



Port Said University



faculty of Pharmacy

Port Said University
faculty of Pharmacy

Internal Bylaw
a program

Bachelor of Pharmacy (Pharm D)

According to the credit hours system

Faculty of Pharmacy - Port Said University

2019



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an introduction

The Faculty of Pharmacy - Port Said University offers a distinguished study program leading to the Bachelor of Pharmacy (Pharm D) according to the credit hours system, in addition to conducting research and services that serve the local and regional community.

College Vision:

The Faculty of Pharmacy - Port Said University is looking forward to excellence in the fields of pharmaceutical education, scientific research, community service and development at the local and regional level and to encourage positive interaction with the surrounding environment as well as healthy and fruitful cooperation between the college graduate and the community.

MISSION OF THE COLLEGE

The Faculty of Pharmacy - Port Said University aims to provide distinguished community and environmental services through the organization of scientific conferences and awareness campaigns and activating the role of continuous pharmaceutical education and sustainable professional development of the pharmaceutical sector and community members, as well as to develop the self-resources of the college, which will help in the development and continuous improvement of the college services Through the establishment of a group of special units and partnership with civil society institutions and the establishment of a media center and office to market the services of the community college.

STRATEGIC OBJECTIVES

Goal 1: Develop institutional capacity

1. Developing the administrative system.
2. Establish a crisis and emergency unit.
3. Development of self-resources.
4. Commitment to credibility and ethics.

Second Goal: Distinguished faculty member

1. Develop the abilities and skills of the teaching staff and the supporting staff
2. Appointing new faculty members.
3. Approval of missions for teaching assistants and assistant teachers of prestigious universities scientifically.
4. Approving the scientific tasks of the faculty members.



Third Goal: Improve the educational process to achieve the aspirations of the beneficiaries

1. Developing the curriculum in line with scientific progress and the labor market.
2. To prepare qualified pharmacists with specialized knowledge, professional skills and ethical values based on standards
3. To develop and support computer service.
4. Work to train students and prepare them to join the labor market.

Fourth goal: to increase student satisfaction

1. Expansion of student activities and services.
2. Continuous communication with students through the Complaints Fund and increase questionnaires.
3. Motivating the distinguished students.
4. Provide health care for students.

Fifth Goal: Support and develop scientific research

1. To create a research environment and distinct.
2. Linking scientific research with the needs of society.
3. Develop a research plan for the college.
4. Encourage scientific innovation.

Goal 6: To deepen the interdependence between the college and the community

1. To promote community participation and link the College of Pharmacy with the surrounding community
2. Enhancing the interest of graduates and achieving sustainable communication with them.
3. Increase awareness of environmental and community issues.
4. Increase scientific and applied studies and research in the fields of pharmaceutical sciences that have a direct impact on the development of society



Scientific Sections

The College consists of the following departments:

1. Department of Pharmaceutics.
2. Department of Drugs ..
3. Department of Medicines and Toxicology.
4. Department of Microbiology and Immunology.
5. Department of Pharmaceutical Organic Chemistry.
6. Department of Pharmaceutical Analytical Chemistry.
7. Department of Biochemistry
8. Department of Pharmaceutical Chemistry.
9. Pharmacy Practice Section

Articles of the Regulation

Article (1)

Vision of the program:

Scientific excellence and continuous development to serve the therapeutic health system and the pharmaceutical industry and achieve sustainable development in order to reach a prominent position in the field of pharmacy globally.

Program Message:

Preparing pharmacists with professional ethics and qualified with the latest pharmacy concepts and therapeutic care that enable them to contribute to the development of pharmaceutical industries and raise the efficiency of pharmaceutical care system at the local and regional level in hospitals and private pharmacies Pharmaceutical and food analysis in addition to work in the field of information and pharmaceutical marketing and actively participate in scientific research through research centers and universities to serve the community

Program Goals:

- Graduating a distinguished pharmacist qualified to work in public and private pharmacies, pharmaceutical factories and companies, pharmaceutical control laboratories, food analysis, work in the field of media, marketing, research and universities.



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- Focus on the role of the pharmacist in providing appropriate health care to the patient inside and outside hospitals by educating and advising individuals and communities to improve therapeutic outcomes and reduce the incidence of diseases, taking into account that the profession exercises its responsibilities and authorities, respecting its laws and ethics, and respecting the rights of patients.
- Preparation of a pharmacist using evidence-based data to provide contemporary pharmaceuticals and pharmaceutical services in addition to being able to have effective communication skills, leadership, management and entrepreneurship.
- Graduating a pharmacist who works as a lifelong learner for sustainable professional development and demonstrates the ability to assess performance and self-assessment skills.
- Increase the competitiveness of program graduates at the regional level through study and training programs.
- Participate in community service and environmental development and provide a tangible economic return by rationalizing the use of medicines in hospitals.
- Commitment to achieving quality standards in pharmaceutical education through interactive learning and self-learning.

Article (2)

Degree awarded to graduates

The University Council grants, upon request of the College Board of Pharmacy, a Bachelor of Pharmacy (Pharm D) according to the credit hours system

Article (3)

Qualification for higher academic degrees:

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



Article (4)

Study system

The duration of study in the program is five academic years (five levels over ten semesters) according to the credit hours system and an advanced training year (excellence) in the work places (5 + 1). In addition to the number of 100 hours of actual field training in private and government pharmacies and pharmacies of hospitals take place during the summer holidays for years of study after the end of the third level and before the start of the year of excellence.

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

The credit hour is a unit of measurement and is equivalent to a theoretical weekly study hour or a practical lesson of not less than two hours per week and taught over one semester.

Article (5)

Course design

The course is designed to be through theoretical lectures, panel discussions, practical lessons, workshops, field training, research and presentations, and collaboration with the surrounding community.

The course is designed to:

First: The number of credit hours 175 credit hours in addition to the university requirements 4 credit hours.

Second: The number of elective courses Four courses (8 credit hours) are selected from the list determined by the College in addition to 100



hours of actual summer training begins by the end of the third level and before the start of the year of excellence.

Third: The faculty can make a change by deletion and narrowing in the description of the courses by not more than 20% of the scientific content of the course and to achieve the addition and update necessary.

Fourth: Elective courses for the student at the other levels in order to achieve competencies and skills to help him on the professional and specialized orientation. And to be one of the elective courses in one of the areas of clinical pharmacy.

Article (6)

Registration

The College assigns each group of students an academic adviser from the faculty who carries out the tasks of care and guidance and is responsible for the student in scientific, social and psychological affairs and guidance in all matters relating to his university life and helps students in the selection of courses from the list of courses offered by the college in each semester.

