Mansoura University

Faculty of Pharmacy

Bachelor of Pharmacy program
Ministry Approval Date: 23/12/2014

Program Specification
Last Faculty Council Approval Date: 20/9/2023
Approved after external evaluation

Program approval acc. To NARS 2017

Program Specification
Bachelor of Pharmacy

University: **Mansoura**
Faculty: **Pharmacy**

A-Basic Information:

1	**Program Title:**	Bachelor of Pharmacy (Credit Hours)
2	**Program Type:**	Single
3	**Departments:**	**1.** Pharmaceutics (PT) **2.** Pharmacognosy (PG) **3.** Pharmacy Practice(PP) **4.** Pharmacology and Toxicology (PH) **5.** Microbiology and Immunology (PM) **6.** Pharmaceutical Analytical Chemistry (PA) **7.** Pharmaceutical Organic Chemistry (PO) **8.** Medicinal Chemistry (PD) **9.** Biochemistry (PB)
4	**Duration of program:**	5 Years
5	**Language of study:**	English
6	**Program Coordinator:**	Vice Dean of Education and Students Affairs
7	**External Evaluator(s):**	Prof. Dr. Assem El Shazly
8	**Faculty Approval Date**	6 September 2016
9	**Last faculty approval Date**	20/9/2023

B-Professional Information:

1. Program Aims:

Mansoura University awards Bachelor of Pharmacy (BPharm) degree following a five-year undergraduate Pharmacy program. This Pharmacy program provides students with the necessary knowledge and skills in basic, pharmaceutical, medical, social, behavioral, health, environmental sciences , pharmacy practice and management; aiming to graduate competent general practitioner pharmacists; capable of working effectively in different settings, including community pharmacies, hospitals, forensic and biomedical laboratories, governmental health institutions, pharmaceutical industries, academia and research centers. Graduates are talented to:

1. Fulfill the needs of the local and regional market, and bear responsibilities at work place, in compliance with the pharmacy laws and legislations, and with the ethical and professional rules and the community values.

2. Handle safely and prudently chemicals and pharmaceutical products and participate in systems for dispensing, storing and distribution of medications.
3. Practice effectively the good manufacturing, good laboratory, and good safety principles to assure the quality of raw materials, procedures and pharmaceutical products.
4. Deliver patient care in hospital and community pharmacies; and promote rational, safe and effective use of medication in pharmacy practice settings.
5. Collaborate actively with other health care professionals in health education of the public, and in prevention and management of diseases, by providing drug information and preventive health care systems to the community.
6. Perform research at competitive level, using appropriate evidence-based methodologies, and in compliance with the academic standards.
7. Develop presentation, marketing, promotion, business administration and information technology skills.
8. Conduct effective communication, time management, critical thinking, problem solving, decision-making, team-working, performance appraisal and self-assessment.
9. Commit to educate and train the upcoming generation of pharmacists, and to assure and improve the quality of health care of the society.
10. Oblige to life-long learning for continuous professional improvement.

2 - Competencies of the Pharmacy graduates:

On successful completion of the program, graduates will acquire the following competencies in the following domains:

Domain 1- Fundamental Knowledge

Domain 2: Professional and Ethical Practice

Domain 3: Pharmaceutical Care

Domain 4: Personal Practice

3- Program Learning Outcomes

Faculty of pharmacy – Mansoura University, adopts the National Academic Reference Standards in Pharmacy education, issued by National Authority for Quality Assurance and Accreditation of Education (NAQAAE) - 2nd Edition in April 2017.

DOMAIN 1 - FUNDAMENTAL KNOWLEDGE

1 -1 – COMPETENCY

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

- **Key Elements :**

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

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

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

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

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

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

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

DOMAIN 2: PROFESSIONAL AND ETHICAL PRACTICE

2-1 – COMPETENCY

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

- **Key Elements** :

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

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

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

2-2- COMPETENCY

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

➢ **Key Elements :**

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

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

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

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

2-3- COMPETENCY

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

➢ **Key Elements** :

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

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

2-4- COMPETENCY

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

➢ **Key Elements :**

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

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

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

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

2-5- COMPETENCY

Contribute in pharmaceutical research studies and clinical trials needed to authorize medicinal products.

➢ **Key Elements :**

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

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

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

2-6- COMPETENCY

Perform pharmacoeconomic analysis and develop promotion, sales, marketing, and business administration skills.

➢ **Key Elements :**

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

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

DOMAIN 3: PHARMACEUTICAL CAR

3-1 – COMPETENCY

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

➢ **Key Elements :**

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

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

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

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

3-2- COMPETENCY

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

➢ **Key Elements :**

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

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

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

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

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

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

DOMAIN 4: PERSONAL PRACTICE

4-1 - COMPETENCY

Express leadership, time management, critical thinking, problem solving, independent and team working, creativity and entrepreneurial skills.

➢ **Key Elements** :

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

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

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

4-2- COMPETENCY

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

➢ **Key Elements:**

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

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

4-3- COMPETENCY

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

➢ **Key Elements:**

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

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

4- Academic Reference Standards

4a-External References for Standards

The Faculty of Pharmacy-Mansoura University, adopts the National Academic Reference Standards in Pharmacy education, issued by National Authority for Quality Assurance and Accreditation of Education (NAQAAE) 2nd Edition in April 2017.

4-b: Comparison of Program Aims to NARS Graduate Attributes (Attachment # 1)

4. c. The program Learning Outcomes is the National Academic Reference Standards (NARS) (2nd Edition in April 2017).

5-Curriculum Structure and Contents

5-a Program duration: 5 years.

5-b Program structure: 165 hours

5b.i	No. of hrs per week:	Lectures	116	Lab./Exercise	45	Total	161
5b. ii	Practical/Field Training:		300 hours Summer training (4 credit hours)				

6- Program Courses:

To obtain a bachelor's degree in pharmacy, the student is required to study 165 credit hours. The Faculty has issued a Study Plan, where courses are distributed over five levels of 10 regular semesters. The following two tables illustrate the types of hours and courses distribution. A detailed distribution of the courses, along with their credit hours, prerequisites, exam marks and exam time is included **(Attachment # 2)**

	C.H.	Notes
University Requirements	5	
Faculty Compulsory courses	150	
Faculty Elective Courses	6	
Summer Training	4	300 Hours
Total	165	

Program course Levels (in credit-hours system):

Level	Semester	Lectures	Practical	Elective	Total per semester	Total per level
1	1	11	2	-	13	29
	2	11	5	-	16	
2	3	11	5	-	16	33
	4	12	5	-	17	
3	5	11	6	-	17	31
	6	10	4	-	14	
4	7	14	6	-	20	39
	8	12	5	2	19	
5	9	8	4	2	14	29
	10	10	3	2	15	
Total		110	45	6	161	161

Matrix of the courses with the Program k-elements (NARS k-elements) is included. (**Attachment # 3**)

Curriculum Contents:

Courses Description are included **(Attachment # 4);** and Course Specification are available at both the Scientific Departments and the Quality Assurance Unit.

7- Teaching and Learning method

1.	**Developed lecture**	المحاضرة المطورة
2.	Practical work and tutorials	**التجارب العملية والتمارين**
3.	Hybrid learning	**التعليم الهجين**
4.	Collaborative learning	**التعلم التعاوني**
5.	Self-learning	**التعلم الذاتي**
6.	Simulation based learning	**التعليم القائم على المحاكاة**
7.	Problem – based learning	**التعلم بطريقة حل المشكلات**
8.	Case study	**دراسة الحالة**
9.	Presentation	**العروض التقديمية**
10.	Computer aided learning	**التعلم بمساعدة تكنولوجيا المعلومات**
11.	Reciprocal learning	**التدريس التبادلي**
12.	Demos	**العروض التقديمية**

Matrix of the teaching and learning methods with the Program k-elements (NARS k-elements) is included. (**Attachment # 5**)

8- Student Assessment:

- Methods of assessments include written, oral and practical examination. Course assignments, presentations and research papers are also taken into consideration.
- Midterm exam is held by the end of the 6^{th} – 9^{th} week of the semester
- Practical exams are held by the end of the 12^{th} -14^{th} week and can be modified according to the academic plan of the higher education ministry.
- Final written and oral exams are started from 15^{th} week of the semester and can be modified according to the academic plan of the higher education ministry.
- Matrix of the assessment methods with the Program k-elements (NARS k-elements) is included. (**Attachment # 5**)
- Each course is assigned a total of 100 points (marks)

- Courses without practical sessions represent **31.8%** of the total number of courses. Marking scale is different.
- Performance of a student is measured by the **Grade Point Average (GPA)** value he/she scores in an individual course (**attachment # 6**).
- Student assessment methods help to evaluate the k-elements of each course.

