

**Faculty of Pharmacy**

**Pharos University in Alexandria**



**Program Specification**  
**Bachelor's Degree in Pharmacy**  
**(Pharm-D)**

**2019**

**إعتماد مجلس وحدة 10/8/2020**

**إعتماد مجلس كلية 12/8/2020**

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

## **Program Specification**

### **(A) Basic Information:**

**1- Program Title: Bachelor's Degree in Pharmacy (Pharm-D)**

**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: 12/8/2020**
- **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 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) 2017:**

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

### **The competency domains are the followings:**

Domain 1: Fundamental Knowledge

Domain 2: Professional and Ethical Practice

Domain 3: Pharmaceutical Care

Domain 4: Personal Practice

## **DOMAIN 1- FUNDAMENTAL KNOWLEDGE**

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

### **KEY ELEMENTS**

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

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

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

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

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

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

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

## **DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE**

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

### **KEY ELEMENTS:**

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

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

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

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

**KEY ELEMENTS:**

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

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

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

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

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

**KEY ELEMENTS:**

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

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

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

**KEY ELEMENTS:**

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

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

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

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

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

**KEY ELEMENTS:**

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

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

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

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

**KEY ELEMENTS:**

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

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

### **DOMAIN 3: PHARMACEUTICAL CARE**

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

**KEY ELEMENTS:**

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

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

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

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

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

**KEY ELEMENTS:**

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

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

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

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



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

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

## **DOMAIN 4: PERSONAL PRACTICE**

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

### **KEY ELEMENTS:**

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

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

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

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

### **KEY ELEMENTS:**

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

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

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

### **KEY ELEMENTS:**

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

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



### **3. Academic Standards of Program Specification:**

- The Faculty 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.
- Comparative study between Competency-Based NARS 2017 and Pharm-D program graduate attributes is available as attached extension.
- Program Matrix; program courses vs key elements, was prepared.
- 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.
- All previous documents are available as external extensions.

### **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** 167

**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 academic years, with training in human and veterinary pharmaceutical companies and factories - companies and factories for: medical supplies and devices, cosmetics, nutritional supplements, herbs, medicinal plants, disinfectants and pesticides - distribution companies and drug stores - local and international drug control and follow-up centers and organizations - pharmaceutical and medical research centers, bioavailability and clinical studies - media and drug marketing ... etc., in addition to private and governmental hospitals and pharmacies. Those who wish to specialize in the academic field (teaching and research) can spend a training period in colleges of pharmacy and research centers.
- The internship training during the 6<sup>th</sup> year must include one clinical training course.
- 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 18 units distributed as follows:-  
Compulsory: 18 Cr. Hs    Elective: 0    University Requirement: 0
- Semester 4/ Second year: required to pass 19 units distributed as follows:-  
Compulsory: 19 Cr. Hs    Elective: 0    University Requirement: 0

- Semester 5/ Third year: required to pass 18 units distributed as follows:-  
Compulsory: 18 Cr. Hs      Elective: 0      University Requirement: 0
- Semester 6/ Third year: required to pass 18 units distributed as follows:-  
Compulsory: 18 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 16 units distributed as follows:-  
Compulsory: 14 Cr. Hs      Elective: 2 Cr. Hs      University Requirement: 0

### **c- Program Courses:**

The student must successfully study 181 credit hours, including 167 credit hours compulsory courses, 8 credit hours elective courses, and 6 credit hours university requirements. The student must complete summer training and internship year under the supervision of the faculty.

