



Course specification
2019- 2020
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, Second semester
Date of course specification approval	6/5/2020

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.



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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	
2-3	FIVE-MEMBERED HETEROCYCLES : Pyrrole, furan, thiophen and indole and its derivatives	4	2 hours	
4.	FUSED HETEROCYCLES OF PYRROLE AND ITS DERIVATIVES	2	2 hours	



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5.	COMPOUNDS WITH TWO OR MORE HETEROATOMS	2	2 hours	
6.	SIX MEMBERED HETEROCYCLES	2	2 hours	
7.	Mid term exam			
8-9.	QUINOLINES AND ISOQUINOLINES	4	2 hours	
10.	SIX-MEMBERED RINGS WITH ONE OXYGEN ATOM	2	2 hours	
11-12.	SIX-MEMBERED RINGS WITH TWO NITROGEN ATOMS	4	2 hours	
13.	SIX-MEMBERED RINGS WITH TWO DIFFERENT HETEROATOMS	2	2 hours	
Practical topics				
Week No	Topics	No. of hours	Lecture credit hours	Practical credit hours
1-4	Separation of solid binary mixtures of organic compounds	8		
5.	Mixture separation Exam			
6.	Organic synthesis (synthetic strategies)	2		1 hour
7.	Mid term exam			
8.	Synthesis of ethyl acetate ester	2		1 hour
9.	Synthesis of acetyl salicylic acid	2		1 hour
10.	Synthesis of glucosazone	2		
11.	Synthesis of nitrotoluene nitronaphthalene	2		1 hour
12.	Synthesis of nitronaphthalene	2		
13.	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 data presentation
5. Written exam	To assess understanding, intellectual and professional skills

b- Assessment schedule

Assessment 1	Mid-term	7 th week
Assessment 2	Practical	5 th and 14 th week
Assessment 3	Written	15 th week
Assessment 4	Oral	15 th 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
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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	1 st	a1	b1, b2	c1, c2	d2,d3
2.	FIVE-MEMBERED HETEROCYCLES : Pyrrole, furan, thiophen and indole and its derivatives	2 nd and 3 rd	a2, a3	b2, b3	c1, c3	d2
3.	FUSED HETEROCYCLES OF PYRROLE AND ITS DERIVATIVES	4 th	a2	b2, b4	c1, c2, c3	d2,d3
4.	COMPOUNDS WITH TWO OR MORE HETEROATOMS	5 th	a3	b4	c2	d1, d2
5.	SIX MEMBERED HETEROCYCLES	6 th	a2, a3	b3	c1, c4	d2,d3
6.	QUINOLINES AND ISOQUINOLINES	8 th and 9 th	a2, a3	b2,b3	c1, c3	d1, d2,d3
7.	SIX-MEMBERED RINGS WITH ONE OXYGEN ATOM	10 th	a3	b3,b4	c2, c4	d1, d2
8.	SIX-MEMBERED RINGS WITH TWO NITROGEN ATOMS	11 th and 12 th	a2, a3	b2,b3	c1, c2, c3	d2,d3
9.	SIX-MEMBERED RINGS WITH TWO DIFFERENT HETEROATOMS	13 th	a3	b4	c1, c4	d1, d2

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