The By-laws of the Pharmacy Bachelor's Degree Program (Pharm D)

(Clinical Pharmacy)

According To the Credit Hour System Mansoura University Faculty of Pharmacy

June 2019

CONTENTS

Vision – Mansoura University College of Pharmacy

Achieving leadership and excellence in pharmaceutical education and scientific research locally and internationally, and improving pharmaceutical practices and community service.

Mission – Mansoura University College of Pharmacy

Faculty of Pharmacy, Mansoura University, is committed to developing its academic programs and methods of teaching, learning and assessment, and to providing a supportive environment for advancing scientific research, innovation and community service, and building local and international partnerships.

Strategic Goals- Mansoura University College of Pharmacy

1. Supporting and developing the teaching and learning system.
2. Improving the system of scientific research, drug development and innovation support.
3. Maximizing community participation and building local and international partnerships.
4. Supporting sustainable development goals in the pharmaceutical field.
5. Preparing distinguished graduates who are able to compete and meet the needs of the labor market.
6. Achieving excellence by committing to applying quality standards in academic and administrative performance.

Academic departments

As the following shows, the college consists of nine departments:

1. Pharmaceutics Department (PT)
2. Pharmacognosy Department (PG)
3. Clinical pharmacy and Pharmacy Practice Department (PP)
4. Pharmacology and Toxicology Department (PO)
5. Microbiology and Immunology Department (PM)
6. Pharmaceutical Organic Chemistry Department (PC)
7. Department of Pharmaceutical Analytical Chemistry (PC)
8. Medicinal Chemistry Department (PC)
9. Department of Biochemistry (PB)

Articles and Bylaws

Article 1:

Program vision:

Scientific excellence and continuous development to serve the curative health system and reach a prominent position globally in the field of clinical pharmacy.

Program mission:

Preparing pharmacists with professional ethics and qualified with the latest concepts of pharmacy and curative care that enable them to contribute to the development of pharmaceutical industries and raise the efficiency of the pharmaceutical care system at the local and regional levels in hospitals and private pharmacies by providing pharmaceutical services at a professional skill level in public and private pharmacies, factories, pharmaceutical companies, and control laboratories Pharmaceutical and food analysis, in addition to working in the field of media and pharmaceutical marketing, and actively participating in scientific research through research centers and universities to serve the community.

Program Goals

- Focusing on the role of the pharmacist in providing appropriate health care to the patient inside and outside hospitals through following up the medication regimen for him, studying the principles of clinical drug kinetics and their applications in treatment in different disease states, and finding appropriate treatment regimens in cooperation with the treating physician, which results in improving health care for patients and reducing risks and drug interactions.
- Graduating a Distinguished Alumni of Mansoura's University, who is eligible to work in public and private pharmacies, pharmaceutical factories and companies, drug control laboratories, food analysis, and work in the field of media, marketing, research, and universities.
- Increasing the competitiveness of program graduates at the regional level through study and training programs.
- Participation in community service, environmental development and providing a tangible economic return through rationalizing the use of medicines in hospitals.
- Commitment to achieving quality standards in pharmacy education through interactive education and attention to self-learning.

Article 2:

Academic degree awarded to graduates

At the request of the College of Pharmacy Council, The University Council confers a bachelor's degree in pharmacy (Pharm D) "clinical pharmacy" according to the credit hour system.

Article (3):

Graduate Degrees:

Bachelor's degree in Pharmacy or PharmD degree (clinical pharmacy) is the first university degree in the field of pharmacy necessary to obtain a license to practice the profession in all available pharmaceutical fields. It also qualifies the graduate to register for a master's degree in any of the scientific departments in the college:

First: Diplomas:

1- Clinical Pharmacy (a specific program).
2- Clinical nutrition (a specific program).
3- Pharmaceutical technology.
4- Cosmetics.
5- Herbal medicine.
6- Poisons and forensic chemical analysis.
7- Microbiology and Immunology.
8- Chemistry of the pharmaceutical industries.
9- Design of medicines.
10- Quality control and drug analysis.
11- Biochemistry.

Second: Masters:

1. Master's degree in Pharmaceutical Sciences.

Third: Professional Master's in:

1. Immunology and Regenerative Medicine with a credit-hour system in French and English (Professional Master's).
2. Quality control and pharmacological analysis.

Fourth: PhD:

PhD in Pharmaceutical Sciences

Fifth: Doctor of Pharmacy degree in clinical pharmacy (Pharm D, professional degree).

Article 4:

Study system

The duration of study in the program is five academic years (five levels divided into ten semesters) according to the credit hour system, and an academic year of advanced training (an internship year) in work sites '5+1 internship year. In addition, 100 hours of field training in private and government pharmacies and hospital pharmacies taking place during the summer vacations for the years of study after the end of the third level and before starting the internship year.

Each academic level (year) is divided into two semesters (fall and spring) and the duration of each semester is fifteen weeks. Some courses may be offered in a summer semester of six to eight weeks of intensive study.

A credit hour is a unit of study and is equivalent to one hour of weekly theoretical study or a practical lesson of no less than two hours per week and taught over one semester.

Teaching methods include the method of distance teaching in one or more modes, with a percentage that varies according to the nature of the course. The College Council decides the percentages for each teaching method within the course. This is presented to the University Education and Student Affairs Council for approval and submitting it to the University Council for approval.

Article 5:

Course design

Learning is through theoretical lectures, panel discussions, practical and clinical lessons, workshops, field exercises, research, and presentations, in addition to cooperation with the community surrounding the university.

Course Design so that:

First: The student studies 182 credit hours over five academic years, provided the student's cumulative average at the time of graduation is not less than one (1) and includes:

1- Compulsory college requirements, representing 168 credit hours (Course Schedule)
2- College elective requirements, representing 8 credit hours,
3. University requirements, which represent 6 credit hours, provided they are not included in the calculation of the student's semester or cumulative average.

Second: The number of elective courses that the student studies shall not be less than four courses (8 credit hours) to be selected from the list determined by the college. The elective courses for the student in the other two levels achieve competencies and skills that help him in professional guidance and specialization, provided that one of the elective courses is in one of the pharmaceutical fields such as drug manufacturing or drug control..... etc.

Third: The student must successfully complete the Initial field-training period with a total of 100 actual training hours in private and government pharmacies, and hospital pharmacies approved by the College Council, under the supervision of a faculty member. Training takes place during the summer vacations for the years of study after the end of the third level.

Fourth: The student must successfully pass the internship year (9 months) after the end of the college years, according to the detailed regulation for the internship training program, which includes a graduation project in one of the majors offered.

Fifth: The student must pass the graduation project in one of the majors offered.

Sixth: The College can make amendments by deletion and addition in the course description with only 20% of the course content to achieve the addition and update.

Article (6):

Registration

The college assigns to each group of students an academic advisor from the faculty member who performs the tasks of care and guidance. He is responsible for the student in scientific, social, and psychological affairs and directs him in everything related to his university life, and assists students in choosing courses from the list of courses offered by the college each semester. The student shall personally register the courses he wishes to study each semester, provided the courses and the number of credit hours are selected with the help of the academic advisor. To register for the course, the student must have successfully passed the requirements of this course.

The College Council may, in cases of extreme necessity and after the approval of the supervisory committee, allow the student to register some courses in parallel with their requirements that the student did not successfully pass, if the available academic load for the student is less than 12 credits ((see the following, paragraph A, the study load), provided a written acknowledgment made by the student's guardian that his success in this course will not be approved until he will complete the requirement for which he was allowed to register in parallel.

The student must fill out the course registration form at the specified times according to the announced university calendar for each semester, and it is not permissible to attend classes until the registration process is completed. The student is not allowed to register later than the specified times except with a compelling excuse accepted by the College Council, provided that the delay period does not exceed one week from the end of the registration period. It is not permissible to attend classes until after the registration process is completed.

a) Study load:

The academic load is the number of credit hours that the student registers in one semester. It must be considered that the student's registered academic load in any semester should not be less than 12 credits and not more than 22 credits, and the academic load for a struggling student should not exceed 12 credits (see Article 13).

The academic load during the summer semester is a maximum of 10 credit hours.

The College Council, after the approval of the supervisory committee, may allow the student in the last two semesters to increase the study load beyond the maximum, and shall not exceed 3 credit hours (the student enjoys benefits once).