### ➤ **Abbreviations**

<b>CrH</b>	Credit Hour	<b>CH</b>	Contact Hour	<b>CW</b>	Course Work & Lab.
<b>Lec</b>	Lecture	<b>Pr</b>	Prerequisite	<b>Period.</b>	Mid-term Exam
<b>Tut</b>	Tutorial	<b>TM</b>	Total Mark	<b>OE</b>	Oral Exam
<b>Lab</b>	Laboratory	<b>ET</b>	Exam Time	<b>FWE</b>	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)
									CW	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)
									CW	Period.	FWE	OE		
1	PPD 101	Pharmacy Orientation	1	1	0	0	1	-	0	20	80	0	100	1
2	PPD 102	Medical Terminology	1	1	0	0	1	-	0	20	80	0	100	1
3	PCD 101	Pharmaceutical Analytical Chemistry I	3	2	1	2	5	-	25	15	50	10	100	2
4	PCD 102	Pharmaceutical Organic Chemistry I	3	2	1	2	5	-	25	15	50	10	100	2
5	PCD 103	Mathematics	1	1	1	0	2	-	25	15	60	0	100	1
6	PCD 104	Information Technology I	2	1	0	2	3	-	25	15	60	0	100	2
7	PGD 101	Human Rights and Fighting Corruption	1	1	0	0	1	-	0	20	80	0	100	1
8	PLD 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)
									CW	Period.	FWE	OE		
1	PPD 103	Physical Pharmacy	3	2	0	2	4	-	25	15	60	0	100	2
2	PCD 105	Pharmaceutical Analytical Chemistry II	3	2	1	2	5	PCD 101	25	15	50	10	100	2
3	PCD 106	Pharmaceutical Organic Chemistry II	3	2	1	2	5	PCD 102	25	15	50	10	100	2
4	PGD 102	Medicinal Plants	3	2	1	2	5	-	25	15	50	10	100	2
5	PLD 102	Anatomy and Histology	3	2	0	2	4	-	25	15	60	0	100	2
6	PLD 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)
									CW	Period.	FWE	OE		
1	PPD 201	Pharmaceutics I	3	2	0	2	4	PPD 103	25	15	50	10	100	2
2	PPD 203	Communication Skills I	1	1	1	0	2	-	25	15	60	0	100	1
3	PCD 201	Pharmaceutical Analytical	2	1	1	2	4	PCD 105	25	15	50	10	100	1
4	PCD 202	Pharmaceutical Organic	3	2	1	2	5	PCD 106	25	15	50	10	100	2
5	PGD 201	Pharmacognosy I	3	2	1	2	5	PGD 102	25	15	50	10	100	2
6	PMD 201	General Microbiology and	3	2	0	2	4	PLD 101	25	15	50	10	100	2
7	PLD 201	Physiology and Pathophysiology	3	2	1	2	5	PLD 101	25	15	60	0	100	2
Total Semester			18	12	5	12	29							

Second Semester (Spring)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									CW	Period.	FW	OE		
1	PPD 202	Pharmaceutics II	3	2	0	2	4	PPD 103	25	15	50	10	100	2
2	PCD 203	Instrumental Analysis	3	2	1	2	5	PCD 105	25	15	50	10	100	2
3	PCD 204	Electroanalytical Methods	1	1	1	0	2	PCD 201	25	15	60	0	100	1
4	PGD 202	Pharmacognosy II	3	2	1	2	5	PGD 102	25	15	50	10	100	2
5	PMD 202	Parasitology and Virology	2	1	0	2	3	PMD 201	25	15	50	10	100	2
6	PLD 202	Pathology	2	2	1	0	3	PLD 102	25	15	60	0	100	2
7	PLD 203	Biochemistry I	3	2	0	2	4	PCD 102	25	15	50	10	100	2
8	PND 201	Biostatistics	2	1	0	2	3	PCD 103	25	15	60	0	100	2
Total Semester			19	13	4	12	29							

## Third Level

First Semester (Fall)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									CW	Period.	FWE	OE		
1	PPD 301	Pharmaceutics III	3	2	0	2	4	PPD 103	25	15	50	10	100	2
2	PCD 301	Medicinal Chemistry I	3	2	1	2	5	PCD 106 PCD 203	25	15	50	10	100	2
3	PGD 301	Phytochemistry I	3	2	1	2	5	PGD 202	25	15	50	10	100	2
4	PMD 301	Pharmaceutical Microbiology	3	2	0	2	4	PMD 201	25	15	50	10	100	2
5	PLD 301	Biochemistry II	3	2	0	2	4	PLD 203	25	15	50	10	100	2
6	PLD 302	Pharmacology I	3	2	0	2	4	PLD 201	25	15	50	10	100	2
Total Semester			18	12	2	12	26							

Second Semester (Spring)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									CW	Period.	FWE	OE		
1	PPD 302	Biopharmaceutics and Pharmacokinetics	3	2	0	2	4	PPD 201 PPD 301	25	15	50	10	100	2
2	PPD 303	Pharmaceutics IV	3	2	0	2	4	PPD 201	25	15	50	10	100	2
3	PCD 302	Medicinal Chemistry II	3	2	1	2	5	PCD 106 PCD 203 PLD 302	25	15	50	10	100	2
4	PGD 302	Phytochemistry II	3	2	1	2	5	PGD 202	25	15	50	10	100	2
5	PMD 302	Medical Microbiology	3	2	0	2	4	PMD 201	25	15	50	10	100	2
6	PLD 303	Pharmacology II	3	2	0	2	4	PLD 302	25	15	50	10	100	2
Total Semester			18	12	2	12	26							



