Parvobacteriacae.
- Mycobacteria, Spirochetes, Rickettsiae, Mycoplasma and Chlamydiae.
- Introduction to mycology.
- Some pathogenic fungi and their underlying diseases.
- Practically, students will get acquainted with aseptic techniques in the lab, different types of microscopes, different staining techniques, different culturing plates for bacteria and fungi and morphology of their colonies, different biochemical tests, and different methods for laboratory diagnosis.

Learning outcomes:

On successful completion of this course the student should be able to:

- Identify and distinguish bacteria and fungi causing diseases.
- Recognize and interpret the signs and symptoms of some infectious diseases.
- Apply laboratory diagnosis and treatment of some microbial diseases.
- Discover and report the different laboratory results and relate them to the clinical picture to be able to establish a diagnosis.
- Recognize different microorganisms on different cultures and with different chemical reactions.
- Apply the skills required for the safe handling and identification of infectious agents.
- Practice the ability to prepare certain topics of the course and be able to extract information from text, reference books and the internet.

Course Title	Virology & Parasitology								
Course Code	PM 203	Credit hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PM 201								
Department	Microbiology and Immunology								

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 content:

- General features and classification of viruses.
- Viral replication, recombination and transmission.
- Viral immune response, vaccines and antiviral chemotherapy.
- Laboratory diagnosis of viral infections.
- Introduction to Parasitology.
- Protozoa: Amebae, Flagellates and Spore forming protozoa.
- Helminths: Trematodes, Cestodes and Nematodes.
- Clinical pictures of viruses and parasites and their control measures.

Learning outcomes:

On successful completion of this course the student should be able to:

- Identify and describe members of the viral and parasitic world at different stages.
- Describe the structure, the replication strategies and modes of transmission.
- Identify and interpret the signs and symptoms of some viral and parasitic diseases.
- Distinguish the required measurements for prevention and control of viruses and parasites that cause human diseases.
- Describe examples of antiviral and antiparasitic drugs & their modes of action.
- Interpret the serological and molecular laboratory results of viral infections.

Course Title	Public Health								
Course Code	PM 305	Credit hours	2	Lecture	2	Tutorial	0	Practical	0
Pre-requisite	PM 202								
Department	Microbiology and Immunology								

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 content:

- Overview of challenges in public health.
- Infectious disease prevention and control.
- Trends and epidemiology of chronic and infectious diseases.
- Occupation health and employee safety.
- Environment and its impact on the society.
- Sanitary microbiology.
- Introduction to public health pharmacy.
- Pharmacy profession in healthcare system and patient management.

Learning outcomes:

On successful completion of this course the student should be able to:

- Identify the principles of public health and its role in improving the health of the community.
- Discuss the public health management of communicable and noncommunicable diseases and their preventive measuires.
- Recognize bacterial flora and indicator organisms used to determine the suitability of water, milk and food.
- Interpret proper sampling methods and tests for detection and enumeration of indicator organisms in food, milk and water.
- Practice and apply proper infection control measures in different healthcare facillities.
- Discuss the different environmental health issues and relate them to the society.
- Promote the implementation of occupational health safety standards.
- Explain the basis and role of the public health pharmacy

Course Title	Genetics & Immunology								
Course Code	PM 204	Credit Hours	2	Lecture	2	Tutorial	0	Practical	0
Pre-requisite	PM 202								
Department	Microbiology & 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 content:

- Introduction and overview of the immune system.
- Antigen and immunoglobulin structure and functions.
- Cell mediated immune response.
- Hypersensitivity and autoimmune reactions.
- Immunization and Immunotherapy.
- Introduction to classical and Molecular Genetics.
- Gene expression and drug interference.
- Microbial genetics and genotyping.
- Mutations and drug genotoxicity.
- Genetics of cancer and other genetic disorders.

Learning outcomes:

On successful completion of this course the student should be able to:

- Distinguish the main humoural and cellular components of the immune system and identify their roles and functions in the immune response.
- Discuss the basis of hypersensitivity reactions and immune disorders. .
- Classify immunotherapy drugs and distinguish their mechanism of action and applications.
- Explain the different means of immunization.
- Interpret the basic tests used in diagnostic immunology and genetics and their clinical applications.
- Summarize how DNA stores genetic information ; Distinguish the structures and functions of informational bio-polymers ; Recognize mutations and drug genotoxicity; Recognize the fundamentals of microbial genetics and genotyping ;Describe the genetics of cancer and other genetic disorders ; Relate drug response to genome structure.
- Practice problem solving through case studies and study questions concerning immunological and genetic abnormalities.

Course Title	Drug & Molecular Biotechnology								
Course Code	PM 406	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PM 305								
Department	Microbiology and Immunology								

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.

Course content:

- Definition, history and areas of biotechnology.
- Biocatalysts, bioreactors & fermentation technology.
- Process economics, optimization.
- Downstream processing.
- Recombinant DNA technology & gene therapy.
- Different types and applications of polymerase chain reaction.
- Molecular bioinformatics.
- Manufacturing bio-pharmaceutical products.
- Immunological applications in biotechnology.
- Regulatory standards & ethical aspects.

Learning outcomes:

On successful completion of this course the student should be able to:

- Recall the application of biotechnology procedures in the pharmaceutical field
- Cope with living cells and enzymes as biological catalysts
- Recognize how to screen for, preserve and propagate industrially important microbes
- Compare and contrast between different fermentation strategies.
- Acquire preliminary skills in gene cloning and applications of monoclonal antibodies
- Interpret molecular biotechnology and genomic applications
- Explore biological activities for solving pollution problems and protecting the environment
- Design multi-factorial experiments for optimization of drug production
- Discuss the clinical, epidemiological, economical and ethical aspects of biotechnological drugs
- Acquire appropriate professional attitudes and problem solving skills
- Interpret the overall impact of new technology procedures on the future of healthcare

II. Elective Course

Course Title	Advanced Microbiology								
Course Code	PM E07	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PM 305								
Department	Microbiology and Immunology								

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 content:

- Microbial pathogenesis.
- Molecular Microbiology.
- Ecological Microbiology.
- Recent Diagnostic Microbiology.
- Quality and Laboratory Safety.

Learning outcomes:

On successful completion of this course the student should be able to:

- Determine the pathogenesis of different infectious diseases.
- Discuss molecular microbiological methods and its application in the medical and pharmaceutical field.
- Describe the applications of microbial ecology.
- Discover the different advanced microbiological diagnostic procedures used in identification of microorganisms.
- Apply quality assurance and laboratory safety measures.

Course Title	Project in Microbiology & Immunology			
Course Code	PM E08	Credit Hours	2	
Pre-requisite	PM 406			
Department	Microbiology and 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.

Course content:

- The students have the opportunity to do the graduation project in an emerging area of microbiology related to pharmacy such as the interaction between parasitic microorganisms and their hosts, treatment of microbial diseases and pharmaceutical industrial microbiology.

Learning outcomes:

On successful completion of this course the student should be able to:

- Acquire the skill to search for and extract information from scientific journals, reference books and the internet
- Collect, summarize and analyze data in the field of microbiology
- Present the data in the form of a scientific thesis.
- Gain appropriate professional attitudes and problem solving skills
- Acquire the attitude of working in teams
- Prepare and perform scientific presentations
- Describe microbiology problems related to pharmacy business.

V. Department of Clinical Pharmacy & Pharmacy Practice (PN)

I. Required Courses

Course Title	Pharmacy Ethics								
Course Code	PN 201	Credit Hours	1	Lecture	1	Tutorial	0	Practical	0
Pre-requisite	None								
Department	Clinical Pharmacy & Pharmacy Practice								

Course Objective:

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

Course content:

- Introduction to Professionalism, Legal and Ethical behavior.
- Ethical principles.
- Code of ethics for pharmacists and drug promotion.
- Major ethical problems in the pharmacy practice and the appropriate interventions.
- The legal and Clinical principles of consent, and confidentiality that apply to Pharmacy Practice.