9-Programme Admission Requirements

- The Faculty complies with the admission regulations and requirements of the Egyptian Supreme Council of Universities (SCU).
- Nominated students must hold the Egyptian General Secondary Education Certificate (GSEC) (Science Section), or an equivalent certificate accepted by the SCU.
- Foreign students are nominated for admission to the faculty according to the general regulations of the Ministry of Higher Education (MoHE).
- Students from other governmental Egyptian Universities or foreign scientific institutes recognized by the Supreme Council of Universities must fulfill the Faculty of Pharmacy admission requirements before being transferred at our Faculty. Courses completed at another Pharmacy Institution are evaluated for equivalency.
- Full-time study is required by all students.

10-Regulations for progression and program completion

- The Faculty adopts the Credit Hour System in this program.
- Student registers the courses in each semester with the guidance of his/her academic advisor, taking into consideration the prerequisite of each course.
- Student is allowed to register a total of 12 - 20 credit hours in each semester; while the academic load during summer semester is 6 – 10 credit hours.
- Students must attend not less than 75 % of the lectures and laboratory sessions. Otherwise, They would not be able to attend the final exam and complete the course.
- Progression into a higher level requires that the student should successfully complete about 20 % of the total credit hours.
- Completion of the program requires that the student must successfully achieve 161 credit hours, in addition to acquiring 300 hours of summer training in a Pharmaceutical establishment/setting (community or hospital pharmacies, pharmaceutical firms) or equivalent (research institutes and universities).

- Student transferred from other institutions must study at our university at least 60% of graduation requirements.
- Grading of the Human rights course and the Summer Training is not included in the cumulative GPA (cGPA).
- Minimum cGPA of 2 is a must for successful graduation.
- The First Class honor will be awarded to students who scored cGPA of 3.7 or more upon graduation. Grading system is clearly illustrated in the By-Law.

11. Evaluation of Program Learning Outcomes

Annual review of the program report

Feedback of stakeholders

Feedback of participant in teaching stuff from other faculties

Feedback of students and graduates

Reports of reviews of internal and external evaluators

Reports of annual review boards and committees

Program Coordinator: Prof .Dr. Rasha Mohamed Barwa

Vice Dean of Education and student affairs

Signature: Rasha Barwa

Faculty Approval Date	6 September 2016
Last faculty approval Date	20/9/2023
	Approved after external evaluation

Program approval acc. To NARS 2017

Attachment # 1

A. Comparison of Program Aims to Graduate Attributes

Program Aims	Graduate Attributes (NARS)
1. Fulfill the needs of the local and regional market, and bear responsibilities at work place, in compliance with the pharmacy laws and legislations, and with the ethical and professional rules and the community values.	1.1 Educate and counsel individuals and communities to participate in optimizing therapeutic outcomes and minimizing the incidence of illness of individuals and populations.
2. Handle safely and prudently chemicals and pharmaceutical products and participate in systems for dispensing, storing and distribution of medications.	1.2 Practice and perform responsibilities and authorities legally, professionally, and ethically respecting patients' rights.
3. Practice effectively the good manufacturing, good laboratory, and good safety principles to assure the quality of raw materials, procedures and pharmaceutical products.	1.3 Utilize evidence-based data to deliver contemporary pharmaceutical products and pharmacy services.
4. Deliver patient care in hospital and community pharmacies; and promote rational, safe and effective use of medication and medical devices in pharmacy practice settings.	1.4 Assure the quality of pharmaceutical materials and products.
5. Collaborate actively with other health care professionals in health education of the public, and in prevention and management of diseases, by providing drug information and preventive health care systems to the community.	1.5 Apply integrated evidence-based pharmaceutical and clinical information in assessing the appropriateness, effectiveness, and safety of medications.
6. Perform research at competitive level, using appropriate evidence-based methodologies, and in compliance with the academic standards.	1.6 Contribute effectively in planning and conducting research using appropriate methodologies.
7. Develop presentation, marketing, promotion, business administration and information technology skills.	1.7 Work collaboratively and share therapeutic decision-making as a member of an inter-professional health care team.

8. Conduct effective communication, time management, critical thinking, problem solving, decision-making, team-working, performance appraisal and self-assessment.	1.8 Demonstrate effective communication, leadership, business administration, and entrepreneurial skills.
9. Commit to educate and train the upcoming generation of pharmacists, and to assure and improve the quality of health care of the society.	1.9. Work as a life-long learner for continuous professional improvement and demonstrate capabilities of performance appraisal and self-assessment.
10. Oblige to life-long learning for continuous professional improvement.	

Attachment # 2

Detailed Courses distribution into 10 semesters

Program Curriculum

Level 1

Semester (1)

Course code	Course Title	Credit hours			Prerequisite	Exam Marks				Total. marks	Exam Time (hrs)
		L.	P/T	Total		CW	P/T	F.E	Oral		
PG 111	Medical Botany	1	1	2	Registration	10	25	50	15	100	2
PA 111	Physical Chemistry	1	--	1	Registration	10	--	75	15	100	2
PO 111	Pharmaceutical Organic Chemistry (1)	2	1	3	Registration	10	25	50	15	100	2
PT 111	Pharmacy orientation	2	--	2	Registration	10	--	90	--	100	2
PP 111	Medical Terminology	1	--	1	Registration	10	--	90	--	100	1
UR 111	English Language	2	--	2	Registration	10	--	90	--	100	2
Total		9	3	11						600	
UR 112	Human Rights	2	--	2	Registration	10	--	90	--	100	2

Semester (2)

Course code	Course Title	Credit hours			Prerequisite	Exam Marks				Total. marks	Exam Time (hrs)
		L.	P/T	Total		CW	P/T	F.E	Oral		
PG 122	Pharmacognosy (1)	2	1	3	Registration	10	25	50	15	100	2
PT 122	Physical Pharmacy	2	1	3	Registration	10	25	50	15	100	2
PA 122	Inorganic Chemistry	1	1	2	Registration	10	25	50	15	100	2
PO 122	Pharmaceutical Organic Chemistry (2)	2	1	3	Registration	10	25	50	15	100	2
MH 121	Histology & Anatomy	2	1	3	Registration	10	25	65	--	100	2
MP 122	Psychology & Communication skills	1	--	1	Registration	10	--	90	--	100	1
UR 123	Quality Assurance of Education	1	--	1	Registration	10	--	90	--	100	1
Total		11	5	16						700	

L = Lecture, P/T = Practical/Tutorial, CW =Course Work, F.E.= Final Exam

Level 2

Semester (3)

Course code	Course Title	Credit hours			Prerequisite	Exam Marks				Total. marks	Exam Time (hrs)
		L.	P/T	Total		CW	P/T	F.E	Oral		
PT 213	Pharmaceutics	2	1	3	Registration	10	25	50	15	100	2
PG 213	Pharmacognosy (2)	2	1	3	Registration	10	25	50	15	100	2
PA 213	Pharmaceutical Analytical Chemistry (1)	2	1	3	Registration	10	25	50	15	100	2
PO 213	Pharmaceutical Organic Chemistry (3)	2	1	3	Registration	10	25	50	15	100	2
PH 212	Physiology	2	1	3	Registration	10	25	65	--	100	2
PP 213	Pharmaceutical Ethics & Legislation	1	--	1	Registration	10	--	90	--	100	1
Total		11	5	16						600	

Semester (4)

Course code	Course Title	Credit hours			Prerequisite	Exam Marks				Total. marks	Exam Time (hrs)
		L.	P/T	Total		CW	P/T	F.E	Oral		
PT 224	Pharmaceutical Dosage Forms (1)	2	1	3	Registration	10	25	50	15	100	2
PG 224	Pharmacognosy (3)	2	1	3	Registration	10	25	50	15	100	2
PA 224	Pharmaceutical Analytical Chemistry (2)	2	1	3	Registration	10	25	50	15	100	2
PO 224	Heterocyclic chemistry	2	1	3	Registration	10	25	50	15	100	2
PB 221	Biochemistry (1)	2	1	3	Registration	10	25	50	15	100	2
PH 223	Pathophysiology	2	--	2	Registration	10	--	90	--	100	2
Total		12	5	17						600	