Each student must personally register the courses he / she wishes to study in each semester, with the need to choose the courses and the number of credit hours in consultation and agreement with the academic advisor.

To be enrolled, the student must have successfully passed the registration requirement.

The College Council may, in cases of extreme necessity, register some courses in line with its requirements that the student has not successfully passed if the student's workload is less than 12 credit hours (see the following - paragraph A - the academic burden), provided that an



acknowledgment is written by the student's parent His success in this course will only be approved after passing the requirement for which he was allowed to register in parallel.

The student should complete the registration form at the specified times according to the university calendar announced for each semester.

The student is not allowed to register late for the specified times except with a compulsory excuse accepted by the College Board and the period of delay shall not exceed one week from the end of the registration period.

A) Study burden:

The workload is the number of credit hours recorded by a student per semester. The student's registered workload in any semester should not be less than 12 credit hours and not more than 22 credit hours. Article 13).

Course load during the summer semester with a maximum of 10 credit hours.

The College Council may allow the student in the last two semesters to increase the academic load of the maximum and not exceeding the number of 3 credit hours (which benefit the student for one time), and the College Council may allow the student troubled (see Article 13 - academic failure) to increase the academic load of the maximum During the summer semester and not exceeding the number of 2 credit hours.

B) Adding, deleting and withdrawing:

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

After registering, a student may withdraw from one or more courses in any semester without being considered a failure in this course, if he / she submits the withdrawal request during the specified periods according to the declared university calendar for each semester. Anyone who withdraws after this specified period is considered a failure.



Article (7)

A) Attendance

The student must continue to attend theoretical lectures, panel discussions, practical lessons, field training and assignments. According to the request of the councils of the concerned scientific departments, the College Council may deprive the student from taking the final written examination if his absence exceeds 25% of the total credit hours for each course.

B) Attending exams, absenting them and violating the regulations

The student must take the final written exams in the prescribed dates according to the university calendar announced for each semester. The student shall not be considered a failure if he is absent with a compulsive excuse accepted by the College Board.

Article (8) Language of study

Study in English. However, some courses may be taught in Arabic based on the recommendation of the concerned scientific department and the approval of the faculty and university councils.

Article (9): First Field Training and Advanced Field

Training (Internship Year)

First Field Training:

The student should complete a first field training period with a total of 100 actual training hours in private and government pharmacies and hospital



pharmacies approved by the faculty council under the supervision of a faculty member.

B- Advanced Field Training (Internship Year):

- The student should complete the year of excellence (academic year 9 months) after the completion of the academic years by training in human and veterinary pharmaceutical companies and factories - Companies and factories: medical supplies and equipment, cosmetics, food supplements, herbs, medicinal plants, disinfectants and pesticides - Distribution companies and drug stores - centers and bodies Local and international drug monitoring and monitoring (MOH-CAPA-NODCAR-...; WHO, FDA, EMA..etc) - Pharmaceutical and Medical Research Centers, Bio-Availability and Clinical Studies (CROs) - Media and Drug Marketing... etc, in addition to hospitals And private pharmacies and government Those who wish to specialize in the academic field (teaching and research) can spend a period of training in the faculties of pharmacy or research centers. The training program should include one clinical training course.

Article (10): Admission requirements

Applicants must meet all the conditions set by the Supreme Council of Universities.

The transfer of students enrolled in a similar program may be accepted in one of the faculties of pharmacy in Egyptian or foreign universities, provided that the student meets the admission requirements of the faculty.

Article (11): Evaluation system

The final grade of the course consists of the total grades of the quarterly, practical, written and oral work as shown in the tables of the study plan.



The minimum pass rate in any course is 60% of the total grades of this course. The student will not be successful in any course unless he obtains 30% of the final written examination. The percentage of the final grades and grades is as shown in the following table.

Evaluation system

percentage	Number of points	Symbol	Appreciation
95 and above	4	A ⁺	Excellence
90 for less than 95	3.85	A	
85 for less than 90	3.7	A ⁻	
82.5 for less than 85	3.3	⁺ B	very good
77.5 for less than 82.5	3	B	
75 for less than 77.5	2.7	B ⁻	
72.5 for less than 75	2.3	C ⁺	good
67.5 for less than 72.5	2	C	
65 for less than 67.5	1.7	C ⁻	
62.5 for less than 65	1.3	D ⁺	Acceptable
60 for less than 62.5	1	D	
Less than 60	0.00	F	Failure
withdrawn	-	W	withdrawn
incomplete	-	I*	incomplete
absent	-	Abs E**	absent



I*: The student will receive this code if the attendance rate is complete and he / she cannot enter the final written and oral exam (if any) for one or more courses in the same semester for compelling reasons accepted by the College Council. Second semester of the next semester with retention.

Abs E **: The student will receive this code if he is unable to enter the final written and oral examination (if any) on the date mentioned in the previous paragraph (I) because the compulsive reason has not been removed. While retaining appreciation.

There are other assessment codes that are not matched by points - used in some graduation requirements - namely:

S: Satisfactory level

U: Unsatisfactory level

T: Degrees obtained by a transfer student from another pharmacy college

The student's GPA and GGPA are calculated as follows:

A - The grade of each course (points shown in the previous table) is multiplied by the number of credit hours for this course to get the number of points for each course in the semester.

B - Points are collected for all courses that the student has registered in the same semester.

C- The total points of all courses shall be divided by the total credit hours registered for the student per semester for the purpose of obtaining the semester average as follows:



$$(GPA)= \frac{\text{Total points of all courses per semester}}{\text{Total credit hours registered per semester}}$$

The cumulative GPA is calculated as follows:

$$(cGPA)= \frac{\text{Total score of all courses for all semesters}}{\text{Total credit hours registered for all semesters}}$$

Article (12)

Failure in the courses

-In case the student is absent without an excuse accepted by the College Council for the final written examination.

-If the student has obtained less than 30% of the final written examination.

-Failure to achieve at least 60% of the total grades of the course.

-If the student fails in any compulsory course in any semester, he must study the same course and the exam in it when it is offered again .

Article (13): academic failure

A student is considered to be academically defaulted if he / she receives a GPA of less than 1.

A student who obtains a GPA of less than 1 for six consecutive semesters or in ten non-consecutive semesters shall be dismissed from the College after presentation and approval by the College Council. Summer semesters, if any, shall not be considered.



A student who is in trouble is allowed to re-study the courses he / she passed with a grade of D in order to improve the grade point average and calculate the highest score obtained by the student.