The student is allowed to re-study the courses he passed with a grade of D or D+ with a maximum of 3 courses through the five years of study to raise his cumulative average, and the higher grade is used to calculate grade points earned.

b) Addition, deletion, and withdrawal:

After completing the registration procedures, the student may add or delete one or more courses to his credits in any semester, provided this is within the specified periods according to the university calendar announced for each semester, taking into account the minimum and maximum academic load.

The student, after being registered, may also withdraw from one or more courses in any semester without being considered a failure in this course, if he submits a withdrawal request during the specified periods according to the university calendar announced for each semester. Whoever withdraws after this specified period is considered a failure.

Article (7):

A. Punctuality

The student must regularly attend theoretical lectures, panel discussions, practical lessons, field exercises, and assignments. The College Council, at the request of the councils of the specialized scientific departments, may deprive the student of applying for the final written exam if his absence exceeds 25% of the total credit hours for each course.

B. Attending exams, absenting them, and breaching their rules

The student must take the final written exams on the dates set for them according to the university calendar announced for each semester. A student who is absent from the final written exam is considered a failure in the courses in which he was absent from the exam. The student is not considered failing in the event of absence with a compelling excuse accepted by the College Council.

Article (8):

The language of study

The Program will be taught in English. However, some courses may be taught in the

Arabic language based on the recommendation of the specialized scientific department and the approval of the college and university councils.

Article (9):

Initial field training and the internship year (advanced field training)

- The student must successfully complete the Initial field-training period with a total of 100 actual training hours in private and government pharmacies, and hospital pharmacies. The training takes place during the summer vacations for the years of study after the end of the third level. In addition, the sixth year is devoted to field training with a total of 36 weeks. It is divided into six training courses, with four courses at least in hospitals applying clinical pharmacy practice. One course is devoted to training in the pharmaceutical field (manufacturing, drug control, ... etc.), as shown in the training program, which includes an integrated and systematic training program in a periodic, rotating manner recorded in hours and training tasks and under close supervision from the college and training place.
- The student submits a graduation project as one of the graduation requirements under the supervision of a faculty member in a particular specialization that contributes to preparing him and guiding him for this specialization.
- A graduate can work in this field for a period of two years, after which he becomes a specialized pharmacist capable of providing clinical pharmacy services or various pharmaceutical practices.
- The training program is designed in different clinical specialties (such as heart disease, cancer, psychological and neurological diseases, nutrition, intensive care, drug information unit, drug economics, clinical research... etc.) according to the university's capabilities and the needs of the community within the university

(The College is in the process of preparing the bylaws of the Internship Training Program).

Article (10):

Admission requirements

Clause (**1**) It is required that whoever applies to join the program must fulfill all the conditions determined by the Supreme Council of Universities and in accordance with what is included in the executive regulations of the Law regulating Universities No. 49 of 1972.

Clause (**2**) the college accepts transfers from Egyptian or foreign universities of the same study program, provided the student fulfills the requirements for admission to the faculty, in accordance with the college intake capacity, and after taking the opinion of the college council.

Clause (**3**) the student transferred from another college of pharmacy of the same program recognized by the Supreme Council of Universities is required to study 60% of the program's credits (109 credit hours) within the College of Pharmacy, Mansoura University before graduation.

Article (11):

Evaluation system

The final course grade consists of the sum of the semester, practical, written, and oral grades as shown in the study plan tables. The minimum score for success in any course is 60% of the total marks for this course, and the student is not successful in any course unless he obtains 30% of the final written exam score, and the percentage of the final grades and grades is shown in the following table.

The methods of exam and electronic exams are varying in certain percentages according to the nature of the course. The College Council decides to hold the exam partially or completely electronically for one or more courses. It also decides the percentages for each exam method within the course and presents it to the University's Education and Student Affairs Council for approval and submitting it to the University Council for approval.

Percentage	Points	Letter Grade	Level
95-100	4	A^+	Excellent
90 to less than 95	3.85	A	
85 to less than 90	3.7	A^-	
82.5 to less than 85	3.3	B+	Very Good
77.5 to less than 82.5	3	B	
75 to less than 77.5	2.7	B-	
72.5 to less than 75	2.3	C^+	Good
76.5 to less than 72.5	2	C	
65 to less than 67.5	1.7	C^-	
62.5 to less than 62	1.3	D+	Pass
60 to less than 62.5	1	D	
Less than 60	0.00	F	Fail
Withdrawal	-	W	Withdrawal
Incomplete	-	I*	Incomplete
Absent	-	Abs E**	Absent

I*: The student gets this grade if the attendance rate is highly significant and he is unable to enter the final written and oral exam (if any) for one or more academic courses in the same semester for compelling reasons accepted by the College Council. Therefore, he must perform the final written and oral exam (if any) No later than the second week of the following semester, with grade retention.

Abs E**: The student earns this grade if he is not able to enter the final written and oral exam (if any) on the aforementioned date in the previous paragraph (I) because the compelling reason has not gone away, and the student must register in this course when it will be offered again and studied completely. with grade retention.

There are other result codes:

The **S** does not correspond to any specific letter grade; rather, it is an indication of a "satisfactory level".
The **U** does not correspond to any specific letter grade; rather, it is an indication of an "unsatisfactory level".
The **T** does not correspond to any specific letter grade; rather, it is an indication of the grades earned in the previous college (transferred student).
P: Graduation Requirements

The student's semester grade point average (GPA) and cumulative grade point average (cGPA) are calculated as follows:

A. For each course (the points shown in the table) are multiplied by the number of credit hours of this course to get the number of points for each course in the semester.

B. Points are collected for all courses in which the student registered in one semester.

C. The total points of all academic courses are divided by the total credit hours registered for the student in one semester, in order to obtain the semester average as follows:

Semester average (GPA) =	Total points for all courses in one semester Total credit hours registered in one semester

The cumulative average is calculated as follows:	
Cumulative grade point average (cGPA) =	Total points for all courses for all semesters Total registered credit hours for all semesters

Article (12):

Failure in courses

- If the student is absent from performing the final written exam without an excuse accepted by the College Council.
- If the student obtains less than 30% of the final written exam score.
- Failure to achieve at least 60% of the total course grades.
- If the student fails a compulsory course in any semester, he must study the same course and take the exam when it will be offered again. If he fails an elective course, he can re-study or study another elective course to complete the graduation requirements, after the approval of the academic advisor and the approval of the College Council.

Article (13):

Academic struggling

- A student may be struggling academically if he/she earns less than a 1.00 semester GPA.
- A student will normally be dismissed if he gets less than a 1.00 semester GPA for six (6) continuous semesters or ten (10) non-continuous semesters shall be dismissed from the college after the approval of the College Council. Summer semesters, if any, are not taken into consideration.

Article (14):

A. Dropping out of College

The student shall be considered dropped out if he did not register for a semester or withdrew from the semester, whether with or without an excuse.

A student may interrupt for a two-consecutive-semester period, or a maximum of three non-consecutive semesters provided the approval of the College Council is obtained. If he is interrupted for a longer period without an excuse accepted by the College Council and approval of the University Council, he will be dismissed from the College and the provisions contained in the executive regulations of the Law regulating Universities will be applied.

B. Suspension, Cancellation and Re-enrollment

Clause (1). A student may apply for suspension of enrollment in the college according to the terms and conditions set by the university.

Clause (2). Suspension of registration: A student may apply to suspend his registration for one semester, up to a maximum of four continuous or non-continuous semesters for compelling reasons approved by the College Council.

Clause (3). Cancellation of enrollment: The student's enrollment is canceled if he commits a moral violation or violates the regulations of the college, university regulations, public morals, or student disciplinary regulations were applied to him, in accordance with the Provisions of Law regulating Universities.

Clause (4) Re-enrollment: It is the re-enrollment of a student after being previously enrolled and canceled for one of the reasons stipulated in the College Bylaws.

Article (15):

Requirements for obtaining a Bachelor of Pharmacy degree (PharmD

Obtaining a Bachelor of Pharmacy degree (Pharm D) according to the credit hour system requires the student to pass the following:

First: Successfully passing 182 credit hours over five academic years, provided the cumulative average at the time of graduation is not less than one. It includes:

1. The compulsory college requirements (Course Schedule), representing 168 credits
2. The elective college requirements), representing 8 credits
3. The university graduation requirements, representing 8 credits, provided they are not calculated in the student's semester or cumulative average.
4. Studying and passing the course (Social Issues) within the requirements of the university, provided that it is studied at the first level, in the first semester. The number of examination papers is (one paper), the exam score is (100 marks), and the exam time is (one hour). This course is considered a passing or failing subject (The minimum level of success must be 50% of the total grades). The successful student gets a grade of (P) and the failing student gets a grade of (NP). It is not counted from the undergraduate courses. A credit hour is counted for him and is not included in the student's cumulative total.