## Fourth Level

First Semester (Fall)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	C H	Pr	Mark Distribution				TM	ET (hr)
									CW	Period.	FWE	OE		
1	PPD 401	Pharmaceutical Technology I	3	2	0	2	4	PPD 201 PPD 202 PPD 301	25	15	50	10	100	2
2	PGD 401	Applied and Forensic Pharmacognosy	2	1	0	2	3	PGD 302	25	15	50	10	100	2
3	PMD 401	Public Health	2	2	1	0	3	PMD 301	25	15	60	0	100	2
4	PLD 401	Pharmacology III	2	2	1	0	3	PLD 303	25	15	60	0	100	2
5	PLD 402	Clinical Biochemistry	3	2	0	2	4	PLD 301	25	15	50	10	100	2
6	PND 401	Drug Information	2	1	0	2	3	-	25	15	60	0	100	2
7	PND 402	Pharmaceutical Legislations and Regulatory Affairs	1	1	0	0	1	-	0	20	80	0	100	1
8	PMD 402	English (3)	2	0	2	2	4	UGE 02	25	15	60	0	100	2
9	E 01	Elective 1	2	1	2	0	3	-	25	15	60	0	100	2
Total Semester			19	12	6	10	28							

Second Semester (Spring)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	C H	Pr	Mark Distribution				TM	ET (hr)
									CW	Period.	FWE	OE		
1	PPD 402	Pharmaceutical Technology II	2	2	1	0	3	PPD 401	25	15	60	0	100	2
2	PCD 401	Drug Design	2	1	1	2	4	PCD 301	25	15	60	0	100	2
3	PLD 403	Toxicology and Forensic chemistry	3	2	0	2	4	PLD 302	25	15	50	10	100	2
4	PND 403	Clinical Pharmacokinetics	3	2	0	2	4	PPD 302	25	15	60	0	100	2
5	PND 404	Hospital Pharmacy	2	2	1	0	3	PLD 303 PPD 303	25	15	50	10	100	2
6	PND 405	Community Pharmacy Practice	3	2	0	2	4	PLD 303 PPD 202 PPD 301	25	15	60	0	100	2
7	PCD 402	Information Technology II	2	1	0	2	3	PCD 104	25	15	60	0	100	2
8	E 02	Elective 2	2	1	2	0	3	-	25	15	60	0	100	2
Total Semester			19	13	5	10	28							

## Fifth Level

First Semester (Fall)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									CW	Period.	FWE	OE		
1	PPD 501	Good Manufacturing Practice	2	1	0	2	3	PPD 402	25	15	60	0	100	2
2	PCD 501	Analytical Quality Control of Pharmaceuticals	3	2	1	2	5	PCD 203	25	15	50	10	100	2
3	PGD 501	Phytotherapy and Aromatherapy	3	2	0	2	4	PGD 302	25	15	60	0	100	2
4	PMD 501	Biotechnology	2	2	1	0	3	PMD 301	25	15	60	0	100	2
5	PMD 502	Clinical Research, Pharmacoepidemiology and pharmacovigilance	2	1	2	0	3	PND 202 PND 405	25	15	60	0	100	2
6	PND 501	Clinical pharmacy I	3	2	0	2	4	PND 404	25	15	50	10	100	2
7	PPD 502	Communication Skills II	1	1	1	0	2	PPD 203	25	15	60	0	100	1
8	E 03	Elective 3	2	1	2	0	3	-	25	15	60	0	100	2
Total Semester			18	12	7	8	27							

Second Semester (Spring)														
No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution				TM	ET (hr)
									CW	Period.	FWE	OE		
1	PPD 503	Advanced Drug Delivery Systems	2	2	0	0	2	PPD 202 PPD 301 PPD 303	0	25	75	0	100	2
2	PLD 501	Drug interaction	2	2	1	0	3	PLD 401	25	15	50	10	100	2
3	PLD 502	First Aid	1	1	1	0	2	PLD 302	25	15	60	0	100	1
4	PND 502	Marketing and Pharmacoeconomics	2	2	0	0	2	PMD 502 PND 404	0	25	75	0	100	2
5	PND 503	Clinical Pharmacy II and pharmacotherapeutics	3	2	0	2	4	PLD 401 PND 501	25	15	60	0	100	2
6	PND 504	Professional Ethics	1	1	0	0	1	-	0	20	80	0	100	1
7	PND 505	Entrepreneurship	1	1	1	0	2	-	25	15	60	0	100	1
8	PND 506	Scientific Writing	2	1	0	2	3	-	25	15	60	0	100	2
9	E 04	Elective 4	2	1	2	0	3	-	25	15	60	0	100	2
Total Semester			16	13	5	4	22							

## Elective Courses

### Clinical Pharmacy & Pharmacy Practice Department (PN)

No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									CW	Period.	FWE	OE	TM	
1	PND E01	Management of chronic illness	2	1	2	0	3	PLD 303 PND 501	25	15	60	0	0	1
2	PND E02	Management of Critical Care Patients	2	1	2	0	3	PLD 303 PND 501	25	15	60	0	0	1