L = Lecture, P/T = Practical/Tutorial, CW =Course Work, F.E.= Final Exam

Level 3

Semester (5)

Course code	Course Title	Credit hours			Prerequisite	Exam Marks				Total. marks	Exam Time (hrs)
		L.	P/T	Total		CW	P/T	F.E	Oral		
PA 315	Instrumental and Applied Analysis	2	1	3	Registration	10	25	50	15	100	2
PO 315	Spectroscopic Identification	1	1	2	Registration	10	25	50	15	100	2
PG 315	Phytochemistry (1)	2	1	3	Pharmaceutical Organic Chemistry (1)	10	25	50	15	100	2
PT 315	Pharmaceutical Dosage Forms (2)	2	1	3	Registration	10	25	50	15	100	2
PH 314	Pharmacology (1)	2	1	3	Registration	10	25	50	15	100	2
PB 312	Biochemistry (2)	2	1	3	Pharmaceutical Organic Chemistry (1)	10	25	50	15	100	2
Total		11	6	17						600	

Semester (6)

Course code	Course Title	Credit hours			Prerequisite	Exam Marks				Total. marks	Exam Time (hrs)
		L.	P/T	Total		CW	P/T	F.E	Oral		
PG 326	Phytochemistry (2)	2	1	3	Pharmaceutical Organic Chemistry (1)	10	25	50	15	100	2
PP 324	Drug Information	1	--	1	Registration	10	--	75	15	100	1
PP 325	Hospital Pharmacy	2	--	2	Registration	10	--	75	15	100	2
PH 325	Pharmacology (2)	2	1	3	Physiology	10	25	50	15	100	2
PM 321	Pharmaceutical Microbiology	2	1	3	Registration	10	25	50	15	100	2
PM 322	Parasitology	1	1	2	Registration	10	25	50	15	100	2
Total		10	4	14						600	

pSt 1	Summer training (1)	--	2	2	Registration	--	50	25	25	100	-

L = Lecture, P/T = Practical/Tutorial, CW =Course Work, F.E.= Final Exam

Level 4
Semester (7)

Course code	Course Title	Credit hours			Prerequisite	Exam Marks				Total. marks	Exam Time (hrs)
		L.	P/T	Total		CW	P/T	F.E	Oral		
PT 416	Biopharmaceutics & Pharmacokinetics.	2	1	3	Physical Pharmacy	10	25	50	15	100	2
PG 417	Phytotherapy	2	1	3	Pharmacognosy (1, 2)	10	25	50	15	100	2
PD 411	Medicinal Chemistry (1)	3	1	4	Pharmaceutical Organic Chemistry (2)	10	25	50	15	100	2
PH 416	Pharmacology (3)	2	1	3	Physiology	10	25	50	15	100	2
PH 417	Biostatistics	1	--	1	Registration	10	--	90	--	100	1
PM 413	Medical Microbiology and Immunology	2	1	3	Registration	10	25	50	15	100	2
PP 416	Clinical Pharmacy	2	1	3	Physiology	10	25	50	15	100	2
Total		14	6	20						700	

Semester (8)

Course code	Course Title	Credit hours			Prerequisite	Exam Marks				Total. marks	Exam Time (hrs)
		L.	P/T	Total		CW	P/T	F.E	Oral		
PT 427	Industrial Pharmacy (1)	2	1	3	Pharmaceutics	10	25	50	15	100	2
PA 426	Quality Control of Drugs	2	1	3	Registration	10	25	50	15	100	2
PP 427	Pharmacy Practice	2	1	3	Registration	10	25	50	15	100	2
PD 422	Medicinal Chemistry (2)	3	1	4	Pharmaceutical Organic Chemistry (2)	10	25	50	15	100	2
PB 423	Nutrition	1	--	1	Registration	10	--	75	15	100	1
PH 428	Therapeutics	2	1	3	Pharmacology (1)	10	25	50	15	100	2
	Elective Courses	2	--	2	Registration	10	--	75	15	100	2
Total		14	5	19						700	

pSt 2	Summer training (2)	--	2	2	PSt 1	--	50	25	25	100	-

L = Lecture, P/T = Practical/Tutorial, CW =Course Work, F.E.= Final Exam

Level 5
Semester (9)

Course code	Course Title	Credit hours			Prerequisite	Exam Marks				Total. marks	Exam Time (hrs)
		L.	P/T	Total		CW	P/T	F.E	Oral		
PT 518	Industrial Pharmacy(2) & Good Manufacturing Practice.	1	1	2	Pharmaceutics	10	25	50	15	100	2
PH 519	Toxicology & Forensic Medicine	2	1	3	Pharmacology (1)	10	25	50	15	100	2
PG 518	Nutraceuticals	1	--	1	Registration	10	--	90	--	100	1
PD 513	Medicinal Chemistry (3)	2	1	3	Heterocyclic chemistry	10	25	50	15	100	2
MP 514	Pathology	1	1	2	Registration	10	25	50	15	100	2
PG 519	Technology of natural drugs	1	--	1	Pharmaceutical Microbiology	10	--	75	15	100	1
	Elective Courses	2	--	2	Registration	10	--	75	15	100	2
Total		10	4	14						700	

Semester (10)

Course code	Course Title	Credit hours			Prerequisite	Exam Marks				Total. marks	Exam Time (hrs)
		L.	P/T	Total		CW	P/T	F.E	Oral		
PM 525	Public Health	2	--	2	Registration	10	--	75	15	100	2
PD 524	Drug Design	1	1	2	Heterocyclic chemistry	10	25	50	15	100	2
PB 524	Clinical Biochemistry	2	1	3	Biochemistry (1)	10	25	50	15	100	2
PT 529	Pharmaceutical Business administration	1	--	1	Registration	10	--	90	--	100	1
PP 528	Drug Marketing	1	--	1	Registration	10	--	90	--	100	1
MF 5210	First Aids & emergency Medicine	1	--	1	Pharmacology (1- 2)	10	--	75	15	100	1
PM 526	Pharmaceutical Biotechnology	2	1	3	Registration	10	25	50	15	100	2
	Elective Courses	2	--	2	Registration	10	--	75	15	100	2
Total		12	3	15						800	

L = Lecture, P/T = Practical/Tutorial, CW =Course Work, F.E.= Final Exam

The Faculty Departments and the subjects studied within each are as follows:

1- Department of Pharmaceutics

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PT 111	Pharmacy orientation	2	--	2
PT 122	Physical Pharmacy	2	1	3
PT 213	pharmaceutics	2	1	3
PT 224	Pharmaceutical Dosage Forms (1)	2	1	3
PT 315	Pharmaceutical Dosage Forms (2)	2	1	3
PT 416	Biopharmaceutics & Pharmacokinetics.	2	1	3
PT 427	Industrial Pharmacy (1)	2	1	3
PT 518	Industrial Pharmacy.(2) & Good Manufacturing Practice.	1	1	2
PT 529	Pharmaceutical Business administration	1	--	1
		16	7	23
PTE 01	Nano & Radiopharmaceuticals	2	--	2
PTE 02	Cosmetic Preparations	2	--	2

2- Department of Pharmacognosy

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PG 111	Medicinal Botany	1	1	2
PG 122	Pharmacognosy (1)	2	1	3
PG 213	Pharmacognosy (2)	2	1	3
PG 224	Pharmacognosy (3)	2	1	3
PG 315	Phytochemistry (1)	2	1	3
PG 326	Phytochemistry (2)	2	1	3
PG 417	Phytotherapy	2	1	3
PG 518	Nutraceuticals	1	--	1
PG 519	Technology of natural drugs	1	--	1
		15	7	22
PGE 03	Natural Drug Discovery	2	--	2
PGE 04	Internationally controlled drugs	2	--	2
PGE 05	Marine Natural Drugs	2	--	2

3- Department of Pharmacy Practice

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PP 111	Medical Terminology	1	--	1
MP 122	Psychology & Communication skills	1	--	1
PP 213	Pharmaceutical Ethics & Legislation	1	--	1
PP 324	Drug Information	1	--	1
PP 325	Hospital Pharmacy	2	--	2
PP 416	Clinical Pharmacy	2	1	3
PP 427	Pharmacy Practice	2	1	3
PP 528	Drug Marketing,	1	--	1
		11	2	13

