

Faculty of Pharmacy

Pharos University in Alexandria



Program Specification

Bachelor's Degree in Pharmacy

Pharm-D (Clinical Pharmacy)

2020

إعتماد مجلس وحدة 19/11/2020

إعتماد مجلس كلية 23/11/202

Index

<i>Content</i>	<i>Page</i>
Basic Information	2
Program Aims	2
Graduate Attributes	3
National Academic Reference Standards (NARS) 2017	4
Academic Standards of Program Specification	7
External References for Standards (Benchmarks)	7
Program Structure and Contents	8
Faculty Study Plan	11
Program Courses Contents	17
Program Admission Requirements	46
Regulations for Program Course Completion	46
Teaching and Learning Methodology for Blended Learning	49
Methods of Student's Evaluation	49
Evaluation of Program Learning Outcomes and Competencies	50

University: Pharos University in Alexandria.
Faculty: Faculty of Pharmacy

Program Specification

(A) Basic Information:

1- Program Title:

Bachelor's Degree in Pharmacy Pharm-D (Clinical Pharmacy)

2- Program Type: Single Double Multiple

3- Department (s):

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

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

(B) Special Information:

1. Program Aims:

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

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

Graduate attributes:

Faculty of Pharmacy, Pharos University in Alexandria strives to develop a graduate of the Pharm-D Clinical Pharmacy program who will be considered as a multi-disciplinary professional pharmacist. Graduates will acquire the competencies that will enable them to improve the quality of life of individuals and communities. Accordingly, graduates must develop several variant competencies related to different aspects comprising both drug-oriented and patients'-oriented ones. Competencies acquired will build up a graduate of several virtues as self-awareness and being a successful health care-giver, professional, promotor, teacher, leader, collaborator, manager, well trained communicator, problem solver, decision-maker, life-long learner and innovator .

➤ Pharmacy graduates must be able to :

1. Provide patient care and proper education and counselling for individuals and communities in order to reach optimized therapeutic outcomes and minimize the incidence of illness in populations .
2. Identify and solve patient-specific drug-related problems.
3. Practice and perform responsibilities legally, professionally and ethically respecting patients' rights.
4. Assure the quality of pharmaceutical material, compounds, products and related pharmacy services.
5. Contribute effectively in planning and conducting research using appropriate methodologies.
6. Utilize evidence-based data in delivering contemporary and novel pharmaceutical products and pharmacy services.
7. Apply integrated evidence-based pharmaceutical and clinical information in evaluating the appropriateness, effectiveness, and safety of various compounds, medications and therapeutic related decisions .
8. Share collaboratively in the therapeutic decision-making as a member of an inter-professional health care team.
9. Demonstrate capabilities and skills of leadership, creativity, administration and entrepreneurship.
10. Use the most advanced technologies as a life-long learner for continuous professional development and demonstrate capabilities of performance appraisal and self-assessment.
11. Show the ability to communicate with patients and healthcare providers with complete respect of cultural diversity

2. National Academic Reference Standards (NARS):

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

The competency domains are the followings:

Domain 1: Fundamental Knowledge

Domain 2: Professional and Ethical Practice

Domain 3: Pharmaceutical Care

Domain 4: Personal Practice

DOMAIN 1- FUNDAMENTAL KNOWLEDGE

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

KEY ELEMENTS

1-1-1- Demonstrate understanding of knowledge of pharmaceutical, biomedical, social, behavioral, administrative, and clinical sciences.

1-1-2- Utilize the proper pharmaceutical and medical terms, abbreviations and symbols in pharmacy practice.

1-1-3- Integrate knowledge from fundamental sciences to handle, identify, extract, design, prepare, analyze, and assure quality of synthetic/natural pharmaceutical materials/products.

1-1-4- Articulate knowledge from fundamental sciences to explain drugs' actions and evaluate their appropriateness, effectiveness, and safety in individuals and populations.

1-1-5- Retrieve information from fundamental sciences to solve therapeutic problems.

1-1-6- Utilize scientific literature, and collect and interpret information to enhance professional decision.

1-1-7- Identify and critically analyze newly emerging issues influencing pharmaceutical industry and patient health care.

DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE

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

KEY ELEMENTS:

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

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

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

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

KEY ELEMENTS:

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

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

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

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

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

KEY ELEMENTS:

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

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

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

KEY ELEMENTS:

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

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

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

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

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

KEY ELEMENTS:

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

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

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

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

KEY ELEMENTS:

- 2-6-1-** Apply the principles of business administration and management to ensure rational use of financial and human resources.
- 2-6-2-** Utilize the principles of drug promotion, sales, marketing, accounting, and pharmaco-economic analysis.

DOMAIN 3: PHARMACEUTICAL CARE

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

KEY ELEMENTS:

- 3-1-1-** Apply the principles of body function and basis of genomics in health and disease states to manage different diseases.
- 3-1-2-** Apply the principles of public health and pharmaceutical microbiology to select and assess proper methods of infection control.
- 3-1-3-** Monitor and control microbial growth and carry out laboratory tests for identification of infections/diseases.
- 3-1-4-** Relate etiology, epidemiology, pathophysiology, laboratory diagnosis, and clinical features of infections/diseases and their pharmacotherapeutic approaches.

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

KEY ELEMENTS:

- 3-2-1-** Integrate the pharmacological properties of drugs including mechanisms of action, therapeutic uses, dosage, contra-indications, adverse drug reactions and drug interactions.
- 3-2-2-** Apply the principles of clinical pharmacology and pharmacovigilance for the rational use of medicines and medical devices.
- 3-2-3-** Provide evidence-based information about safe use of complementary medicine including phytotherapy, aromatherapy, and nutraceuticals.
- 3-2-4-** Provide information about toxic profiles of drugs and other xenobiotics including sources, identification, symptoms, and management control.
- 3-2-5-** Educate and counsel patients, other health care professionals, and communities about safe and proper use of medicines including OTC preparations and medical devices.
- 3-2-6-** Maintain public awareness on social health hazards of drug misuse and abuse.

DOMAIN 4: PERSONAL PRACTICE

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

KEY ELEMENTS:

- 4-1-1-** Demonstrate responsibility for team performance and peer evaluation of other team members, and express time management skills.
- 4-1-2-** Retrieve and critically analyze information, identify and solve problems, and work autonomously and effectively in a team.
- 4-1-3-** Demonstrate creativity and apply entrepreneurial skills within a simulated entrepreneurial activity.

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

KEY ELEMENTS:

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

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

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

KEY ELEMENTS:

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

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

3. Academic Standards of Program Specification:

- The Faculty adopts the Academic Standards of the National Authority for Quality Assurance and Accreditation of Education (NAQAAE), Competency-Based NARS 2017, in a faculty council on 7/10/2019.
- Competency-Based NARS 2017 was previously discussed and adopted in all departments' councils.
- Updating teaching and learning strategy and assessment methods, to be in line with Competency-Based NARS 2017, was a major activity done by QAU.
- QAU started to organize workshops to train and increase the awareness of staff members about Competency-Based NARS 2017 and the updated teaching and learning strategy and assessment methods.

4. External References for Standards (Benchmarks):

NA

5. Program Structure and Contents:

a- Program: Five years + 1 academic year (9 months) internship + Graduation Project

No. of credit hours: Compulsory 169

Elective 8

University Requirements 6

Summer Training 100 training hours

- Suggested credit hours for the courses, in addition to university requirements, achieve and maintain NARS 2017.
- Elective courses for the student in the last two levels should enable him to achieve competencies and skills that help him in his professional orientation and specialization.
- One of the elective courses should be in one of the clinical pharmacy fields.
- Summer training (100 training hours) begins with the end of the third level before the start of the internship year, in community & governmental pharmacies and hospital pharmacies, under the supervision of a faculty staff member.
- Internship: The student must complete the internship year (an academic year meaning 9 months), after completing the 5 academic years.
- According to the detailed regulations for the Internship Year Training Program, this includes passing a graduation project in one of the disciplines offered for registration as a requirement for graduation.

b- Program Course Levels (in credit-hours system):

- Semester 1/ First year: required to pass 18 units distributed as follows:
Compulsory: 14 Cr. Hs Elective: 0 University Requirement: 4
- Semester 2/First year: required to pass 18 units distributed as follows:-
Compulsory: 16 Cr. Hs Elective: 0 University Requirement: 2
- Semester 3/ Second year: required to pass 19 units distributed as follows:-
Compulsory: 19 Cr. Hs Elective: 0 University Requirement: 0
- Semester 4/ Second year: required to pass 17 units distributed as follows:-
Compulsory: 17 Cr. Hs Elective: 0 University Requirement: 0
- Semester 5/ Third year: required to pass 19 units distributed as follows:-
Compulsory: 19 Cr. Hs Elective: 0 University Requirement: 0
- Semester 6/ Third year: required to pass 19 units distributed as follows:-
Compulsory: 19 Cr. Hs Elective: 0 University Requirement: 0
- Semester 7/ Fourth year: required to pass 19 units distributed as follows:-
Compulsory: 17 Cr. Hs Elective: 2 Cr. Hs University Requirement: 0
- Semester 8/ Fourth year: required to pass 19 units distributed as follows:-
Compulsory: 17 Cr. Hs Elective: 2 Cr. Hs University Requirement: 0
- Semester 9/ Fifth year: required to pass 18 units distributed as follows:-
Compulsory: 16 Cr. Hs Elective: 2 Cr. Hs University Requirement: 0
- Semester 10/ Fifth year: required to pass 17 units distributed as follows:-
Compulsory: 15 Cr. Hs Elective: 2 Cr. Hs University Requirement: 0

c- Program Courses:

The student must successfully study 183 credit hours, including 169 Cr. compulsory courses, 8 Cr. elective courses, and 6 Cr. university requirements. The student must complete summer training and internship year under the supervision of the faculty.