Article (14): drop out of the study

A student shall be deemed to have dropped out of school if he did not register in a semester or withdrew from the semester whether with or without excuse.

The student may interrupt a maximum of two consecutive semesters or three non-consecutive semesters subject to obtaining the approval of the College Council. In case of interruption for a longer period of time without an excuse accepted by the College Council and approved by the University Council, the provisions of the Executive Regulations of the University Regulation Act shall apply.

Article (14):

Requirements for obtaining a Bachelor of Pharmacy (Pharm D)

Bachelor of Pharmacy (Pharm D) according to the credit hour system or its equivalent requires the following:

First: Studying and passing 175 credit hours spread over ten semesters, including the compulsory college requirements 167 credit hours (table of distribution of courses) and elective college requirements and represents the number of 8 credit hours, provided that the cumulative average of not less than one.

Second: Passing a first field training period with a total of 100 actual training hours in private and government pharmacies and hospital pharmacies approved by the faculty council under the supervision of a faculty member. Months) after completing the years of study, according to the detailed list of the internship year training program, which includes the graduation project in one of the disciplines offered.

Third: To pass the requirements that the university may decide to graduate, provided that it does not include the calculation of the student's semester or cumulative average.



Article (16): Disciplinary system of students

Students enrolled in the program are subject to the disciplinary system set forth in the Egyptian Universities Organization Law and its executive regulations.

Article (17):

Department code and course requirements and distribution of courses to scientific departments (see Attachment 1)

Article (18):

study plan(see Attachment 2)

Article (19):

Course content (see Attachment 3)

Article (20):

Update courses

Up to 20% of the content of the courses may be updated based on the proposal of the relevant scientific department council, the approval of the college council and the approval of the university council after giving the necessary justifications.

Article (21):

Internship Year Program:

A detailed training program for the final year (year of excellence) shall be established in the form of rotation courses in an appendix to the list of the rotational training program in a systematic and detailed manner.



Attachment 1 to Article 17

Department code, university requirements and elective courses

1- Sections code

Key for Course Abbreviations

	Department decisions	(Code)
1	Pharmaceutics Department	PT
2	Pharmacognosy department.	PG
3	Pharmacology and Toxicology Department	PH
4	Microbiology and Immunology Department	PM
5	Pharmaceutical Organic Chemistry Department	PO
6	Pharmaceutical Analytical Chemistry Department	PA
7	Biochemistry Department	PB
8	Pharmaceutical Chemistry Department	PD
9	Pharmacy Practice Department	PP
10	Medical Courses	MD
11	Non professional	NP

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

University Requirements: 4 credit hours



Course	Code	Credit Hours			exam degree		Total scores	Exam time
		theoretical	practical	Total	year works	Editorial		
		human rights	UR101	2	--	2		
Introduction to Quality Science	UR202	2	--	2	25	75	100	2
Note: Human rights and an introduction to quality science are not added to the total		4	--	4			200	4

3- Elective Courses:

The Faculty 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
PO E04	Advanced Pharmaceutical Analysis - Spectroscopy	1	1	2
PG E09	Alternative Medicinal Therapies	1	1	2
PG E10	Production and Manufacture of Medicinal plants	1	1	2
PG E11	Chromatography and Separation Techniques	1	1	2
PG E12	Marine Pharmacognosy	1	1	2
PT E12	Quality Assurances and GMP	1	1	2
PT E13	Applied Industrial Pharmacy	1	1	2
PBE06	Clinical Nutrition	1	1	2
PT E14	Cosmetic Preparations	1	1	2
PH E08	Biological Standardization	1	1	2
PH E09	Veterinary Pharmacology	1	1	2
PM E 07	Gene regulation and epigenetics	1	1	2



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PM E 08	Antimicrobial stewardship	1	1	2
PM E 09	Infection Control	1	1	2
PM E 10	Bioinformatics	1	1	2
PA E06	Food analysis	1	1	2
PD E04	Drug Targeting	1	1	2

L: Lecture

P: Practical

T: Tutorial

•The faculty board can offer elective courses from the examples mentioned in the previous table in each level / semester, after taking the opinion of the councils of the competent scientific departments.

Distribution of courses to scientific departments:

- Department of Pharmaceutics PT

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PT 101	Pharmacy Orientation	1	--	1
PT 202	Physical Pharmacy	2	1	3
PT 303	Pharmaceutics I	2	1	3
PT 404	Pharmaceutics II	2	1	3
PT 505	Pharmaceutics III	2	1	3
PT 606	Biopharmaceutics and Pharmacokinetics	2	1	3
PT 607	Pharmaceutics IV	2	-	1
PT 708	Pharmaceutical Technology I	2	1	3
PT 809	Pharmaceutical Technology II	2	1	3
PT 910	Good Manufacturing Practice	1	1	2
PT 011	Advanced Drug Delivery Systems	1	1	2



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		19	9	28
PT E12	Quality Assurances and GMP	1	1	2
PT E13	Applied Industrial Pharmacy	1	1	2
PT E1	Cosmetic Preparations	1	1	2

• Pharmacognosy department. PG

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PG 101	Medicinal Plants	2	1	3
PG 202	Pharmacognosy I	2	1	3
PG 303	Pharmacognosy II	2	1	3
PG 504	Phytochemistry I	2	1	3
PG 605	Phytochemistry II	2	1	3
PG 706	Applied & Forensic Pharmacognosy	2	1	3
PG 907	Phytotherapy and Aromatherapy	2	1	3
PG 008	Nutraceuticals	1	--	1
NP 303	Scientific Writing	1	1	2
NP 007	Entrepreneurship	1	1	2
		17	9	26
PG E09	Alternative Medicinal Therapies	1	1	2
PG E10	Production and Manufacture of Medicinal plants	1	1	2
PG E11	Chromatography and Separation Techniques	1	1	2
PG E12	Marine Pharmacognosy	1	1	2



- **Department of Pharmacology and Toxicology PH**

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PH 401	Biostatistics	1	--	1
PH 502	Pharmacology I	2	1	3
PH 603	Pharmacology II	2	1	3
PH 704	Pharmacology III	2	1	3
PH 805	Drug Information	1	1	2
PH 806	Basic & Clinical Toxicology	2	1	3
PH 007	Drug interaction	1	1	2
MD 101	Medical Terminology	1	--	1
NP404	Communication skills	--	1	1
NP 008	Professional Ethics	1	--	1
		13	7	20
PH E08	Biological Standardization	1	1	2
PH E09	Veterinary Pharmacology	1	1	2