### Microbiology and Immunology Department (PM)

No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									CW	Period.	FWE	OE	TM	
1	PMD E01	Environment and sustainability	2	1	2	0	3	PMD 201	25	15	60	0	100	1
2	PMD E02	Gene Regulation and Epigenetics.	2	1	2	0	3	PMD 201	25	15	60	0	100	1
3	PMD E03	Clinical immunology	2	1	2	0	3	PMD 201	25	15	60	0	100	1
4	PMD E04	Mycology	2	1	2	0	3	PMD 201	25	15	60	0	100	1
5	PMD E05	Bioinformatics.	2	1	2	0	3	PMD 201	25	15	60	0	100	1
6	PMD E06	Advanced microbiological techniques	2	1	2	0	3	PMD 302	25	15	60	0	100	1
7	PMD E07	Infection control	2	1	2	0	3	PMD 302	25	15	60	0	100	1

### Pharmaceutical Chemistry Department (PC)

No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									CW	Period.	FWE	OE	TM	
1	PCD E01	Chromatography and Separation	2	1	2	0	3	PCD 203	25	15	60	0	100	1
2	PCD E02	Analysis of food and flavours.	2	1	2	0	3	PCD 203	25	15	60	0	100	1
3	PCD E03	Forensic analysis	2	1	2	0	3	PCD 203 PGD 401	25	15	60	0	100	1

### Pharmaceutics and Pharmaceutical Technology Department (PP)

No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									CW	Period.	FWE	OE	TM	
1	PPD E01	Cosmetics Preparations	2	1	2	0	3	PPD 201 PPD 202 PPD 301	25	15	60	0	100	1
2	PPD E02	Pharmaceutical Nanotechnology	2	1	2	0	3	PPD 402	25	15	60		100	1
3	PPD E03	Supply Chain Management	2	1	2	0	3	-	25	15	60		100	1

### Pharmacognosy and Natural products Department (PG)

No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									CW	Period.	FWE	OE	TM	
1	PGD E01	Natural Cosmetics	2	1	2	0	3	-	25	15	60	0	100	1
2	PGD E02	Herbal medicine.	2	1	2	0	3	-	25	15	60	0	100	1



### Pharmacology and Therapeutics Department (PL)

No.	Course Code	Title	CrH	Lec	Tut	Lab	CH	Pr	Mark Distribution					ET (hr)
									CW	Period.	FWE	OE	TM	
1	PLD E01	Pharmacotherapeutics for Special Population	2	1	2	0	3	PLD 303 PLD 401	25	15	60	0	100	1
2	PLD E03	Sustainability in Therapeutics	2	1	2	0	3	PLD 303 PLD 401	25	15	60	0	100	1
3	PLD E02	Addiction and Drug Abuse	2	1	2	0	3	PLD 403	25	15	60	0	100	1
4	PLD E04	Molecular Therapeutics	2	1	2	0	3	PLD 402	25	15	60	0	100	1
5	PLD E05	Complementary and Alternative Medicine	2	1	2	0	3	PLD 302	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 قادراً على:
- اجادة مهارات اللغة العربية التى تصقل أسلوب كتابته
  - اعداد تقرير او صياغة طلب باللغة العربية بأسلوب صحيح و لغة سليمة
  - استخدام اللغة العربية فى 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	PND 201	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
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	Drug Information I								
Course Code	PND 401	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Department	Clinical Pharmacy & Pharmacy Practice								

#### **Course Description:**

This course introduces students to the concept and need of drug information, types of drug information resources, printed and online resources, literature evaluation critical appraisal and retrieval of information. Students learn the skills of systematic approach to answering queries and are able to critically evaluate the information obtained. Critical appraisal of clinical studies and finds the evidence related to clinical questions is an importance part of this course syllabus which support the clinical practice. Students should become effective drug information providers to healthcare professionals and general publics.

Course Title	Pharmaceutical Legislations and Regulatory Affairs								
Course Code	PND 402	Credit Hours	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, ethical principles and moral rules.

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

**Course Description:**

This course provides basic principles of pharmacokinetics and their application to the clinical setting. Single intravenous bolus and oral kinetics, IV infusion, multiple IV bolus, short infusion & oral dosing, non-linear pharmacokinetics, pharmacokinetic models will be studied. Sources of variability in pharmacokinetics, Therapeutic drug monitoring approach, dosage regimen and dosage adjustment in children, obese, elderly patients and chronic disease states will be introduced.

Course Title	Hospital Pharmacy								
Course Code	PND 404	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Clinical Pharmacy & Pharmacy Practice								

**Course Description:**

The course aims to introduce students to the hospital pharmacy organization, structure, management and related activities on both technical and administrative levels in accordance with national and international established guidelines. Administrative services include: the pharmacy, the pharmacy and therapeutic committee and policy making, the hospital formulary, medication purchasing, distribution and dispensing systems. The pharmaceutical (technical) services include: preparation of intravenous (IV) admixtures, total parenteral nutrition (TPN) fluids, renal dialysis fluids, dispensing and safe handling of radiopharmaceuticals, cytotoxic drugs, and medical gases.