➤ Abbreviations

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

➤ Course Work

During Course Work students are continuously evaluated in practical lessons, tutorials, interactive learning, periodic scientific assignments, field projects, presentations of some topics assigned to students and also through practical examinations and short theoretical exams. The Faculty Council determines how to distribute grades of course work between these items.

➤ Types of Courses

1. Compulsory courses required for graduation (university requirements - faculty requirements - department or specialization requirements)
2. Elective courses (student studies a specific number of credit hours in some elective courses, according to the requirements of each faculty, department, or specialization).



University Requirements (U)*

Required Courses

No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									Pract./Tut	Period.	FWE	OE	TM	
1	UGA 03	Arabic Language Skills	2	2	0	0	2	-	0	25	75	0	100	2
2	UGE 01	English (1)	2	0	2	2	4	-	25	15	60	0	100	2
3	UGE 02	English (2)	2	0	2	2	4	UGE 01	25	15	60	0	100	2

*That it is not included in the calculation of the student's semester GPA or cGPA.

Faculty Study Plan First Level

First Semester (Fall)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									Pract./tut	Period	FWE	OE		
1	PPC 101	Pharmacy Orientation	1	1	0	0	1	-	0	25	75	0	100	1
2	PPC 102	Medical Terminology	1	1	0	0	1	-	0	25	75	0	100	1
3	PCC 101	Pharmaceutical Analytical	3	2	1	2	5	-	25	15	50	10	100	2
4	PCC 102	Pharmaceutical Organic	3	2	1	2	5	-	25	15	50	10	100	2
5	PCC 103	Mathematics	1	1	1	0	2	-	25	15	60	0	100	1
6	PCC 104	Information Technology I	2	1	0	2	3	-	25	15	60	0	100	1
7	PGC 101	Human Rights and Fighting	1	1	0	0	1	-	0	25	75	0	100	1
8	PLC 101	Cell Biology	2	2	1	0	3	-	25	15	60	0	100	2
9	UGA 03	Arabic Language Skills	2	2	0	0	2	-	0	25	75	0	100	2
10	UGE 01	English (1)	2	0	2	2	4	-	25	15	60	0	100	2
Total Semester			18	13	6	8	27							

Second Semester (Spring)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									Pract./Tut	Period	FWE	OE		
1	PPC 103	Physical Pharmacy	3	2	0	2	4	-	25	15	60	0	100	2
2	PCC 105	Pharmaceutical Analytical	3	2	1	2	5	PCC 101	25	15	50	10	100	2
3	PCC 106	Pharmaceutical Organic	3	2	1	2	5	PCC 102	25	15	50	10	100	2
4	PGC 102	Medicinal Plants	3	2	1	2	5	-	25	15	50	10	100	2
5	PLC 102	Anatomy and Histology	3	2	0	2	4	-	25	15	60	0	100	2
6	PLC 103	Psychology	1	1	1	0	2	-	25	15	60	0	100	1
7	UGE 02	English (2)	2	0	2	2	4	UGE 01	25	15	60	0	100	2
Total Semester			18	11	6	12	29							

Second level

First Semester (Fall)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									Pract./Tut	Period.	FWE	OE		
1	PPC 201	Pharmaceutical Dosage Forms I	3	2	0	2	4	PPC 103	25	15	50	10	100	2
2	PPC 203	Communication Skills I	1	1	1	0	2	-	25	15	60	0	100	1
3	PCC 201	Pharmaceutical Organic Chemistry III	2	1	1	2	4	PCC 106	25	15	50	10	100	1
4	PCC 202	Instrumental Analysis	2	2	1	0	3	PCC 105	25	15	60	0	100	2
5	PGC 201	Pharmacognosy I	3	2	1	2	5	PGC 102	25	15	50	10	100	2
6	PMC 201	General Microbiology and	3	2	0	2	4	PLC 101	25	15	50	10	100	2
7	PLC 201	Biochemistry I	3	2	0	2	4	PCC 102	25	15	50	10	100	2
8	PLC 202	Physiology and pathophysiology	2	2	1	0	3	PLC 101	25	15	60	0	100	2
Total Semester			19	14	5	10	29							

Second Semester (Spring)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									Pract./Tut	Period.	FWE	OE		
1	PPC 202	Pharmaceutical Dosage Forms II	3	2	0	2	4	PPC 103	25	15	50	10	100	2
2	PGC 202	Pharmacognosy II	3	2	1	2	5	PGC 201	25	15	50	10	100	2
3	PMC 202	Parasitology and Virology	2	2	0	1	3	PMC 201	25	15	60	0	100	1
4	PLC 203	Basic Pharmacology	3	2	0	2	4	PLC 202	25	15	60	0	100	2
5	PLC 204	Pathology	2	2	1	0	3	PLC 102	25	15	60	0	100	2
6	PLC 205	Biochemistry II	3	2	0	2	4	PLC 201	25	15	50	10	100	2
7	PNC 201	Biostatistics	1	1	1	0	2	PCC 103	25	15	60	0	100	1
Total Semester			17	12	3	10	25							

Third level

First Semester (Fall)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									Pract./Tut	Period.	FWE	OE		
1	PPC 301	Pharmaceutical Dosage Forms III	3	2	0	2	4	PPC 103	25	15	50	10	100	2
2	PGC 301	Phytochemistry I	3	2	1	2	5	PGC 202	25	15	50	10	100	2
3	PMC 301	Pharmaceutical Microbiology and Antimicrobials	3	2	0	2	4	PMC 201	25	15	50	10	100	2
4	PMC 303	Advanced scientific language	2	0	2	2	4	UGE 02	25	15	60	0	100	2
5	PLC 301	Pharmacology I	3	2	0	2	4	PLC 203	25	15	50	10	100	2
6	PNC 301	Scientific Writing	1	1	1	0	2	-	25	15	60	0	100	1
7	PNC 302	Pharmaceutical Legislation and Practice Ethics	1	1	0	0	1	-	0	25	75	0	100	1
8	PNC 303	Community Pharmacy Practice	3	2	0	2	4	PLC 202	25	15	50	10	100	2
Total Semester			19	12	4	12	28							

Second Semester (Spring)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									Pract./Tut	Period.	FWE	OE		
1	PPC 302	Pharmaceutical Technology	3	2	0	2	4	PPC 201 PPC 202	25	15	60	0	100	2
2	PPC 303	Biopharmaceutics and Pharmacokinetics	3	2	0	2	4	PPC 301	25	15	50	10	100	2
3	PPC 304	Communication Skills II	1	1	1	0	2	PPC 203	25	15	60	0	100	1
4	PGC 302	Phytochemistry II	3	2	1	2	5	PGC 301	25	15	50	10	100	2
5	PMC 302	Medical Microbiology	3	2	0	2	4	PMC 201	25	15	50	10	100	2
6	PLC 302	Pharmacology II	3	2	0	2	4	PLC 203	25	15	50	10	100	2
7	PLC 303	First Aid and Basic Life Support (BLS)	1	1	1	0	2	PLC 301	25	15	60	0	100	1
8	PNC 304	Drug Information	2	1	0	2	3	-	25	15	60	0	100	1
Total Semester			19	13	3	12	28							

Fourth level

First Semester (Fall)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									Pract /Tut	Period.	FWE	OE		
1	PPC 401	Advanced Drug Delivery Systems	2	2	0	0	2	PPC 201 PPC 303	0	15	50	10	100	2
2	PCC 401	Medicinal Chemistry I	3	2	1	2	5	PCC 201 PLC 203	25	15	50	10	100	2
3	PCC 402	Analytical Quality Control of Pharmaceuticals	2	1	1	2	4	PCC 202	25	15	50	10	100	1
4	PMC 401	Public Health and Preventive Medicine	2	2	1	0	3	PMC 302	25	15	50	10	100	2
5	PLC 401	Pharmacology III	2	2	1	0	3	PLC 203	25	15	50	10	100	2
6	PNC 401	Hospital Pharmacy	3	2	0	2	4	PLC 302 PPC 201	25	15	50	10	100	2
7	PNC 402	Clinical Pharmacokinetics	3	2	0	2	4	PPC 303	25	15	50	10	100	2
8	E 01	Elective 1	2	1	2	0	3	-	25	15	60	0	100	1
Total Semester			19	14	6	8	28							