Second: The student must successfully pass the Initial field-training period with a total of 100 actual training hours in private and government pharmacies, and hospital pharmacies approved by the College Council, under the supervision of a faculty member. Training takes place during the summer vacations for the years of study after the end of the third level.

Third: Successfully passing the internship year (academic year - 9 months) after the completion of the study years, according to the detailed regulation of the internship year training program, which includes a graduation project in one of the specializations offered.

Fourth: Successfully passing the graduation project in one of the specializations offered.

Article (16):

Student discipline system

Students enrolled in the program are subject to the disciplinary system set out in the Law

on the Law regulating Universities and its Executive Regulations.

Article (17):

Clause (1) Code for departments and Study Program Requirements (Annex No. 1)

Article (18):

Study plan (Annex 2)

Article (19):

Course Content (Annex 3)

Article (20):

Course updates

The University Council may approve the update of a percentage not exceeding 20% of the course content based on the proposal of the College Council, after the approval of the supervisory committee and the relevant academic department council and after giving the necessary justifications.

Article (21):

Internship Program for the Internship Year

A detailed program of training for the final year (internship) is drawn up in the form of rotational courses in an appendix to the bylaws of the rotational training program in a systematic and detailed way.

Attachment 1

Article (17)

Code of Departments, university and college requirements, and elective courses

1- Code of academic departments and non-specialized courses:

MS	**Mathematics**
PB	**Biochemistry**
PC	**Chemistry**
PG	**Pharmacognosy**
PM	**Microbiology and Immunology**
PO	**Pharmacology and Toxicology**
PP	**Clinical pharmacy and Pharmacy Practice**
PT	**Pharmaceutics**
MD	**Medical Courses**
NP	**Non Pharmaceutical Courses**
UR	**University requirements**

Key for Course Abbreviations:

1.The letter 'P' means that the courses are offered to students of Pharmacy only.

2.The first digit represents the semester number.

3.The second and third digits represent the course number.

2- University requirements

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Exam Final Hours
		Lect.	Pract./Tut	Total		Period.. Activity/C.W	Pract./Tut.	Wr.	Oral		
Information Technology	UR1	1	1	2	Registration	15	25	60	---	100	1
Social Issues	UNVS101	1	--	1	Registration	----	--	100	--	100	1
Psychology	UR3	1	--	1	Registration	25	--	75	--	100	1
Communication and presentation Skills	UR4	1	--	1	Registration	25	--	75	--	100	1
Entrepreneurship	UR5	1	--	1	Registration	25	--	75	--	100	1
Total		5	1	6							

- ***Lect.*** = Lecture
- ***Period.*** = Periodical
- ***C.W.*** = ***Course Work***
- ***Pract./ Tut.*** = Practical /Tutorial
- ***Wr.*** = Written

3- College Requirements: See program curriculum (Appendix 2)

4- Elective courses

The Mansoura University College of Pharmacy offers elective courses from which the students are free to select eight credit hours.

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PC E01	Drug Design	1	1	2
PC E02	Advanced Pharmaceutical Analysis– Spectroscopy	1	1	2
PC E03	Therapeutic Drug Monitoring	1	1	2
PG E04	Complementary Therapies	1	1	2
PG E05	Chromatography and Separation Techniques	1	1	2
PG E06	Biotechnology of medicinal plants	1	1	2
PT E07	Applied Industrial Pharmacy	1	1	2
PT E08	Good Manufacturing Practices	1	1	2
PT E09	Cosmetic Preparations	1	1	2
PT E10	Advanced pharmaceutical technology	1	1	2
PT E11	Medical devices	1	1	2
PM E12	Infection control and antimicrobial stewardship	1	1	2
PM E13	Bioinformatics	1	1	2
PO E14	Biological standardization	1	1	2
PO E15	Geriatric pharmacotherapy	1	1	2
PO E16	Pharmacogenetics of drug metabolism and transport	1	1	2
PP E17	Interprofessional Skills	1	1	2
PP E18	Advanced Pharmacoeconomics	1	1	2
PC E06	Green Chemistry	1	1	2

L: Lecture
P: Practical
T: Tutorial

- The College Council offers elective courses from the examples mentioned in the previous table in each level/semester, after the approval of the supervisory committee. The College can add other elective courses after the approval of the supervisory committee and after taking the opinion of the councils of the concerned departments. The approval of the university council is required after giving the necessary justifications.

Attachment 2

Article (18)

Program Curriculum

Table (1) / Semester (1)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam. Hours
		Lect.	Pract./Tut	Total		Period.. Activity/C.W.	Pract./Tut.	Wr.	Oral		
Pharmaceutical Analytical Chemistry I	PC 101	2	1	3	Registration	15	25	50	10	100	2
Pharmaceutical Organic Chemistry I	PC 102	2	1	3	Registration	15	25	50	10	100	2
Pharmacy Orientation	PT 101	1	--	1	Registration	25	--	75	--	100	1
Medicinal Plants	PG 101	2	1	3	Registration	15	25	50	10	100	2
Medical Terminology	MD 101	1	--	1	Registration	25	--	75	--	100	1
Mathematics and Biostatistics	MS 101	1	---	1	Registration	25	--	75	--	100	1
University Requirements:											
Information Technology	UR1	1	1	2	Registration	15	25	60	---	100	1
Social Issues	UNVS101	1	--	1	Registration	---	--	100	--	100	1
Total		11	4	15						600	

- ***Lect.*** = Lecture
- ***Period.*** = Periodical
- ***C.W.*** = ***Course Work***
- ***Pract ./ Tut.*** = Practical / Tutorial
- ***Wr.*** = Written

One or more courses may be added from the university requirements for graduation.

Table (2) / Semester (2)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam Hours
		Lect.	Pract./Tut	Total		Period.. Activity/C.W.	Pract./Tut.	Wr.	Oral		
Pharmaceutical Analytical Chemistry II	PC 203	2	1	3	Pharmaceutical Analytical Chemistry I	15	25	50	10	100	2
Pharmaceutical Organic Chemistry II	PC 204	2	1	3	Pharmaceutical Organic Chemistry-I	15	25	50	10	100	2
Cell Biology	PB 201	1	1	2	Registration	15	25	50	10	100	1
Anatomy& Histology	MD 202	2	0	2	Registration	25	-	75	-	100	2
Physical Pharmacy	PT 202	2	1	3	Registration	15	25	50	10	100	2
Pharmacognosy I	PG 202	2	1	3	Medicinal Plants	15	25	50	10	100	2
University Requirements:											
Psychology	UR3	1	-	1	Registration	25	--	75	--	100	1
Total		12	5	17						600	

- ***Lect.*** **= Lecture**
- ***Period.*** **= Periodical**
- ***C.W. = Course Work***
- ***Pract./ Tut.*** **= Practical / Tutorial**
- ***Wr.*** **= Written**

One or more courses may be added from the university requirements for graduation.

Table (3) / Semester (3)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam Hours
		Lect.	Pract./Tut	Total		Period.. Activity/C.W.	Pract./Tut.	Wr.	Oral		
Pharmaceutical Organic Chemistry-III	PC 305	2	1	3	Pharmaceutical Organic Chemistry-II	15	25	50	10	100	2
Biochemistry I	PB302	2	1	3	Registration	15	25	50	10	100	2
Pharmacognosy II	PG 303	2	1	3	Pharmacognosy-I	15	25	50	10	100	2
Pharmacy Legislation and practice ethics	PT 303	1	0	1	Registration	25	--	75	--	100	1
Physiology and pathophysiology	MD 303	2	1	3	Registration	15	25	60	--	100	2
Pharmaceutical dosage forms I	PT 304	2	1	3	Physical pharmacy	15	25	50	10	100	2
University Requirements:											
Communication and presentation Skills	UR4	1	0	1	Registration	25	--	75	---	100	1
Total		12	5	17						600	

- *Lect.* = Lecture
- *Period.* = Periodical
- *C.W.* = *Course Work*
- *Pract./ Tut.* = Practical / Tutorial
- *Wr.* = Written

One or more courses may be added from the university requirements for graduation.