Course Title	Community Pharmacy Practice									
Course Code	PND 405	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	Clinical pharmacy I								
Course Code	PND 501	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Clinical Pharmacy & Pharmacy Practice								

### **Course Description:**

Definition and concepts of clinical pharmacy and pharmaceutical care, and qualification to become a clinical pharmacy. Patient history, medication reconciliation, therapeutic planning and drug- related problems. Interpretation of clinical laboratory data and physical examination. Providing Medication Therapy Management services. Principles of special care populations (geriatric, pediatric, renal and hepatic patients, obesity & pregnancy & lactation). The course introduces the student to the principles of management and supportive care of oncological diseases, and blood disorders. The course is also designed to familiarize students with the major types of drug interactions (Pharmacokinetic, pharmacodynamics and pharmacogenetics interactions) in the clinical setting, in addition to drug food and drug disease interactions

Course Title	Marketing and Pharmacoeconomics								
Course Code	PND 502	Credit Hours	2	Lecture	2	Tutorial	0	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	Clinical Pharmacy II and pharmacotherapeutics								
Course Code	PND 503	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Clinical Pharmacy & Pharmacy Practice								

### **Course Description:**

The course is shared between 2 departments: Pharmacology & Pharmacy Practice. The course introduces the student to the principles of pharmacotherapeutics & management of the common disease states (e.g. cardiovascular diseases, gastrointestinal diseases, respiratory diseases, endocrine diseases, obstetrics and gynecology, rheumatic diseases, renal diseases, CNS diseases).

Course Title	Professional Ethics								
Course Code	PND 504	Credit Hours	1	Lecture	1	Tutorial	0	Practical	0
Department	Clinical Pharmacy & Pharmacy Practice								

### **Course Description:**

Professional ethics provides general principles and history of pharmacy ethics. General principles of medical ethics, research ethics and various ethical issues faced by pharmacist.

Course Title	Entrepreneurship								
Course Code	PND 505	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.

Course Title	Scientific Writing								
Course Code	PND 506	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Department	Clinical Pharmacy & Pharmacy Practice								

### **Course Description:**

This course is designed to introduce the students to the principles of good scientific writing, to be familiar with the basic structure of scientific reports and research articles. It covers methods of paraphrasing, common mistakes in scientific writing, different writing styles, how to write a scientific report, proposal and manuscript, appropriate use of tables and figures in data presentation. In addition to evaluation of literature and information sources.

Course Title	Management of chronic illness								
Course Code	PND 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 Title	Management of Critical Care Patients								
Course Code	PND E02	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
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

## **Courses Offered or Supervised by the Department of Microbiology and Immunology (PM)**

### **Required Courses**

Course Title	General Microbiology and Immunology									
Course Code	PMD 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	PMD 202	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0	
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									
Course Code	PMD 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	PMD 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	Public Health								
Course Code	PMD 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 required to prevent the spread of infection within the community including healthcare settings and employee safety measures. It also includes the fundamentals of environmental microbiology as well as the means of sustaining the environment and the means of maintaining a healthy lifestyle for a healthy community.

Course Title	English (3)								
Course Code	PMD 402	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 straightforward information about study related topics identifying both gist and most specific detail.
- Deliver clear, systematically developed descriptions and presentations highlighting main points and providing relevant examples.
- Follow with minimal difficulty academic lectures and talks.
- Ask for explanations of set phrases, the function of rhetorical questions and demonstrate ability to use them.

##### **(II). Reading**

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

##### **(III). Writing**

- Write straightforward connected texts on subjects within their field of study.
- Synthesizing and evaluating information from different sources.
- Summarize information from different sources and media.



- Take precise notes during a lecture for own use at a later date.
- Develop an argument systematically in a report emphasizing decisive points and including supporting detail/evidence.

**(IV). Grammatical Accuracy**

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

**(V). Study Skills**

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

Course Title	Biotechnology								
Course Code	PMD 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.

Course Title	Clinical Research, Pharmacoepidemiology and Pharmacovigilance								
Course Code	PMD 502	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Microbiology and Immunology								

**Course Description:**

This course covers the basic concepts and practice of pharmacoepidemiology and pharmacovigilance. It comprises clinical research methods, analytical conclusions required for the development of effective pharmacy research across a range of practice settings.

## Elective Courses

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

### Course Description:

This course covers the different challenges influencing the environment including climate change and pollution. This course also includes the different aspects of sustainability.

Course Title	Gene Regulation and Epigenetics.								
Course Code	PMD E02	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Microbiology and Immunology								

### Course Description:

This course encompasses up-to-date information about epigenetic modifications, the methods used to detect them, and how they interact to regulate gene expression in health and disease.

Course Title	Clinical immunology								
Course Code	PMD E03	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	PMD E04	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	Bioinformatics.								
Course Code	PMD E05	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Microbiology and Immunology								

### **Course Description:**

This course focuses on the organization, analysis, and comparison of biological data across whole genomes, covering a broad selection of important databases and techniques. It will also include bioinformatics applications, as genetic sequencing, protein structure comparisons, phylogenetic tree analysis, gene expression and biological pathway analysis.