Second Semester (Spring)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									Pract /Tut	Period.	FWE	OE		
1	PCC 403	Medicinal Chemistry II	3	2	1	2	5	PCC 201 PLC 203	25	15	50	10	100	2
2	PCC 404	Information Technology II	2	1	0	2	3	PCC 104	25	15	60	0	100	1
3	PLC 402	Clinical Biochemistry	3	2	0	2	4	PLC 205	25	15	50	10	100	2
4	PNC 403	Clinical Pharmacy Practice	3	2	0	2	4	PLC 302 PPC 303	25	15	50	10	100	2
5	PNC 404	Management of Oncological Diseases and Radiopharmacy	3	2	0	2	4	PLC 401	25	15	50	10	100	2
6	PNC 405	Management of Endocrine and Renal Disorders	3	2	0	2	4	PLC 401	25	15	50	10	100	2
7	E 02	Elective 2	2	1	2	0	3	-	25	15	60	0	100	1
Total Semester			19	12	3	12	27							

Fifth year

First Semester (Fall)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									Pract./Tut	Period.	FWE	OE		
1	PGC 501	Phytotherapy	2	2	1	0	3	PGC 302	25	15	50	10	100	2
2	PMC 501	Pharmaceutical Biotechnology	2	2	1	0	3	PMC 302	25	15	50	10	100	2
3	PLC 501	Toxicology and Forensic Chemistry	3	2	0	2	4	PLC 302	25	15	50	10	100	2
4	PNC 501	Clinical Research, Pharmacoepidemiology and Pharmacovigilance	1	1	1	0	2	PMC 401 PNC 403	25	15	60	0	100	1
5	PNC 502	Management of Neuropsychiatry diseases	3	2	0	2	4	PLC 401	25	15	50	10	100	2
6	PNC 503	Management of Dermatological, Reproductive and Musculoskeletal Diseases	3	2	0	2	4	PLC 401	25	15	50	10	100	2
7	PNC 504	Management of Pediatric Diseases	2	2	1	0	3	PLC 203	25	15	50	10	100	2
8	E 03	Elective 3	2	1	2	0	3	-	25	15	60	0	100	1
Total Semester			18	14	6	6	26							

Second Semester (Spring)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									Pract./Tut	Period.	FWE	OE		
1	PLC 502	Clinical Nutrition	2	2	1	0	3	PLC 205	25	15	50	10	100	2
2	PNC 505	Management of Cardiovascular Diseases	3	2	0	2	4	PLC 301	25	15	50	10	100	2
3	PNC 506	Management of Gastrointestinal Diseases	3	2	0	2	4	PLC 302	25	15	50	10	100	2
4	PNC 507	Management of Respiratory Diseases	2	2	1	0	3	PLC 302	25	15	50	10	100	2
5	PNC 508	Marketing and Pharmacoeconomics	2	1	2	0	3	PNC 501 PNC 401	25	15	60	0	100	1
6	PNC 509	Management of Critical Care Patients	2	1	0	2	3	PLC 401 PNC 403	25	15	50	10	100	1
7	PNC 510	Entrepreneurship	1	1	1	0	2	-	25	15	60	0	100	1
8	E 04	Elective 4	2	1	2	0	3	-	25	15	60	0	100	1
Total Semester			17	12	7	6	25							

Elective Courses

Clinical Pharmacy & Pharmacy Practice Department (PN)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									Pract./Tut	Period.	FWE	OE	TM	
1	PNC E01	Management of chronic illness	2	1	2	0	3	PLC 301 PNC 403	25	15	60	0	100	1
Microbiology and Immunology Department (PM)														
1	PMC E01	Environment and sustainability	2	1	2	0	3	PMC 201	25	15	60	0	100	1
2	PMC E02	Clinical immunology	2	1	2	0	3	PMC 201	25	15	60	0	100	1
3	PMC E03	Mycology	2	1	2	0	3	PMC 201	25	15	60	0	100	1
4	PMC E04	Advanced microbiological techniques	2	1	2	0	3	PMC 302	25	15	60	0	100	1
Pharmaceutical Chemistry Department (PC)														
1	PCC E01	Chromatography and Separation Techniques	2	1	2	0	3	PCC 202	25	15	60	0	100	1
2	PCC E02	Drug Design	2	1	2	0	3	PCC 401	25	15	60	0	100	1
3	PCC E03	Analysis of food and flavours.	2	1	2	0	3	PCC 202	25	15	60	0	100	1
4	PCC E04	Forensic analysis	2	1	2	0	3	PCC 202	25	15	60	0	100	1
5	PCC E05	Overview Of spectroscopy	2	1	2	0	3	PCC 201 PCC 202	25	15	60	0	100	1
Pharmaceutics and Pharmaceutical Technology Department (PP)														
1	PPC E01	Cosmetics Preparations	2	1	2	0	3	PPC 201 PPC 202	25	15	60	0	100	1
2	PPC E02	Good Manufacturing Practices	2	1	2	0	3	PPC 302	25	15	60	0	100	1
3	PPC E03	Pharmaceutical Nanotechnology	2	1	2	0	3	PPC 302	25	15	60	0	100	1
4	PPC E04	Supply Chain Mangement	2	1	2	0	3	-	25	15	60	0	100	1
Pharmacognosy and Natural products Department (PG)														
1	PGC E01	Processing of medicinal plants	2	1	2	0	3	-	25	15	60	0	100	1
2	PGC E02	Complementary and Alternative Medicine	2	1	2	0	3	-	25	15	60	0	100	1
Pharmacology and Therapeutics Department (PL)														
1	PLC E01	Pharmacotherapeutics for Special	2	1	2	0	3	PLC 203	25	15	60	0	100	1
2	PLC E02	Geriatric Pharmacotherapy	2	1	2	0	3	PLC 302 PLC 401	25	15	60	0	100	1
3	PLC E03	Addiction and Drug Abuse	2	1	2	0	3	PLC 203 PLC 401	25	15	60	0	100	1
4	PLC E04	Molecular Therapeutics	2	1	2	0	3	PLC 402	25	15	60	0	100	1

6. Program Courses Contents:

University Requirement

Required Courses

Course Title	Arabic Language Skills								
Course Code	UGA 03	Credit Hours	2	Lecture	2	Tutorial	0	Practical	0
Department	University Requirements								

وصف المقرر:

بعد الانتهاء من هذا المقرر يكون الطالب قادرا على:

- اجادة مهارات اللغة العربية التي تصقل أسلوب كتابته
- اعداد تقرير او صياغة طلب باللغة العربية بأسلوب صحيح و لغة سليمة
- استخدام اللغة العربية في العرض و اعادة الصياغة , مع تجنب الخطأ او الغموض اللغوى.

Course Title	English (1)								
Course Code	UGE 01	Credit Hours	2	Lecture	0	Tutorial	2	Practical	2
Department	University Requirements								

Course Description:

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 Hours	2	Lecture	0	Tutorial	2	Practical	2
Department	University Requirements								

Course Description:

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, findings, conclusions and recommendations.

(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.

Courses Offered or Supervised by the Department of Clinical Pharmacy and Pharmacy Practice (PN)

Required Courses

Course Title	Biostatistics								
Course Code	PNC 201	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Department	Clinical Pharmacy & Pharmacy Practice								

Course Description:

This course provides basic concepts of biostatistics and data analysis. It includes introduction to descriptive and inferential statistics, interpretation of estimates, confidence intervals and significance tests, elementary concepts of probability and sampling; binomial and normal distribution, basic concepts of hypothesis testing, estimation and confidence intervals, t-test and chi-square test, linear regression theory and the analysis of variance.

Course Title	Scientific Writing								
Course Code	PNC 301	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Department	Clinical Pharmacy & Pharmacy Practice								

Course description:

This course is designed to introduce students to the principles of good scientific writing, to be familiar with basic structure of scientific reports and research articles. Moreover, to develop required skills for proper scientific writing, paraphrasing and referencing to avoid plagiarism. In addition it will help students develop necessary written and oral communication and presentation skills to improve inter- and intra-professional collaboration and communication with patients and other health care providers.

