Course Specification
(Bachelor)

Course Title:	Heterocyclic Organic Chemistry
Course Code:	CEM232
Program:	Chemistry
Department:	Chemistry
College:	Science
Institution:	Majmaah University
Version:	TP153
Last Revision Date:	9 December 2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		
3. Level/year at which this course is offered: (level 4/ 2nd year.)					
4. Course General Description:					

- The course of Heterocyclic Chemistry presented in the fourth level with 3 credit hours. This course provides a systematic study of the theories and principles of heterocyclic compounds with a focus on the aromatic heterocyclic compounds. This course provides concepts and knowledge in nomenclature, synthesis, reactions and physical properties of heterocyclic compounds, with practical section include synthesis of selective heterocyclic compounds

5. Pre-requirements for this course (if any):

Organic chemistry 2 (CEM231)

6. Co-requisites for this course (if any):

NONE

7. Course Main Objective(s):

- The course main objective make student able to define fundamental theoretical of heterocyclic chemistry.
- Provide concepts and knowledge in nomenclature, synthesis, reactions and physical properties of heterocyclic compounds.
- covers heterocyclic compounds. Containing one O-, N-, and S - heteroatom in five- and six- membered ring and heterocyclic compounds containing two heteroatoms in five-, and six-membered ring synthesis and reactions.
- Identify the medical and biological importance of some of these heterocyclic compounds and its aspect of benefit.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	68	100
2	E-learning	-	-
3	Hybrid • Traditional classroom • E-learning	-	-
4	Distance learning	-	-

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	34
2.	**Laboratory/Studio**	34
3.	**Field**	-
4.	**Tutorial**	-
5.	**Others (specify)**	-
Total		68

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**Define the concepts and principles of heterocyclic organic chemistry of five and six memebered rings,classification, nomenclature, preparation and reactions along with the ability to evaluate their aromaticity**	**K1**	**Lectures. - Seminars. Discussions - Brainstorming**	**Written and electronic Exams, home work**

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.2	Recognize laboratory skills, quality control standards, and the concepts of experimental chemistry	K2	-Lectures. - Seminars. - Discussions - Brainstorming	Written and electronic Exams
2.0	**Skills**			
2.1	Perform the Laboratory experiments using the right scientific methods and proper safety procedures	S1	Practical sections	Practical exam
2.3	Demonstrate the ability to use modern technology and statistical applications that are used in the various fields of chemistry	S3	Lectures,	Home work
3.0	**Values, autonomy, and responsibility**			
3.1	Apply standards of integrity, transparency, and ethical behavior in various Academic and professional fields	V1	Practical section	continuous assessment

C. Course Content

No	List of Topics	Contact Hours
1.	Fundamental theory of heterocyclic chemistry. Classification and nomenclature of heterocyclic compounds.	6
2.	Chemistry of five membered aromatic heterocyclic compounds contain one heterocyclic atom such as (pyrrole furan and thiophene) and some of their derivatives with an emphasis on structural characteristics, physical and chemical properties, Synthesis and reactions.	4

3.	Chemistry of fused 5-membered heterocyclic compounds with an emphasis on structural characteristics, physical and chemical properties, Synthesis and reactions.	**4**
4.	Chemistry of six membered aromatic heterocyclic compounds contain one heterocyclic atom and some of their derivatives with an emphasis on structural characteristics, physical and chemical properties, Synthesis and reactions.	**4**
5.	Chemistry of fused 6-membered heterocyclic compounds with an emphasis on structural characteristics, physical and chemical properties, Synthesis and reaction**.**	**4**
6.	Chemistry of five membered ring heterocyclic compounds with two or more than one heteroatom with an emphasis on structural characteristics, physical and chemical properties, Synthesis and reactions.	**4**
7.	Chemistry of six membered ring heterocyclic compounds with two or more than one heteroatom with an emphasis on structural characteristics, physical and chemical properties, Synthesis and reactions.	4
8.	the medical and biological importance of some of these heterocyclic compounds and its aspect of benefit	4
9.	Practical part : Synthesis of heterocyclic compound, Perform the standard techniques used in practical heterocyclic compounds	34
Total		68

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Mid-term exam**1**	7th	10%
2.	Mid-term exam2 (written)	12th	10%
3.	Electronic exam (distance)	9-10th	10%
4.	Problem solving (group work), oral presentation, home work	3- 12th	10%
5	Continuous assessment (practical)	2-15th	10%
6	Practical exam	17th	10%
7	Final exam (written)	17-19th	40%

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	2. Louis D. Quin, John Tyrell, "Fundamentals of Heterocyclic Chemistry", 2010
Supportive References	John A. Joule, Keith Mills, "Heterocyclic Chemistry", 2010
Electronic Materials	http://www.organic-chemistry.org/ http://www.acdlabs.com/iupac/nomenclature/ http://www.chem1.com/acad/webtext/gas/gas_3.htm. http://www.chemistry.ohio-state.edu. Elsevier (www.sciencedirect.com) Springerlink (**www.springerlink.com**)
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Class room, **labs**
Technology equipment (projector, smart board, software)	data show, Smart Board, chemdraw, chemsketch
Other equipment (depending on the nature of the specialty)	**Chemical material and apparatus**

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	students	indirect
Effectiveness of Students assessment	staff	Direct **(internal report)**
Quality of learning resources	students	indirect
The extent to which CLOs have been achieved	staff	Direct(PLO assessment)
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**CHEMISTRY COMMITTE**
REFERENCE NO.	**17**
DATE	**16/12/2024**