Course Title	Advanced microbiological techniques								
Course Code	PMD E06	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 Title	Infection control								
Course Code	PMD E07	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Microbiology and Immunology								

### **Course Description:**

This course comprises the fundamentals of infection prevention and control focusing on the standard and extended transmission based precautions as well as the measures to prevent the spread of healthcare associated infections in any facility or special unit.

## Courses Offered or Supervised by Department of Pharmaceutical Chemistry (PC)

### Required Courses

Course Title	Pharmaceutical Analytical Chemistry I									
Course Code	PCD 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 titrations.

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

### **Course Description:**

This course introduces the students to electrochemistry and oxidation-reduction reactions. It covers the topics of electrode potential, Nernst equation and cell potential. Galvanic and electrolytic cells. Titration curves. Redox indicators. Selected oxidants and reductants. Application of oxidation – reduction titrations.

Course Title	Pharmaceutical Organic Chemistry III								
Course Code	PCD 202	Credit Hours	3	Lecture	2	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. Carbohydrates. Amino acids. Introduction to the use of different spectroscopic tools: UV, IR, NMR and MS.

Course Title	Instrumental Analysis								
Course Code	PCD 203	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2
Department	Pharmaceutical Chemistry								

### **Course Description:**

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

Course Title	Electroanalytical Methods								
Course Code	PCD 204	Credit Hours	1	Lecture	1	Tutorial	1	Practical	0
Department	Pharmaceutical Chemistry								

### **Course Description:**

This course provides the students with an overview of different electrochemical methods of analysis, with special emphasis on potentiometry, conductometry, polarography, derivatization polarography, electrogravimetry, coulometry and voltammetry.

Course Title	Medicinal Chemistry I								
Course Code	PCD 301	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	Medicinal Chemistry II								
Course Code	PCD 302	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	Drug Design								
Course Code	PCD 401	Credit Hours	2	Lecture	1	Tutorial	1	Practical	2
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	Information Technology II								
Course Code	PCD 402	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
Department	Pharmaceutical Chemistry								

### **Course Description:**

The aim of this course is to teach newcomers 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.



Course Title	Analytical Quality Control of Pharmaceuticals								
Course Code	PCD 501	Credit Hours	3	Lecture	2	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.

## **Elective courses**

Course Title	Chromatography and Separation Techniques								
Course Code	PCD 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	Analysis of food and flavours.								
Course Code	PCD E02	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	PCD E03	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.

## **Courses Offered or Supervised by the Department of Pharmaceutics and Pharmaceutical Technology (PP)**

### **Required Courses**

Course Title	Pharmacy Orientation								
Course Code	PPD 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, and 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	PPD 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	PPD 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	Pharmaceutics I								
Course Code	PPD 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.

Course Title	Pharmaceutics II								
Course Code	PPD 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).

Course Title	Communication Skills I								
Course Code	PPD 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	Pharmaceutics III								
Course Code	PPD 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	Biopharmaceutics and Pharmacokinetics								
Course Code	PPD 302	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmaceutics and Pharmaceutical Technology								

### **Course Description:**

This course aims to provide students with an understanding of the relation between the physicochemical and biological properties of the drug and its fate in the body. The course explores the principles of biopharmaceutics and strategies for enhancing drug delivery and bioavailability. Students will also be introduced to the principles of pharmacokinetics (absorption, distribution, metabolism and elimination). The concepts of bioequivalence, biowaiver and in vitro-in vivo correlations (IVIVC's) will be discussed along with different models of drug disposition. The course prepares students for their evolving role in utilizing pharmacokinetics to guide formulation, dosage-regimen design and optimizing drug usage.

Course Title	Pharmaceutics IV								
Course Code	PPD 303	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmaceutics and Pharmaceutical Technology								

### **Course Description:**

This course involves principles of formulation, development, sterilization, packaging and quality control testing of pharmaceutical sterile drug products. Principles for calculation and manipulation of parenteral and ophthalmic preparations are emphasized. An in depth study on the formulation, manufacturing, quality control testing and applications of aerosols and other inhalation products is also, accentuated.

Course Title	Pharmaceutical Technology I								
Course Code	PPD 401	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2
Department	Pharmaceutics and Pharmaceutical Technology								

### **Course Description:**

The course aims to provide students with insights and competencies related to the principles of pharmaceutical pre- formulation as a gateway to dosage forms design and formulation. This course deals with the principles of various techniques in unit operations such as size reduction, size separation, size analysis , size enlargement, mixing, emulsification, tableting and coating involved in the process development, scale-up and manufacturing of pharmaceutical drug products in industry (conventional / advanced nanotechnology based)

Course Title	Pharmaceutical Technology II								
Course Code	PPD 402	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Pharmaceutics and Pharmaceutical Technology								

### **Course Description:**

The course is a continuation of the study of various unit operations essential in pharmaceutical industry with emphasis on evaporation, drying, filtration, centrifugation, crystallization and extraction. It focuses on the application of these unit operations in pharmaceutical industry with emphasis on the equipment and machines used during the production of different dosage forms. In addition, container/closure systems, some of the packaging processing methods will be covered.