- Department of Microbiology and Immunology (PM)**

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PM 401	General Microbiology and Immunology	2	1	3
PM 502	Pharmaceutical Microbiology	2	1	3
PM 603	Parasitology and Virology	2	1	3
PM 704	Medical Microbiology	2	1	3
PM 905	Biotechnology	2	1	3
PM 906	Public Health	2	-	2
MD 405	Pathology	1	1	2
		13	6	19
PM E 07	Gene regulation and epigenetics	1	1	2
PM E 08	Antimicrobial stewardship	1	1	2
PM E 09	Infection Control	1	1	2
PM E 10	Bioinformatics	1	1	2

Department of Pharmaceutical Organic Chemistry PO

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PO 101	Pharmaceutical Organic Chemistry I	2	1	3
PO 202	Pharmaceutical Organic Chemistry II	2	1	3
PO 303	Pharmaceutical Organic Chemistry III	2	1	3



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NP 101	Information Technology	1	1	2
NP 101	Mathematics	1	--	1
		8	4	12
PO E04	Advanced Pharmaceutical Analysis - Spectroscopy	1	1	2

• **Department of Pharmaceutical Analytical Chemistry PA**

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PA 101	Pharmaceutical Analytical Chemistry I	2	1	3
PA 202	Pharmaceutical Analytical Chemistry II	2	1	3
PA 303	Pharmaceutical Analytical Chemistry III	1	1	2
PA 404	Instrumental Analysis	2	1	3
PA 005	Quality Control of Pharmaceuticals	2	1	3
		9	5	14
PAE 10	Food analysis	1	1	2

• **Department of Pharmaceutical Chemistry PDF**

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PD 501	Medicinal Chemistry I	2	1	3
PD 602	Medicinal Chemistry II	2	1	3
PD703	Drug Design	1	1	2



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MD 203	Psychology	1	--	1
NP 705	Pharmaceutical Legislations and Regulatory Affairs	1	--	1
		7	3	10
PD E04	Drug Targeting	1	1	2

• **Department of Biochemistry PB**

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PB 201	Cell Biology	1	1	2
PB 402	Biochemistry I	2	1	3
PB 503	Biochemistry II	2	1	3
PB 604	Applied Clinical Analysis	1	-	1
PB 705	Clinical Biochemistry	2	1	3
PB 906	Molecular Genetics	2	1	3
MD 202	Anatomy & Histology	2	1	3
MD 304	Physiology and Pathophysiology	2	1	3
MD 006	First Aid	1	--	1
		15	7	22
PB 06	Clinical Nutrition	1	1	2



- **Pharmacy Practice Department**

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PP 801	Clinical Pharmacokinetics	2	1	3
PP 802	Hospital Pharmacy	1	1	2
PP 803	Community Pharmacy Practice	2	1	3
PP 904	Clinical pharmacy I	2	1	3
PP 005	Clinical Pharmacy II & Pharmacotherapeutics	1	1	2
PP 006	Clinical Research, Pharmacoepidemiology and & Pharmacovigilance	1	1	2
NP 906	Marketing & Pharmacoeconomics	1	--	1
		10	1	3



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Attachment 2

Article (18)

Programme Curriculum

Table (1)

Semester (1)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam. Hours
		Lect.	Pract./Tut	Total		Period.	Pract./Tut.	Wr.	Oral		
Pharmaceutical Analytical Chemistry I	PA 101	2	1	3	Registration	30	50	100	20	200	2
Pharmaceutical Organic Chemistry I	PO 101	2	1	3	Registration	30	50	100	20	200	2
Pharmacy Orientation	PT 101	1	-	1	Registration	10	--	40	--	50	1
Medicinal Plants	PG 101	2	1	3	Registration	30	50	100	20	200	2
Medical Terminology	MD 101	1	-	1	Registration	10	--	40	--	50	1
Information Technology	NP 101	1	1	2	Registration	15	25	60	---	100	1
Mathematics	NP 102	1	---	1	Registration	10	--	40	--	50	1



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Human Rights and Fighting Corruption	UR 101	2	---	2	Registration	25	--	75	--	100	2
Total		12	4	16						850	

○ *Lect.* = Lecture

○ *Period.* = Periodical

○ *Pract./ Tut.* = Practical / Tutorial

○ *Wr.* = Written



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Table (2)

Semester (2)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam. Hours
		Lect.	Pract./Tut	Total		Period.	Pract./Tut.	Wr.	Oral		
Pharmaceutical Analytical Chemistry II	PA 202	2	1	3	Pharmaceutical Analytical Chemistry I	30	50	100	20	200	2
Pharmaceutical Organic Chemistry II	PO 202	2	1	3	Pharmaceutical Organic Chemistry-I	30	50	100	20	200	2
Cell Biology	PB 201	1	1	2	Registration	15	25	50	10	100	1
Anatomy & Histology	MD 202	2	1	3	Registration	30	50	120	-	200	2
Physical Pharmacy	PT 202	2	1	3	Registration	30	50	100	20	200	2
Pharmacognosy I	PG 202	2	1	3	Medicinal Plants	30	50	100	20	200	2
Introduction to Quality	UR202	2	-	2	Registration	25	--	75	--	100	2
Total		13	6	19						1100	

○ *Lect.* = Lecture

○ *Period.* = Periodical

○ *Pract./ Tut.* = Practical / Tutorial

○ *Wr.* = Written



Table (3)

Semester (3)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam. Hours
		Lect.	Pract./Tut	Total		Period.	Pract./Tut.	Wr.	Oral		
Pharmaceutical Analytical Chemistry III	PA 303	1	1	2	Pharmaceutical Analytical Chemistry-II	15	25	50	10	100	1
Pharmaceutical Organic Chemistry III	PO 303	2	1	3	Pharmaceutical Organic Chemistry-II	30	50	100	20	200	2
Scientific Writing	NP 303	1	1	2	Registration	15	25	60	---	100	1
Pharmacognosy II	PG 303	2	1	3	Pharmacognosy-I	30	50	100	20	200	2
Physiology and Pathophysiology	MD 304	2	1	3	Registration	30	50	100	20	200	2
Pharmaceutics I	PT 303	2	1	3	Registration	30	50	100	20	200	2
Psychology	MD 303	1	-	1	Registration	10	--	40	--	50	1
Total		11	6	17						1050	

- *Lect.* = Lecture
- *Period.* = Periodical
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- *Wr.* = Written