Learning outcomes:
On successful completion of this course the student should be able to:

- Describe the concepts of code of ethics.
- Examine the pharmacy Practice situation and develop the appropriate approach to improve the pharmacy practice.
- Practice the pharmacy profession, particularly drug promotion according to the national code of ethics.
- Carry out the pharmacy professional duties based on the ethical principles to be prepared for the dilemma in their careers.
- Follow ethical and legal guidelines in pharmacy practice.
- Describe the Legal System and the Laws that govern the legal obligations of Pharmacists and identify the legal and Clinical principles of negligence, consent, and confidentiality that apply to Pharmacy Practice.
- Apply knowledge to analyze some of the major ethical problems in the pharmacy practice and select appropriate interventions.

Course Title	Pharmacy Law & Legislations								
Course Code	PN 302	Credit Hours	1	Lecture	1	Tutorial	0	Practical	0
Pre-requisite	None								
Department	Clinical Pharmacy & Pharmacy Practice								

Course Objective:

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

Course content:

- National drug policy.
- Essential drug list.
- Rational use of drugs.
- Pharmacy laws.

Learning outcomes:

On successful completion of this course the student should be able to:

- Know core components of national drug policy.
- List core elements in laws and legislation regulating the pharmaceutical sector.
- Describe the concepts of essential drugs, rational use of drugs.
- Interpret the policy approach to address priority issues in the pharmaceutical sector.
- Apply knowledge to analyze some of the major problems in the pharmacy practice and select appropriate interventions.
- Examine the pharmacy situation and develop the appropriate approach to improve the pharmacy practice.
- Carry out the pharmacy professional duties.
- Follow legal guidelines in pharmacy practice.
- Practice critical thinking and problem solving ability.

Course Title	Drug Information								
Course Code	PN 303	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Pre-requisite	PP 305, PL 309								
Department	Clinical Pharmacy & Pharmacy Practice								

Course Objectives:

- 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 Content:

- Systematic approach retrieval skills.
- Categorization of drug information questions.
- Drug information resources (printed, electronic and internet).
- Internet website information quality certification.
- Use MEDLINE database and search skills.
- Reading and critically evaluate scientific research papers.
- Reference style.
- Study designs in clinical research.
- Evidence-based medicine.
- Learn or comprehend methods of reporting adverse drug reaction, drug interactions and medication errors.

Learning Outcomes:

On successful completion of this course, the students should be able to:

- Provide answers to questions and acquire appropriate background information.
- Search and retrieve qualified drug information from printed and electronic resources.
- Perform the steps of the systematic approach to answering drug information questions.
- Describe the characteristics, advantages and limitations of tertiary, secondary and primary resources.
- Evaluate, interpret and summarize the drug information obtained.
- Effectively communicate and respond to drug information questions.
- Perform MEDLINE search.
- Read scientific papers applying critical appraisal skill.
- Use proper citations.
- Form well-built clinical questions using PICO in cases.
- Search evidence-based medicine literature.
- Publish newsletters on various drug topics through group interaction and team work.

Course Title	Pharmaceutical Care I								
Course Code	PN 404	Credit Hours	1	Lecture	0	Tutorial	1	Practical	2
Pre-requisite	PN 303								
Department	Clinical Pharmacy & Pharmacy Practice								

Course Objectives:
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 Content:

- Pharmaceutical care concept and pharmacist's responsibility.
- The patient care process.
- Medication records and documentation standards required to provide pharmaceutical care to patients.
- Structure of a prescription, reviewing prescription and prescription counseling.
- Implementing pharmaceutical care in hospital setting.
- Implementing pharmaceutical care in community pharmacy setting.
- Implementing pharmaceutical care in critical care and long-term care setting.
- Case assessment methods.
- Case based studies for the selected topics.

Learning Outcomes:
On successful completion of this course, the students should be able to:

- Apply pharmaceutical care to patient cases with various medical conditions in community pharmacy settings, hospital inpatient setting and long-term care.
- Identify patient-specific drug therapy problems, and to work with the patient and prescribers to propose effective solutions for those problems.
- Achieve positive clinical and therapeutic outcomes.
- Optimize the patient's health-related quality of life.

Course Title	Hospital Pharmacy								
Course Code	PN 405	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PP 305								
Department	Clinical Pharmacy & Pharmacy Practice								

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 content:

- Hospital Administrative aspects (The pharmacy, its organization and personnel,The pharmacy and therapeutic committee, policy making and the hospital drug formulary).
- Hospital Pharmaceutical services: Medication-based services which include medications purchasing, distribution, and dispensing systems.
- The pharmaceutical technical services include: preparation of small and large volume parentrals, I.V. admixtures and total parenteral nutrition fluids, and preventing parentral incompatibilities. Dispensing of cytotoxic drugs, renal dialysis fluids, and blood products and plasma substitutes.

Learning outcomes:

On successful completion of this course the student should be able to:

- Understand the pharmacist's administrative activities in the hospital.
- Know technical services performed by hospital pharmacist.
- Recognize how to handle special drug therapy safely.
- Apply necessary calculation, e.g. calculating the flow rate of intravenous infusions administered to hospitalized patients.
- Reviewing & dispensing prescription and medication order.
- Detect and correct medication errors and how to minimize the risk.
- Dispense medication orders.
- Select the suitable iv administration set for certain drug-drug or drug-fluid combinations.
- Safe handling and preparation of some drug therapies including, intravenous fluids and admixtures, total parenteral nutrition, dialysis fluids, cytotoxic drugs and medical gases.
- Differentiate between blood products and plasma substitutes and indicate their uses.

Course Title	First Aid								
Course Code	PN 406	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Pre-requisite	None								
Department	Clinical Pharmacy & Pharmacy Practice								

Course Objective:

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

Course content:

- The general principles of first Aid.
- Medical emergencies.
- Injury emergencies (wounds, bleeding, burns, fractures).
- Environmental emergencies.
- Basic cardiopulmonary resuscitation (CPR).

Learning outcomes:

On successful completion of this course, the students should be able to:

- Describe and practice the general principles of first Aid.
- Describe and know how to handle medical emergencies.
- Describe and know how to handle injury emergencies (wounds, bleeding, burns, and fractures).
- Describe and know how to handle environmental emergencies.
- Conduct basic cardiopulmonary resuscitation (CPR).

Course Title	Pharmaceutical Care II								
Course Code	PN 407	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Pre-requisite	PL 414								
Department	Clinical Pharmacy & Pharmacy Practice								

Course Objectives:
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 Content:

- Communication skills with patients, physicians, nurses and other health care providers.
- Good Pharmacy Practice.
- Medication reconciliation.
- Introduction to professionalism and ethical behavior.
- Medication compliance: causes of medication non-adherence, monitoring of patient compliance, principle of concordance and patient counseling.
- Guidelines on quering a prescription, the application of questioning, listening and explaining skills.
- Revise knowledge of clinical indices, laboratory data, medication use history and demographic information to optimize drug therapy and how to integrate this knowledge in response to the needs of individual patients.
- Problem-based learning, with selected case studies.

Learning Outcomes:
On successful completion of this course, the students should be able to:

- Apply pharmaceutical care to patient cases with various medical conditions.
- Adentify patient-specific drug therapy problems, and to work with the patient and pre-scribers to propose effective solutions for those problems.
- Achieve positive clinical and therapeutic outcomes.
- Optimize the patient's health-related quality of life.

Course Title	Community Pharmacy								
Course Code	PN 408	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PN 303								
Department	Clinical Pharmacy & Pharmacy Practice								

Course Objectives:

- 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 Content:

- General introduction to community pharmacy practice including the role of the community pharmacist in self-care and nonprescription pharmacotherapy, drug distribution procedures and computer data entry.
- Patient assessment.
- Basic guidelines for responding to symptoms, the application of questioning, listening and explaining skills.
- Distinction between minor illness and major disease.
- Minor ailments frequently encountered in community pharmacy and the selection of appropriate OTC/ herbal medications; e.g., gastrointestinal disorders, pain and fever management, respiratory disorders, ophthalmic, otic and oral disorders, dermatologic disorders and others.
- Counseling patients /care takers on the appropriate use of drugs/devices.
- Home medical equipment.

Learning Outcomes:

On successful completion of this course, the students should be able to:

- Assess prevalence, aetiology, signs and symptoms of different conditions frequently encountered in community pharmacy.
- Determine whether self-care and self-testing/monitoring are appropriate.
- Recommend the appropriate and safe OTC/herbal medications for patients with minor ailments.
- Differentiate between minor illness and major disease in community practice and refer or treat the patient appropriately.
- Establish patient-specific therapeutic outcomes and evaluate all rational therapeutic plans.
- Utilize clinical literature and available drug information resource to provide patient-centered pharmaceutical care.
- Apply patient counseling in the treatment and monitoring devices.
- Identify medication errors in prescription and inappropriate use of prescription and non-prescription medicines/devices.