Course Title	Good Manufacturing Practice								
Course Code	PPD 501	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2
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	Communication Skills II								
Course Code	PPD 502	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 his / her feelings, ideas and exchanging information and knowledge with others in health care provider team, build human relations with the group i.e. acquiring interprofessional skills. 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	PPD 503	Credit Hours	2	Lecture	2	Tutorial	0	Practical	0
Department	Pharmaceutics and Pharmaceutical Technology								

### **Course Description:**

The course introduces the students to the formulation principles and applications of novel and targeted drug delivery systems. In addition to formulation aspects of biotechnology derived pharmaceuticals including proteins, genes and others. 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	PPD 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	Pharmaceutical Nanotechnology								
Course Code	PPD E02	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 Management								
Course Code	PPD E03	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 good



## **Courses Offered or Supervised by the Department of Pharmacognosy and Natural Products (PG)**

### **Required Courses**

Course Title	Human Rights and Fighting Corruption								
Course Code	PGD 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	PGD 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	PGD 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, leaves, 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	PGD 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 allows 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	PGD 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. The general method of isolation and characterization of different types of plant constituents. The distribution, chemical structure, physico-chemical properties, methods of isolation and identification and medicinal uses of volatile oils, carbohydrates and their derivatives and glycosides. The course enables the student to categorize the different types of secondary metabolite, predict therapeutic and toxic effects based on the chemical structure of the constituents. Propose structure modification that yields the production of more effective and less toxic products. Predict the use of natural products for the production of synthetic analogues with similar or more potent pharmacological activity. The course allows the student to have the basic methods for extraction, isolation purification and identification of the natural compounds and the quantitative analysis of the natural compounds.

Course Title	Phytochemistry II								
Course Code	PGD 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 includes the study of alkaloids, marine natural products, miscellaneous isoprenoids and bitters and principles of chromatography.



Course Title	Applied and Forensic Pharmacognosy									
Course Code	PGD 401	Credit Hours	2	Lecture	1	Tutorial	0	Practical	2	
Department	Pharmacognosy and Natural products									

### **Course Description:**

The course includes the Study of plants and their natural products that constitute health hazards, or intended for criminal uses to produce, abortion, loss of mental control, hallucination, death due to dehydration or heart arrest. Illegal poisoning of well-water and killing farm animals. Also it includes the study of drug dependents, narcotics, analgesics psychoenergetics, euphoric. Mycotoxin as a serious threat to general health and safety of community, contamination of food material with poisonous fungi. As well as evaluation of drugs: Sampling, structural, physical and analytical standards, adulteration of drugs and their detection. In addition to modern techniques of chromatography, choice of suitable chromatographic system, Gas chromatography, pressurized liquid chromatography HPLC, LC-MS.

Course Title	Phytotherapy and Aromatherapy									
Course Code	PGD 501	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2	
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	Natural Cosmetics								
Course Code	PGD E01	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmacognosy and Natural products								

### Course Description:

The course will acquire the students by natural products used in the different cosmetic preparations including skin care products, hair care including their mechanism of action, adverse reaction, side effects and contraindication and methods of formulation.

Course Title	Herbal medicine.								
Course Code	PGD E02	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmacognosy and Natural products								

### Course Description:

The course includes methods of production of Medicinal Plants, Wild plants versus cultivated plants, factors (genetic and ecologic) affecting variability in drug activity, plant growth regulators. The study of storage methods and methods of adulteration of medicinal plants.

## **Courses Offered or Supervised by the Department of Pharmacology and Therapeutics (PL)**

### **Required Courses**

Course Title	Cell Biology								
Course Code	PLD 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	PLD 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	PLD 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	Physiology and Pathophysiology									
Course Code	PLD 201	Credit Hours	3	Lecture	2	Tutorial	1	Practical	2	
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	Pathology									
Course Code	PLD 202	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0	
Department	Pharmacology and Therapeutics									

### **Course Description:**

The main aim of pathology course is to provide the second year student with knowledge and skills for common diseases affecting body organs and system. It helps the student to understand the causes (etiology) of disease, the mechanisms of its development (pathogenesis) and the associated alterations of structure (morphologic changes) and function (clinical manifestations and complications) to be able to determine the most likely diagnosis of the disease.