**Table (4)****Semester (4)**

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam. Hours
		Lect.	Pract./Tut	Total		Period.	Pract./Tut	Wr.	Oral		
Biochemistry I	PB 402	2	1	3	Registration	30	50	100	20	200	2
General Microbiology and Immunology	PM 401	2	1	3	Cell Biology	30	50	100	20	200	2
Instrumental Analysis	PO 404	2	1	3	Registration	30	50	100	20	200	2
Pathology	MD 405	1	1	2	Histology	15	25	50	10	100	1
Pharmaceutics II	PT 404	2	1	3	Registration	30	50	100	20	200	2
Communication skills	NP404	1	-	1	Registration	10	15	25	---	50	1
Biostatistics	PH 401	1	-	1	Registration	10	--	40	--	50	1
Total		11	6	16						1000	

- *Lect.* = Lecture
- *Period.* = Periodical
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Table (5)

Semester (5)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam. Hours
		Lect.	Pract./Tut	Total		Period.	Pract./Tut.	Wr.	Oral		
Biochemistry II	PB 503	2	1	3	Biochemistry-I	30	50	100	20	200	2
Pharmaceutical Microbiology	PM 502	2	1	3	General Microbiology and Immunology	30	50	100	20	200	2
Phytochemistry I	PG 504	2	1	3	Registration	30	50	100	20	200	2
Pharmaceutics III	PT 505	2	1	3	Registration	30	50	100	20	200	2
Medicinal Chemistry I	PD 501	2	1	3	Pharmaceutical organic III	30	50	100	20	200	2
Pharmacology I	PH 502	2	1	3	Physiology & Pathophysiology	30	50	100	20	200	2
Total		13	6	18						1200	

○ *Lect.* = Lecture

○ *Period.* = Periodical

○ *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.	Pract./Tut.	Wr.	Oral		
Parasitology and Virology	PM 603	2	1	3	Registration	30	50	100	20	200	2
Applied Clinical Analysis	PB 604	1	-	1	Biochemistry II	10	-	40	-	50	1
Biopharmaceutics and Pharmacokinetics	PT 606	2	1	3	Pharmaceutics I	30	50	100	20	200	2
Phytochemistry II	PG 605	2	1	3	Phytochemistry-I	30	50	100	20	200	2
Pharmaceutics IV	PT 607	2	-	2	Registration	15	-	75	10	100	2
Pharmacology II	PH 603	2	1	3	Pharmacology-1	30	50	100	20	200	2
Medicinal Chemistry II	PD 602	2	1	3	Medicinal Chemistry - I	30	50	100	20	200	2
Total		12	5	18						1150	

- *Lect.* = Lecture
- *Period.* = Periodical
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- *Wr.* = Written

**Table (7)****Semester (7)**

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam. Hours
		Lect.	Pract./Tut	Total		Period.	Pract./Tut.	Wr.	Oral		
Medical Microbiology	PM 704	2	1	3	Pharmaceutical Microbiology	30	50	100	20	200	2
Pharmacology III	PH 704	2	1	3	Pharmacology-II	30	50	100	20	200	2
Applied & Forensic Pharmacognosy	PG 706	2	1	3	Registration	30	50	100	20	200	2
Drug Design	PD 703	1	1	2	Pharmaceutical Organic Chemistry III	15	25	50	10	100	1
Clinical Biochemistry	PB 705	2	1	3	Biochemistry-II	30	50	100	20	200	2
Pharmaceutical Technology I	PT 708	2	1	3	Registration	30	50	100	20	200	2
Pharmaceutical Legislations and Regulatory Affairs	NP 705	1	-	1	Registration	10	--	40	--	50	1
Elective	PE---	1	1	2	Registration	15	25	60	---	100	1
Total		13	7	20						1250	

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**Table (8)****Semester (8)**

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam. Hours
		Lect.	Pract./Tut	Total		Period.	Pract./Tut.	Wr.	Oral		
Clinical Pharmacokinetics	PP 801	2	1	3	Biopharmaceutics and Pharmacokinetics	30	50	100	20	200	2
Drug Information	PH 805	1	1	2	Registration	15	25	50	10	100	1
Basic & Clinical Toxicology	PH 806	2	1	3	Pharmacology-III	30	50	100	20	200	2
Hospital Pharmacy	PP 802	1	1	2	Pharmacology II Pharmaceutics IV	15	25	50	10	100	1
Pharmaceutical Technology II	PT 809	2	1	3	Pharmaceutical Technology I	30	50	100	20	200	2
Community Pharmacy Practice	PP 803	2	1	3	Registration	30	50	100	20	200	2
Elective	PE ---	1	1	2	Registration	15	25	60	---	100	1
Total		11	7	18						1100	

○ *Lect.* = Lecture○ *Period.* = Periodical○ *Pract./ Tut.* = Practical / Tutorial○ *Wr.* = Written



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Table (9)

Semester (9)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam. Hours
		Lect.	Pract./Tut	Total		Period.	Pract./Tut.	Wr.	Oral		
Biotechnology	PM 905	2	1	3	Pharmaceutical Microbiology	30	50	100	20	200	2
Clinical pharmacy I	PP 904	2	1	3	Registration	30	50	100	20	200	2
Public Health	PM 906	2	-	2	Medical Microbiology	25	---	75	---	100	2
Phytotherapy and Aromatherapy	PG 907	2	1	3	Phytochemistry-II	30	50	100	20	200	2
Good Manufacturing Practice	PT 910	1	1	2	Registration	15	25	50	10	100	1
Marketing & Pharmacoeconomics	NP 906	1	--	1	Registration	10	---	40	---	50	1
Molecular Genetics	PB 906	2	1	3	Biochemistry I & II	30	50	100	20	200	2
Elective	PE ---	1	1	2	Registration	15	25	60	---	100	1
Total		12	6	19						1150	

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Table (10)

Semester (10)

Course Title	Course Code	Credit Hours			Prerequisite	Examination Marks				Total Marks	Final Exam. Hours
		Lect.	Pract./Tut	Total		Period.	Pract./Tut.	Wr.	Oral		
Quality Control of Pharmaceuticals	PA 005	2	1	3	-Pharmaceutical Analytical Chemistry-II - Pharmaceutical Microbiology	30	50	100	20	200	2
First Aid	MD 006	1	--	1	Registration	10	--	40	--	50	1
Drug interaction	PH 007	1	1	2	Pharmacology-III	15	25	50	10	100	1
Advanced Drug Delivery Systems	PT 011	1	1	2	Pharmaceutics IV	15	25	50	10	100	1
Clinical Pharmacy II & Pharmacotherapeutics	PP 006	1	1	2	Clinical Pharmacy I	15	25	50	10	100	1
Entrepreneurship	NP 007	1	1	2	Registration	15	25	50	10	100	1
Clinical Research, Pharmacoepidemiology and & Pharmacovigilance	PP 007	1	1	2	Registration	15	25	50	10	100	1
Nutraceuticals	PG 008	1	--	1	Registration	10	-	40	-	50	1



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Professional Ethics	NP 008	1	--	1	Registration	10	--	40	--	50	1
Elective	PE ---	1	1	2	Registration	15	25	60	---	100	1
Total		11	7	18						950	

○ *Lect.* = Lecture

○ *Period.* = Periodical

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Attachment 3

Article 19

Course Content

PA 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 , Chemical equilibrium, Theories of reaction rate, activation energy and catalysis , Photochemistry, absorbed energy, quantum yield and chemical equilibrium.