Table (4) / Semester (4)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam Hours
		Lect.	Pract./Tut	Total		Period.. Activity/C.W.	Pract./Tut.	Wr.	Oral		
Basic Pharmacology	PO 301	2	1	3	Registration	15	25	50	10	100	2
General Microbiology and Immunology	PM 401	2	1	3	Registration	15	25	50	10	100	2
Instrumental Analysis	PC406	2	1	3	Pharmaceutical Analytical Chemistry II	15	25	50	10	100	2
Pathology	MD 404	2	--	2	Registration	25	---	75	---	100	2
Pharmaceutical Dosage Forms-II	PT 405	2	1	3	Physical Pharmacy	15	25	50	10	100	2
Biochemistry II	PB 403	2	1	3	Biochemistry I	15	25	50	10	100	2
Total		12	5	17						600	

- ***Lect.*** = **Lecture**
- ***Pract./ Tut.*** = **Practical / Tutorial**
- ***Period.*** = **Periodical**
- ***Wr.*** = **Written**
- ***C.W.*** = ***Course Work***

Table (5) / Semester (5)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam Hours
		Lect.	Pract./Tut	Total		Period.. Activity/C.W.	Pract./Tut.	Wr.	Oral		
Pharmacology –I	PO 502	2	1	3	Basic Pharmacology	15	25	50	10	100	2
Pharmaceutical Microbiology and Antimicrobials	PM 502	2	1	3	General Microbiology & Immunology	15	25	50	10	100	2
Parasitology & Virology	PM 503	2	1	3	Registration	15	25	50	10	100	2
Pharmaceutical Dosage Forms-III	PT 506	2	1	3	Physical Pharmacy	15	25	50	10	100	2
Phytochemistry-I	PG 504	2	1	3	Registration	15	25	50	10	100	2
Hospital Pharmacy	PP 501	2	1	3	Registration	15	25	50	10	100	2
Total		12	6	18						600	

- ***Lect.*** = **Lecture**
- ***Period.*** = **Periodical**
- ***C.W.*** = ***Course Work***
- ***Pract./ Tut.*** = **Practical / Tutorial**
- ***Wr.*** = **Written**

Table (6) / Semester (6)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam Hours
		Lect.	Pract./Tut	Total		Period.. Activity/C.W.	Pract./Tut.	Wr.	Oral		
Pharmacology-II	PO 603	2	1	3	Pharmacology I	15	25	50	10	100	2
Phytochemistry-II	PG 605	2	1	3	Phytochemistry-I	15	25	50	10	100	2
Pharmaceutical Technology	PT 607	2	1	3	Registration	15	25	50	10	100	2
Community Pharmacy Practice	PP 602	2	1	3	Pharmacology -I	15	25	50	10	100	2
Biopharmaceutics and Pharmacokinetics	PT 608	2	1	3	Pharmaceutical dosage forms III	15	25	50	10	100	2
First Aid and Basic Life Support	MD 605	2	0	2	Registration	15	--	75	10	100	2
Total		12	5	17						600	

- ***Lect.*** = Lecture
- ***Pract./ Tut.*** = Practical / Tutorial
- ***Period.*** = Periodical
- ***Wr.*** = Written
- ***C.W.*** = ***Course Work***

Table (7) / Semester (7)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam Hours
		Lect.	Pract./Tut	Total		Period.. Activity/C.W.	Pract./Tut.	Wr.	Oral		
Pharmacology-III	PO 704	2	1	3	Pharmacology-II	15	25	50	10	100	2
Medicinal Chemistry-I	PC 707	2	1	3	Pharmaceutical Organic Chemistry-II	15	25	50	10	100	2
Advanced Drug Delivery Systems	PT 709	2	-	2	Registration	25	---	75	---	100	2
Clinical Pharmacy Practice	PP 703	2	1	3	Registration	15	25	50	10	100	2
Medical Microbiology	PM 704	2	1	3	General Microbiology and Immunology	15	25	50	10	100	2
Phytotherapy	PG 706	2	1	3	Phytochemistry-II	15	25	50	10	100	2
Elective course	PE --	1	1	2	Registration	15	25	50	10	100	1
Total		13	6	19						700	

- ***Lect.*** = Lecture
- ***Period.*** = Periodical
- ***C.W.*** = ***Course Work***
- ***Pract./ Tut.*** = Practical / Tutorial
- ***Wr.*** = Written

Table (8) / Semester (8)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam Hours
		Lect.	Pract./Tut	Total		Period.. Activity/C.W.	Pract./Tut.	Wr.	Oral		
Medicinal Chemistry-II	PC 808	2	1	3	Medicinal Chemistry I	15	25	50	10	100	2
Advanced Pharmacotherapy and Therapeutics	PO 805	2	1	3	Pharmacology III	15	25	50	10	100	2
Clinical Pharmacokinetics	PP 804	2	1	3	Biopharmaceutics and Pharmacokinetics	15	25	50	10	100	2
Pharmacotherapy of Critical Care Patients	PP 805	1	1	2	Pharmacology-III	15	25	50	10	100	1
Clinical Biochemistry	PB 804	2	1	3	Biochemistry-II	15	25	50	10	100	2
Public Health and Preventive Medicine	PM 805	2	--	2	Medical Microbiology	25	---	75	---	100	2
Quality Control and pharmaceutical analysis	PC 809	2	1	3	Pharmaceutical Analytical Chemistry-II	15	25	50	10	100	2
Elective Course	PE ---	1	1	2	Registration	15	25	50	10	100	1
Total		14	7	21						800	

- ❍ *Lect.* = Lecture
- ❍ *Period.* = Periodical
- ❍ *C.W.* = *Course Work*
- ❍ *Pract./ Tut.* = Practical / Tutorial
- ❍ *Wr.* = Written

Table (9) / Semester (9)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam Hours
		Lect.	Pract./Tut	Total		Period.. Activity/C.W.	Pract./Tut.	Wr.	Oral		
Pharmacotherapy of Endocrine and Renal Disorders	PP 906	2	1	3	Pharmacology-I	15	25	50	10	100	2
Pharmacotherapy of Cardiovascular Diseases	PP 907	2	1	3	Pharmacology-II	15	25	50	10	100	2
Biotechnology	PM 906	2	1	3	Pharmaceutical Microbiology	15	25	50	10	100	2
Pharmacotherapy of Neuropsychiatric Diseases	PP 908	2	1	3	Pharmacology III	15	25	50	10	100	2
Clinical Nutrition	PB 905	1	1	2	Biochemistry-II	15	25	50	10	100	1
Drug Information	PO 905	1	1	2	Pharmacology-III	15	25	60	---	100	1
Drug Marketing & Pharmacoeconomics	NP 901	2	--	2	Registration	25	---	75	---	100	2
Elective Course	PE --	1	1	2	Registration	15	25	50	10	100	1
University Requirement											
Entrepreneurship	UR5	1	0	1	Registration	25	--	75	---	100	1
Total		14	7	21						800	

- ***Lect.*** = Lecture
- ***Pract./ Tut.*** = Practical / Tutorial
- ***Period.*** = Periodical
- ***Wr.*** = Written
- ***C.W.*** = ***Course Work***

Table (10) / Semester (10)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam Hours
		Lect.	Pract./Tut	Total		Period.. Activity/C.W.	Pract./Tut.	Wr.	Oral		
Clinical Toxicology	PO 006	2	1	3	Pharmacology-III	15	25	50	10	100	2
Pharmacotherapy of Dermatological, Reproductive and Musculoskeletal Diseases	PP 009	1	1	2	Pharmacology II	15	25	50	10	100	1
Pharmacotherapy of Pediatric Diseases	PP 010	2	1	3	Pharmacology-III	15	25	50	10	100	2
Pharmacotherapy of Oncological Diseases and Radiopharmacy	PP 011	2	1	3	Pharmacology III	15	25	50	10	100	2
Pharmacotherapy of Gastrointestinal Diseases	PP 012	2	1	3	Pharmacology-II	15	25	50	10	100	2
Pharmacotherapy of Respiratory Diseases	PP 013	1	1	2	Pharmacology-II	15	25	50	10	100	1
Clinical Research and Pharmacovigilance	PP 014	1	1	2	Drug information	25	25	50	10	100	1
Elective Course	PE --	1	1	2	Registration	15	25	50	10	100	1
Total		12	8	20						800	

- ❍ *Lect.* = Lecture
- ❍ *Period.* = Periodical
- ❍ *C.W. = Course Work*
- ❍ *Pract./ Tut.* = Practical / Tutorial
- ❍ *Wr.* = Written

Attachment 3

Article (19)

Course Content

PC 102 Pharmaceutical Organic Chemistry I (2+1)

The objective of this course is to provide students with the basic knowledge in pharmaceutical organic chemistry, which will serve as fundamentals for other courses offered during subsequent semesters. This course involves Electronic structure of atom, alkanes [nomenclature, synthesis and reactions (free radical reactions)], and cycloakanes. Stereochemistry (Optical isomers, racemic modification, nomenclature of configurations). Alkenes, alkadienes and alkynes. Alkyl halides (nomenclature, preparation and chemical reactions (SN1, SN2, E1, E2). Arenes and aromatic compounds (Kekule structure, Huckel rule, Electrophilic aromatic substitution and orientation).