4- Department of Pharmacology & Toxicology

Course Code	Course Title	Credit Hours		
		L	P/T	Total
MH 121	Histology & Anatomy	2	1	3
PH 212	Physiology	2	1	3
PH 223	Pathophysiology	2	--	2
PH 314	Pharmacology (1)	2	1	3
PH 325	Pharmacology (2)	2	1	3
PH 416	Pharmacology (3)	2	1	3
PH 417	Biostatistics	1	--	1
PH 428	Therapeutics	2	1	3
PH 519	Toxicology & Forensic Medicine	2	1	3
MF 5210	First Aids & emergency Medicine	1	--	1
		18	7	25
PHE 06	Geriatrics	2	--	2

5- Microbiology and Immunology

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PM 321	Pharmaceutical Microbiology	2	1	3
PM 322	Parasitology	1	1	2
PM 413	Medical Microbiology and Immunology	2	1	3
MP 514	Pathology	1	1	2
PM 525	Public Health	2	--	2
PM 526	Pharmaceutical Biotechnology	2	1	3
		10	5	15
PME 07	Advanced Immunology	2	--	2

6- Pharmaceutical Organic Chemistry

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PO 111	Pharmaceutical Organic Chemistry (1)	2	1	3
PO 122	Pharmaceutical Organic Chemistry (2)	2	1	3
PO 213	Pharmaceutical Organic Chemistry (3)	2	1	3
PO 224	Heterocyclic chemistry	2	1	3
PO 315	Spectroscopic Identification	1	1	2
		9	5	14
POE 08	Combinatorial Chemistry and Quantum Mechanics	2	--	2
POE 09	Polymers, Nano-chemistry and green chemistry	2	--	2

7- Department of Analytical Chemistry

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PA 111	Physical Chemistry	1	--	1
PA 122	Inorganic Chemistry	1	1	2
PA 213	Pharmaceutical Analytical Chemistry(1)	2	1	3
PA 224	Pharmaceutical Analytical Chemistry(2)	2	1	3
PA 315	Instrumental and Applied Analysis	2	1	3
PA 426	Quality Control of Drugs	2	1	3
		10	5	15
PAE 10	Therapeutic drug monitoring	2	--	2
PAE 11	Food analysis	2	--	2

8- Department of Medicinal Chemistry

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PD 411	Medicinal Chemistry (1)	3	1	4
PD 422	Medicinal Chemistry (2)	3	1	4
PD 513	Medicinal Chemistry (3)	2	1	3
PD 524	Drug Design	1	1	2
		9	4	13
PDE 12	Drug Targeting	2	--	2

9- Department of Biochemistry

Course Code	Course Title	Credit Hours		
		L	P/T	Total
PB 221	Biochemistry (1)	2	1	3
PB 312	Biochemistry (2)	2	1	3
PB 423	Nutrition	1	--	1
PB 524	Clinical Biochemistry	2	1	3
		7	3	10
PBE 13	Nutrition in Disease, Prevention and Cure	2	--	2

Attachment # 3

Matrix

Courses versus Program k-elements (NARS)

Matrix of the courses with the Program k-elements (NARS k-elements) is provided as supplementary excel sheet**.**

Attachment # 4

مادة (22): وصف مقررات البرنامج (Course Descriptions)

PT 111 Pharmacy orientation توجيه صيدلي

Incompatibilities (Physical, chemical and therapeutic), routes of drug administration; (oral, rectal, topical, parenteral, lung, nasal, ophthalmic, otic and vaginal), Prescription (definition, types; Simple, compound and Narcotic), different type of Pharmaceutical dosage forms, system of medicine, system for weight and measures (the apothecaries', avoirdupois & metric system, conversion of one system to the other), role of the pharmacist in health care team, pharmacy organization, ethics of pharmacy and pharmaceutical terminology (medical terminology, symbols and abbreviations).

- أشهر علماء الطب و الصيدلة من العرب – عند العرب - الصيدلة ـ الصيدلة في الأقطار الشرقية المصريين الصيدلة عند قدماء تاريخ الصيدلة: تطور التعليم الصيدلي في مصر

PT 122 Physical Pharmacy صيدلة طبيعية

Solubility and solution (types of solutions and colligative properties, solubility of gases in liquids, liquids in liquids, solid in liquids, distribution coefficient and its applications) - rheology of liquids (fundamental of rheology, viscosity & newtonian and non newtonian systems, application of rheology in pharmacy) - surface properties of liquids and solids (fundamentals of surface phenomena and interfacial tension, adsorption and its application in pharmacy and medicine) - stability and reaction kinetics (fundamental degradation pathways and reaction kinetics).

PT 213 Pharmaceutics صيدلانيات

Pharmaceutical calculation, pharmaceutical solutions : (definition, types), suspensions : definition, properties, formulation, problems in formulation, suspending agents), emulsions : definition, types, preparation of emulsions, application of emulsions, colloids : types of colloidal systems, stabilization of colloidal systems, properties of colloids

PT 224 Pharmaceutical Dosage Forms (1) مستحضرات صيدلية (1)

Solid preparations including: tablets (definition, advantages & disadvantages and types), capsules (definition, advantages & disadvantages and types (soft and hard), micro-encapsulation (definition and methods of preparations), suppositories (definition, anatomy and physiology of the rectum, absorption of drugs from the rectum, formulation, manufacture and quality control).

PT 315 Pharmaceutical Dosage Forms (2) مستحضرات صيدلية (2)

Semisolid preparations (structure, function & topical treatment of skin, ointments and creams: (definition, classification, evaluation and uses), cosmetics preparations (anatomy and physiology of the skin, skin-care products, antiperspirants and deodorants, hair - care products, colour cosmetics (lip colour, face make-up), dentifrices, baby care products), aerosols: theory, mechanisms, applications), equipment, sterile products (parenteral and ophthalmic preparations).

PT 416 Biopharmaceutics & Pharmacokinetics. الصيدلة الحيوية وحركية الدواء

Concept of Bioavailability (bioavailability and bioequivalence, absolute and relative bioavailability), factors affecting bioavailability, drug absorption, drug distribution, drug metabolism, drug excretion and pharmacokinetic parameters**.**

PT 427 Industrial Pharmacy (1) صيدلة صناعية (1)

Heat transfer: (introduction, theory, sources, mechanisms, applications and equipment), evaporation: (factors affecting rate of evaporation, equipments), drying: theory of drying, and dryers), crystallization: (theory and factors affecting crystallization and equipments), filtration and centrifugation: (theory of filtration, factors affecting filtration rate and filter aid and equipments).

PT 518 Industrial Pharmacy (2) & GMP **صيدلة صناعية** (2) وممارسة التصنيع الجيد

Size separation and size reduction: (mechanisms, factors affecting size reduction and equipments), size enlargement: (granulation and equipment), size analysis:(mechanisms, theories, factors affecting size analysis and equipments) mixing: (liquid, solid and semisolid mixing. Mixer selection and equipment), emulsification and homogenization: applications, theory & mechanisms, equipments), good manufacturing practices: (introduction,

quality management in the drug industry, quality assurance and good manufacturing practices for pharmaceutical products (GIVIP).

PT 529 Pharmaceutical Business administration إدارة الأعمال الصيدلية

The pharmacist as entrepreneur, starting or buying pharmacy, legal forms of ownership, selecting location and positioning of pharmacy, the planning process, financing and organizing pharmacy, pharmacy layout and merchandising, accounting and financial records, purchasing and inventory control, promotion and personal selling, personal relations and patient communication and consultation.

PG 111 Medical Botany نباتـات طبيــة

The course covers different plant tissues and the diagnostic cell contents (Ergastic cell contents); classification of the plant kingdom (Taxonomy).

PG 122 Pharmacognosy (1) عقاقير (1)

This course will encompass Introduction to pharmacognosy; drugs derived from medicinal leaves, flowers, Barks and Woods.

PG 213 Pharmacognosy (2) عقاقير (2)

This course will encompass the studying of the drugs derived from medicinal seeds, fruits, and herbs.

PG 224 Pharmacognosy (3) عقاقير (3)

This course will encompass the studying of the medicinal drugs derived from subterranean organs; unorganized drugs; animal derived drugs.

PG 315 Phytochemistry (1) كيمياء العقاقير (1)

This course will encompass the studying of plant primary metabolites; natural drugs related to carbohydrates, glycosides and tannins.

PG 326 Phytochemistry (2) كيمياء العقاقير (2)

This course will encompass the studying of plant primary metabolites; natural drugs related to Alkaloids, Volatile oils, and Bitter Principles; Marine Natural products; Natural toxins.