Course Title	Pharmaceutical Legislation and Practice Ethics								
Course Code	PNC 302	Credit	1	Lecture	1	Tutorial	0	Practical	0
Department	Clinical Pharmacy & Pharmacy Practice								

Course description:

A detailed presentation of law that governs and affects the practice of pharmacy, legal principles for non-controlled and controlled prescriptions, OTC drug requirements, opening new pharmacies, opening medical stores, opening factories, opening scientific offices, medicine registration, pharmacies and medicine stores management. Pharmacist duties and responsibilities, pharmacist-patient relationship, patient's rights and ethical principles and moral rules

Course Title	Community Pharmacy Practice								
Course Code	PNC 303	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Clinical Pharmacy & Pharmacy Practice								

Course description:

The course provides students with competencies and knowledge for the provision of quality pharmaceutical care in a community pharmacy setting aiming at improving use of medicines and therapeutic outcomes. The course covers differentiation between minor and major ailments and responding to minor ailments with over-the-counter products. It also provides concepts of patient assessment, counselling, and monitoring in community pharmacy and in outpatient care settings. This course integrates the pharmaceutical, clinical and social sciences relevant to community pharmacy practice using competency-based learning approach. 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. Students are provided a systematic and comprehensive approach to assessing and monitoring drug therapy in order to identify and solve drug-related problems and to ensure that all therapeutic objectives are being achieved in the context of pharmacy primary care.

Course Title	Drug Information								
Course Code	PNC 304	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Department	Clinical Pharmacy & Pharmacy Practice								

Course description:

This course will introduce students to; function, structure, services and documentation methods of drug information centers. This course is designed to provide students with the required skills to retrieve, analyze and evaluate drug information on tertiary, secondary and primary literature resources, using a systematic approach to provide appropriate response to drug information requests and communicating the response. In addition, students will develop skills in evidence based practice by searching electronic databases and appraising available research evidence to answer clinical queries.

Course Title	Hospital Pharmacy								
Course Code	PNC 401	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Clinical Pharmacy & Pharmacy Practice								

Course description:

Organization and structure of a hospital pharmacy, hospital pharmacy facilities and services (inpatient and outpatient services), patient's medication record, and rational medication use. Administrative services including: hospital formulary, pharmacy and therapeutic committee, purchasing, distribution, dispensing medicines and policy making. Technical services includes: I.V. admixtures services and IV incompatibilities, total parenteral nutrition, safe handling of cytotoxic drugs & radiopharmaceuticals, medical gases & blood products, the composition of renal dialysis fluids, patient safety, and risk management .

Course Title	Clinical Pharmacokinetics								
Course Code	PNC 402	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Clinical Pharmacy & Pharmacy Practice								

Course description

Introduction to clinical pharmacokinetics and its applications, non-compartmental pharmacokinetics and moment analysis. The course covers drug distribution, drug clearance mechanisms, single IV bolus, IV infusion kinetics and kinetics following extra-vascular dosing, metabolite kinetics, multiple dose kinetics, non-linear pharmacokinetics, and dosage regimen design. Sources of variability in pharmacokinetics and dosage individualization of drugs will be studied especially in patients with compromised renal and hepatic function. The course also deals with several approaches in therapeutic drug monitoring.

Course Title	Clinical Pharmacy Practice								
Course Code	PNC 403	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Clinical Pharmacy & Pharmacy Practice								

Course description:

This course includes the definition and concepts of clinical pharmacy and pharmaceutical care, and qualification to become a clinical pharmacist. Patient history, medication reconciliation, therapeutic planning, clinical rounding and assessment of patient compliance and drug-related problems. Interpretation of clinical laboratory data and physical examination. Providing Medication Therapy management services. Principles of special care populations (obese, geriatric, pediatric, pregnancy, lactation, renal and hepatic patients). The course is designed to familiarize students with the major types of drug interactions (Pharmacokinetic, pharmacodynamic and pharmacogenetic interactions) in the clinical setting, in addition to drug food and drug disease interactions. This course will also enable students to apply case-based learning strategies of any encountered diseases through experiential learning in hospitals or healthcare settings or simulated cases.

Course Title	Management of Oncological Diseases and Radiopharmacy								
Course Code	PNC 404	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

Cancer etiology, risk factors, cancer staging and grading, diagnosis, prognosis, optimizing chemotherapeutic regimens, different types of tumors (solid and hematologic) and their management, toxicities of chemotherapy, supportive treatment, pharmaceutical care and patient's support measures. This course also includes studying radioactive isotopes which process medical applications and precautions of their usage.

Course Title	Management of Endocrine and Renal Disorders								
Course Code	PNC 405	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

This course includes the Pathophysiology, causes, clinical presentation, diagnosis and application of pharmaceutical care plans in different endocrinologic disorders (Diabetes, thyroid disorder, Cushing syndrome,...) and different renal disorders and related fluid and electrolyte disturbances (acute and chronic renal failure, uremic syndrome, kidney stones, ..). The course develops the students' ability to design, monitor, refine safe and cost-effective treatment plans and provide appropriate information to patient, caregivers, and health professionals.

Course Title	Clinical Research, Pharmacoepidemiology and Pharmacovigilance								
Course Code	PNC 501	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Department	Microbiology and Immunology								

Course description:

This course will introduce basic principles of clinical research. Students will develop an understanding of different study designs, research methods and how to calculate clinically important measures of effect of observational and experimental studies. This course also provides the students with an understanding of the concept and importance of pharmacovigilance and reporting systems.

Course Title	Management of Neuropsychiatry diseases								
Course Code	PNC 502	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

This course aims to provide the student with the knowledge in, pathophysiology, clinical interpretation, pharmacotherapy and management of neuropsychiatric diseases (e. .g mental health disorders, schizophrenia, depression, anxiety, seizure disorders, parkinsonism, migraines, dementia and Alzheimer's disease). Sedative and hypnotics, general anesthetics, opioid analgesics and non-steroidal anti-inflammatory drugs.

Course Title	Management of Dermatological, Reproductive and Musculoskeletal Diseases								
Course Code	PNC 503	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

Skin structure and function, primary and secondary lesions. Most popular skin diseases: infective and non-infective types and their differentiation. Sexually transmitted diseases, male infertility, and women health. Musculoskeletal disorders are also included.

Course Title	Management of Pediatric Diseases								
Course Code	PNC 504	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

Nutritional requirements in neonates and infants, Pharmacokinetics and GIT disorders in Pediatrics, nutritional disorders, neonatology, infectious diseases in pediatrics, congenital heart diseases, endocrine, neurological, haematologic, renal, and respiratory disorders, pediatric emergencies.

Course Title	Management of Cardiovascular Diseases								
Course Code	PNC 505	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

Main diseases affecting the cardiovascular system, symptoms, prognosis, pharmacological and non-pharmacological management, patient counseling and monitoring of dyslipidemias, hypertension, coronary artery disease, acute coronary syndromes, heart failure, dysrhythmias, thromboembolic disorders, and stroke.

Course Title	Management of Gastrointestinal Diseases								
Course Code	PNC 506	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

Hepatic disorders including viral hepatitis, pancreatitis, gastrointestinal bleeding, peptic ulcer, gastro- esophageal reflux disease, inflammatory bowel diseases and irritable bowel syndrome as well as gastrointestinal symptoms including nausea, vomiting, constipation, and diarrhea.

Course Title	Management of Respiratory Diseases								
Course Code	PNC 507	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

Epidemiology, etiology, pathophysiology, clinical manifestation, investigations, treatment, monitoring, and patient counseling of bronchial asthma, chronic obstructive pulmonary disease, pulmonary hypertension, cystic fibrosis, upper and lower respiratory tract infections, and drug-induced respiratory problems.

Course Title	Marketing and Pharmacoeconomics								
Course Code	PNC 508	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Clinical Pharmacy & Pharmacy Practice								

Course description:

This course introduces the basic concepts of health economics, basic terms of health economics. The course covers the key components of health care financing, some methods of how to contain health care expenditure and the major definitions in health technology assessment. The course will also introduce different types of economic evaluation, budget impact analysis and their uses, in addition to different methods of pricing among which value-based pricing. Moreover, the course will introduce students to the concepts, analyses, and activities that comprise marketing management, and to provide practice in assessing and solving marketing problems. The course is also designed to provide students with principles of marketing strategy, customer behavior, segmentation, market research, product management, pricing, promotion, sales force management and competitive analysis.

Course Title	Management of Critical Care Patients								
Course Code	PNC 509	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Department	Clinical Pharmacy & Pharmacy Practice								

Course description:

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. Several topics will be discussed including, Sepsis, Pneumonias, Cardiac arrhythmias, Hypertensive urgency/emergency, and Acute coronary syndromes. Decompensated heart failure/cardiogenic shock, VTE prophylaxis and treatment and bleeding, Sedation, neuromuscular blockade, pain management. Acid base, fluid and electrolytes, ABG/ventilator issues, Diabetic and thyroid emergencies, Status asthmaticus/status epilepticus, and Antidotes/poisoning.

