Course specification
2017- 2018
Faculty of Pharmacy
Mansoura University

Second Level | **Heterocyclic Chemistry**

University: Mansoura University (MU)
Faculty: Pharmacy
Department: Pharmaceutical Organic Chemistry
Course title: Heterocyclic chemistry
Course code: PO 224

Program on which the course is given	B. Pharm
Academic Level	Second Level, First semester, 2017-2018
Date of course specification approval	11/4/2018

1. Basic Information: Course data:

Course title:	**Heterocyclic chemistry**	**Code: PO224**
Specialization:	**Pharmaceutical sciences**	
Prerequisite:	**Registration**	
Teaching Hours:	**Lecture: 2**	**Practical: 1**
Number of units: (credit hours)	**3**	

2. Course Aims:

2.1. Gain an understanding of the basic principles of organic chemistry.
2.2. Have a good idea about stereo-chemistry and organic reactions to help in understanding of the next applied sciences.
2.3. 3. Be capable to synthesize and prepare many organic compounds

3. Intended learning outcomes (ILO_S):

a- Knowledge and understanding

a1	Identify the principles of basic and pharmaceutical sciences.
a2	Define the physical and chemical properties of various substances used in preparation of medicines.
a3	Enumerate the theories of synthesis, purification and identification methods of chemicals, natural and pharmaceutical compounds.

b- Intellectual skills

b1	Recommend good laboratory practice (GLP) and good safety practice (GSP) guidelines in pharmaceutical research.
b2	Design appropriate methods for synthesis, purification and identification of various chemicals and pharmaceutical compounds.
b3	Interpret experimental data and published literatures, based on relevant chemical, pharmaceutical and statistical principles.
b4	Predict the physical and chemical properties and biological activity of natural and synthetic compounds based on molecular structure.

c- Professional and practical skills

c1	Handle and dispose hazardous chemicals, biological and pharmaceutical preparations safely.
c2	Apply appropriate methods for, synthesis, purification, and identification of active substances from different origins.
c3	Conduct experimental and research studies and present, analyze and interpret the results.
c4	Apply different qualitative and quantitative chemical methods for identification of raw materials as well as pharmaceutical preparations.

d- General and transferable skills

d1	Interact effectively in team working.
d2	Practice independent learning needed for continuous professional development.
d3	Promote critical thinking, problem-solving, decision-making, and time managing capabilities.

4. Contents:

Week No	Topics	No. of hours	Lecture credit hours	Practical credit hours
1.	HETEROCYCLIC COMPOUNDS : Nomenclature and classification	2	2 hours	
2.	FIVE-MEMBEED HETEROCYCLES : Pyrrole, furan, thiophen and indole and its derivatives	4		
3.	FUSED HETEROCYCLES OF PYRROLE AND ITS DERIVATIVES	2	2 hours	

4.	COMPOUNDS WITH TWO OR MORE HETEROATOMS	2	2 hours	
5.	SIX MEMBERED HETEROCYCLES	2	2 hours	
6.	QUINOLINES AND ISOQUINOLINES	4	2 hours	
7.	SIX-MEMBERED RINGS WITH ONE OXYGEN ATOM	2	2 hours	
8.	SIX-MEMBERED RINGS WITH TWO NITROGEN ATOMS	4	2 hours	
14.	SIX-MEMBERED RINGS WITH TWO DIFFERENT HETEROATOMS	2	2 hours	
	Practical topics			
Week No	**Topics**	**No. of hours**	**Lecture credit hours**	**Practical credit hours**
1.	Separation of solid binary mixtures of organic compounds	8		
2.	Organic synthesis (synthetic strategies)	2		1 hour
3.	Synthesis of ethyl acetate ester	2		1 hour
4.	Synthesis of methyl salicylate ester	2		1 hour
5.	Synthesis of acetyl salicylic acid	2		1 hour
6.	Synthesis of acetanilide and glucosazone	2		
7.	Synthesis of nitrotoluene and nitronaphthalene	2		1 hour
8.	Synthesis of iodoform and azodye	2		1 hour

5. Teaching and learning Methods:

5.1	Lectures using whiteboard
5.2	Laboratory equipments
5.3	Models
5.4	Animation files
5.5	Lectures using Data show, PowerPoint presentations

6. Student Assessment:

a- Assessment methods

1. Quizzes	To assess understanding, intellectual and professional skills
2. Oral exam	To assess knowledge, understanding, intellectual skills, general skills and confidence
3. Practical exam	To assess professional and practical skills
4. Lab. reports	To assess the skills of problem-solving and date presentation
5. Written exam	To assess understanding, intellectual and professional skills

b- Assessment schedule

Assessment 1	Mid-term	5th week
Assessment 2	Oral Practical	6th week and
Assessment 3	Practical	7th and 11th week
Assessment 4	Written	15th week
Assessment 5	Oral	15th week

c- Weighting of assessments

1.	Mid-term examination	10 %
2.	Final-term examination	50 %
3.	Oral examination	15 %
4.	Practical examination and Semester work	25 %
Total		100 %

7. List of References

No	Reference	Type
1.	Practical course notes and lectures notes prepared by the department staff members	Course notes
2.	Organic Chemistry: Structure and Reactivity by Seyhan N. Hardcover - Jul 2003)	Book
3.	Handbook of Heterocyclic Chemistry, Second Edition by Alan R. Katritzky and Pozharskii (Paperback - Oct 16, 2000	Book
4.	Pine, Hendrickson, Cram and Hammond, Organic Chemistry •	Book
5.	Joule, Mills and Smith, Heterocyclic Chemistry	Book

8. Matrix of knowledge and skills of the course

No	Course contents	Study Week	ILOS			
			Knowledge & understanding	Intellectual skills	Professional and practical skills	General & transferable skills
1.	HETEROCYCLIC COMPOUNDS : Nomenclature and classification	1st	a1	b1, b2	c1, c2	d2,d3
2.	FIVE-MEMBEED HETEROCYCLES : Pyrrole, furan, thiophen and indole and its derivatives	2nd and 3rd	a2, a3	b2, b3	c1, c3	d2
3.	FUSED HETEROCYCLES OF PYRROLE AND ITS DERIVATIVES	4th	a2	b2, b4	c1, c2, c3	d2,d3
4.	COMPOUNDS WITH TWO OR MORE HETEROATOMS	5th	a3	b4	c2	d1, d2
5.	SIX MEMBERED HETEROCYCLES	6th	a2, a3	b3	c1, c4	d2,d3
6.	QUINOLINES AND ISOQUINOLINES	7th and 8th	a2, a3	b2,b3	c1, c3	d1, d2,d3
7.	SIX-MEMBERED RINGS WITH ONE OXYGEN ATOM	9th	a3	b3,b4	c2, c4	d1, d2
8.	SIX-MEMBERED RINGS WITH TWO NITROGEN ATOMS	10th and 11th	a2, a3	b2,b3	c1, c2, c3	d2,d3
9.	SIX-MEMBERED RINGS WITH TWO DIFFERENT HETEROATOMS	12th	a3	b4	c1, c4	d1, d2

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