Course Title	Clinical Pharmacy I								
Course Code	PN 509	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PP 408								
Department	Clinical Pharmacy & Pharmacy Practice								

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 content:

- Introduction to Clinical Pharmacy: Concept; functions and responsibilities of clinical pharmacist.
- Introduction to daily activities of a clinical pharmacist:
  - Ward round participation, taking history and medication reconciliation.
  - Disease management, laboratory data interpretation, medication management.
  - Monitoring parameters to assure safety and efficacy of drug treatment, adverse and toxic drug reactions and their management.
  - Patient counseling and patient education, communication skills for the clinical pharmacist, medication compliance: Causes of medication non- adherence; monitoring of patient compliance in the hospital settings.
  - Pharmaceutical calculations performed in pharmacy practice.
- Patients' medication records.
- Statistics in pharmacy practice and in practice audit.
- Characteristics of certain therapeutic regimens particularly anticoagulant therapy.
- Clinical Pharmacokinetics: Fundamentals of therapeutic drug monitoring (TDM): Need for TDM, Factors to be considered during the TDM.

Learning outcomes:

On successful completion of this course, the students should be able to:

- Choose the appropriate and effective therapy, monitor thereof and counsel the patient on the use of the recommended therapies and health promotion.
- Implement the knowledge acquired throughout the program including epidemiology, etiology, pathophysiology, signs, symptoms, tests, differential diagnosis, drug treatment, pharmaceutical care plan, patient counseling and monitoring for problem-solving in clinical practice.
- Become confident in the ability to contribute to patient care as part of the multidisciplinary healthcare team in daily practice.
- Demonstrate self-directed learning that will help in professional development as an independent learner.
- Perform pharmaceutical calculations relevant to the professional practice of pharmacy.

Course Title	Pharmacy Practice Experience I								
Course Code	PN 510	Credit Hours	1	Lecture	0	Tutorial	1	Practical	2
Pre-requisite	PN 407								
Department	Clinical Pharmacy & Pharmacy Practice								

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 content:

- Application of knowledge acquired, disease state management and patient counseling based on experiential learning in hospital settings or simulated hospital pharmacy workplace.
- Case analysis methods including SOAP note.
- Problem based case studies with escalating levels of difficulties.
- Students will document activities undertaken at the practice site/s using a Portfolio, under the guidance and supervision of the preceptor or supervising pharmacist. The Portfolio provides a guide to professional activities that may be undertaken while on placement.

Learning outcomes:

On successful completion of this course, the students should be able to:

- Analysis cases for safety and efficacy issues, develop and document pharmaceutical care plans.
- Understand the principles of pharmaceutical care and problem-solving in clinical practice.
- Demonstrate knowledge and skills needed to develop and extend professional role in healthcare.
- Manipulate prescriptions with good skills and communicate with different patient categories.
- Provide the opportunity for students to appreciate health care settings, develop awareness of professional practice issues, and to apply and consolidate their knowledge and skills within the context of the professional placement setting.
- Develop team work-based learning which will be reflected to team work-based care provided to the patient in IPE workshops.

Course Title	Pharmacy Management & Pharmacoeconomics								
Course Code	PN 511	Credit Hours	3	Lecture	3	Tutorial	1	Practical	0
Pre-requisite	None								
Department	Clinical Pharmacy & Pharmacy Practice								

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 responsibiltiy in such practices.
- To introduce cost-effectiveness analyses.
- To enable students to use pharmacoeconomic analysis in pricing decisions and formulary decision-making.

Course content:

- Introduction to Management and Organizations.
- Organization Culture and Environment.
- Organization structure and Design.
- Managing Change and Innovation.
- Managing in a global Environment.
- Social Responsibility and Managerial Ethics.
- Types of economic analysis.
- Pharmacoeconomic literature evaluation.
- Health related quality of life and decision analysis.

Learning outcomes:

On successful completion of this course the student should be able to:

- Identify the fundamentals of Management.
- Differentiate between types of organizational structures.
- Relate factors of change to the organizational change process and understand how to manage the change.

Course Title	Sales, Marketing & Drug Promotion								
Course Code	PN 512	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	None								
Department	Clinical Pharmacy & Pharmacy Practice								

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 content:

- The relationship between marketing and sales.
- How do companies deal with their markets.
- Consumer markets and consumer buying behavior.
- Business markets and business buying behavior.
- Product and Service Strategy.
- Distribution Channels and Marketing Plans.
- Integrated Marketing Communication Systems.
- Sales Force Management.
- Steps in the Selling Process.
- Communication Skills needed by sales people.
- Presentations of marketing term papers.

Learning outcomes:

On successful completion of this course the student should be able to:

- Identify the functional responsibilities of marketing, sales managers and sales people (medical representatives).
- Demonstrate better decision making, analytical and communication skills.

Course Title	Clinical Pharmacy II								
Course Code	PN 513	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PN 509								
Department	Clinical Pharmacy & Pharmacy Practice								

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 content:

- Clinical pharmacokinetics:
  - Basic Principles of clinical pharmacokinetics.
    - Bioavailability.
    - Administration rate.
    - Variations in plasma protein binding.
    - Volume of distribution and loading dose.
    - Drug clearance and maintenance dose.
  - Clinical aspects of drug interactions, metabolism and pharmacogenetics.
  - Renal and hepatic diseases.
- Characteristics of certain therapeutic regimens particularly oncological therapy, care for cancer patients including antibiotic policy and other supportive therapy.
- Critical appraisal of clinical research evidence.
- Individualized therapy, case studies, interpretation and evaluation of clinical studies.
- Design and conduct clinical trials.
- Design and execution of a research protocol, recognition of problems in design and identification of poor research practice.

Learning outcomes:

On successful completion of this course, the students should be able to:

- Build on existing knowledge of disease states and pharmacokinetics to enable application in a clinical setting.
- Assess drug therapy for effectiveness, safety, compatibility, patient acceptability and cost, and use this information to make effective interventions and develop and document pharmaceutical care plans.
- Apply clinical perspectives in interpreting drug interaction/metabolism and pharmacogenetics data from the literature and application in practice.
- Demonstrate a wider view of healthcare and sufficient knowledge and skills to develop and extend professional role.
- Demonstrate self-discipline of private study and self-directed learning that will help in professional development as an independent learner.
- Demonstrate practical skills including written and oral communication, and the ability to design a project, collect, analyze and interpret data.

Course Title	Clinical Toxicology								
Course Code	PN 514	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Pre-requisite	PL 312								
Department	Clinical Pharmacy & Pharmacy Practice								

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 content:

- Initial Evaluation and Management of the Poisoned Patient.
- Fluid, Electrolyte, and Acid-Base Principles
- Special considerations in pediatric poisoning and in the geriatric patient
- Over the counter drugs
- Non-steroidal anti-inflammatory drugs
- Cardiovascular drugs
- Hypoglycemic drugs
- Opioids
- CNS depressants
- CNS stimulant.
- Antibiotics, chemotherapeutics
- Vitamins.
- Chemical and Environmental Toxins
- Botanicals and plants-derived toxins.

Learning Outcomes:

On successful completion of this course, the students should be able to:

- Understand in depth the clinical relevance of electrolyte and acid-base balance in settings of toxicities.
- Recognize clinical presentation of toxic syndromes associated with overdose of the major drugs or drug groups frequently involved in poisoning. (drugs listed in the course lecture schedule).
- Describe the methods used for identification of toxic compounds, including descriptive signs and symptoms and laboratory methods.
- Describe the methods available for decontamination of poisoned patients and for increasing the elimination of toxic compounds.
- Describe the emergency steps involved in the supportive care of the poisoned patient which may be implemented by the hospital or community pharmacist ; Understand the different

Course Title	Pharmacy Practice Experience II								
Course Code	PN 515	Credit Hours	2	Lecture	1	Tutorial	1	Practical	2
Pre-requisite	PN 510								
Department	Clinical Pharmacy & Pharmacy Practice								

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.