Course Title	Entrepreneurship								
Course Code	PNC 510	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Department	Clinical Pharmacy & Pharmacy Practice								

Course description:

This course is designed to enhance a student's knowledge in leadership, business, and financial skills in pharmacy practice while learning the traits of an entrepreneur, current topics in entrepreneurship with a specific focus on pharmacy practice and patient care programs. This course will teach the participants a comprehensive set of critical skills needed to develop a profitable business project. This course is designed to provide the students the personal and business tools including risk-taking, strategic planning, marketing, competitiveness, and social responsibility to make the transition from the academic environment to the daily practice of pharmacy now and in the future, with an emphasis on entrepreneurship.

Elective Courses

Course Title	Management of chronic illness								
Course Code	PNC E01	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Clinical Pharmacy & Pharmacy Practice								

Course description:

This course provides insights into epidemiology, etiology, pathophysiology, clinical manifestation, investigations, guidelines of treatment, monitoring, and patient counseling of chronic illness including Cardiovascular disorders (Heart Failure, Hypertension, Arrhythmias, Ischemic Heart Diseases, dyslipidemia, ...), respiratory disorders (asthma, COPD, ...), GIT problems (GERD & peptic ulcers), endocrine disorders (Diabetes, hypo- & hyperthyroidism ,...) and Chronic renal and hepatic diseases, in addition to rheumatic disorders (rheumatoid arthritis, osteoarthritis, gout, autoimmune disorders,) . Pain management in these chronic diseases should also be discussed.

Course Description

Microbiology and Immunology Department

Required Courses

Course Title	General Microbiology and Immunology								
Course Code	PMC 201	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Microbiology and Immunology								

Course description:

The course will cover the introduction to bacterial structure, metabolism and genetics. It will also include classification of bacteria, viruses and fungi implicated in human infections. It will also include the basic fundamentals of the innate and adaptive immune system, including their cells and functions, hypersensitivity reactions in addition to immunization. The course also includes structures and functions of genetic material and the different basics of classical and molecular genetics.

Course Title	Parasitology and Virology								
Course Code	PMC 202	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Department	Microbiology and Immunology								

Course description:

The course comprises the structural components, life cycles, transmission, immune response, pathogenesis, laboratory diagnosis and treatment of viral and parasitic infections in humans and their relevance for human health and control.

Course Title	Pharmaceutical Microbiology and Antimicrobials								
Course Code	PMC 301	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Microbiology and Immunology								

Course description:

The course covers chemotherapeutic agents along with structure activity relationship and bacterial resistance, control of microbial growth through sterilization, disinfectants antiseptics and preservatives. It also comprises an introduction to industrial microbiological quality control, the hazards of microbial contamination of pharmaceuticals. In addition to fermentation processes and their applications in the pharmaceutical industry.

Course Title	Medical Microbiology								
Course Code	PMC 302	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Microbiology and Immunology								

Course description:

This course comprises the study of different bacteria implicated in human infections along with their underlying pathogenesis and etiology with special emphasis on host microbe interaction. pathogenic fungi along with some human fungal diseases.

Course Title	Advanced scientific language								
Course Code	PMC 303	Credit Hours	2	Lecture	0	Tutorial	2	Practical	2
Department	Microbiology and Immunology								

Course description:

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-ings, conclusions and recommendations.

(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	Public Health and Preventive Medicine								
Course Code	PMC 401	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Microbiology and Immunology								

Course description:

The course covers the standard precautions and the preventive measures for communicable and non- communicable diseases, as well as the employee safety measures that are required in healthcare settings. It also includes the fundamentals of environmental and sanitary microbiology as well as the means of sustaining the environment and the means of maintaining a healthy lifestyle for a healthy community.

Course Title	Pharmaceutical Biotechnology								
Course Code	PMC 501	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Microbiology and Immunology								

Course description:

The course comprises in-depth the fundamentals of the rapidly developing areas of pharmaceutical and molecular biotechnology as well as the pharmacist's role in biotechnology. It includes the techniques of drug production by different biological systems and the methods for production of commercial products including recombinant proteins.

Elective Courses

Course Title	Environment and sustainability								
Course Code	PMC E01	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Microbiology and Immunology								

Course description:

This course focuses on the environment and its relation to the society where it covers several environmental issues as the ecosystem as well as its hazards; as pollution, carcinogens, global warming; extending to cover the different aspects of sustainable development.

Course Title	Clinical immunology								
Course Code	PMC E02	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Microbiology and Immunology								

Course description:

This course addresses the clinical aspects of immunology including; immune mediated disorders as autoimmunity, cancer immunodeficiency, as well as their underlying mechanisms , laboratory diagnosis and their possible immunotherapeutic treatment strategies.

Course Title	Mycology								
Course Code	PMC E03	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Microbiology and Immunology								

Course description:

This course comprises the basic fundamentals of clinical mycology that includes the basic features of medically important fungi, their disease spectrum, and toxins they produce. It also extends to cover the identification of the fungal infections, their laboratory diagnosis and treatment.

Course Title	Advanced microbiological techniques								
Course Code	PMC E04	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Microbiology and Immunology								

Course description:

The course will cover the basic , conventional as well as the new laboratory diagnostic methods required for both clinical and research studies in Microbiology.

Course Description

Pharmaceutical Chemistry Department

Required Courses

Course Title	Pharmaceutical Analytical Chemistry I								
Course Code	PCC 101	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmaceutical Chemistry								

Course description:

This course is designed to provide the students with the fundamentals of Thermochemistry and thermodynamics. Chemical kinetics and reaction rates. Chemical equilibrium. Introduction to qualitative inorganic chemistry. Quantitative volumetric analysis. volumetric calculation and concentration expressions. It also covers acid-base titration.

Course Title	Pharmaceutical Organic Chemistry I								
Course Code	PCC 102	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmaceutical Chemistry								

Course description:

This course includes an introduction to nomenclature, synthesis and reactions of: alkanes, alkenes, alkynes, alkyl halides, alcohols and ethers. Stereochemistry (Structural, geometrical and optical isomerism).

Course Title	Mathematics								
Course Code	PCC 103	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Department	Pharmaceutical Chemistry								

Course description:

This course provides the students with some essential elements of mathematics such as: Functions, limits, derivatives of 1st and higher orders, integration, exponents, logarithm, probability and random variables, significant figures, in addition to pharmaceutical calculation.

Course Title	Information Technology I								
Course Code	PCC 104	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Department	Pharmaceutical Chemistry								

Course description:

This course is designed to provide students with a brief introduction to the world of computers and the concept of information technology including: number systems and data representation, computer system components: hardware & software, storage and input/output systems, operating systems and utility Systems, software applications. In addition, it gives an overview about computer networks and internet: data communication, transmission modes, transmission media, computer networks, internet protocol, and internet services. It gives some computer applications in the laboratory such as internet access, word processing and power point. It is also concerned with Pharmacy Informatics and the use of technology to improve patient care as well as increasing patient safety by dealing with data generated by software used in patient care, not only the storage of data but also the retrieval of data as meaningful clinical reports and the management of information systems to assure patient safety and optimal medical outcomes.

Course Title	Pharmaceutical Analytical Chemistry II								
Course Code	PCC 105	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmaceutical Chemistry								

Course description:

This course deals with precipitation titration (Mohr, Fajan and Volhard methods), complex formation titration (Types of ligands, coordination number, argentometric and mercurimetric titration, EDTA titrations), introduction to oxidation- reduction titrations (Balancing redox reactions and principles of Nernst equation and cell potential) and applications of oxidation-reduction titrations: selected oxidants and reductants.

Course Title	Pharmaceutical Organic Chemistry II								
Course Code	PCC 106	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmaceutical Chemistry								

Course description:

This course deals with the chemistry of aromatic compounds. Electrophilic aromatic substitution reactions. The chemistry and reactions of ethers, epoxides, aldehydes, ketones, carboxylic acids and their derivatives: Acid halides, anhydrides, esters and acidamides. The chemistry and reactions of phenols, sulphonic acids and sulphonamides.

Course Title	Pharmaceutical Organic Chemistry III								
Course Code	PCC 201	Credit Hours	2	Lecture	1	Tutorial	1	Practical	2
Department	Pharmaceutical Chemistry								

Course description:

This course covers the chemistry of aromatic nitro compounds, amines: classification, nomenclature, basicity and synthesis of different classes of amines, reactions with different electrophiles, differentiation between the three classes. It gives an overview of the structure, chemistry and stability of diazonium salts at different pH values. Overview on nomenclature, synthesis of some heterocyclic compounds including derivatives of pharmaceutical importance.

Course Title	Instrumental Analysis								
Course Code	PCC 202	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Pharmaceutical Chemistry								

Course description:

This course provides the students with an overview of different instrumental methods of analysis with special emphasis on conductometry, molecular ultraviolet-visible absorption spectroscopy (theory, instrumentation and application), molecular fluorescence spectroscopy (theory, instrumentation and application), atomic absorption and emission spectroscopy, polarimetry and refractometry.