Course Title	Biochemistry I									
Course Code	PLD 203	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2	
Department	Pharmacology and Therapeutics									

### **Course Description:**

Proteins (protein structure, biologically important peptides – fate of proteins) – Amino acids as precursors for biosynthesis of biomolecules (e.g. neurotransmitters, nucleotides, ...) – Carbohydrates (glycoproteins and proteoglycans - glucose transporters) – Lipids (physiologically important lipid molecules – cholesterol and steroids – lipoprotein metabolism) – Enzymology (enzyme kinetics – regulation – enzyme inhibitors as drugs) - Hemoglobin and porphyrins (Hb derivatives and types– metabolism of Hb and regulation) – Biological oxidation and ATP synthesis – Clinical correlations.

Course Title	Biochemistry II									
Course Code	PLD 301	Credit Hours	3	Lecture	2	Tutorial	0	Practical	2	
Department	Pharmacology and Therapeutics									

### **Course Description:**

Energy production from dietary fuels (carbohydrates, lipids and proteins) –Integration of metabolism (Feed/fast cycle – diabetes mellitus – obesity) – Nitrogen metabolism and nitrogen balance – Hormonal regulation of metabolism – Inborn errors of metabolism – Free radicals and antioxidants.

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

**Course Description:**

The general principles of pharmacology are presented; such as pharmacokinetics, pharmacodynamics, receptor theory, drug interaction and principle of therapeutics. This course integrates principles of pharmacology with conceptual knowledge of physiology and pathophysiology to disease processes regarding the autonomic, neuromuscular and autacoids.

Course Title	Pharmacology II								
Course Code	PLD 303	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 cardiovascular systems, central nervous system, renal, gastro-intestinal tract, pulmonary systems and hematologic disorders. Antihyperlipidemic drugs are also included.

Course Title	Pharmacology III								
Course Code	PLD 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. The anti-inflammatory, analgesics as well as gout treatments are also included.

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

**Course Description:**

Biochemical/pathophysiological changes and laboratory diagnostic markers for disorders of (Endocrine glands – renal function – hepatic function –plasma proteins and lipoproteins) – Clinical enzymology and myocardial infarction - Electrolytes, blood gases and acid-base balance - Handling, preservation, storage and analysis of biological samples – Homeostasis and biochemical aspects of hematology and blood analysis – Urine analysis – Tumor markers - Recent diagnostic biomarkers.

Course Title	Toxicology and Forensic chemistry								
Course Code	PLD 403	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	Drug interaction								
Course Code	PLD 501	Credit Hours	2	Lecture	2	Tutorial	1	Practical	0
Department	Pharmacology and Therapeutics								

#### **Course Description:**

The course is shared between 2 departments: Pharmacology & Pharmacy Practice. This course provides the knowledge and skills enabling them to develop professional competencies in the recognition and discussion of the pharmacological aspects of drug-drug, drug-chemical, drug-herb or drug-food interactions and their clinical significance as well as the application of that knowledge to minimize the risk and outcome of interactions. It covers different types of drug interaction including pharmaceutical interactions, pharmacokinetic interactions, pharmacodynamic interactions, alcohol and smoking drug interactions, CNS drug interactions, interactions of cardiovascular acting drugs, interactions of anticoagulants, interactions of antimicrobials, interactions of immune-based therapies, interactions of hormones, and drug-disease interactions.

Course Title	First Aid								
Course Code	PLD 502	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

## Elective Courses

Course Title	Pharmacotherapeutics for Special Population								
Course Code	PLD 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	Addiction and Drug Abuse								
Course Code	PLD E02	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	Sustainability in Therapeutics								
Course Code	PLD E03	Credit Hours	2	Lecture	1	Tutorial	2	Practical	0
Department	Pharmacology and Therapeutics								

### Course Description:

This course covers the different challenges influencing the environment including climate change and pollution. This course also includes the different aspects of sustainability.

Course Title	Molecular Therapeutics								
Course Code	PLD 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.

Course Title	Complementary and Alternative Medicine								
Course Code	PLD E05	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



## 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 for Program Course Completion:

In order to complete the requirements for the Bachelor's Degree in Pharmacy (PharmD), the student should:

- Pass successfully a total of 175 credit hours distributed over ten semesters including:
  - 167 credit hours compulsory faculty courses
  - 8 credit hours faculty elective Courses
  - Obtain cGPA higher than or equal to (2)
- Pass the requirements for graduation that the university may decide.
- 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.
- 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):**

- a) 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.
- b) Points are collected for all the courses in which the student is registered in one semester.
- c) 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:

<b>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</b>
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 <sup>th</sup> Year Students	Questionnaires and Periodic Meetings	Questionnaires (20%)	25%
Graduate students	Questionnaires and Periodic Meetings	Questionnaires (20%)	25%
Stakeholders (Employers)	Questionnaires and Periodic Meetings	One meeting / year	25%
External Evaluator	Reviewing of the specifications of the program and the courses according to the bylaw	At least one reviewer professor in the specialty	25%

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