Course content:

- Experiential learning in hospital settings or simulated hospital pharmacy workplace.
- Case analysis methods.
- Problem based case studies with escalating levels of difficulties.
- Workshop(s) of integrated professional education (IPE) with other medical students to solve one or more cases based on cooperative integration of skills and knowledge.
- Student assessment is based also on professional activities presented in the Portfolio as well as OSCE (Objective Structured Clinical Examination).

Learning outcomes:

On successful completion of this course, the students should be able to:

- Integrate clinical and scientific discipline using patient cases.
- Analyze cases effectively and provide future plan to latent failure in the medical system.
- Emphasize the development of independent learning and communication skills.
- Extend students' skills in critical thinking, writing, presenting and problem solving, as well as oral and written scientific communication.
- Design a clinical trial and provide systematic details to conduct the trial.
- Improve academic writing skills, which provides instruction and support for developing skills for academic writing and critiquing.

II. Elective Courses

Course Title	Research Methods and Applied Data Analysis								
Course Code	PN E16	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL 206, PN 303								
Department	Clinical Pharmacy & Pharmacy Practice								

Course Objectives:

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 Content:

- An introduction to research (formulating research questions in qualitative and quantitative research).
- The research process (refining research questions, thinking about how to plan and carry out a research project, getting research into practice).
- Searching for evidence (electronic databases, key words, inclusion and exclusion criteria).
- Critical appraisal skills (how to assess the quality of research).
- Writing a literature review.
- Ethics of research/research governance (ethical issues, research ethics committees, research governance framework).
- Recognising and evaluating different types of study design. Choosing, interpreting and reporting analyses.
- Quantitative statistics (descriptive statistics, basic comparative parametric & non-parametric statistics, associative statistics, ANOVA, multiple regression).
- Qualitative methods (in-depth interviews and focus groups, using a topic guide, interview techniques, conducting an interview).
- Mixed methods research. Questionnaire design. Presentations of research ideas.

Learning Outcomes:

On successful completion of this course, the student should be able to:

- Demonstrate ability in formulating research questions in qualitative and quantitative research projects
- Recognise the ethical issues relating to research in are range of pharmacy practice settings ;Compare methods of data analysis and presentation of results from both quantitative and qualitative research ;Demonstrate critical awareness of methods and study designs in qualitative and quantitative research ;Recognise and critically appraise the elements of the research process and apply this to writing and presenting a pragmat-ic research proposal ; Demonstrate the ability to write a research paper by completing at

Course Title	Critical Care Therapeutics								
Course Code	PN E17	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PL 415								
Department	Clinical Pharmacy & Pharmacy Practice								

Course Objectives:

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 Contents:

- Sedation, neuromuscular blockade, pain management.
- Acid base, fluid and electrolytes, ABG/ventilator issues.
- Sepsis.
- Pneumonias (CAP, HCAP, HAP, VAP).
- Cardiac arrhythmias.
- Hypertensive urgency/emergency.
- Acute coronary syndromes.
- Decompensated heart failure/cardiogenic shock.
- VTE prophylaxis and treatment.
- Diabetic and thyroid emergencies.
- Status asthmaticus/status epilepticus.
- Bleeding (GI, ICH, iatrogenic, drug-induced).
- Renal dosing, acute renal failure/dialytic techniques.
- Antidotes/poisoning.

Learning Outcomes:

On successful completion of this course, the students should be able to:

- Construct a patient-centered pharmacotherapeutic plan based on disease pathophysiology in critically ill patients.
- Analyze patient information to identify drug-related problems, contrast therapeutic options, and recommend changes in the medication plan in critically ill patients.
- Apply evidence-based pharmacy (obtained from primary, secondary or tertiary critical care literature) and related information needed to prevent or resolve medication–related problems in the critically ill patient.
- Design patient-specific pharmacotherapeutic regimens and monitoring plans to prevent or resolve medication-related problems in critically ill patients.
- Summarize patient information, assessment, pharmacologic plans and monitoring for preventing and solving critical care patient problem.

Course Title	Dispensing Medications								
Course Code	PN E18	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PN 405								
Department	Clinical Pharmacy & Pharmacy Practice								

Course Objectives:

- 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 Content:

- Interpretation of the prescription, accuracy in dispensing, methodical approaches to preparing and dispensing prescribed products including preparing, selecting or using appropriate materials, equipment, labels and containers.
- Documentation of dispensing procedures, effect of ingredients and methods used on the quality of pharmaceutical products.
- Checking for errors in all aspects of the dispensing process.
- Introduction to Dispensing of Medication: Antimicrobials, Non-steroidal anti-inflammatory drugs, Drugs used in treatment of ulcer, Cardiovascular drugs, Anti-diabetic drugs, Anti-neoplastic drugs.
- Introduction to pharmaceutical doses calculations and unit dose systems application and benefits.
- Controlled drugs' prescription.

Learning Outcomes:

On successful completion of this course, the students should be able to:

- Discuss the history and development of the group of the drugs in the market.
- Distinguish features among the group members including the specific therapeutics indications and enumerate the dosage forms available for each drug group member.
- Indicate the proper direction of use and the important patient advices.
- Explain the main precautions and contraindications and identify the clinically significant drug-drug interactions.
- Indicate the common innovator's trade names of a selected drug group members and available generic in the Egyptian market.
- Integrating the skills the students developed in the previous courses (including the use of computer-based dispensing programs), using simulated practice environment in which students apply what they learned.

Course Title	Home Health Care								
Course Code	PN E19	Credit Hours	2	Lecture	1	Tutorial	1	Practical	2
Pre-requisite	PN 405								
Department	Clinical Pharmacy & Pharmacy Practice								

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 content:

- Introduction to home healthcare
- Home parenteral and enteral nutrition support
- Fluid and electrolyte management
- Home Intravenous Antibiotic therapy
- Pain control in home care

Learning outcomes:

On successful completion of this course the student should be able to:

- Describe home healthcare services
- Apply pain and nutritional status assessment
- List the indications and contraindications for home nutrition support, intravenous antibiotic therapy and pain control in specific disease states
- Recognize causes of electrolyte abnormalities in critically ill patients
- Apply parenteral formula design
- Tailor chronic pain control
- Detect appropriate candidates for home healthcare support
- Recommend treatment of electrolyte disturbance
- Select appropriate dosage regimes for parenteral antibiotic therapy
- Analyze and manage home care drug related problems
- Design a monitoring plan to ensure safe and effective use of home medications
- Design education plan for home care patients

Course Title	Project in Clinical Pharmacy &Pharmacy Practice .			
Course Code	PN E20	Credit Hours	2	
Pre-requisite	PN 509			
Department	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.

Course content:

The course content will be determined according to the topics chosen by the students under the supervision of the department supervisors. It may entail a literature survey, practical or fieldwork.

Learning outcomes:

On successful completion of this course the student should be able to:

- Compile a relevant and up-to-date bibliography and literature review.
- Design and develop a plan of work fulfilling the project objectives.
- Interpret data and summarize the findings.
- Demonstrate the capacity to think independently.
- Develop professional knowledge in pharmacy field.
- Demonstrate good communication, presentation and intellectual skills.
- Demonstrate working in a team skills.

VI- Department of Pharmaceutics & Pharmaceutical Technology (PP)

I. Required Courses

Course Title	Pharmacy Orientation								
Course Code	PP101	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Pre-requisite	None								
Department	Pharmaceutics and Pharmaceutical Technology								

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 content:

- Mission of pharmacy, role of pharmacist in society, the responsibility of pharmacist, the pharmacy careers and educational requirements.
- Patient-centered pharmaceutical care.
- History of pharmacy practice.
- Pharmaceutical dosage forms.
- Drug label information.
- Prescription and dispensing terminology.
- Routes of drug administration & drug classification.
- Medication errors and prevention.
- Pharmaceutical calculation.
- Sources of information and information retrieval system.

Learning outcomes:

On successful completion of this course the student should be able to:

- Describe the role and responsibilities of professional pharmacists.
- Associate modern and traditional pharmacy practice.
- Differentiate various types of pharmaceutical dosage forms.
- Read prescription and drug label information.
- Recognize and prevent medication errors.
- Perform accurate pharmaceutical calculations.