Course Title	Medicinal Chemistry I								
Course Code	PCC 401	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmaceutical Chemistry								

Course description

This course deals with the chemistry, properties and mechanism of action of different classes of chemotherapeutic agents and diagnostic agents that treat different infections, including antivirals, antineoplastics, antibacterial sulfonamides, antimycobacterium, antifungal agents, local anti-infective agents, antibiotics, antiprotozoal agents, anthelmintics, antibilharzial agents and urinary tract anti-infectives.

Course Title	Analytical Quality Control of Pharmaceuticals								
Course Code	PCC 402	Credit Hours	2	Lecture	1	Tutorial	1	Practical	2
Department	Pharmaceutical Chemistry								

Course description:

This course includes sampling of Pharmaceutical materials. Quality assurance and quality control. Validation of analytical procedures; accuracy, precision, specificity, linearity, range, detection limit and quantitation limit, ruggedness and robustness. Qualifications of instruments: HPLC, spectrophotometers and pH- meters. Drug stability. Routes of drug degradation; stress testing and forced degradation. Documentation.

Course Title	Medicinal Chemistry II								
Course Code	PCC 403	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmaceutical Chemistry								

Course description:

This course includes important chemical, biochemical and pharmacological aspects of medicinal and pharmaceutical agents that belong to different categories. An overview of NSAIDs, opioids, CNS drugs, CV drugs, Steroids, GIT drugs, drugs acting on the respiratory system, drugs affecting neurotransmission as well as drugs acting on immune system and neuromuscular disorders.

Course Title	Information Technology II								
Course Code	PCC 404	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Department	Pharmaceutical Chemistry								

Course description:

The aim of this course is to teach THE students spreadsheet, Databases and Hypertext markup language. The course aims to enable the student to carry out simple or more complicated calculations using numerical data and formulas using the variety of tasks that spreadsheets are used. The course also aims to help students to analyze, organize, and manipulate data. The course aims to help students, regardless of their major, to feel justifiably confident of their ability to create static webpage's using HTML.

Elective Courses

Course Title	Chromatography and Separation Techniques								
Course Code	PCC E01	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmaceutical Chemistry								

Course description:

This course provides the students with principles, instrumentation and applications of chromatographic and other separation techniques including: Thin Layer Chromatography, High Performance Liquid Chromatography, Gas Chromatography, Ultra Performance Liquid Chromatography, Capillary Electrophoresis.

Course Title	Drug Design								
Course Code	PCC E02	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmaceutical Chemistry								

Course description:

This course introduces essentials of pharmaceutical chemistry and metabolism. Development of prodrugs, soft drugs, hard drugs. Computer aided drug design. Type of receptors, mode of interaction of drugs with receptors. In silico drug design. Quantitative structure activity relationship. Computer visualization and molecular modeling.

Course Title	Analysis of food and flavours.								
Course Code	PCC E03	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmaceutical Chemistry								

Course description:

This course deals with the classification of flavouring agents and chemesthetic compounds found in food, their chemistry and methods of analysis. It also deals with the choice and application of the common analytical methods to the analysis of the different types of food, with special emphasis on the analysis of milk, carbohydrates and proteins. It is designed to provide information about chemical composition, processing, quality control and detection of adulteration of food stuffs.

Course Title	Forensic analysis								
Course Code	PCC E04	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmaceutical Chemistry								

Course description:

The objective of this course is to provide students with the required knowledge in forensic analysis labs and chemistry of drugs of abuse. In addition, it gives a general overview of the chemical principles, methods and analytical instruments involved in trace analysis of poisons, drugs of abuse and/or their metabolites, in addition to heavy metals in different biological specimens such as hair, skin and biological fluids.

Course Title	Overview Of spectroscopy								
Course Code	PCC E05	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmaceutical Chemistry								

Course description:

This course is designed to provide the students basic knowledge about the use of different spectroscopic tools, including ultraviolet (UV), infrared (IR), nuclear magnetic resonance (NMR) and mass spectrometry (MS) both qualitatively (for the structural elucidation of organic compounds such as the degradation products of drugs during stability testing) and quantitatively (for drug analysis).

Course Description

Pharmaceutics and Pharmaceutical Technology Department

Required Courses

Course Title	Pharmacy Orientation								
Course Code	PPC 101	Credit Hours	1	Lecture	1	Tutorial	0	Practical	0
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

The course describes the basic information of all aspects of professional pharmacy, including the mission of pharmacy, role and responsibility of pharmacists in society, pharmacy careers, classification of medications, interpretation of prescriptions, medication orders, and sources of drugs, different dosage forms and various routes of administration. In addition to the history of pharmacy practice in various civilizations.

Course Title	Medical Terminology								
Course Code	PPC 102	Credit Hours	1	Lecture	1	Tutorial	0	Practical	0
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

This course deals with basic components of medical terms (roots, prefixes, suffixes, and linking or combining vowels) and how does the medical terminology work by combining these basic components. The course also includes commonly used prefixes, and roots of body system, as well as the commonly used medical abbreviations and diseases.

Course Title	Physical Pharmacy								
Course Code	PPC 103	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

This course provides the students with knowledge of physicochemical principles essential for the design and formulation of pharmaceutical products. Students are introduced to the fundamental concepts of states of matter, phase equilibrium, colligative properties, solubility, dissolution, partition coefficient, surface and interfacial phenomena, surface active agents, adsorption and its application in pharmacy and rheological behavior of dosage forms.

Course Title	Pharmaceutical Dosage Forms I								
Course Code	PPC 201	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

This course is concerned with the study of the system of weights, measures and pharmaceutical calculations requisite to the compounding, dispensing, and utilization of drugs in pharmacy practice. It will also comprise all manufacturing formulations aspects, packaging, storage and stability of liquid dosage forms including solutions (aqueous and non-aqueous), colloids, suspensions and emulsions with emphasis on the technology and pharmaceutical rationale fundamental to their design and development. The incompatibilities occurring during compounding are also considered. The course will also briefly study the basic principle of sterile products including parenteral, ocular formulations, etc.

Course Title	Pharmaceutical Dosage Forms II								
Course Code	PPC 202	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

This course describes the principles and techniques involved in the formulation and manufacturing of traditional dermatological semisolid dosage forms and cosmetic products. It also covers the structure and function of the skin, target area of treatment after topical application, basic principles of diffusion through membranes and factors affecting percutaneous absorption, enhancement of skin penetration and transdermal drug delivery systems (TDDS). Fabrication, testing of aerosols and other inhalation products is also accentuated.

Course Title	Communication Skills I								
Course Code	PPC 203	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

This course will develop students' communication and presentation skills and train them to present themselves and their ideas orally and written in an effective manner that leads them to excellence and leadership in their Work and life.

Course Title	Pharmaceutical Dosage Forms III								
Course Code	PPC 301	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

The course describes the principles and techniques involved in the formulation, and manufacturing of solid dosage forms including powders, granules, tablets, capsules and suppositories. It introduces the main principles of the kinetics of drug decomposition including rate and order of reaction, determination of the half-life, expiry date and shelf-life by different methods, stability testing, and in- vitro possible drug/excipients interactions.

Course Title	Pharmaceutical Technology								
Course Code	PPC 302	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

The course provides students with an introduction to industrial pharmacy. It deals with the principles of preformulation and various unit operations such as emulsification, drying, filtration, centrifugation, size reduction, size separation, size enlargement and others. In addition to tableting and coating. It focuses on the application of these unit operations in pharmaceutical industry with emphasis on the equipment used during the production of different dosage forms.

Course Title	Biopharmaceutics and Pharmacokinetics								
Course Code	PPC 303	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

The course is concerned with the exploration and examination of the physicochemical properties of drugs in the physiological environment and their impact on product performance. It explores the principles of biopharmaceutics and strategies for enhancing drug delivery and bioavailability. Also it introduces the students to basic pharmacokinetic parameters and mathematical aspects. General principles of pharmacokinetic models are presented as they pertain to the process of absorption, distribution and elimination of drugs in humans and the significance of these processes in drug therapy.

Course Title	Communication Skills II								
Course Code	PPC 304	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

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.

Course Title	Advanced Drug Delivery Systems								
Course Code	PPC 401	Credit Hours	2	Lecture	2	Tutorial	0	Practical	0
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

A continued study of pharmaceutical dosage forms with emphasis on novel and targeted drug delivery systems. In addition to formulation aspects of biotechnology derived pharmaceuticals. It also covers the application of polymers and excipients to solve problems/issues concerning the optimization of absorption, selective transport, and targeting.