PG 417 Phytotherapy **العلاج بالأعشــاب**

This course will encompass the studying of herbal medicine: Principles, regulation and applications; studying the quality control methods of medicinal herbal materials.

PG 518 Nutraceuticals المواد الغذائية الصيدلية

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

PG 519 Technology of natural drugs تكنولوجيا العقاقير الطبيعية

The course covers introduction to plant tissue culture; Tools and Techniques; Applications of plant tissue culture; Natural drugs produced by plant tissue culture technology; Biotransformation of natural substances; Bioactive compounds produced by biotransformation techniques.

PP 111 Medical Terminology مصطلحات طبية

The language of medicine. Students will gain an understanding of basic elements, rules of building and analyzing medical words, and medical terms associated with the body as a whole. The student will define, interpret, and pronounce medical terms relating to structure and function, pathology, diagnosis, clinical procedures, oncology, and pharmacology. In addition to medical terms, common abbreviations applicable to each system will be interpreted.

MP 122 Psychology & Communication skills علم النفس ومهارات التواصل

Contemporary psychology, psychological processes, sensation, perception, conditioned learning, motivation, secondary psychological processes, behavior dynamics, mentee heath, skills of communication (verbal and non verbal)

PP 213 Pharmaceutical Ethics & Legislation تشريعات صيدلة وأخلاق المهنة

التعريف بقانون مزاولة مهنة الصيدلة والتسجيل بنقابة الصيادلة . التعريف بجداول المواد المخدرة وقواعد صرفها . قواعد فتح المؤسسات الصيدلية (صيدلية جديدة ، مخازن الأدوية ، مصانع الأدوية والمكاتب العلمية). استيراد الأدوية والمستحضرات الصيدلية والنباتات الطبية . أخلاقيات مهنة الصيدلة وعلاقة الصيدلي بالمريض . جميع أنواع المستحضرات الصيدلية .

PP 324 Drug Information معلومات الدواء

Drugs and Medications. Classification of different drugs. Drug side effects.

PP 325 Hospital Pharmacy صيدلة المستشفيات

Introduction to hospital pharmacy: (definition and structure of hospital pharmacy, pharmacy – patient relationship, and basic general functions of hospital pharmacy) - the hospital: (definition, classification, hospital functions, objectives of hospital pharmacy) - functional organization of hospital pharmacy: (administrative division, educational and training division, other specific divisions) - surgical dressing and suture materials: (absorbable sutures, synthetic absorbable suture, non-absorbable sutures and metallic sutures) - investigational drugs and hospital therapeutic committee

PP 416 Clinical Pharmacy صيدلة إكلينيكية

Definition and concepts of clinical pharmacy. Case history and patient history. Patient management approach of various toxic exposures. Clinical problems solving. Topics discussion including :(clinical drug interactions, adverse drug reactions, drug interference and clinical laboratory data).

PP 427 Pharmacy Practice ممارسة صيدلية

Concepts of pharmaceutical care, pharmacy profession, professional communication, patient counseling, problems solving skills, role of the pharmacist in management of symptoms of certain diseases such as: (GIT diseases, respiratory diseases, eye diseases and skin diseases).

PP 528 Drug Marketing التسويق الدوائي

Introduction of marketing: (pharmaceutical marketing and the commodity marketing) - the product development process in the pharmaceutical marketing, developing a marketing plan, performing a needs analysis, big picture analysis (SWOT analysis) - positioning statement and examples from the industry practices, simple forecasting formula - the budget elements of a product - a communication plan, definition and developing - the marketing research; (definition, objective, types of market research and methods) - recognizing trends; definition, types - recent trends of pharmaceutical marketing, ethical guidelines and regulations - pricing & reimbursement, pricing issue and the contribution of price elements such as discounts, bonuses, credit term - the new trends of pharmaceconomics studies and role in pricing - the comparison of pricing with the competitors.

MH 121 Histology & Anatomy علم الأنسجة والتشريح

Cytology, various tissues, heart, blood vessels, lymphatic organs, skin, systems (digestive and associated glands, respiratory, urinary, reproductive, central nervous system, endocrine glands and eye, Introduction, skeletal system, muscular system, auricular system, cardio vascular system, lymphatic system, nervous system, digestive system, respiratory system, uro-genital system, endocrine glands, blood, liver, spleen, lungs, kidney, stomach, intestine, aorta and cardiac muscle.

PH 212 Physiology علم وظائف الأعضاء

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.

PH 223 Pathophysiology علم وظائف الأعضاء المرضى

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).

PH 314 Pharmacology (1) فارماكولوجى (1)

A basic pharmacology course in which principles underlying the actions of drugs are presented; including pharmacokinetics, drug-receptor interactions, and drug metabolism.

The course is designed to introduce the student to principles that provide the foundation for the study of pharmacology and therapeutics. Students will be given a thorough introduction to pharmacologic terms, definitions and principles which are essential to understanding drug properties and actions. Focus will be on the pharmacologic agents related to cholinergic agents: neuromuscular blokers: adrenergic agents, pulmonary, allergic, dermatologic, and gastrointestinal disorders. Students will gain knowledge of pharmacokinetic principles of drug absorption, distribution and metabolism, and elimination.

PH 325 Pharmacology (2) فارماكولوجى (2)

Mechanism and site of action(s), prototypic examples, and therapeutic applications of drugs used in infectious & ophthalmic disorders Also, local anesthetics; cardiovascular agents; diuretics; hypolipidemic agents, antithrombolytic, anticoagulant, and thrombolytic drugs, agents for respiratory tract disorders and antihistamines, and Ca++/endocrine hormones.

PH 416 Pharmacology (3) فارماكولوجى (3)

Mechanism of action, biological effects, and therapeutic applications of CNS-acting agents, anti-inflammatory agents, immunomodulating agents, agents for gastrointestinal tract disease, hormonal agents, antimicrobial agents, and cancer chemotherapy.

PH 417 Biostatistics الإحصـــاء الحيـــوي

This course introduces statistical concepts and analytical methods as applied to data encountered in biotechnology and biomedical sciences. It emphasizes the basic concepts of experimental design, quantitative analysis of data, and statistical inferences. The course provides students a foundation to evaluate information critically to support research objectives and product claims and a better understanding of statistical design of experimental trials for biological products/devices.

PH 428 Therapeutics علاجيـــات

Classification, symptoms and treatment of certain diseases: Obstetrics and Gynaecology. Paediatrics, neonates and geriatrics. Blood diseases. C.N.S. diseases, Cardiovascular diseases and renal diseases.

PH 519 Toxicology & Forensic Medicine علم السموم والطب الشرعي

The principles, toxicity assessment, clinical, environmental, occupational, reproductive, and genetic, heavy metals toxicity, animal, plant and marine poisons, toxicity of pesticides and radiation hazards. It also covers immunotoxicology, drug induced toxicity, and drug abuse. Postmortem samples for detection of poisons, methods for detection, interpretation of results and writing of a report.

MF 5210 First Aids & emergency Medicine الإسعافات الأولية وطب الطوارئ

The correct procedures to be followed in the emergency care of a sick or injured person. The skills and knowledge critical to saving life and minimizing the severity of injury or sudden illness. Safety awareness and accident prevention are emphasized throughout the course.

PM 321 Pharmaceutical Microbiology الميكروبيولوجيا الصيدلية

Classification & Morphology of Microorganisms, Bacterial growth & cell death, General virology, General Mycology, Physical & chemical methods of sterilization & sterility test, Disinfection & preservation, Evaluation of Disinfectant & antimicrobial Agents,

PM 322 Parasitology طفيليـــات

Classical and modern parasitology concentrating on protozoan and worm parasites of major medical/veterinary importance. Topics include basic principles of parasitology, life cycles, epidemiology, host-parasite interactions, drug treatments and vector control programs.

PM 413 Medical Microbiology and Immunology الميكروبيولوجيا الطبية وعلم المناعة

Three major topics "bacteriology, mycology and virology". The important microorganism causing disease. Morphology and characters, virulence factors "surface antigen, toxins and enzymes", pathogenesis, the disease caused by infectious micro-organism, clinical and laboratory diagnosis, prophylaxis, epidemiology, vaccination and treatment. Molecular and cellular immunology, including antigen and antibody structure, function and reaction between them, effector mechanisms, complement, and cell mediated immunity. Autoimmunity, and vaccination.

MP 514 Pathology مبادئ علم الأمراض

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

PM 525 Public Health صحـة عامـة

Introduction to individual and population health by exploring health as an evolving and multidimensional concept. Historical and theoretical perspectives will be explored with a focus on chronic disease prevention, injury prevention, health promotion, and health.