Introduction to general chemistry, Types of chemical reactions – calculations of concentrations of substances. Analysis of anions – Analysis of cations – Analysis of mixture of anions and cations.

PO 101 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 cycloalkanes. Stereochemistry (Optical isomers, racemic modification, nomenclature of configurations). Alkenes, alkadienes and alkynes. Alkyl halides (nomenclature, preparation and chemical reactions (S_N1 , S_N2 , E_1 , E_2)). Arenes and aromatic compounds (Kekule structure, Huckel rule, Electrophilic aromatic substitution and orientation).

The practical sessions of this course help students gain skills required to purify and identify organic compounds of different classes such as aliphatic and aromatic aldehydes, ketones alcohols and hydrocarbons, halogenated hydrocarbons.

PA 202 Pharmaceutical Analytical Chemistry II (2+1)

Acid-Base theory, titration curves, indicators, applications. Titrations in non aqueous media, classification of solvents, theory, applications. Precipitometric titrations: solubility product principle, titration curves, Mohr's method. volhard's method, Fajans' method, pharmaceutical application. Complexometric reactions, theory, reaction with EDTA, indicators, applications.

PO 202 Pharmaceutical Organic Chemistry II (2+1)

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

PA 303 Pharmaceutical Analytical Chemistry III (1+1)

Redox titations, theory, oxidation potentials, Nernst equation, titration curves, redox indicators, selected oxidants and reductants, applications of redox titrations . The course also covers applied pharmaceutical analysis such as water analysis (water hardness, analysis of chloride, chlorine, iron, oxidizable matter, ... in water.

Electrochemical methods, electrode potential, reference electrodes, indicator electrode, applications. Conductometric titration : ionic conductance, definition of cell constant, conductance, applications.



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polarography: ILkovic equation, dropping mercury electrodes, diffusion current, applications, derivatization polarography.

PO 303 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.

PA 404 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.

PD 501 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), CNS. 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, steroidal hormones and related drugs are also covered.

PD 602 Medicinal Chemistry II (2+1)

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

PD 703 Drug Design (1+1)

The prime objective of this course is to prepare the students for professional practice by understanding the essentials of Medicinal Chemistry, and how the drugs, biological and toxicological activities are strongly correlated to their chemical structures (Structure-activity relationship; SAR), physicochemical properties and metabolic pathways. Focusing on patient-directed clinical care, the molecular aspects governing drugs' pharmacokinetics (ADME), pharmacodynamics, optimization of drug action, possible side effects, in addition to understanding drug interactions are targeted. In terms of chemistry, SAR, mechanism of action and side effects. The course is also designed to familiarize the students with drug design and molecular modelling covering structure-based and ligand-based drug design. This also includes the process of drug discovery and development from target identification until approval of a new drug. Much concern is given to lead structure identification, optimization and targeting certain receptors and enzymes active sites. Additionally, the course addresses the study of molecular docking, pharmacophore generation, and molecular modifications including prodrug design, stereochemistry alterations, isosteric replacement, drug metabolism and Quantitative Structure-activity relationship (QSAR).



PA 005 Quality Control of Pharmaceuticals (2+1)

The course is shared with departments: Microbiology & Analytical Chemistry :

I-Quality control & quality assurance of pharmaceuticals .

The **course** has to be designed for **quality control microbiology** professionals, **quality assurance** or regulatory affairs personnel who have responsibility for the performance of Bioburden, Endotoxin & Sterility Testing or for data review, pharmacists performing sterile compounding. Principles, methods and procedures of different quality control tests used for evaluation of safety, potency and palatability of pharmaceutical products of small and large molecules drugs (biologicals) including herbal drugs have to be taught. The standard pharmacopeial methods and procedures as well as international guidelines as WHO, EMA, TGA should be discussed.

II-Good Analytical Practice and Sampling: Introduction, Sampling of pharmaceuticals and related materials, Type of sampling tools, Sampling plans.

III-Documentation

IV- Validation of analytical methods according to ICH Guidelines Q2 R1. Compendial testing , Validation of analytical methods, Data elements required for assay validation.

V- 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.

VI- Official methods of analysis applied to raw materials and end products.

PB 201 Cell Biology (1+1)

The cell theory and cell structure (membranous and non-membranous organelles - cell inclusions and the nucleus - macromolecules of the cell) – Transport of biomolecules across membranes – Cellular energetics - Ions and voltages – Intercellular communication , Acid-base balance. Mineral (Macro- Microminerals),- Vitamins (Fat soluble vitamins and Water soluble vitamins),.

PB 402 Biochemistry I (2+1)

Proteins and amino acids (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) – Enzymes (Classification, Mechanism of enzyme action, enzyme kinetics – Regulation - Isoenzymes –Enzyme inhibitors as drugs) - Hemoglobin and porphyrins (Hb derivatives and types–metabolism of Hb and regulation).

PB 503 Biochemistry II (2+1)



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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 –Biosignaling – Inborn errors of metabolism – Biological oxidation and ATP synthesis –Clinical correlations.

PB 604 Applied Clinical Analysis (1+0)

Free radicals and antioxidants, - Metabolic Integration - Metabolism of Xenobiotics – Immunochemistry – Inflammation and Inflammatory mediators - Water metabolism.

PB 705 Clinical Biochemistry (2+1)

Biochemical/pathophysiological changes and laboratory diagnostic markers for disorders of (Endocrine glands – renal function – hepatic function – gastric function –bone and mineral metabolism - plasma proteins and lipoproteins) – Clinical enzymology and myocardial infarction - Electrolytes, blood gases - Handling, preservation, storage and analysis of biological samples –Homeostasis and biochemical aspects of hematology and blood analysis – Urine analysis – Biochemistry of cancer - Biochemistry of aging – Food biochemistry (milk – probiotics) – Tumor markers - Recent diagnostic biomarkers.