Elective Courses

Course Title	Cosmetics Preparations								
Course Code	PPC E01	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

The course introduce the students' with the knowledge of cosmetic products regarding their nature, formulations, indications and unwanted effects. Its information is of particular interest for conveying proper counseling to consumers looking for Pharmacist's consultation as a drug expert. In addition to the introduction of application of nanotechnology in cosmetics products.

Course Title	Good Manufacturing Practices								
Course Code	PPC E02	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

This course involves the principles of the Current Good Manufacturing Practices (cGMP). It exposes students to all aspects of validation, calibration, inspection and the requirements for manufacturing facilities. It also provides students with a review of the process engineering, technology transfer, personnel management, training and hygiene, premises and contamination control, documentation and auditing, process deviation with emphasis on risk management, complaint handling and product recall theory. Introduction to the quality systems as it applies to the manufacture of pharmaceutical products will be also described.

Course Title	Pharmaceutical Nanotechnology								
Course Code	PPC E03	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

This course will provide the student with basic concepts and terminologies in nanoscience. The student will gain sufficient knowledge about introducing nanotechnology into the pharmaceutical field with higher emphasis on drug delivery. The student will understand the rationale for employment of nanotechnology in pharmaceutical formulation and evaluation processes.

Course Title	Supply Chain Mangement								
Course Code	PPC E04	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmaceutics and Pharmaceutical Technology								

Course description:

This course describes the process of buying: learning of the need, locating and selecting a supplier, negotiating price and other significant terms, and following up to ensure delivery. In addition, it includes stores, traffic, receiving, incoming inspection, and salvage of goods.

Course Description

Pharmacognosy and Natural Products Department

Required Courses

Course Title	Human Rights and Fighting Corruption								
Course Code	PGC 101	Credit Hours	1	Lecture	1	Tutorial	0	Practical	0
Department	Pharmacognosy and Natural products								

Course description:

The course provides an introduction to basic human rights philosophy, principles, instruments and institutions, and also an overview of current issues and debates in the medical and pharmaceutical field with focus on the problems specific to our country. This course also aims to explore some aspects of the diverse and increasingly complex body of international law of human rights that has both national and international application.

Course Title	Medicinal Plants								
Course Code	PGC 102	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmacognosy and Natural products								

Course description:

The course provides the students with Classification of living organisms (plant, animal, fungi, protista, eubacteria and archaeobacterias). Taxonomic classification of plant kingdom, plant nomenclature (kingdom, phylum, class, order, family, genus and species). Microscopical study of the cell and the cell wall (prokaryotic and eukaryotic cells) and cell differentiation in different plant organs (parenchyma, collenchyma, sclerenchyma....etc). Ergastic cell contents (reserve food material and active constituents. Plant body cells and tissues (stem, root, leaves, flowers, seeds, barks and woods). Preparation of crude drug (Collection of medicinal plants, processing of plant material, storage of crude drugs). In addition to study of medicinal leaves concerning their morphology, histology, powder, constituents and uses.

Course Title	Pharmacognosy I								
Course Code	PGC 201	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmacognosy and Natural products								

Course description:

After completion of the course the student have the knowledge and acquires skills that helps her/him to recognize and identify different commercial and pharmaceutical starches, barks, woods, flowers and seeds drugs in entire and powdered forms. The student should recognize 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. The subject allows the student to acquire knowledge about 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	PGC 202	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmacognosy and Natural products								

Course description:

Continuation of the course Pharmacognosy I, this course allow the student 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. The student should recognize the principles of quality control of these drugs including microbiological and other contamination. Also the student should recognize the possible ways of adulteration of these drugs particularly when occur in powdered form by the help of microscopical examination and the recommended and specific chemical tests.

Course Title	Phytochemistry I								
Course Code	PGC 301	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmacognosy and Natural products								

Course description:

The course introduces the student to the biogenetical origin of secondary metabolites, namely; volatile oils, carbohydrates and their derivatives and glycosides. Their general method of isolation, characterization, distribution, chemical structure and physico-chemical properties. The course enables the students to categorize types of secondary metabolites, predict therapeutic and toxic effects based on their chemical structure, propose structure modifications that leads to more effective or 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 student to have the basic methods of extraction, isolation, purification, identification and quantitative analysis of natural products.

Course Title	Phytochemistry II								
Course Code	PGC 302	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmacognosy and Natural products								

Course description:

The course is a continuation of phytochemistry I. It comprises two parts;
Part 1 : The study of alkaloids, marine natural products, miscellaneous isoprenoids and bitters. It describes the general methods of isolation and characterization, their natural occurrence, chemical structure and physico-chemical properties and pharmacological activity. The course teaches the student to identify and assay of natural products, in addition to proposing structure modification to increase efficacy or decrease toxicity.
Part 2: Principles of chromatography. The student is introduced to the different types of chromatography, scientific terms related to chromatography, factors affecting separation and applications of different chromatographic techniques in analysis of natural products.

Course Title	Phytotherapy								
Course Code	PGC 501	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Pharmacognosy and Natural products								

Course description:

Upon successful completion of this course, the students should be able to 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. Also the student should understand the basis of complementary and alternative medicine with emphasis on herbal remedies, nutritional supplements, homeopathies, aromatherapy & their effect on maintaining optimum health and prevention of chronic diseases.

Elective Courses

Course Title	Processing of medicinal plants								
Course Code	PGC E01	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmacognosy and Natural products								

Course description:

The course will study the action of herbal drugs in the treatment of different body disorders regarding the adverse effect, contraindication of the used drug and preparation of herbal teas.

Course Title	Complementary and Alternative Medicine								
Course Code	PGC E02	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

The course includes different types of complementary / alternative medicines, such as herbal medicines, homeopathic drugs, aromatherapy, and naturopathy with other nutritional supplements, energy therapy, hydrotherapy, oxygenation therapy and life style intervention in chronic diseases

Course Description

Pharmacology and Therapeutics Department

Required Courses

Course Title	Cell Biology								
Course Code	PLC 101	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

The course aims at studying the structure and function of prokaryotic and eukaryotic cells. In this course study will include many different areas of cellular biology involving: the synthesis and function of macromolecules such as DNA and RNA; control of gene expression; membrane and organelle structure and function; bioenergetics; and cellular communication, transformation; transport, receptors, and cell signaling; the cytoskeleton, the extracellular matrix, and cell movements.

Course Title	Anatomy and Histology								
Course Code	PLC 102	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

This course aims to provide the students with knowledge concerning the appropriate functions of cells, tissues, organs and body system. The course also enables the student to integrate physiological data and mechanisms with ongoing taught sciences: anatomy and histology. Histology part includes cytology, epithelium, C.T., blood, muscle, vascular, lymphatic, respiratory, gastrointestinal and endocrine systems. Anatomy part includes introduction to human anatomy, tissues of the body, skeletal system, articular system, muscular system, digestive system, cardiovascular, respiratory system, lymphatic system, urinary system, genital system, nervous and endocrine systems.

Course Title	Psychology								
Course Code	PLC 103	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

The course introduces different principles, theories and vocabulary of psychology as a science. The course also aims 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 Title	Biochemistry I								
Course Code	PLC 201	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

Structure of proteins – Biologically active peptides – Protein turnover – Amino acids as precursors for biosynthesis of biomolecules (e.g. neurotransmitters –nucleotides, ...) – Structurally and physiologically important lipids – Carbohydrates and connective tissue – Enzymes (theories of enzyme action – enzyme kinetics – inhibition and regulation of enzyme activity – clinical correlations) – The structure and function; fat soluble vitamins, water soluble vitamins , minerals, nucleic acids.

Course Title	Physiology and pathophysiology								
Course Code	PLC 202	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

Physiology :Introduction to body water, homeostasis, transport of materials, nervous systems, neuron structure and function, cardiovascular system, blood, respiratory cycle, gastrointestinal, reproductive, and renal systems, endocrine glands and body temperature regulation. Pathophysiology: Introduction to pathophysiology, cell injury, inflammation and immune response, autonomic nervous system in health and disease, endocrine disorders, pancreatic disorders, fluid and electrolyte imbalance, vascular and haematological disorders, disease of urinary, pulmonary and digestive systems.

Course Title	Basic Pharmacology								
Course Code	PLC 203	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

This course provides the principles underlying the actions of drugs; including pharmacokinetics, drug-receptor interactions, and drug metabolism. It explores the fundamental mechanism of drug action emphasizing the modulation of interactions between endogenous ligands and targets. Key target types include receptors, enzymes, transporter proteins, ion channels and nucleic acids. Key concepts include enzyme action, regulation, inhibition and signal transduction. In addition, the course provides the basic principles of drug absorption, distribution, metabolism and excretion. It also provides the conceptual knowledge of physiology and pathophysiology of the neuromuscular and the autonomic nervous system as well as the drugs acting upon them.

Course Title	Pathology								
Course Code	PLC 204	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

The study of biochemical, structural and functional changes in cells, tissues and organs, which are caused by diseases.