PM 526 Pharmaceutical Biotechnology التقنية الحيوية الصيدلية

Molecular basis of Bacterial genetics The traditional and molecular methods strategically applied to problems related to microbial biotechnology and environmental microbiology. Industrial uses of microorganisms and efforts to genetically modify microorganisms for specific purposes. Topics include: history and development, microbial products, microbial biomass as a protein source, bioremediation, N2 fixation, detection and monitoring of genetically engineered microorganisms, sequence and phylogenetic analysis followed by probe design, and other modem techniques of environmental microbiology

PO 111 Pharmaceutical Organic Chemistry (1) (1) كيمياء عضوية صيدلية

A) Introduction : Atomic Structure, Electronegativity, chemical bonding , Hybridization aspect , Dipole moments , Molecular Orbital theory , Factors Affecting Electron Availability in bonds and individual atoms , Concept of acidity and basicity , Nueleophilicity .

B) Classes of organic compounds

1) Saturated hydrocarbons: Alkane and cycloalkane, Conformational isomers.

2) Alkyl halides: Synthesis and nomenclature, Substitution reactions, Elimination reactions.

C) Stereochemistry.

PO 122 Pharmaceutical Organic Chemistry (2) (2) كيمياء عضوية صيدلية

Unsaturated hydrocarbons: Alkenes , Alkyne, polygenes

Aromaticity: Aromatic Hydrocarbons, polynuclear Hydrocarbons.

Functional groups, Alcohols, phenol, ether and Thio ether .

PO 213 Pharmaceutical Organic Chemistry (3) (3) كيمياء عضوية صيدلية

Carbonyl containing compounds: Aldehydes & ketones, Acids and its derivatives, Sulphonic acid derivatives.

Nitrogen containing compounds: Nitro compounds , Amines, Amino acids and dipeptides .

Carbohydrates

PO 224 Heterocyclic chemistry كيمياء حلقية غير متجانسة

Nomenclature and Chemistry of organic heterocyclic compounds, five-membered heterocycles, and its fused derivatives (pyrrole, thiophere Furan and its derivatives, indole, six-membered heterocycls and its Fused derivatives pyridine, quinolines and isoquinolines, Seven-membered rings with one or two heteroatoms.

PO 315 Spectroscopic Identification الإثبات الطيفي

Structure elucidation of organic compounds using spectroscopy, Elemental analyses and Molecular formula determination, Introduction to spectroscopy, IR and Raman spectroscopy, Mass Spectrometry and NMR .

PA 111 Physical Chemistry كيميـاء فيـزيائـية

Thermochemistry, heat reactions, energy, enthalpy equations , Types of heat reaction, AHF, AHC, heat of solution, heat of neutralization, transition change , Hess's Law, its applications, and bond energy.

Thermodynamics, first law of thermodynamics . Second and third law of thermodynamics. 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, quantum yield , Colloids, types, characterization and preparation , Emulsion and sols and their stability

PA 122 Inorganic Chemistry كيمياء غير عضوية

Introduction to general chemistry, Types of chemical reactions – Calculations of solubility product constant of a precipitant calculations of concentrations of substances.
Analysis of anions – Analysis of cations – Analysis of mixture of anions and cations .

PA 213 Pharmaceutical Analytical Chemistry (1) كيمياء تحليلية صيدلية (1)

Theory, titration curves, indicators, applications. Titrations in non-aqueous media, classification of solvents, theory, applications. Precipitimetric titrations: solubility product principle, titration curves, Mohr's method, volhard's method, Fajan's method, application. Gravimetric analysis: theory, contamination of ppt, organic precipitatnts, homogenous precipitatrions, applications.

PA 224 Pharmaceutical Analytical Chemistry (2) كيمياء تحليلية صيدلية (2)

Redox titrations, theory, oxidation potentials, titration curves, redox indicators, selected oxidants and reductants, applications. Analysis of oils and fats: physical analysis, chemical analysis: acid value, saponification value, iodine value, rancidity, spectroscopic examination of oils and fats, UV-Visible, IR, X-ray.

PA 315 Instrumental and Applied Analysis تحليل آلي وتطبيقي

Electrochemical methods, electrode potential, reference electrodes, indicator electrode, applications. Conduct metric titrations: ionic conductance, definitionsm cell constant, conductance measurements, applications.
Polarography: Ilkovic equation, dropping mercury electrode, diffusion current, applications, derivatization polarography. Chromatography: paper, thin layer chromatography and electrophoresis.
High performance liquid chromatography: evaluation of chromatograms, instruments. Gas chromatography: GLC and GSC, columns, temperature settings and detectors. Water analysis: sampling, physical analysis, chemical analysis: determination of chloride, chlorine, ammonia, nitrate, nitrite and hardness.

PA 426 Quality Control of Drugs رقابة جودة الأدوية

Control and quality assurance, in process control and validation. Sampling process prior to analysis, analysis of raw materials and finished products using reference standards. Pharmacopeia methods of stability and stability testing of drugs. Performance and calibration of instruments used in pharmaceutical analysis. Validation of analytical methods and ISO and BSI.

PD 411 Medicinal Chemistry (1) (1) كيمياء دوائية

The course focuses on the chemistry of drugs, particularly on the effect of the physiochemical properties on drug action, drug – receptor interaction and the in vivo biotransformation of drugs. The course also reviews the drugs acting on the autonomic nervous system, cardio – vascular system, besides diuretic and local anesthetics drugs.

PD 422 Medicinal Chemistry (2) (2) كيمياء دوائية

The course reviews drug members action on the central nervous system, hormones and related drugs, prostaglandins, analgesics, antihistamine and gastro – intestinal drugs, with special emphasis on the structure activity relationships and mode of action.

PD 513 Medicinal Chemistry (3) (3) كيمياء دوائية

The course emphasizes the chemistry and mode of action of the chemotherapeutic agents, including antibacterial, antiviral, antifungal, antiprotozoal, anthelmintic and anticancer drugs.

PD 524 Drug Design تصميم الأدوية

This course focuses on the fundamental aspects and methodology involved in the drug design process. These include the general processes, lead optimization, QSAR and structure – based and mechanism – based design methodologies.

PB 221 Biochemistry (1) كيمياء حيوية (1)

Carbohydrates chemistry: Chemistry & functions of Polysaccharides, & of Mucopolysacharides Lipids chemistry: Chemistry of Fatty acids, Neutral Fats (Triglycerides), , Phospholipids, Sphingolipids, Lipoproteins, cholesterol & Atherosclerosis

Protein chemistry: Chemistry & functions of Proteins, Chemistry & functions of amino acids,Nutritional & Biological value of amino acids, Structure of Proteins, Determination of Protein Structure, Macromolecule protein & Hemoglobinopathies - Enzymes: nomenclature, composition & properties, Mechanisn of action, factors affecting enzyme activity, Enzymes in clinical significance - Vitamins: classification & Vitamin types, Fat-Soluble Vitamins A, D, E & K - Biological oxidation: importance - Oxidative stress & human disease

PB 312 Biochemistry (2) كيمياء حيوية (2)

Metabolism of carbohydrate: digestion & absorption, Aerobic & Anaerobic Glycolysis, Fructose, galactose, sorbitol metabolism, uronic acid pathway, Glycogen metabolism, glycogen storage disease, Kreb's cycle, Regulation of Kreb's cycle, fate of active acetate & CO2, Hexose monophosphate shunt, Gluconeogenesis, blood glusoe

Metabolism of Lipids: digestion & absorption of neutral fat, Beta oxidation, Fatty acid synthesis, Lipogenesis, depot fat, hormonal effect, Ketogenesis, ketolysis, Cholesterol functions & synthesis, bile acids functions, Metabolism of phospholipids, role of liver in lipid metabolism & hormonal regulation

Metabolism of proteins: protein turnover, Urea cycle, metabolism of ammonia, Individual amino acids metabolism

Chemical structure of Nucleic Acids (RNA, DNA)

PB 423 Nutrition علـم التغـذيـة

Calorimetry: basal metabolic rate (BMR), measurements of energy requirements and RDA.

Nutrients: carbohydrates, fats, proteins, minerals, vitamins, requirements for adults and during infancy, childhood and pregnancy. Diet therapy in: Obesity, under weight and Diabetes mellitus.