Course Title	Physical Pharmacy								
Course Code	PP 202	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Pre-requisite	PC 101								
Department	Pharmaceutics and Pharmaceutical Technology								

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 content:

- Solubility and distribution phenomena: general principles, solvent-solute interactions, solubility of gases in liquids, solubility of liquids in liquids, solubility of solids in liquids and distribution of solutes between immiscible solvents.
- Diffusion and dissolution phenomena.
- Interfacial phenomena and Surface active agents.
- Disperse systems: Colloids, Coarse dispersions (Suspensions and Emulsions).
- Rheology: Newtonian and non Newtonian systems, thixotropy, determination of rheological properties and applications to Pharmacy

Learning outcomes:

On successful completion of this course the student should be able to:

- Define the fundamental concepts of solubility, diffusion, dissolution rate, interfacial phenomena, rheology and disperse systems.
- Describe the factors affecting solubility of solutes (solid, liquid and gas) in solvents, diffusion of solutes through a membrane, dissolution rate of solute , interfacial phenomena and dispersed systems.
- Recall the formulation characteristics, types and main properties of disperse systems including colloids, suspensions, emulsions and their pharmaceutical applications.
- Apply Fick's law of diffusion and Noyes Whitney equation showing their pharmaceutical applications. in addition to settling and sedimentation theory
- Differentiate between types of interfaces and flocculated and deflocculated suspensions and flow properties and rheograms of Newtonian and non-Newtonian materials.
- Calculate surface and interfacial tension, diffusion, partition and spreading coefficients ; Classify surface active agents and relate their applications in pharmacy as wetting, solubilization and emulsification and disperse systems instabilities.
- Distinguish between types of colloidal systems and their main characteristics ;Prepare dispersed phase pharmaceutical dosage forms (colloids, emulsions and suspensions).

Course Title	Pharmaceutics I								
Course Code	PP 203	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Pre-requisite	PP 202								
Department	Pharmaceutics and Pharmaceutical Technology								

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 content:

- Introduction to powders, granules, suppositories, and capsules.
- Powders and formulation of granules: types, uses, and their manufacturing Tablets: types of tablets and basic methods for their manufacturing, the role of different pharmaceutical excipients in solid dosage forms formulation and manufacturing, tablet coating and processing problems.
- Capsules: types of gelatin, gelatin or others as a capsule shell, types of capsules and manufacturing process.
- Suppository: types of suppository bases, selection criteria for suppository bases, manufacturing and drug interactions involving suppository bases and stability of suppositories.
- Quality control testing for different solid dosage forms.

Learning outcomes:

On successful completion of this course the student should be able to:

- List the advantages and disadvantages of solid dosage forms compared to other dosage forms.
- Classify the types of different solid dosage forms and their packaging material.
- Distinguish between the different manufacturing methods for preparation different solid dosage forms.
- Identify the role of pharmaceutical excipients in the formulation of different solid dosage forms.
- Detect and solve the problems encountered during and after solid dosage forms manufacturing process.
- Explain the rationale of some characteristics of solid dosage forms and their packaging materials
- Perform the pharmaceutical calculations necessary for formulating solid dosage forms.
- Understand the rationale for performing the quality control tests for different solid dosage forms during and after manufacturing.
- Evaluate solid dosage form as a unit dosage form by analyzing data from the performed quality control tests.

Course Title	Terminology								
Course Code	PP204	Credit Hours	1	Lecture	1	Tutorial	0	Practical	0
Pre-requisite	None								
Department	Pharmaceutics and Pharmaceutical Technology								

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 content:

- Introduction to medical Terminology, Word Parts
- Rules of Word Building
- Basic elements of the medical word and how they are combined. Prefix, Suffix, Combining Forms.
- Pronunciation of the medical terms
- Decoding Medical Term.
- Word Roots
- Prescription and its parts, detecting the meaning of prescribed and over the counter drugs
- Abbreviations used in Drug Prescribing
- Routes of Drug Administration
- Pharmaceutical Terminology Related to Drug Therapy.

Learning outcomes:

On successful completion of this course the student should be able to:

- Explain the purpose of medical terminology and describe the fundamental units of medical words. Define and differentiate between word root, suffix, prefix and combining form. Distinguish new medical terms and differentiate the difference between over-the counter and prescription drugs.
- Describe the rules of medical word building, and the rules of decoding the medical term. Distinguish the word roots pertaining to body regions and the word roots used in medical examination, diagnosis, and treatment.
- Describe unfamiliar term and its basic components rather than memorize the exact definition of the word
- Identify and use the common prefixes for number, colors, directions, degree, size, comparison and negative prefixes.
- Define basic terms pertaining to medical examination, diagnosis, and treatment.
- Define new medical terms, and Explain the difference between the different drug names.
- Summarize key elements and abbreviations for prescription dispensing, and explain the difference between OTC and prescription drugs.

Course Title	Pharmaceutics II								
Course Code	PP 305	Credit Hours	4	Lecture	3	Tutorial	1	Practical	2
Pre-requisite	PP 202								
Department	Pharmaceutics and Pharmaceutical Technology								

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 content:

- Liquid Dosage Forms- Solutions (Advantages and disadvantages, formulation additives, types of solutions, quality control testing).
- Sterile pharmaceutical preparations (parenterals, ophthalmics; introduction, specifications, components, packaging, quality control testing).
- Semi-Solid Dosage Forms (creams, ointment, paste & gels: Introduction, formulation aspects of semisolid dosage forms, packaging and quality control testing).
- Cosmetics (FDA laws and regulations, skin and hair products and/or others with their main ingredients, patient counseling about choice and limitations of cosmetics).

Learning outcomes:

On successful completion of this course the student should be able to:

- Describe the concept of the liquid dosage forms, types of these dosage forms, advantages and disadvantages.
- Be familiar with the types of additives used in formulation of liquid dosage forms, vehicles, solubilizers, colors, flavors and others.
- Describe the concept of the semisolid dosage forms, types, advantages and disadvantages.
- Differentiate between ointments, creams, gels and pastes.
- Identify the basic specifications and components of sterile dosage forms and the quality control tests required according to the official procedures.
- Calculate the correct concentration required for the patient, the rate of flow of parenteral infusions, the volume of reconstitution and prepare isotonic buffers.
- Differentiate between cosmetics, drugs, cosmeceuticals, soap, cleansing products and moisturizers according to the FDA and the criteria that it should meet.
- Identify the main ingredients used in cosmetics formulation.
- Define the advantages and side effects of different cosmetics products (skin and hair or others) with proper consumers counseling and appropriate recommendations.

Course Title	Biopharmaceutics								
Course Code	PP 306	Credit Hours	2	Lecture	1	Tutorial	1	Practical	2
Pre-requisite	PP 203, PP 305								
Department	Pharmaceutics and Pharmaceutical Technology								

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 content:

- Introduction to the different routes of administration; oral and non-oral routes.
- Factors affecting gastrointestinal absorption: physiological considerations, physicochemical considerations and role of dosage forms.
- Non-oral routes of administration: Parenteral (Intravenous, Intramuscular, Subcutaneous, Intrathecal, Intraarticular, ….), mucosal and transmucosal routes (Nasal, Buccal, Sublingual, Rectal, Vaginal and Ophthalmic) and transdermal routes.
- Non-oral routes of administration: advantages and disadvantages of each route.
- Factors affecting drug absorption via the non-oral routes: Anatomical and physiological aspects , physicochemical considerations and formulation factors.
- Formulation approaches for improving bioavailability via non-oral routes.
- The most recent formulations available on the market, concerning the non-oral route.

Learning outcomes:

On successful completion of this course the student should be able to:

- List the physiological and physicochemical factors affecting drug absorption via different routes of administration.
- Identify the role of drug formulation on delivery to the site of action.
- Predict the influence of the different oral dosage forms on drug bioavailability.
- Detect the bioavailability problems encountered following administration of different formulations via different routes of administration.
- Solve the problems of poor absorption via different routes of administration.
- Compare between different formulations of the same dosage form and choose the formula of choice.
- Identify the most recent formulation approaches for improving drug bioavailability from the different routes of administration.
- Apply patient counseling by providing advice and information about the correct use of different dosage forms through different routes of drug administration.