PB 906 Molecular Genetics (2+1)

Chemistry of nucleoproteins, nucleotides and nucleic acids Nucleic acids metabolism, DNA synthesis (replication) and DNA repair (DNA damage- Mechanism of DNA repair), RNA synthesis (transcription), protein synthesis (translation) DNA and genetic code - Cell cycle and control of cell number, Mutations – From gene to protein, Molecular Biology Techniques and Recombinant DNA technology, Genetic engineering, Polymerase Chain Reaction (PCR). Blotting techniques (Southern Blotting technique, Northern Blotting technique and Western Blotting technique), DNA sequencing, Gene therapy, Gene Mapping – Human Genome Project.

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 and their taxonomy. 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)



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Based on the Egyptian flora and other floras 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 and to have an overview over their phytopharmaceuticals available on the market specially the Egyptian market.

PG 303 Pharmacognosy II (2+1)

After completion of the course the student should have the knowledge and skills that enable the student to differentiate between different organs of through their monographs. The course comprises the study of identification of different organs through their monographs. (fruits, herbs, Subterranean organs, unorganized drugs in addition to drugs of marine and animal origin) , including identify their active constituents and adulterants describe micro- and macro-morphological characteristics, benefits and precautions of their medicinal uses., side effects and contraindications and to have an overview over their phytopharmaceuticals available on the market specially the Egyptian market.

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 students the knowledge and skills that enable them to understand, describe and deal with the chemistry of volatile oils, resins, miscellaneous terpenoids, bitters of plant or animal origin, carbohydrates and glycosides of plant or animal origin and different techniques used for their preparation, identification and determination. Also, the students should become aware of different chromatographic methods used for isolation and analysis of different plant constituents and their pharmacological actions and medicinal uses.

PG 605 Phytochemistry II (2+1)

In continuation with Pharmacognosy I, this course aims to enable students to demonstrate the knowledge and experience that enables her/ him to understand, describe and deal with the chemistry of alkaloids, tannins and antioxidants of plant, fungi or animal origin as well as techniques for their isolation, identification and determination in their respective sources. Finally, the course focuses on the structure activity relationships (SAR) of these natural products derived compounds and their pharmacophoric features.

PG 706 Applied & Forensic Pharmacognosy (2+1)

The course aims to provide pharmacy students with sufficient knowledge concerning quality control from herbal aspects, Sampling, structural, physical and analytical standards, purity, safety and adulteration of drugs and their detection. It also covers the modern chromatographic techniques employed for the evaluation of natural product and their products. It also provide the student with basic knowledge about the application of plant biotechnology for the production of pharmaceutically active materials.



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The course also include an overview on forensic pharmacognosy including plants and their natural products that constitute health hazards, or intended for criminal uses to produce, abortion, loss of mental control, hallucination, heart arrest.. Also it includes the study of drug dependents, narcotics, analgesics psych energetics, euphoric. Mycotoxin as a serious threat to general health and safety of community, contamination of food material with poisonous fungi.

PG 907 Phytotherapy and Aromatherapy (2+1)

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. It includes studying of medicinal plants portfolios in relation to Phytopharmaceuticals in Egyptian Market.

PG 008 Nutraceuticals (1+0)

The course covers classification of nutraceuticals as dietary supplements, vitamins and minerals, flavonoids and phenolics, carotenoids and miscellaneous, functional foods and medical foods.

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 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, isotonicity solubility, dissolution, partition coefficient, surface and interfacial phenomena, surface active agents, adsorption and its application in pharmacy and rheological behaviour of dosage forms

PT 303 Pharmaceutics 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),



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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 404 Pharmaceutics 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 505 Pharmaceutics 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 606 Biopharmaceutics and Pharmacokinetics (2+1)

This course aims to provide students with an understanding of the relation between the physicochemical 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. Integration of knowledge gained from other courses is emphasized to design and assure the quality of drug products. Students will also be introduced to the principles of pharmacokinetics (absorption, distribution, metabolism and elimination). The concepts of bioequivalence, biowaivers 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.

PT 607 Pharmaceutics IV (2+0)

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

PT 708 Pharmaceutical Technology I (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 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.



PT 809 Pharmaceutical Technology II (2+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 910 Good Manufacturing Practice (1+1)

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.

PT 011 Advanced Drug Delivery Systems (1+1)

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. Emphasis is placed on developing formulations based on the physical and chemical properties of the drug substance and the intended use of the drug product. The course also introduces the students to the formulation principles and applications of novel and targeted drug delivery systems by transforming proteins, genes, and other biotechnology driven compounds into therapeutic products. 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.

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, growth, metabolism, role of microorganisms in infectious diseases and microbial pathogenesis. It also clarifies different mechanisms of transport across bacterial cell membrane, metabolic pathways and physiology of bacteria. The course also covers the principles of genetic characters including DNA and RNA structures, replication, different forms of mutation and mutagenic agents. It also explores the basic concepts microbial growth, cultivation and reproduction.

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, effector mechanisms, complement, and cell mediated immunity. Active and passive immunization. Hypersensitivity and in vitro antigen antibody reactions, Immuno-deficiency disorders, Autoimmunity and auto-immune disease, organ transplantation.

PM 502 Pharmaceutical Microbiology (2+1)



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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, followed by the proper tests of quality control and sterility assurance. Sterilization, sterilization indicators, sterility testing, aseptic area, the microbiological quality of pharmaceuticals. 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, Antiviral and antifungal agents, different classes of antibiotics including the new categories and new approaches to overcome bacterial resistance & antibiotics clinical abuse.

PM 603 Parasitology and 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. It concerns with different parasitological related diseases in 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 cover 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 and clinical manifestation, routes of transmission, treatment and techniques in detection and identification of pathogenic microorganisms caused by Gram positive cocci & bacilli, Gram negative cocci & bacilli and mycobacteria of major significance to public health will be studied.

PM 905 Biotechnology (2+1)

The course is shared between 2 departments : Microbiology & Biochemistry

The course aims to provide students with fundamentals, scope and applications in biotechnology through studying fermentation technology, upstream, downstream, scaling up and down processes, use of molecular techniques for production of recombinant products and other major biotechnological products, biotransformation, bioremediation, bioleaching, bioinsecticides, biosurfactants and biopolymer production.

PM 906 Public Health (2+0)

This course aims at understanding all scientific 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



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control of communicable, non-communicable diseases, 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.

PH 401 Biostatistics (1+0)

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.

PH 502 Pharmacology-I (2+1)

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.