PB 524 Clinical Biochemistry كيمياء حيوية إكلينيكية

Basic concepts in laboratory investigation. Diagnostic enzymology. Water, electrolytes and hydrogen ion disorders. Respiratory disorders. Disorders of kidney and urinary tract. Cardiovascular disorders. Porphyrins, the hemoproteins, bile pigments and jaundice. Gastrointestinal and pancreatic disorders. Disorders of carbohydrate metabolism. Disorders of amino acids and protein metabolism. Disorders of lipid metabolism. Disorders of nucleic acids, purine and pyrimidine metabolism.

UR 111 English Language اللغة الانجليزية

Training in reading, Conversation comprehension, basic grammatical rules, writing and translation.

UR 112 Human Rights حقوق الإنسان

For students taking this course, the aims are :

Knowing the different information about human rights in Egypt including; the human rights in Islamic law, civil rights, political rights, economic rights and social rights.

Understanding the basic knowledge of pharmaceutical care, patient care and storage of medicine.

UR 123 Quality assurance of education ضمان جودة التعليم

مفهوم ومبادئ ضـمان جودة التعليم – توصـيف البرنامج - توصـيف المقرر الفاعلية التعليمية - القدرة المؤسـسـية – المعايير القومية الأكاديمية المرجعية لكلية الصيدلة (NARS) الدراسة الذاتية - المستخرجات المستهدفة من البرنامج

ST Summer Training: التدريب الصيفي

- Every student should complete of least 300 hours of training in pharmacy settings such as community or hospital pharmacies, pharmaceutical Firms or research institutes. The student should learn how to communicate with patients, medical team and coworkers. The student also should know how to manage, control and elesing the pharmaceutical dosage form on shields, Finally, the student , should know the regulation of OTC and the application of pharmacy practice,

(Elective Courses)

PTE 01 Nano & Radiopharmaceuticals المستحضرات الصيدلية المتناهية الصغر والإشعاعية

Introduction to nanotechnology, nano-disperse system including (nano-emulsion and nano-suspension) - preparation and their application - nano-particles (nano-crystals and polymeric nano-particles) preparation and their application and nano-metals (silver, gold, carbon and nano-tube).

PTE 02 Cosmetic Preparations مستحضرات التجميل

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.

PGE 03 Natural Drug Discovery **اكتشاف أدوية طبيعية**

Target Identification and Diversity of Natural Products. Screening Methodologies and Assays. Mechanism-Based Design. Structure-Based Design. Chemical Analoging. In vitro and in vivo Testing. Issues Commonly Encountered During Early Stage Development

PGE 04 Internationally controlled drugs **العقاقير الخاضعة للرقابة**

The course deals with narcotic and psychotropic drugs under international control : classification, illicit products, uses, patterns of abuse, detectain, identification and analysis.

PGE 05 Marine Natural Drugs المستحضرات الطبيعية البحرية

Classification, isolation and identification biological activity, uses and limtations.

PHE 06 Geriatrics طـب المســـنين

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.

PME 07 Advanced Immunology علم المناعة المتقدم

Eukaryotic and prokaryotic cells, nomenclature of microorganisms, structure and form of the bacterial cells, spores, mycoplasma or PPLO, actinomycetes. Rickettsiae, viruses, eukaryotic microorganisms (fungi), bacterial genetics, molecular genetics, physiology of microorganisms, the growth curve microbial metabolism.

POE 08 Combinatorial Chemistry and Quantum Mechanics الكيمياء التوافقية وميكانيكية الكم

It includes: materials science, diversity-oriented libraries, virtual libraries and molecular modeling, medicine and pharmaceuticals drug delivery, synthetic receptors, biochem ligands, biosensors and cheminformatics.

POE 09 Polymers, Nano-chemistry and green chemistry البوليمرات وكيمياء النانو والكيمياء الخضراء

Polymers are long chain giant organic molecules assembled form many smaller molecules called monomers. Studying of polymers includes addition polymers, condensation polymers, thermoplastics, thermosets and natural polymers. Green chemistry is a highly effective approach to pollution prevention. Design chemical products for increased, more facile reuse or recycling, it applies innovative scientific solutions to real-world environmental situations.

PAE 10 Therapeutic drug monitoring متابعة الدواء العلاجية

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

PAE 11 Food analysis تحليل الغذاء

Introduction to food analysis, Analysis of proteins, kjeldahl method, Analysis of oils and fats, Analysis of carbohydrate, Analysis of food additives(colouring agent, preservatives,……),and Genetically modified foods.

PDE 12 Drug Targeting التهديف الدوائي

This course focuses on the fundamental concepts of drug – receptor interaction and the different sites of drug action, including enzymes and nucleic acids. Different methods used to increase drug specificity and delivery of drugs to specific target sites. Applications to and examples of different drug classes are presented.

PBE 13 Nutrition in Disease, Prevention and Cure التغذية والأمراض : الوقاية والعلاج

Basic concept of food, nutrition and health. Food groups and the concept of a balanced diet. Nutritional needs during the life cycle (infancy to old age) including physiological conditions like pregnancy and lactation. Major nutritional deficiency diseases- Protein Energy Malnutrition, Vitamin A deficiency, Iron deficiency anemia, Iodine deficiency disorders, their causes, symptoms, treatment and prevention. Life style related diseases- hypertension, diabetes mellitus, and obesity-their causes and prevention through dietary/lifestyle modifications. Social health problems- smoking, alcoholism, drug dependence and Aquired Immuno Deficiency Syndorme (AIDS). Common aliments- cold, cough, fevers, diarrhea, constipation-their causes and dietary treatment.

Attachment # 5

Matrix of the coherence between teaching and learning methods, assessment methods with the Program k-elements (NARS k-elements)

Attachment # 6

Students' evaluation and grading system

Grades are a measure of the performance of a student in an individual course

Grade Expression	Grade Scale	Grade Point Average Value* (GPA)	Numerical Scale of Marks
Excellent	A	4	≥ 90 %
	A-	3.7	85 – < 90 %
Very Good	B+	3.3	82.5 – < 85 %
	B	3	77.5 – < 82.5 %
	B-	2.7	75 – < 77.5 %
Good	C+	2.5	72.5– < 75 %
	C	2.3	67.5 – < 72.5 %
	C-	2	65 – < 67.5 %
Satisfactory	D+	1.3	62.5 – < 65 %
	D	1	60 – < 62.5 %
Fail	F	0	< 60 %

يحسب للطالب من بين تقديراته في المقررات الدراسية كل من :

- المعدل الفصلي : (هو متوسط ما يحصل علية الطالب من نقاط في الفصل الدراسي الواحد ويقرب إلى رقمين عشريين فقط) ويتم حسابه كالآتي :

$$\text{المعدل الفصلي GPA} = \frac{\text{مجموع حاصل ضرب النقاط} \times \text{عدد الساعات المعتمدة المكتسبة}}{\text{مجموع الساعات المعتمدة}}$$

- المعدل التراكمي : (هو متوسط ما يحصل علية الطالب من نقاط خلال الفصول الدراسية ويقرب إلى رقمين عشريين فقط) ويتم حسابه كالآتي

$$\text{المعدل التراكمي العام cGPA} = \frac{\text{مجموع حاصل ضرب النقاط} \times \text{عدد الساعات المعتمدة لكل الفصول}}{\text{مجموع الساعات المعتمدة المسجلة}}$$