Course Title	Biochemistry II								
Course Code	PLC 205	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

Mobilization of body stores of glycogen and fats -Metabolism and tissue utilization of glucose, amino acids, and fatty acids – Metabolism of lipoprotein– Regulation of blood glucose level and clinical correlations – Feed/fast cycle – Nitrogen metabolism and nitrogen balance – Inborn errors of metabolism –Oxidative stress.

Course Title	Pharmacology I								
Course Code	PLC 301	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

This course integrates principles of pharmacology with conceptual knowledge of physiology and pathophysiology to disease processes regarding, autacoids and cardiovascular systems, renal & hematology.

Course Title	Pharmacology II								
Course Code	PLC 302	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

This course integrates principles of pharmacology with conceptual knowledge of physiology and pathophysiology disease processes regarding drugs acting on central nervous system, gastro-intestinal and pulmonary systems. The anti-inflammatory, analgesics as well as gout treatments are also within the scope of the course.

Course Title	First Aid and Basic Life Support (BLS)								
Course Code	PLC 303	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

Basic life support, bleeding, shock, medical emergencies, poisoning, bones and joints, soft tissue injuries, rescue and transportation

Course Title	Pharmacology III								
Course Code	PLC 401	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

This course integrates principles of pharmacology with conceptual knowledge of physiology and pathophysiology disease processes regarding drugs acting on endocrine system. Chemotherapeutic drugs including antimicrobials, anticancer and immunosuppressant are within the scope of the course. Stem cell therapy is also included.

Course Title	Clinical Biochemistry								
Course Code	PLC 402	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

Organ function and laboratory diagnostic tests (liver – kidney – heart – pancreas – bone) – Plasma proteins and albumin/globulin ratio – Types and lab differentiation of hyperlipidemia - Examples of different diseases (case study – interpretation of analytical data) - Handling, preservation, storage and analysis of biological samples - Abnormalities of urine analysis – Blood analysis and complete blood count – Tumor markers – Endocrinology (classification of hormones - mechanisms of action – dysfunction) - Electrolytes, blood gases and acid-base balance - Recent diagnostic biomarkers.

Course Title	Toxicology and Forensic Chemistry								
Course Code	PLC 501	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmacology and Therapeutics								

Course description:

This course provides basics and concepts of toxicology including the mechanism of toxicity, target organ and treatment of toxicity. Toxic groups including heavy metals, toxic gases, animal, plant and marine poisons, pesticides and radiation hazards are covered. Environmental, occupational, reproductive and genetic toxicology as well as drug abuse are included. Postmortem sampling for detection of poisons, methods of detection, interpretation of results and writing of a report are also covered.

Course Title	Clinical Nutrition								
Course Code	PLC 502	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

The aim of the course is designed to provide the student with understanding of the fundamentals of nutrition, roles of carbohydrates, proteins, fats, water, minerals and vitamins in clinical nutrition and how these components promote and maintain of optimal health. Nutritional assessment and management of patients requiring specialized nutrition support. Nutritional therapy in specific diseases (diabetes, cardiovascular, cancer, gastrointestinal diseases, malnutrition and genetic diseases).

Elective Courses

Course Title	Pharmacotherapeutics for Special Population								
Course Code	PLC E01	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

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 Title	Geriatric Pharmacotherapy								
Course Code	PLC E02	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

This course aimed to promote health, prevent and treat diseases in geriatric aged group, also the course deals with adverse drug reactions and interactions. In addition to management of neurological disorders in these special population.

Course Title	Addiction and Drug Abuse								
Course Code	PLC E03	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

This course deals with the socio-psychological, biological, genetic and pharmacological aspects of the problem and strategies for prevention and treatment.

Course Title	Molecular Therapeutics								
Course Code	PLC E04	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmacology and Therapeutics								

Course description:

This course involves a wide range of new molecular therapies such as simple protein replacement therapy, gene augmentation therapy, antisense therapy, stem cells therapy and advanced therapies of cancer. It focuses on the new in the clinical trials of stem cell therapy that considered one of the important types of future medicine. Also, it provides knowledge about the advanced molecular diagnosis and therapy of cancer.

7. Program Admission Requirements:

- Those who apply to join the program must fulfill all the conditions set by the Supreme Council of Egyptian Universities.
- Transfer students, enrolled in a similar program in one of the Faculties of Pharmacy in Egyptian or foreign universities, may be accepted provided that the student fulfills the requirements for admission to the faculty, and the courses he studied in the faculty from which he was transferred are counted according to the rules determined by the faculty council.
- 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 Private 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 requirements and comply with the rules of the Faculty.
- Full-time study is required by all students.

8. Regulations Rules for Program Course Completion:

In order to complete the requirements for the Bachelor's Degree in Pharmacy Pharm-D (Clinical Pharmacy), the student should:

- I. Pass successfully a total of 177 Cr. distributed over ten semesters including:
 - 169 Cr. compulsory faculty courses
 - 8 Cr. faculty elective Courses
 - Obtain cGPA higher than or equal to (2)
- II. Pass the requirements for graduation that the university may decide.
- III. Pass the summer training period with a total of 100 training hours in private and governmental pharmacies as well as hospital pharmacies that are approved by the faculty council, under the supervision of a faculty staff member. Summer training takes place during summer vacations after the end of the third level and before the start of the internship year.
- IV. Complete the internship year (A nine-month academic year) after completing the years of study, according to the detailed regulations for the Internship Year Training Program, which includes passing a graduation project in one of the disciplines offered for registration.

➤ **Examinations Procedure:**

- The final grade awarded to student in a course is usually based on the total grades of the course work, practical, written and oral exams according to the table of the study plan.
- The passing percentage of any course should not be less than 60% of the total marks of the course and the student should not get at least 30% in the final written exam.

➤ **Grading System:**

Grade		Grade points	Percentage Grade in Faculty of Pharmacy
Excellent	A+	4.0	100-97
	A	3.85	less than 97 -90
	A-	3.7	less than 90- 85
Very Good	B+	3.3	less than 85- 80
	B	3.0	less than 80- 75
Good	C+	2.7	less than 75- 70
	C	2.3	less than 70- 65
Pass	D	2.0	less than 65- 60
Fail	F	0.0	less than 60
Bylaw	BL	0.0	less than 30 % in the final written exam
withdraw	W	-	withdraw
incomplete	I	-	incomplete
Absent	E	-	Absent

➤ **Grades not included in the GPA:**

• ***Withdraw (W):***

A grade given to the course or courses from which the student withdrew, and the grade “W” is not included in the calculation of the average cGPA.

• ***Incomplete (I):***

A temporary grade is given to the course or courses that the student was unable to complete on the specified date. Accordingly, when the student completes the course, the actual grade obtained by the student is recorded instead of the grade “I” in the transcript, and grade “I” is not included in the calculation of the average cGPA.

• ***Absent with excuse (E):***

A temporary grade is given to the course or courses for which the student is absent from attending the final written exam with an excuse, and after the student undergoes a substitute exam, the actual grade obtained instead of the grade “E” is recorded in the transcript and the grade “E” is not included in the calculation of the average cGPA.

• ***Absent with no excuse (NE):***

A grade given to the course or courses for which the student was absent from attending the final written exam without an excuse. This grade is equivalent to "zero" points and is included in the calculation of the average cGPA.

• ***Denial (DN):***

A grade given to the student who has been deprived of completing the course. This grade is equivalent to a number of "zero" points as it is included in the calculation of the average cGPA.

- The student who exceeds 25% absence with excuse is treated as incomplete in the end of semester exam and takes a grade (I).



➤ **Calculation of semester GPA (GPA) and cumulative GPA (cGPA):**

- The grade value of each course (the points shown in the previous table) is multiplied by the number of credit hours for this course to obtain the number of points for each course in the semester.
- Points are collected for all the courses in which the student is registered in one semester.
- The total points of all courses are divided by the total credit hours registered for the student in one semester to obtain the semester average as follows:

$$\text{Semester GPA (GPA)} = \frac{\sum \text{Points of all courses in one semester}}{\sum \text{Cr. Hrs in one semester}}$$

$$\text{Cumulative GPA (cGPA)} = \frac{\sum \text{Points of all courses in one semester}}{\sum \text{Cr. Hrs in one semester}}$$

9. Teaching and Learning Methodology for Blended Learning:

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

10. Methods of Student's Evaluation:

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

11. Evaluation of Program Learning Outcomes and Competencies:

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

Program Coordinator
Prof. Dr. Rasha El-Bayaa
Vice Dean of Faculty of Pharmacy
Pharos University in Alexandria

Head of Quality Assurance Unit
Dr. Shaimaa Khamis
Faculty of Pharmacy
Pharos University in Alexandria

Faculty Dean
Prof. Dr. Maged El-Ghazoly
Dean of Faculty of Pharmacy
Pharos University in Alexandria