PC 204 Pharmaceutical Organic Chemistry II (2+1)

This course involves different classes of aliphatic and aromatic organic compounds: aryl halides, Alcohols, Phenols, ethers & epoxides, aldehydes, ketones, carboxylic acid & acid derivatives, sulphonic acids, and nitrogenous compounds.

PC 305 Pharmaceutical Organic Chemistry III (2+1)

This course involves: carbohydrates, amino acid & peptides, polynuclear and heterocyclic chemistry. In addition, it provides an introduction about the use of different spectroscopic tools, including UV, infrared (IR), nuclear magnetic resonance (NMR) and mass spectrometry (MS) for the structural elucidation of organic compounds.

PC 101 Pharmaceutical Analytical Chemistry I (2+1)

Chemical Kinetics, rate of reaction, first Order reaction, rate law , Second order and third order of reaction, molecularity , Theories of reaction rate, activation energy and catalysis , Photochemistry, absorbed energy and quantum yield. Introduction to qualitative and quantitative inorganic chemistry, acid-base theory, titration curve and buffer solutions. Precipitimetry factors affecting precipitate formation and pharmaceutical application.

PC 203 Pharmaceutical Analytical Chemistry II (2+1)

Complexometric titrations and oxidation-reduction titrations (electrical properties of redox systems, Nernest equation factors affecting oxidation potential, redox titration curves, pharmaceutical application on redox reaction), Electrochemistry (potentiometry, conductometry; and polarography).

PC406 Instrumental analysis (2+1)

Spectroscopic methods of analysis which include uv/vis spectroscopy, principal, instrumentation, factors affecting absorption and applications in pharmaceutical analysis. Fluorimetric methods, principal instrumentation, factors affecting fluorescence intensity and applications in pharmaceutical analysis. Atomic spectroscopy; principal and instrumentation. Chromatographic methods for analytical chemistry which includes: TLC, gel chromatography, column chromatography, HPLC, UPLC, TLC, gas chromatography, capillary electrophoresis.

PC 809 Quality Control and pharmaceutical analysis (2+1)

Good Analytical Practice and Sampling: Introduction, Sampling of pharmaceuticals and related materials, type of sampling tools, sampling plans, documentation, validation of analytical methods according to ICH guidelines Q2 R1, compendial testing , validation of analytical methods, data elements required for assay validation, drug stability, stability studies and stability indicating methods Drug stability, Stability testing , Forced degradation studies , stability indicating assay methods for drugs according to ICH Q1 R2 Guidelines. Stress conditions for drug degradation according to ICH Q1 R2 Guidelines. Factors affecting drug degradation, Drug expiration, Drug withdrawal from the market. Pharmaceutical regulations according to FDA & EMA (European medicine agency) and ISO and BSI. Drug-excipient interactions and adduct formation; analytical techniques used to detect drug-excipient compatibility, mechanism of drug-excipient interactions, examples. Official methods of analysis applied to raw materials and end products

PC 707 Medicinal Chemistry I (2+1)

This course is tailored to assist the students to gain the drugs affecting the autonomic nervous system (ANS), drugs acting on the cardiovascular system (CVS). The course handles different classes of antibiotics and antimicrobials (natural and synthetic), beside other synthetic chemotherapeutic agents (including antivirals, antifungals and antiparasitics). Additionally, various anticancer therapies and related drugs are also covered.

PC 808 Medicinal Chemistry II (2+ 1)

The course is tailored to assist the students to gain the drugs affecting central nervous system and neurodegenerative disorders. Moreover, endocrine-related drugs (Diabetes, thyroid and calcium-regulating agents), steroidal hormones, antihistamines (H1, H2 blockers and anti-ulcer PPIs), drugs controlling pain and inflammation (NSAIDs, local anesthetics and rheumatoid drugs) are also handled.

PB 201 Cell Biology (1+1)

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, RNA, and proteins; 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.

PB 302 Biochemistry I (2+1)

Structure of proteins – Biologically active peptides – Protein turnover – Vitamins: water soluble and fat soluble vitamins – Structurally and physiologically important lipids – Lipoprotein metabolism – Carbohydrates and connective tissue – Enzymes (theories of enzyme action – enzyme kinetics – inhibition and regulation of enzyme activity – clinical correlations), oxidative stress and body defense mechanisms.

PB 403 Biochemistry II (2+1)

Mobilization of body stores of glycogen and fats -Metabolism and tissue utilization of glucose, amino acids, and fatty acids – Regulation of blood glucose level and clinical correlations – Feed/fast cycle – Nitrogen metabolism and nitrogen balance – Inborn errors of metabolism – ATP synthesis from reduced metabolites (electron transport chain – inhibitors – uncouplers) – Hemoglobin and myoglobin (structure – synthesis and metabolism).

PB 804 Clinical Biochemistry (2+1)

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

PB 905 Clinical Nutrition (1+1)

Measures of healthy life-style – Macronutrients and calculation of calories – Basal metabolic rate (BMR) - Recommended daily allowance (RDA) – Nutritional requirement for pediatrics and geriatrics - Vitamins and minerals (role in metabolism – clinical significance) – Food drug interaction-Fluid and electrolyte balance – Enteral and parenteral nutrition - Dietary care for patients with obesity, diabetes mellitus, cardiovascular, renal and hepatic disorders – Dietary care for cancer patients - Dietary care for sports` men - Dietary care for pregnant and lactating women – Nutrigenomics.

PT 101 Pharmacy Orientation (1+0)

This is a course to acquaint the beginning pharmacy student with the multiple aspects of the profession of pharmacy, including the mission of pharmacy, role of pharmacist in society and pharmacy careers, classification of medications, interpretation of prescriptions and medication orders, general dispensing procedure and factors affecting drug dosage, sources of drugs, different dosage forms and various routes of administration. In addition to the history of pharmacy practice in various civilizations

PT 202 Physical Pharmacy (2+1)

This course provides students with knowledge of physical and chemical 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, isotonicity solubility, dissolution, partition coefficient, surface and interfacial phenomena, surface active agents, adsorption and its application in pharmacy and rheological behaviour of dosage forms.

PT303 Pharmaceutical Legislations and Practice ethics (1+0)

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

PT304 Pharmaceutical Dosage Forms I (2+1)

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

PT 405 Pharmaceutical Dosage Forms II (2+1)

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

PT 506 Pharmaceutical Dosage Forms III (2+1)

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

PT 607 Pharmaceutical Technology (2+1)

The course provides students with an introduction to industrial pharmacy. It deals with the principles of various unit operations such as heat transfer, evaporation, drying, distillation, filtration, centrifugation, crystallization, extraction, size reduction, size separation, size analysis and size enlargement. 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.

PT 608 Biopharmaceutics and Pharmacokinetics (2+1)

The course is concerned with the exploration and examination of the physicochemical properties of drugs in the physiological environment and their impact on product performance. It explores the principles of biopharmaceutics and strategies for enhancing drug delivery and bioavailability .Also it introduces the students to basic pharmacokinetic parameters and mathematical aspects. General principles of pharmacokinetic models are presented as they pertain to the process of absorption, distribution and elimination of drugs in humans and the significance of these processes in drug therapy. Topics also emphasize linear and nonlinear metabolic clearance kinetics, drug-drug interaction mechanisms and kinetics, in vitro-in vivo predictions, pharmacogenetics and other sources of inter-individual variability.