PH 603 Pharmacology-II (2+1)

This course integrates principles of pharmacology with conceptual knowledge of physiology and pathophysiology disease processes regarding drugs acting on cardiovascular systems, central nervous system, gastro-intestinal tract, pulmonary systems and hematologic disorders. Antihyperlipidemic drugs are also included.

PH 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. The anti-inflammatory, analgesics as well as gout treatments are also included.

PH 705 Drug Information (1+1)

This course introduces the student to the concept and need of drug information, types of drug information resources (primary, secondary and tertiary literature), computerized and online drug information, literature evaluation and critical appraisal, retrieval of information. It also aims at providing the students with the professional skills required to effectively and accurately answer medication-related questions in a systematic and evidence based approach.

PH 806 Toxicology & Forensic Chemistry (2+1)

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.

PH 007 Drug interaction (1+1)

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, herbal & food drug interactions, alcohol and smoking drug interactions, CNS drug interactions, interactions of cardiovascular acting drugs, interactions of anticoagulants, interactions of anti-infectives, interactions of antihistaminics & immune-based therapies, interactions of hormones, and drug-disease interactions.

The course is designed to familiarize students with the major types of drug interactions (Pharmacokinetic, pharmacodynamic and pharmacogenetic interactions) in the clinical setting, in addition to drug food and drug disease interactions. The course comprises digitalis drug interactions, anticoagulants, hypoglycemic interactions, antineoplastic drug interactions, antihypertensive interactions and anticonvulsant Interactions. Students will be expected to determine whether a given interaction is clinically significant or required pharmacist intervention, make rational, scientifically recommendations for management of drug interactions

MD 101 Medical Terminology (1+0)

Introduction to medical and pharmaceutical terminologies, medical abbreviations, medical idioms, suffixes and prefixes, medical terms pertaining to major body systems.

MD 202 Anatomy & Histology (2+1)

Histology:

Cytology, various tissues (epithelial, connective, muscular, and nervous), heart, blood vessels, lymphatic organs, skin and its appendages, systems (digestive and associated glands, respiratory, urinary, reproductive, and central nervous system), endocrine glands, and eye.

Anatomy :

Introduction to skeletal, muscular, and articular systems, fascia, nervous, cardiovascular, and lymphatic systems, digestive, respiratory, and urogenital systems, endocrine glands. Cytology: blood, liver, spleen, lung, kidney, lymph node, cardiac muscle, aorta, stomach, and intestine.

MD 203 Psychologies (1+0)

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.

MD 304 Physiology and Pathophysiology (2+1)

Physiology

Introduction to body water, homeostasis, transport of materials, nervous systems, neuron structure and function (reflex arc), cardiovascular system, blood, respiratory cycle, gastrointestinal, reproductive, and renal systems, endocrine glands and body temperature regulation.

Pathophysiology



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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.

MD 405 Pathology (1+1)

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.

MD 006 First Aid (1+0)

The course covers topics of basic life support and medical emergency of different situations including bleeding, shock, poisoning, bone fractures, soft tissue injuries, rescue and transportation. It includes: introduction to 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.

PP 801 Clinical Pharmacokinetics (2+1)

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. Sources of variability in pharmacokinetics, dosage regimen and dosage adjustment in children, obese, elderly patients and chronic disease states. Therapeutic drug monitoring and pharmacogenomics approaches.

PP 802 Hospital Pharmacy(1+1)

The course aims to introduce students to 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.

PP 803 Community Pharmacy Practice (2+1)

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 and introduces students to pharmaceutical care services for chronic-diseased outpatients and to psychosocial aspects in patient care. In addition, the course provides the students with competencies to promote the public health role of pharmacist including health promotion and disease prevention activities.



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PP 904 Clinical Pharmacy I (2+1)

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 also introduces the student to the principles of management and supportive care of oncological diseases, blood disorders and nutritional deficiencies.

PP 005 Clinical Pharmacy II & Pharmacotherapeutics (1+1)

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).

PP 006 Clinical research, Pharmacoepidemiology 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 addresses a range of study designs and analytic techniques for observational studies on the utilization, safety, and effectiveness of pharmaceuticals. Students will develop an understanding of how to plan, implement, analyse, and criticize pharmacoepidemiological studies. This course also provides the student's with understanding of pharmacovigilance importance, concept, processes, systems, global safety standards and regulations and reporting systems

UR 101 Human Rights and Fighting Corruption 2 + 0) (university requirements)

This course covers the following topics: the concept of human rights in criminal law, the origin and development of human rights, national sources of human rights, international sources of human rights, individual rights, collective rights, restrictions on human rights, the rights of certain special groups, national means of protection of human rights, International instruments for the protection of human rights, practical applications of human rights in the educational field, medical sciences and human rights, and the mechanism for combating corruption.

UR 202 Introduction to Quality (2 + 0) (university requirements)

This course covers the following topics: basic concepts in quality science, quality requirements, quality dimensions, the main objectives in total quality management, philosophy of some quality scientists to define quality, the principles of total quality in the educational process, the basic principles in total quality management in education and the most important, the obstacles of application Total Quality Management in Higher Education, Quality System Implementation Steps, Quality Standards Approved in Higher Education Institutions, Quality Assurance and Accreditation Project (QAAP), National Authority for Quality Assurance and Accreditation of Education, Development Projects, Project Objectives, Extended high, the basic features of the development of university education, the challenges



facing universities, contemporary university education systems, the requirements necessary for the application of quality, the concept of strategic planning in higher education institutions, components of strategic planning.

NP 101 Information Technology (1+1)

This course tends to provide students of all university's faculties 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 of each faculty.

NP 102 Mathematics (1+0)

Functions and graphs, limits and continuity, differentiation, exponential, logarithmic, and trigonometric functions, integration, basic differential equations, functions of several variables and problems related to them, probability and random variables, and hypothesis testing.

NP 303 Scientific Writing (1 + 1)

This course is designed to introduce students to the principles of good scientific writing, to be familiar with basic structure of scientific reports and research articles. 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 and evaluation of literature and information sources.

NP 404 Communication skills (0+1)

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

NP 705 Pharmaceutical Legislations and Regulatory Affairs (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.

NP 906 Marketing & Pharmacoeconomics (1 + 0)

Pharmacoeconomics

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.



Marketing

The objective of this course is to 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 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.

NP 907 Entrepreneurship (1+1)

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.

NP 007 Professional Ethics (1 + 0)

Professional ethics provides general principles and history of pharmacy ethics, general principles of medical ethics, conflicts of interests and its management pharmacists relationship with society and family, ethics in disaster, medication error, research ethics and animal ethics.