Course Title	Drug Stability								
Course Code	PP 407	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Pre-requisite	PP 203, PP 305								
Department	Pharmaceutics and Pharmaceutical Technology								

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 content:

- Definition and significance of drug stability.
- Different types or sources of drug instabilities.
- Chemical instability types as main source of drug instability including :reaction involved, and functional groups responsible for it.
- Kinetics of drug decomposition (zero,first and second order).
- Factors affecting drug instability.
- Physical instability of pharmaceutical products.
- Determination of the expiry date and shelf –life by different methods.
- Stabilization and decrease of the rate of drug decomposition.
- In-vitro drug interaction.
- Preformulation aspects.

Learning outcomes:

On successful completion of this course the student should be able to:

- Recognize and define the significance of stability.
- List the different types or sources of drug instability.
- Identify the chemical instability types as main source of drug instability and calculate the kinetics of drug decomposition including rate and order of the reaction.
- Determine and predict the expiry date and the shelf –life of products.
- List the factors affecting drug instability.
- Determine the in-vitro drug interactions and some sorts of physical instability of drugs.
- Apply necessary calculation e.g. calculating the different reaction rate constants, half life and shelf life and predict the stability of drugs at room temperature using different calculations.

Course Title	Pharmacokinetics								
Course Code	PP 408	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Pre-requisite	PP 306, PP 407								
Department	Pharmaceutics and Pharmaceutical Technology								

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 content:

- Drug kinetics after intravenous bolus dose administration.
- Drug kinetics after intravenous infusion.
- Drug kinetics after multiple dosing.
- Drug kinetics after oral dose administration.
- Bioavailability and bioequivalence.
- Distribution Kinetics.
- Drug Excretion Kinetics.
- Hepatic clearance.
- Two compartment model.
- Non compartmental Analysis

Learning outcomes:

On successful completion of this course the student should be able to:

- Define the pharmacokinetic parameters such as half-life, elimination rate constant and the relationship between the amount of the drug in the body, plasma concentration, and volume of distribution following an intravenous bolus, dose administration.
- Apply the pharmacokinetic parameters to predict drug concentrations with time during and following a constant intravenous infusion with or without a bolus dose.
- Calculate the relative bioavailability given plasma concentration following administration of different dosage forms by the same or different routes of administration.
- Define bioequivalence and regulatory methods used to determine bioequivalence ; Design the appropriate loading and maintenance doses and dosing interval in a patient to achieve a concentration within the therapeutic range; Summarize the various mechanisms involved in renal excretion of drugs ;Verify the effect of changing urine pH and forced diuresis in drug overdose ; Show the difference between high and low hepatic extraction ratio drugs.

Course Title	Pharmaceutical Technology								
Course Code	PP 409	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Pre-requisite	PP 306								
Department	Pharmaceutics and 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 content:

- Pre-formulation
- Tablets.
- Modified release dosage forms.
- Capsules.
- Suppositories.

Learning outcomes:

On successful completion of this course the student should be able to:

- Summerize the essential concepts and aspects related to pharmaceutical formulations of some main dosage forms (tablets, capsules, suppositories and modified release).
- Understand the theory, fundamentals and limitations faced during the preparation of controlled release delivery systems.
- Recognize mechanism, laws governing drug release from each type of the dosage form studied.
- Identify the pre-formulation parameters for the production of a stable biologically active product.
- Distinguish the different techniques of particle size analysis.
- Perform and design a flow chart for each pharmaceutical process studied concerning the steps and equipment used for its preparation.

Course Title	Pharmaceutics III								
Course Code	PP 510	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PP 408								
Department	Pharmaceutics and Pharmaceutical Technology								

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 bio-technology derived pharmaceuticals and the delivery systems for nucleotides, peptides and proteins.

Course content:

- Therapeutic equivalence of drugs including performance testing specifications, biopharmaceutical classification system, in vivo bioequivalence and biowaviers and others.
- Novel drug delivery systems include micelles, liposomes, microspheres, microcapsules, microemulsions, nanoemulsions, SMEDDS, nanoparticles, prodrugs and cyclodextrin-based delivery systems. Examples will be given for various administration routes.
- Targeted drug delivery to different organs and cancer cells.
- Formulation aspects of radiopharmaceuticals and biopharmaceutical

Learning outcomes:

On successful completion of this course the student should be able to:

- Describe the concept of functional, bioactive and biodegradable excipients, biopharmaceuticals and radiopharmaceuticals, performance testing, the concept of sink conditions, bio relevant media, biopharmaceutical classification system, biopharmaceutical drug disposition classification system, the concepts of Bioequivalence, Biowaviers and Biosimilars.
- Describe the fundamental concepts of drug delivery, organ targeting, different physiological and biochemical factors affecting drug absorption in the GIT.
- Discuss some approaches to improve oral drug absorption as using bioactive excipients, prodrugs, transporter targeting, and organ targeting (stomach , colon and cancer cells)
- Define and discuss the characteristics of new drug delivery systems (nanodrug delivery systems) including vesicular systems (as liposomes, niosomes, ethosomes and transferosomes) and non vesicular systems (as nanoparticles and Dendrimers).
- Design techniques suitable for evaluation of different dosage forms performance.

Course Title	Unit Operations								
Course Code	PP 511	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Pre-requisite	PP 409								
Department	Pharmaceutics and Pharmaceutical Technology								

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 content:

- Principles and objectives of pharmaceutical industry processes including heat flow processes (as heat transfer, evaporation, drying, distillation and refrigeration) together with crystallization, filtration, centrifugation, mixing, size reduction…etc.
- The theory and fundamental laws governing each unit operation studied.
- The application of unit operations to pharmaceutical industry.
- Formulation and manufacturing flow charts.

Learning outcomes:

On successful completion of this course the student should be able to:

- Recognize the essential concepts and aspects related to industrial pharmacy.
- Define principles and objectives of different unit operations performed in pharmaceutical industry.
- Identify and analyze problems and estimate the product quality and quantity by applying the rules of energy and material balance.
- Select the appropriate plant construction materials.
- Contribute in problem identification and solving it in the manufacture of different dosage forms.
- Estimate the product yield and get familiar with work in pharmaceutical plants.
- Do numeric and other computations including use of units, mathematical functions, modes of data presentation and presentation skills.

Course Title	Industrial Quality Assurance & GMP								
Course Code	PP 512	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Pre-requisite	PP 409								
Department	Pharmaceutics and Pharmaceutical Technology								

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.

Course content:

- Quality management in drug industry and basics of Q.A., GMP, Q.C. and other related systems.
- Evolution (building) of quality in drug industry.
- Organizational structure of quality system and personal qualifications.
- Materials handling, uses and sampling methods.
- Building and facilities.
- Equipment used in quality assessment.
- Clean room requirements for pharmaceutical systems and HVAC design.
- Documentation (SOP's, batch production records,…etc).
- Self-inspection, quality audits, complaints and recall procedures.
- Validation (pharmaceutical process and cleaning validation).

Learning Outcomes:

On successful completion of this course, students should be able to:

- Describe the basic idea behind GMP, its definition, purpose, how it differs among countries and the relation of GMP to other systems such as quality management and ISO.
- Identify sampling methods, when and how to use each one.
- Label personnel GMP requirements such as qualifications, experience, and training with special emphasis on key positions.
- Identify premises GMP requirements including personnel and material flow, key requirements for each sector such as stores, Q.C., and production.
- Identify equipment GMP requirements including cleaning using different methods such as CIP, COP, as well as traditional manual cleaning.
- Explain concept of clean rooms, identify types of HVAC systems as well as HVAC design criteria listing key requirements for different processes and functional categories.
- Generalize the term validation with special emphasis on process as well as cleaning validation.
- Detect the troubleshooting and major problems faced in water purification systems.

II. Elective Courses

Course Title	Project in Pharmaceutics and Pharmaceutical Technology		
Course Code	PP E13	Credit Hours	2
Pre-requisite	PP 407, PP 408		
Department	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.

Course content:

The course content will be determined according to the topics chosen by the students under the supervision of the department supervisors.

Learning outcomes:

On successful completion of this course the student should be able to:

- Participate in research.
- Practice using internet, textbooks, references and periodicals to retrieve and analyze information.
- Demonstrate the capacity to think independently.
- Develop professional knowledge in pharmacy field.
- Plan and carry out assigned project requirements.
- Demonstrate team work and good communication skills with available resources within certain time frame.
- Present the research in written and oral presentation to faculty members.