PT 709 Advanced Drug Delivery Systems (2+0)

A continued study of pharmaceutical dosage forms with emphasis on novel and targeted drug delivery systems. Discussions focusing on transforming proteins, genes, and other biotechnology driven compounds into therapeutic products including the role of molecular modeling and new drug therapies in fabricating rational drug delivery systems are included. The course covers targeted nanocarrier-based delivery Systems and other advanced therapy medicinal products such as gene therapy medicinal products (GTMPs), somatic cell therapy medicinal products (sCTMPs), and tissue-engineered products (TEPs). In addition to formulation aspects of biotechnology derived pharmaceuticals, it also covers the application of polymers and excipients to solve problems/issues concerning the optimization of absorption, selective transport, and targeting.

PG 101 Medicinal Plants (2+1)

The aim of the course is to provide students with knowledge necessary to identify and prepare a crude drug from the farm to the firm. Students should acquire knowledge concerning dusting powders, plant cytology, physiology and medicinal leafy plants. In this course, the student will study: importance of natural products, preparation of natural products-derived drugs including collection, storage, preservation and adulteration. The course will introduce the students to the different classes of secondary metabolites. In addition, the course will discuss and address the variability in occurrence of pharmacologically active substances in certain official medicinal leafy plants according to their WHO monographs.

PG 202 Pharmacognosy I (2+1)

Based on the Egyptian flora and other florae of wild and cultivated medicinal plants that are used in the pharmaceutical, cosmetic and food industries in the global & Egyptian market. The course introduces students to some botanical drugs of leaves, flower, seeds, bark and wood origin. During the lectures and practical sessions, students learn to identify examples of these drugs in their entire and powdered forms. Student will learn about the major constituents, folk uses, clinically proven uses, benefits, precautions of those medicinal plants. Possible herbal-drug interactions of selected examples of these drugs.

PG 303 Pharmacognosy II (2+1)

Based on the Egyptian flora and other florae of wild and cultivated medicinal plants that are used in the pharmaceutical, cosmetic and food industries in the global & Egyptian market. The course introduces students to some botanical drugs of, fruits, subterreans, herbs, unorganized drugs of marine and animal origin. During the lectures and practical sessions, students learn to identify examples of these drugs in their entire and powdered forms. Student will learn about the major constituents, folk uses, clinically proven uses, benefits, precautions of those medicinal plants. possible herbal-drug interactions of selected examples of these drugs.

PG 504 Phytochemistry I (2+1)

Based on complementary medicine and Egyptian medicinal plants that can be used as natural extracts, bioactive raw materials and phytochemical standards to serve the pharmaceuticals, cosmetics and food industries in Egypt. The course aims to gain the students the knowledge and experience those enable them to understand, describe and deal with the chemistry and Pharmaceutical uses of volatile oils, resins and resin combinations, carbohydrates, glycosides, and bitters of plant or animals as well as techniques for their, isolation, identification and determination from their respective sources. Clinical applications will be correlated with various clinical analyses.

PG 605 Phytochemistry II (2+1)

The course aims to enable students to demonstrate knowledge of basic concepts of chemistry and bioactivities of alkaloids, tannins and antioxidants as well as chromatographic techniques for their isolation and identification. The course emphasizes on drugs with valuable use in the Egyptian and worldwide markets, such as anti-cancer agents, drugs affecting CNS, drugs ameliorating liver diseases and anti-inflammatory agents. Finally, the course focuses on the structure activity relationships (SAR) of these natural products derived compounds and their pharmacophoric features. Clinical applications will be correlated with various clinical analyses.

PG 706 Phytotherapy (2+1)

The course aims to enable students to attain the systematic approach for herbal prescribing through a comparative study of both traditional and scientifically based uses of herbal drugs in the treatment of various clinical disorders. The course provides clinical pharmacy students with review of the available information on how botanicals may normalize an altered function. Approval by World Health Organization (WHO), German Federal Institute for Drugs and Medical Devices (Commission E) is the base for selection of the studied herbs. The herbal drugs treated in combined way relative to pharmacognosy, pharmacology and toxicology. Special concern is given to the possible mode of action of the herbal drugs based on experimental and clinical pharmacological studies. 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.

PM 401 General Microbiology and Immunology (2+1)

The course provides students with a combination of laboratory and theoretical experience exploring the general aspects of microbiology. It includes knowledge of microorganisms, their morphology, diversity, cell structure and function, cultural characteristics, identification of microorganisms, microbial nutrition. It also explores the basic concepts microbial growth, cultivation and reproduction. It also clarifies different mechanisms of transport across bacterial cell membrane. The course also covers the principles of genetic characters including DNA and RNA structures, replication, different forms of mutation and mutagenic agents. Moreover, it introduces the modern concepts of medical immunology, with an emphasis on host parasite relationship, Non-specific and specific immunity, Mechanism of protective immunity. Molecular and cellular immunology, including antigen and antibody structure, function and reaction between them, effect or mechanisms, complement, and cell mediated immunity and in vitro antigen antibody reactions

PM 502 Pharmaceutical Microbiology and Antimicrobials (2+1)

This course describes in detail the physical and chemical methods of bacterial eradication and how to effectively control microbial growth in the field of pharmaceutical industry / hospitals. It further describes the means of preservation of pharmaceutical products, as well as cosmetics; sterilization, sterilization indicators, sterility testing and aseptic area and validation of sterilization process. Moreover, it explains the different groups of antimicrobials, their mechanism of action and resistance of microbes to biocides. Microbiological evaluation of antiseptics, disinfectants and preservatives, antibiotics, classification and mechanism of action including the new categories and new approaches to overcome bacterial resistance & antibiotics clinical abuse will be covered. Antiviral and antifungal agents and assay of antimicrobial activity will be covered as well.

PM 503 Parasitology & Virology (2+1)

Part of this course will focus on parasitic infections of humans with knowledge concerning biological, epidemiological and ecological aspects of parasites causing diseases to humans with special attention to different parasitological related diseases in Egypt causing serious health problems. This part of the course will discuss medical helminthology, protozoology and entomology concerning their morphological features, life cycle, pathogenesis, clinical manifestations, different diagnostic techniques, the most recent lines of treatment and prevention with control strategy for each parasitic infection. Moreover, it also covers laboratory diagnosis of human parasitic infections. The other part of the course provides students with the essential knowledge to recognize the epidemiology, mechanisms of pathogenesis, clinical picture, methods of laboratory diagnosis, treatment, prevention and control measures of RNA and DNA viral infections in humans.

PM 704 Medical Microbiology (2+1)

The course aims at studying microorganisms causing infectious disease in human beings. The infectious diseases, their etiology, pathogenesis and clinical manifestation, routes of transmission, treatment and techniques in detection and identification of pathogenic bacteria and fungi of major significance to public health will be studied. The course also focuses on immunological diseases and disorders in immunity including hypersensitivity, immuno-deficiency disorders, autoimmunity and auto-immune diseases and organ transplantation.

PM 805 Public Health and Preventive medicine (2+0)

This course aims at understanding all writing disciplines required for health education and promotion directed to the community health. How epidemiology acts as the bases of public health actions will be taught. Detailed scientific information and practices programs will be provided for nosocomial infections, control of communicable, non-communicable diseases including active and passive immunization, improving mental, social,

environmental, occupational, geriatric and family health, use of sufficient and balanced food and nutrition, supplying safe drinking water, treating and disposing wastes and proper intervention during disasters

PM 906 Biotechnology (2+1)

Introduction to biotechnology, fermentation technology, fermentation process and fermenters, Fermented products (Antibiotics, vitamins, amino acids, interferons, interleukins, monoclonal antibodies, vaccines and etc.... Bioremediation, N2 fixation, detection and monitoring of genetically engineered microorganisms. Genetic Engineering, PCR, Recombinant DNA Technology and Applications of recombinant DNA in the pharmaceutical and medical fields. Basics of Gene therapy and its applications in monogenic and polygenic disorders. Other modem techniques of environmental microbiology.

MD 101 Medical Terminology (1+0)

To ensure that the students have the necessary competency enabling them to recognize, analyze, synthesize, and apply medical terms as well as universally approved abbreviations related to the health profession, medical and paramedical. 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.

MD 202 Anatomy and Histology (2+0)

The aim of the course is to provide the students with competency 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.