كلية الصيدلة - جامعة المنصورة

مصفوفة توافق بين مقررات برنامج بكالوريوس الصيدلة الاكلينيكة (اللائحة الموحدة والمعدلة و NARS

	course name	course code	MAIN 1- FUNDMENTAL KNOWLED							DOMAIN 2- PROFESSIONAL AND ETHICAL PRACTICE																		DOMAIN 3 - PHARMACEUTICAL CARE										DOMAIN 4- PERSONAL PRACTICE						
			(1-1)							(2-1)			(2-2)				(2-3)		(2-4)				(2-5)			(2-6)		(3-1)				(3-2)						(4-1)			(4-2)		(4-3)	
			1-1-1	1-1-2	1-1-3	1-1-4	1-1-5	1-1-6	1-1-7	2-1-1	2-1-2	2-1-3	2-2-1	2-2-2	2-2-3	2-2-4	2-3-1	2-3-2	2-4-1	2-4-2	2-4-3	2-4-4	2-5-1	2-5-2	2-5-3	2-6-1	2-6-2	3-1-1	3-1-2	3-1-3	3-1-4	3-2-1	3-2-2	3-2-3	3-2-4	3-2-5	3-2-6	4-1-1	4-1-2	4-1-3	4-2-1	4-2-2	4-3-1	4-3-2
1	Physical & Inorganic Chemistry	PC 101	X		X								X		X	X	X	X																				X			X	X	X
2	Pharmaceutical Organic chemistry -I	PC102	X		X								X		X																							X					X
3	Biophysics	MD101	X				X										X																				X	X		X	X	X	X
4	Botany and medicinal plants	PG 101	X		X		X						X	X			X																				X			X			X
5	Cell Biology	MD 102	X	X			X										X	X										X			X						X	X		X	X	X	X
6	Mathematics and statistics	MS 101			X		X	X	X							X										X	X											X					
7	Pharmaceutical Organic chemistry-II	PC 203	X		X								X		X									X													X		X				X
8	Pharmaceutical Analytical chemistry-I	PC 205	X		X								X		X	X	X	X																				X			X	X	X
9	Pharmacognosy -I	PG 202	X	X	X	X							X	X			X																				X			X			X
10	Histology	MD 203	X						X								X							X																X			
11	Physical pharmacy	PT 201	X										x																									x					x
12	Pharmacy orientation	PT 202	X	X									X																		X				X					X			X
13	Human rights and Fighting corruption	HU 201	X							X	X																														X	X
14	Pharmaceutical Organic chemistry-III	PC 304			X								X		X									X							X					X		X				X
15	Pharmaceutical Analytical chemistry-II	PC 306	X		X								X		X	X	X																					X					X
16	Pharmacognosy -II	PG 303	X	X	X	X							X	X			X																				X			X			X
17	Anatomy	MD 304	X						X								X							X																X			
18	Physiology	MD 305	X									X																	X												X	X		
19	Medical Terminology	MD311		X																			X																		X			X
20	Biochemistry -I	PB 401	X	X	X		X	X					X				X	X										X			X						X	X		X	X	X	X
21	Phytochemistry -I	PG 404	X		X	X							X	X			X																					X			X			X

22	Instrumental Analysis	PC 407	X		X								X		X	X	X	X																			X			X		
23	General Microbiology and Immunology	PM 401	X	X			X																	X	X											X					X		X
24	Parasitology	MD 406	X	X			X	X	X																		X									X			X			X
25	Pharmaceutical dosage forms-I	PT 403	X		X											X																				X						X
26	Pharmacy legislation	PT 404	X	X						X								X																		X						X
27	Pharmacology-I	PO 501				X																			X				X						X			X				
28	Pharmaceutical microbiology	PM 502	X	X	X	X								X		X		X																	X							X	
29	Pharmaceutical dosage forms-II	PT 505	X		X											X																				X						X
30	Biochemistry-II	PB 502	X	X	X		X	X					X				X								X			X							X	X		X	X	X	X
31	Phytochemistry-II	PG 505	X		X	X							X	X			X																			X			X			X
32	Pathophysiology	MD 507	X				X																		X			X										X	X		X
33	Pharmacy Administration	PT 506	X					X												X				X											X		X	X			X
34	Pharmacology-II	PO 602				X														X					X				X										X		
35	Pharmaceutical technology	PT 607	X					X	X					X	X																						X				X
36	Community pharmacy practice	PP 601	X			X	X																								X		X	X						X
37	Pharmaceutical analysis and quality control	PC 608	X	X	X	X					X			X	X	X	X	X					x			X							X				X	X	X
38	Quality Control of Herbal Drugs	PG 606	X										X										x																		X
39	Pathology	MD 608		X		X					X																X										X				X
40	First Aid	MD 609	X							X									X									X											X		
41	Pharmacology-III	(PO 703)				x														X							x					x			x					x
42	Medicinal Chemistry I	(PC 709)	X	X		X		X									X			X								X				X	X		X		X			X
43	Hospital Pharmacy	(PP 703)	x			x				x							X																			x		X			x
44	Pharmaceutical Biotechnology	(PM 703)	X	X	X				X				X	X	X																	X				X		X	X		X
45	Clinical Pharmacy 1	(PP 702)				x	x			x										X					x							x						x			x
46	Clinical Microbiology	(PM 704)	X	X			X	X	X											X						X	X							X				X			

47	Controlled Drug Delivery Systems	(PT 710)	X																							X											X		X					X
48	Radio-Pharmaceuticals	(PT 708)	X														X																				X		X					X
49	Medicinal chemistry-2	(PC 810)	X			X		X													X											X				X	X		X		X			X
50	Clinical biochemistry	PB 803	x	x		x	x	x			x										x			x				x					x						x		x	x	x	x
51	Public health and preventive medicine	(PM 810)	X					X		X		X																	X		X						X	X	X		X			
52	Biopharmaceutics and pharmacokinetics	(PT 809)							x									x					x					x											x		x			x
53	Drug marketing	(PP 806)	X					X	X	X											X					X	X											X	X					X
54	Management of oncological diseases	(PP 805)	x			x		x		x																		x							x	x		x						x
55	Clinical pharmacy -2	(PP 804)				x	x			x											X							x					x			x					x			x
56	Clinical Pharmacokinetics	(PP 907)				x																						x								x								x
57	Elective Course (Advanced Pharmaceutical Analysis-	(PC E12)	x		x								x		x	x	x	x							x													x	x			x	x	x
58	Therapeutics 1	(PO 905)				X	X														X											X							X				X	
60	Clinical Nutrition	(PP904)	X	X		X	X	X			X										X			X				X					X						X		X	X	X	X
61	Therapeutics -2	(PO 007)				X	X														X											X							X				X	
62	Management of dermatological and	(PP 008)	x			x			x	x											X											x				x		x						x
63	Management of Pediatrics diseases	(PP 009)	x			x		x		x																		x							x	x		x						x
64	Management of Cardiovascular diseases (PP	(PP 010)	x			x			x	x											X											x				x		x						x
65	Management of gastrointestinal diseases	(PP 011)	x			x		x		x																		x							x	x		x						x
59	Treatment of respiratory diseases	(PP 012)	x			x		x				x																x				x			x	x		x						x
66	Toxicology and forensic chemistry	(PO 904)				X																X										X			X							X	X	
67	Drug information	(PP 013)						x	x															x										x							x			x
68	Antimicrobial Agents	(PM E6)	X		X	X	X			X			X								X								X	X							X	X	X		X			X
69	Cosmetic Preparations	(PT E14)	X		X								X			X																							X					X
70	Hospitals training		x	x		x	x	x	x	x	x	x		x		x	x			X	X			x							x	x	x		x	x	x	X	X		X			X

Coherance between Teaching & learning methods, assesment methods and Pharmacy program learning outcomes (Credit hours system)

	DOMAIN 1- FUNDMENTAL KNOWLEI							DOMAIN 2- PROFESSIONAL AND ETHICAL PRACTICE																		DOMAIN 3 - PHARMACEUTICAL CARE										DOMAIN 4- PERSONAL PRACTICE						
	(1-1)							(2-1)				(2-2)				(2-3)		(2-4)				(2-5)			(2-6)		(3-1)				(3-2)						(4-1)			(4-2)		(4-3)	
	1-1-1	1-1-2	1-1-3	1-1-4	1-1-5	1-1-6	1-1-7	2-1-1	2-1-2	2-1-3	2-1-4	2-2-1	2-2-2	2-2-3	2-2-4	2-3-1	2-3-2	2-4-1	2-4-2	2-4-3	2-4-4	2-5-1	2-5-2	2-5-3	2-6-1	2-6-2	3-1-1	3-1-2	3-1-3	3-1-4	3-2-1	3-2-2	3-2-3	3-2-4	3-2-5	3-2-6	4-1-1	4-1-2	4-1-3	4-2-1	4-2-2	4-3-1	4-3-2
Teaching and learning methods																																									
Developed lecture	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							
Practical work and tutorials			x	x	x							x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x				x	x	x	
Hybrid learning	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							
Collaborative learning		x																																	x	x		x			
Self-learning	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x					x
Simulation based learning			x																																			x			
Problem – based learning															x												x									x	x				
Case study					x	x														x						x	x		x				x	x	x	x				
Presentation																									x	x										x	x	x	x	x	x	x
Computer aided learning			x	x										x									x	x																		
Reciprocal learning																											x								x	x		x		x	
Demos										x									x						x	x								x	x			x		x	
Assesment methods																																									
Semester work	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Practical/ tutorial exam			x	x	x							x	x	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Written exam	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x							
Oral exam	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x