III. SUMMER TRAINING

Summer training course is designed to provide students opportunities to practice and work in community pharmacies, hospital pharmacies and pharmaceutical manufacturing companies. Summer training extends student's learning beyond the classroom into the community. Students will learn to transform the role of the pharmacist from a product-oriented to patient-centered practitioners and be able to face the challenge of complex drug therapy needs of patients. Summer training enhances students to become well-prepared practitioners after graduation.

University Requirements Course Description (U)

Course Title	Computer Skills and Programming Concepts (1)								
Course Code	UEC 01	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Pre-requisite	None								
Department	Faculty of Engineering								

Course objectives:

- Understand the concepts and terminologies of Computer Science.
- Identify the role computation can play in solving problems.
- Develop algorithmic thinking.
- Explore the various topics of basic Computer Science.
- Write small algorithms to accomplish useful goals

Course content:

- Introduction to the world of computers.
- Digital Data Representation: Theory.
- Digital Data Representation: Examples.
- Computer System Architecture.
- Storage Systems and Input / Output Devices.
- Software Systems: Operating Systems and Utility Programs.
- Application Software.
- Problem Solving Techniques.
- Flow Charts: Symbols and Sequential Flow.
- Flow Charts: Decision Making.
- Flow Charts: Repetition.

Learning outcomes:

On successful completion of this course the student should be able to:

- Explain why it is essential to learn about computers today and discuss several ways computers are integrated into our business and personal lives.
- Define computer hardware and software.
- Describe computer's primary operations.
- List some important milestones in computer evolution.
- Identify the major parts of a personal computer, including input, processing, output, storage, and communications hardware.
- Define software and understand how it is used to instruct the computer what to do
- Explain different problem solving techniques and how to be used to find solutions for different types of programming problems.
- Use Flow Chart as a way to implement problem solving.

Course Title	Computer Skills and Programming Concepts (2)								
Course Code	UEC 02	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Pre-requisite	UEC 01								
Department	Faculty of Engineering								

Course objectives:

- Explore the basics of programming using C or Basic.
- Develop reasoning abilities in order to solve problems commonly encountered.
- Develop skills necessary to structure any program in a logical manner.
- Write high level language programs
- Understand the methodology needed to manage programming tasks.
- Define programming essentials.

Course content:

- Introduction to HLL (Basic or C).
- Expressions and assignment statements.
- Decision Making: If statement.
- Repetition (looping): For and While statements.
- Arrays.
- Databases and Database Management Systems: What are the databases and the advantages for using them? Database concepts, Key characteristics about the data in a database, Database classifications and models. Practicing on Database.
- Introduction to the internet and the internet services, Introduction to Visual Basic.Net.

Learning outcomes:

On successful completion of this course the student should be able to:

- Define the essential terminologies relevant to computer programming.
- Define the different expressions and assignment statements.
- Describe a grasp of the principles of decision making statements.
- Explain the principles of repetition (looping) statements.
- Describe the principles and techniques of arrays.
- Describe the different types Data bases and Data Base Management Systems.
- Introduce the Internet and the different Internet services.
- Interpret a wide range of problems related to the analysis, design and construction of computer programs.
- Use effective problem solving and decision making techniques.
- Apply appropriate quantitative and qualitative skills.
- Apply web resources efficiently.
- Use appropriate computer-based design support tools.
- Construct an individual project.
- Formulate technical presentations suitable for the time, place and audience.
- Formulate coherent and structured verbal and written technical reports.
- Design computer programs in High Level Language HLL.
- Categorize a wide range of principles and tools available, such as design methodologies and choice of algorithm.
- Develop Computer skills.
- Use the Internet for preparation of assignments.

Course Title	English (1)								
Course Code	UGE 01	Credit Hours	2	Lecture	0	Tutorial	4	Practical	2
Pre-requisite	None								
Department	English Language Centre								

Course objectives:

- Develop further knowledge of English as a Second Language through readings, writings, and oral discussions.
- Express ideas in written and spoken English through writings based on reading selections, oral analysis of reading selections, and discussions and analysis of student's readings and writings.
- Express ideas through narrative writing, descriptive writing, and expository writing.
- Improve vocabulary comprehension through intensive and extensive reading.
- Demonstrate appreciation of the value of writing English for personal, academic, and professional purposes through actual writing for personal purposes, writing for academic purposes, and writing for professional purposes.

Course content:

- Vocabulary for listening & speaking.
- Practicing listening &speaking.
- Learning new reading& writing skills.
- Checking listening & speaking skills.
- Applying listening &speaking skills.
- Vocabulary for reading & writing.
- Practicing reading &writing.
- Checking reading & writing skills.
- Applying reading & writing skills.

For Education (revising & remembering), Daily life (relationships), and Work and Business (making decisions).

Learning outcomes:

On successful completion of this course the student should be able to:

(I). Listening and Speaking

- Select and use relevant information to introduce self and others stating name, field of study, favorite subjects, likes and dislikes personally and at college.
- Use clear, logical and fairly accurate grammatical language in everyday situations arising at college during lectures.
- Ask for clarification using a set of given phrases.
- Use set phrases in conversations to apologize, accept and decline apologies and give advice.
- Make arrangements to meet someone using a specified set of phrases.
- Use a limited repertoire of lexis appropriate to a given setting and/or study topic

(II). Reading

- Understand and distinguish fact from opinion.
- Interpret information presented in charts, graphs and tables.
- Transfer information onto a graph.

Demonstrate ability to understand form and functions of headings and sub-headings.

(III).Writing

- Demonstrate understanding of non-text markers e.g. brackets, dash, speech marks, italics, bold, acronyms and ellipsis.
- Demonstrate ability to write a brief summary of main points.
- Organize notes into headings and sub-headings.

(IV). Grammatical Accuracy

- Demonstrate control of the 5 basic tenses: simple present, past, future, present and past progressive.
- Use language for making polite questions, requests and suggestions both orally and in writing.
- Demonstrate accurate use and form of basic pronouns: subjective, objective and possessive

(V). Study Skills

- Read and interpret graphs, tables and charts.
- Use a dictionary for word meaning, grammatical classification, pronunciation and usage.

Course Title	English (2)								
Course Code	UGE 02	Credit Hour	2	Lecture	0	Tutorial	4	Practical	2
Pre-requisite	UGE 01								
Department	English Language Centre								

Course objectives:

- Develop communicative competence.
- Acquire the necessary skills to pursue their academic studies.
- Communicate effectively in subject matter areas related to their course of study.
- Reflect critically on their progress and evaluate their development.

Course content:

- Vocabulary for listening & speaking.
- Practicing listening &speaking.
- Checking listening & speaking skills.
- Learning new reading& writing skills.
- Applying listening &speaking skills.
- Vocabulary for reading & writing.
- Practicing reading &writing.
- Checking reading & writing skills.
- Applying reading & writing skills.

For Culture & civilization (rites of passage), Inventions in communications, and Art, East & West literature.

Learning outcomes:

On successful completion of this course the student should be able to:

(I). Listening and Speaking

- Understand, retell and describe information making use of diagrams to clarify.
- Illustrate comprehension by explaining to others a point of view presented.
- Note down specific information/processes to compare, contrast and report to others.
- Identify and explain main points of a lecture to others.
- Recognize and use signpost words and phrases used by a speaker/lecturer to signal organization/sequencing of information.
- Identify specific detail and complete information on a chart/graph/diagram.
- Report subject and main ideas heard in a talk/lecture.

(II). Reading

- Identify and select main information in a text and record it in note or table form.
- Identify key word and specific detail to locate information.
- Make and support inferences based on facts in a text.
- Guess meaning of words from context using linguistic and content knowledge.

(III).Writing

- Demonstrate ability to organize written texts using headings, sub-headings, definitions and examples.
- State an opinion and give examples to clarify.
- Write sections of a progress report following a given model: Introduction, Background, progress to date, in the future, final achievements.
- Write sections of a research report following a given model: Introduction, Process, find-

(IV).Grammatical Accuracy

- Identify and produce grammatical and logical compound sentences using the conjunctions: and, but, so, or.
- Identify and form comparative and superlative forms of adjectives [-er and more, -est and most].
- Recognize and use different forms of nouns: singular, plural, count, mass, collective and determiners: a, an, the, this, that, those and these, accurately.