MD 303 Physiology and Pathophysiology (2+1)

To ensure that the students have the necessary knowledge & skills enabling them to develop professional competency in the recognition & discussion of different physiological and Pathophysiology aspects of the major body organs and system pertinent to this course and in the application of such competencies in the specialist areas. This course cover the physiological function of different organs including physiology of body fluids, blood, nerve and muscle, central nervous system, special senses, autonomic nervous system, defense mechanisms. Physiology of cardiovascular, respiratory, excretory, endocrine and digestive

systems; organic and energy metabolism; exercise and environmental stress are also included. The basic concepts of pathophysiology at the cellular level related to injury, the self-defense mechanism, mutation, and cellular proliferation, and the pathological factors that influence the disease process. Clinical manifestations associated with the diseased organ(s).

MD 404 Pathology (2+0)

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

MD 605 First Aid and Basic Life Support (2+0)

After completing the course, the student should be able to know how to deal with medical emergency based on the different courses. It includes: introduction & accidents, first aid ABCs, medical emergencies, effect of temperature, transportation of an injured casualty & first aid kit, respiratory emergencies, fractures and dislocations, bleeding and surgical emergencies, burns and scalds, animal bites or stings and poisoning.

PO 301 Basic Pharmacology (2+1)

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

PO 502 Pharmacology I (2+1)

This course integrates principles of pharmacology with conceptual knowledge of physiology and pathophysiology to disease processes regarding the autonomic, neuromuscular, autacoids and cardiovascular systems.

PO 603 Pharmacology II (2+1)

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

PO 704 Pharmacology III (2+1)

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.

PO 805 Advanced Pharmacotherapy and Therapeutics (2+1)

The student should on completion of the course should be able to: identify selected diseases based on knowledge of given symptoms and laboratory values, state investigations that are of value for the diagnosis and monitoring of drug therapy in selected disease areas, choose and justify appropriate drug and treatment duration to a given patient with regard to current recommendations and patient-related factors, choose and justify appropriate dose, dosing interval and pharmaceutical form for a given patient with regard to age, organ functions and drug pharmacokinetics, pharmacodynamics and toxicity, evaluate abnormalities in common laboratory values and explain related to physiology, drug treatment and / or disease, extract information from medical records, identify, evaluate and respond to basic drug-related problems from patient records and to motivate action, choose appropriate non-pharmacological treatment with regard to the given patient and current recommendations

PO 905 Drug information (1+1)

This course includes an advanced application of the science of drug information in terms of: its practice within the drug information centers and various clinical sites. The course will focus on Drug information and poison information centers, different drug information resources, use of the internet for drug and research information, evaluating information on the web. The classification of study design and clinical trials, data presentation, and basic statistical concepts are detailed. Basics of pharmacoeconomic literature are described.

PO 006 Clinical Toxicology (2+1)

To ensure that the students have the necessary knowledge & skills, as well as comprehensive understanding of the basics of toxicology enabling them to have detailed knowledge and to develop professional competence in the recognition, solving, and discussion of different toxicological cases. It includes: 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.

PP 501 Hospital Pharmacy (2+1)

Organization and structure of a hospital pharmacy, hospital pharmacy facilities and services (inpatient and outpatient services), transfer of care, patient's medication record, and rational medication use, hospital formulary, pharmacy and therapeutic committee, I.V.

admixtures and incompatibilities, parenteral nutrition, handling of cytotoxic drugs, therapeutic drug monitoring, patient counseling and safety, and risk management

PP 602 Community Pharmacy Practice (2+1)

This course includes the study of the clinical situations that can be handled by the pharmacist in the community pharmacy (referral or using OTC medications) including upper respiratory tract, gastrointestinal, and musculosketal symptoms, skin, eyes, and ears, and childhood symptoms.

PP 703 Clinical Pharmacy Practice (2+1)

This course includes the definition and concepts of clinical pharmacy and pharmaceutical care, case history and case presentation, medication history taking, clinical problem solving, and therapeutic planning, clinical rounding and assessment of patient compliance. Principles of special care populations (geriatric, pediatric, pregnancy, and lactation). Drug-related problems and drug interactions .Interpretation of clinical laboratory data and physical examination.

PP 804 Clinical Pharmacokinetics (2+1)

Introduction to clinical pharmacokinetics and its applications, pharmacokinetics, non-compartmental pharmacokinetics and moment analysis. Drug distribution and drug clearance mechanisms, IV infusion kinetics and kinetics following extra-vascular dosing, metabolite kinetics, multiple dose kinetics, non-linear pharmacokinetics, dosage regimen design, dosage individualization of drugs of narrow therapeutic index especially in patients with compromised renal and hepatic function.

PP 805 Pharmacotherapy of critical care patients (1+1)

This course aims to provide the student with the knowledge in, pathophysiology, clinical interpretation, pharmacotherapy and management of critical care illness (e.g. medical and surgical crises, trauma patients, supportive care, ICU infections, burns, neuro-critical care, cardiovascular critical care, sepsis, septic shock, pain and analgesia, bleeding disorders and anticoagulation, nutritional support and therapy, hemodynamic monitoring, fluid and electrolyte disorders).

PP 906 Pharmacotherapy of endocrine &renal disorders (2+1)

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

PP 907 Pharmacotherapy of Cardiovascular diseases (2+1)

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

PP 908 Pharmacotherapy of neuropsychiatry diseases (2+1)

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

PP 009 Pharmacotherapy of dermatological, reproductive and musculoskeletal diseases (1+1)

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

PP 010 Pharmacotherapy of Pediatric diseases (2+1)

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

PP 011 Pharmacotherapy of oncological diseases and radio pharmacy (2+1)

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

PP 012 Pharmacotherapy of Gastrointestinal diseases (2+1)

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

PP 013 Pharmacotherapy of Respiratory diseases (1+1)

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

PP 014 Clinical Research and Pharmacovigilance (1+1)

This course introduces the student to the basic principles of clinical research, design of research studies, types of research studies, clinical trials, statistical presentation of research data and ethical guidelines in drug research. This course also provides the student's with understanding of pharmacovigilance importance, concept, processes, systems, global safety standards and regulations and reporting systems.

MS 101 Mathematics and biostatistics (1+0)

This course provides an essential guide to the mathematical, biostatistics and data analysis concepts, techniques, and calculations. Functions and graphs, limits and continuity, differentiation, exponential, logarithmic and trigometric functions, integration, basic differential equations, functions of several variables and problems related to them, probability, random variables and hypothesis testing, , estimation and confidence intervals, t-test and chi-square test, linear regression theory and the analysis of variance.

UR1 Information Technology (1+1)

This course tends 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. Also it gives an overview about computer networks and internet: data communication, transmission modes, transmission media, computer networks, internet protocol, and internet services. It practices some computer applications in the laboratory such as Internet Access, word processing and power point. It gives students a practical experience on developing projects related to the specialty.

UNVS101 Social Issues (1+0)

يغطى هذا المقرر الموضوعات التالية: المشكلات المترتبة على الزيادة السكانية ، حقوق الإنسان ، الشفافية ومكافحة الفساد ، الإنتماء والمواطنة ، الشباب والمجتمع ، وتعليم الكبار.

UR3 Psychology (1+0)

This course provides an overview of the basic concepts in psychology. Topics may include human information processing, learning and memory, motivation, development, language acquisition, social psychology, and personality.

UR4 Communication and presentation skills (1+ 0)

This course will help the students to develop necessary written and oral communication and presentation skills to improve inter- and intra-professional collaboration and communication with patients and other health care providers. The course will also deal

with the underlying attitudes, which form an interpersonal skill. It focuses on concept and meaning of communication; verbal and non verbal communication (body and vocal language); active listening skills; communication styles and presentation skills. Communication skills in diverse pharmacy practice setting will be discussed. The course describes elements of successful presentations, types and methods of presentations, how to prepare a presentation, selection and use of the media, how to develop a personal style of presentation, how to deal with speaking anxiety and how to capture an audience's attention .

UR5 Entrepreneurship (1+0)

This course outlines the process of designing, launching and running a new business, which is often initially a small business. The people who create these businesses are called entrepreneurs. Entrepreneurship has been described as the "capacity and willingness to develop, organize and manage a business venture along with any of its risks in order to make a profit. While definitions of entrepreneurship typically focus on the launching and running of businesses, due to the high risks involved in launching a start-up, a significant proportion of start-up businesses have to close due to "lack of funding, bad business decisions, an economic crisis, lack of market demand, or a combination of all of these

NP901 Drug marketing & pharmacoeconomics (2+0)

The course introduces the student to the basic concepts of health economics, learning basic terms of health economics and understand key principles. Topics cover the economic mechanisms of health care markets as market failures, and government intervention. The course covers the key components of health care financing, and some methods of how to contain health care expenditure. Alongside the major definitions in health technology assessment, students should have an overview about different types of economic evaluation, budget impact analysis and their uses. Moreover, students should get familiar with different methods of pricing among which value-based pricing. Moreover, it introduces the 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 a foundation for advanced electives in Marketing as well as other business/social disciplines. Topics include marketing strategy, customer behavior, segmentation, market research, product management, pricing, promotion, sales force management and competitive analysis.