(V). Study Skills

- Refer to an encyclopedia and understand entries and information presented.
- Make use of information in reference books e.g. encyclopedias, thesauruses, atlases, etc. to locate relevant information.
- Demonstrate ability to organize and review material.

Course Title	English (3)								
Course Code	UGE 03	Credit Hour	2	Lecture	0	Tutorial	4	Practical	2
Pre-requisite	UGE 02								
Department	English Language Centre								

Course objectives:

- Develop competence in the analysis and communicative purposes.
- Acquire skills necessary for writing assignments.
- Participate effectively in lectures and tutorials.
- Listen and read more efficiently and effectively.
- Take effective notes from written and spoken texts.
- Produce coherent and cohesive academic texts.

Course content:

- Vocabulary for listening & speaking.
- Practicing listening &speaking.
- Checking listening & speaking skills.
- Applying listening &speaking skills.
- Vocabulary for reading & writing.
- Practicing reading &writing.
- Checking reading & writing skills.
- Applying reading & writing skills.

For Daily life, Culture & civilization and Sports & leisure.

Learning outcomes:

On successful completion of this course the student should be able to:

(I). Listening and Speaking

- Understand straightforward information about study related topics identifying both gist and most specific detail.
- Deliver clear, systematically developed descriptions and presentations highlighting main points and providing relevant examples.
- Follow with minimal difficulty academic lectures and talks.
- Ask for explanations of set phrases, the function of rhetorical questions and demonstrate ability to use them.

(II). Reading

- Read and understand texts including letters related to their academic specialty.
- Select appropriate reference sources.
- Locate relevant information from different parts of a text or from different texts.
- Obtain information, ideas and opinions from different sources related to their field of study.
- Understand the line of argument in the treatment of the issue presented and identify conclusions.

(III).Writing

- Write straightforward connected texts on subjects within their field of study.
- Synthesizing and evaluating information from different sources.
- Summarize information from different sources and media.
- Take precise notes during a lecture for own use at a later date.

- Develop an argument systematically in a report emphasizing decisive points and including supporting detail/evidence.

(IV). Grammatical Accuracy

- Communicate with reasonable accuracy showing a substantial degree of grammatical control.

(V). Study Skills

Utilize appropriate study skills and learning strategies to develop their language proficiency and to support their academic development.

Course Title	Communication skills								
Course Code	UC 01	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Pre-requisite	None								
Department	Faculty of Mass Communication								

Course objectives:

- Know the communication models and the elements of effective communication.
- Overcome the barriers and filters of effective communication.
- Use visual aids and formulate the ideas.
- Use verbal and non verbal communication.
- Enhance the receiving and sending skills.
- Speak in public and deal with audience.
- Present a good presentation and persuade the audience.

Course content:

- The definition of communication and its importance. The elements of communication models.
- Listening skills, levels and its importance.
- Communication barriers and filters.
- Speaking skills.
- Reading skills.
- Writing skills.
- Questioning skills.
- Message elements.
- Message preparation process.
- Handling and persuading audience.
- None verbal communication: Eye contact, voice and verbal viruses.
- Gesture, posture and walking
- Visual aids.
- Impromptu speech.

Learning outcomes:

On successful completion of this course the student should be able to:

- Express their feelings, ideas and exchanging information and knowledge with others.
- Build human relations with the group.
- Give and receive criticism,
- Deal with different personality types.
- Mutual cooperation and better Team work performance.
  Better decision-making and problem-solving.

اسم المقرر	مهارات اللغة العربية								
كود المقرر	UGA 03	عدد الساعات المعتمدة	٢	محاضرة	٢	تمرين	٠	معامل	٠
متطلبات سابقة	لا يوجد								
قسم	مركز اللغة العربية								

الأهداف المرجوة (Course Objectives) :

- يُعنى المقرر بمهارات اللغة العربية الأساسية الضرورية لاستخدام اللغة وسيلةً للتواصل والتوظيف داخل مجالات التخصص المختلفة، مع التركيز على المهارات التنظيمية والفكرية والأسلوبية واللغوية اللازمة في استعمال اللغة وظيفيًا ، خاصةً ما تعرض منها لأخطاء شائعة في استخدامها ، ويحتاج إلى تصويب من مستخدم اللغة .
- يلفت نظر الدارسين إلى أهمية اللغة العربية في حقول التخصص المختلفة ، وأهمية استخدامها في الكتابة الإجرائية أو الوظيفية .

محتويات المقرر (Course contents) :

- تراكيب عربية (مع الاهتمام بتصويب الأخطـاء الشائعة) ، مع التركيز على القواعد الأساسية الآتية:
  - التثنية والجمع - المشتقات الصرفية - الإبدال الصرفي (قواعد تصريفية) - تصريف الأفعال.
  - أنماط الجملة العربية - المطابقة بين العناصر اللغوية - التوابع في اللغة العربية.
  - المفعول به المباشر وغير المباشر - الحذف والإثبات - صيغ الزيادة في الأفعال.
  - صياغة المصادر - الحال والكلمات الدالة عليه - المفعول المطلق - النواســـــخ .
- الجملة العربية البسيطة والمركبة، واستخدامات كل منهما.
- التـــلازم اللغوي ، وخاصة في مجالات علمية معينة .
- قواعـــد صياغة الفقرة في اللغة العربية وقواعـد صياغـــــة التقارير وإعدادها.
- قـواعـــد صياغة الطلب ، والسيرة الذاتية ، والأسلوب المستخدم لكل منهما.
- التلخيص ، والمبادئ التي تضمن صحته وسلامتـــه.
- استخدام اللغة العربية في العرض السريع والموجز للقضايا المطروحة.
- المكاتبات الرسمية ، وأهم قواعد صياغتها .
- التدريب على إدارة الحوارات والمناقشات بلغة عربية معاصرة ، مع التدريب على ترقية العامية.
- تصحيح الأخطـــاء الإملائية التي قد تؤدي إلى اللبس في فهم المعنى .
- دراسة الأخطاء الناجمة عن النقل من كتب أجنبية دون الالتفات إلى طبيعة الأساليب العربية.

النتائج التعليمية المحصلة (Learning outcomes):

بعد الانتهاء من دراسة هذا المقرر يكون الطالب قادراً على:

- إجادة مهارات اللغة العربية التي تصقل أسلوب كتابته.
- إعداد تقرير أو صياغة طلب باللغة العربية بأسلوب صحيح ، ولغة سليمة .
- استخدام اللغة العربية في العرض وإعادة الصياغة ، مع تجنب الخطأ أو غموض المعنى .

محتويات المقرر (Course contents) :

- تراكيب عربية (مع الاهتمام بتصويب الأخطـاء الشائعة) ، مع التركيز على القواعد الأساسية الآتية:

(التثنية والجمع - المشتقات الصرفية - الإبدال الصرفي (قواعد تصريفية) - تصريف الأفعال - أنماط الجملة العربية - المطابقة بين العناصر اللغوية - التوابع في اللغة العربية - المفعول به المباشر وغير المباشر - الحذف والإثبات - صيغ الزيادة في الأفعال - صياغة المصادر- الحال والكلمات الدالة عليه - المفعول المطلق - النواســـــخ)

- الجملة العربية البسيطة والمركبة، واستخدامات كل منهما.
- التـــلازم اللغوي ، وخاصة في مجالات علمية معينة .
- قواعـــد صياغة الفقرة في اللغة العربية .
- قواعــد صياغـــــة التقارير وإعدادها. وصياغة الطلب ، والسيرة الذاتية ، والأسلوب المستخدم لكل منهما.
- التلخيص ، والمبادئ التي تضمن صحته وسلامتـــه.
- استخدام اللغة العربية في العرض السريع والموجز للقضايا المطروحة - المكاتبات الرسمية ، وأهم قواعد صياغتها .
- التدريب على إدارة الحوارات والمناقشات بلغة عربية معاصرة ، مع التدريب على ترقية العامية.
- تصحيح الأخطـــاء الإملائية التي قد تؤدي إلى اللبس في فهم المعنى ودراسة الأخطاء الناجمة عن النقل من كتب أجنبية دون الالتفات إلى طبيعة الأساليب العربية.