PC E01 Drug Design (1+1)

Structure activity relationships, quantum mechanical approaches, molecular connectivity, pharmacophore generation, and molecular modification by isosteric replacement. Natural

products leading to new pharmaceuticals, mathematical treatment serving prediction, defining sites and targets, molecular modeling, prodrugs and drug latentiation.

PC E02 Advanced Pharmaceutical Analysis - Spectroscopy (1+1)

Advanced Pharmaceutical applications of different intsrumental methods of analysis including UV/Visible spectrophotometry, synchronous fluorimetry, chemiluminescenceatomic spectroscopy, mass pectroscopy and nanoanalysis.

PC E03 Therapeutic Drug Monitoring (1+1)

Introduction, serum drug concentrations, drug protein binding, therapeutic drug monitoring of some typical drug classes eg. Antidepressants, benzodiazepines, antipsychotics, antiarrhythmic drugs, toxicological drug monitoring.

PC E04 Complementary therapies (1+1)

The course covers Complementary medicine with an overview of different domains of mind- body interventions, alternative medical systems. This course will also encompass the studying of the nutraceuticals as types of biologically based therapies. Including dietary supplements, vitamins and minerals, functional foods and medical foods. The course will also include aromatherapy: definition, effective application and safety guidelines.

PC E05 Chromatography and separation techniques (1+1)

Introduction and modes of separation, gel filteration and permeation, ion exchange chromatography, type properties, ion exchange and non-ion exchange manifestaions and applications. High pressure liquid chromatography, gas liquid chromatography and their apllication.

PG E06 Biotechnology of medicinal plants (1+1)

The objective of the course is to give students new knowledge and widening of the knowledge acquired in other course by handling of classical and modern plant biotechnology processes, including breeding of healthy plants, plants with improved characteristics and plants for biomolecule production. Understanding of biotechnological processes has also applicative value in pharmaceutical and food industry, in agriculture and in ecology.

PT E07 Applied industrial pharmacy (1+1)

This course is a continuation of the study of the various unit operations in pharmaceutical industry with emphasis on size reduction, size separation, size analysis and size enlargement involved in the process development, scale-up and manufacturing of pharmaceutical drug products in industry (conventional / advanced nanotechnology based). In addition to the container/closure systems, some of the packaging processing methods are covered. Moreover, the vision about designing a quality product and its

manufacturing process to consistently deliver the intended performance of the product to meet patient needs is discussed by applying Quality-by-Design principles.

PT E08 Good manufacturing practices (1+1)

Concepts, objectives and applicability, general provisions, organization, building and facilities, materials, equipment's, production and process controls, packing and labeling, control, distribution, laboratory controls, records and reports, returned and salvaged drug products, repacking and inspections.

PT E09 Cosmetic Preparations (1+1)

Definition, classification, anti dandruff preparations, fragrance preparations, nail lacquers, skin care products (emollients and tanning), antiperspirants and deodorants preparations, shampoo, dentifrices preparations, eye, make-up preparations, acne preparations, hair dyes preparations, rouge preparations, lipstick preparations and quality control tests and evaluation of cosmetic preparations.

PT E10Advanced pharmaceutical technology (1+1)

This course is designed to provide students with various important aspects of quality assurance, cGMP, quality audit, and process validation; including regulatory and quality compliance as applied to pharmaceutical industries. The students will also be provided with in-depth knowledge in the organization and operation of the major departments of pharmaceutical companies, as well as ways of dealing with regulatory and compliance issues. The course will provide advanced information on drug discovery & development process, including INDA, NDA & ANDA, drug master file & therapeutic equivalent codes. Other essential topics such as production & operational management, production planning & control shall be covered. In addition, various in-process quality control tests needed to assess some sterile and non-sterile products shall also be discussed. The course will also include pilot plant and scale up techniques, design, construction and operation of clean rooms as well as recent advances in packaging techniques for various pharmaceutical dosage forms, including stability & regulatory aspects of packaging.

PT E11Medical devices (1+1)

The course presents the foundation to the students to understand the development and commercialization of safe and effective medical devices and in vitro diagnostic devices (IVDs). Students learn to research, design, develop, regulate, test, and market new devices and biologics. Experienced and aspiring medical device professionals will gain insight into the technological, ethical, regulatory, and business aspects of the highly regulated medical device industry.

PM E12 Infection control and antimicrobial stewardship (1+1)

The course includes infection prevention and control practices, the chain of infection, standard and transmission-based precautions, barriers and use of personal protective equipment, strategies for preventing the spread of infectious disease to healthcare workers and patients and disposal of biohazard waste. The course also addresses the improvement of antimicrobial agent's prescription in the clinical practice through the application of stewardship programs in medical institutions. The course focuses on all elements and considerations required for the establishment and implementation of a successful antimicrobial policy.

PM E13 Bioinformatics (1+1)

The course introduces bioinformatics concepts and practice. Topics include: biological databases, sequence alignment, gene and protein structure prediction, molecular phylogenetics, genomics and proteomics. Students will gain practical experience with bioinformatics tools and develop basic skills in the collection and presentation of bioinformatics data, as well as the rudiments of programming in a scripting language.

PO E14 Biological Standardization (1+1)

Introduction to concepts of screening and bioassay in the course of drug discovery. Testing drug activities belonging to various drug classes of which: central and autonomic nervous systems, cardiovascular system, hormones, analgesics, anti-inflammatory, anticancer drugs**, etc..**

PO E15 Geriatric pharmacotherapy (1+1)

The course integrates the critical issues of aging and the importance of team-based health care for geriatric patients in long term care facilities. The Geriatrics course is designed to provide students with the knowledge, skills, and experience to recognize and approach common problems in older adults in inpatient and outpatient settings as well as in the nursing home, common disease in old ages (neurodegenerative disease, osteoarthritis, fall & dizziness, hypertension, ischemic heart disease, arrhythmias and stroke).

PO E16 Pharmacogenetics of drug metabolism and transport (1+1)

This course will intoduce the student to the study of how an individual's genetic inheritance affects the body's response to drugs. This course will examine factors that affect drug response including genetics, as well as, additional factors such as environment, diet, age, and concurrent drug therapy and health status. Methods important to pharmacogenomics research will be presented. The student will be able to discuss basic principles of genetic medicine and personalized medicine, describe the mechanisms by which genetic variation impacts drug metabolism and transport, describe how this may impact clinical response and outcomes and describe the methodology used for standard

genotyping assays and the evolving role of pharmacogenomics in drug discovery and development.

PP E17 Interprofessional skills (1+1)

The students are introduced to interprofessional practice and the roles of the different healthcare professionals that make up an interprofessional team. Understand and respect the roles, responsibilities and scope of practice of one's own profession and of other healthcare professions through a role play experience and open dialogue.Communicate role expectations of each healthcare profession within the context of interprofessional team functioning.Recognize the impact of teamwork on patient-centred practice.Appraise the attributes of effective interprofessional team functioning and their impact on effective healthcare delivery using a case-based approach.

PP E18 Advanced Pharmacoeconomics (1+1)

The Advanced course provides a more in-depth review of the principles for those who aspire to a greater knowledge in how pharmacoeconomic studies are conducted, interpreted and used to make policy and clinical decisions. The student will be able to discuss advanced concepts in cost-effectiveness and cost-utility analyses, draw decision trees and perform the calculations involved in decision analysis, discuss Markov Modeling, probabilistic modeling, multiple criteria decision analysis, creating and interpreting cost-effectiveness graphs, meta-analysis in pharmacoeconomic modeling, mixed treatment comparisons and to describe how to create, read and assess pharmacoeconomic studies.

PC E06 Green Chemistry (1+1)

This course will explore the fundamentals of chemistry, how chemistry can help address global human health and environmental issues. It introduces the foundational principles of chemistry including atoms, molecules, chemical reactions, stoichiometry, chemical/physical properties, and periodic table trends. This knowledge is then related to various environmental and human health issues and develop the appropriate solutions using green chemistry approaches covered in the course.