Course Specifications

Course Title:	**Heterocyclic Chemistry**
Course Code:	**4023556-3**
Program:	**Organic Chemistry**
Department:	**Department of Chemistry**
College:	**Faculty of Applied Science**
Institution:	**Umm Al-Qura University**

Table of Contents

A. Course Identification

1. Credit hours: 3
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 5th level/3rd year
4. Pre-requisites for this course (if any)**: Chemistry of aromatic compounds (4022142-3)**
7. Co-requisites for this course (if any):

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	75	100
2	**Blended**	-	-
3	**E-learning**	-	-
4	**Correspondence**	-	-
5	**Other**	-	-

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	30
2	**Laboratory/Studio**	45
3	**Tutorial**	-
4	**Others** (specify)	-
	Total	75
Other Learning Hours*		
1	**Study**	45
2	**Assignments**	10
3	**Library**	6
4	**Projects/Research Essays/Theses**	4
5	**Others** (specify)	16
	Total	81

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course includes teaching the different methods of classification and nomenclature of heterocyclic ring systems and explaining the chemical properties of the heterocyclic compounds and mechanisms accounting on those properties and methods of synthesis selected heterocyclic ring systems.

2. Course Main Objective

By the end of this course student will be familiar with different methods of nomenclature, chemical properties, synthesis of different heterocyclic compounds

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Recognizing the molecular structures of different heterocyclic compounds	**K2**
1.2	Ddemonstrate the classification of heterocyclic compounds according to their different types	**K2**
1.3	Knowledge of different methods for nomenclature of heterocyclic compounds containing oxygen, sulfur and nitrogen and How to draw the chemical structures	**K1**
1.4	Showing the multiple methods of preparation of heterocyclic compounds	**K4**
1.5	Recognizing the chemical properties of heterocyclic compounds	**K4**
1.6	Gaining a fruitful new and simple methodologies for chemical reactions of different heterocyclic compounds	**K3**
1.7	Recognizing the important characteristics and new culture(s) and at least one other culture and their impacts on course development	**K4**
2	**Skills :**	
2.1	The student's acquiring of the skill of how to predict the outcomes of interactions of heterocyclic compounds	**S1**
2.2	Making the student acquire the skill of naming heterocyclic compounds	**S1**
2.3	Design of different ways to nomenclature the heterocyclic compounds	**S1**
2.4	The student can pick the appropriate methods for the preparation of heterocyclic compounds	**S4**
2.5	Development of reverse thinking skill (back thinking) and the student's acquiring the training skill to choose the suitable method for heterocyclic compounds preparation	**S4**
2.6	Student invents different ideas for the construction of many of the heterocyclic compounds	**S4**
2.7	The student is planning to make a research programme in the field of chemistry of heterocyclic compounds and their effectiveness	**S3**
3	**Competence:**	
3.1	Demonstrating the skills in the usage of computer, network, and software programs related to chemistry; e.g. chem-draw, microsoft excel, power point and word	**C3**
3.2	Ability to work independently to handle chemicals and data	**C4**
3.3	Ability to communicate results of work to classmate and participation in class or laboratory discussions	**C1**
3.4	Demonstrate an ability to work effectively in a team with generating a new competition spirit	**C1**

CLOs		Aligned PLOs
3.5	Demonstrating the effective oral communication skills	C1

C. Course Content

No	List of Topics	Contact Hours
1	Classification of heterocyclic compounds	2
2	Nomenclature of heterocyclic compounds	4
3	Bonding, structure and aromaticity of heterocyclic compounds	4
4	Structure and reactivity of five and six-membered heterocyclic compounds	4
5	Chemical reactions of five and six-membered rings and their benzo fused systems	4
6	Cycloaddition reactions of heterocyclic compounds	4
7	Synthetic Routes to five membered rings and their benzo fused systems	4
8	Synthetic Routes to six membered rings and their benzo fused systems	4
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	Recognizing the molecular structures of different heterocyclic compounds	Lectures	Periodic Short exams and final exam
1.2	Demonstrate the classification of heterocyclic compounds according to their different types	Scientific discussion	web-based student performance systems
1.3	Knowledge of different methods for nomenclature of heterocyclic compounds containing oxygen, sulfur and nitrogen and How to draw the chemical structures	Library visits Web-based	posters lab manuals
1.4	Showing the multiple methods of preparation of heterocyclic compounds	E-learning by virtual class room	Homework
1.5	Recognizing the chemical properties of heterocyclic compounds	Web-based study	long and short essays
1.6	Gaining a fruitful new and simple methodologies for chemical reactions of different heterocyclic compounds		Portfolios
1.7	Recognizing the important characteristics and new culture(s) and at least one other culture and their impacts on course development		
2.0	**Skills**		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.1	The student's acquiring of the skill of how to predict the outcomes of interactions of heterocyclic compounds	Lectures	Periodic Short exams and final exam
2.2	Making the student acquire the skill of naming heterocyclic compounds	Scientific discussion	web-based student performance systems
2.3	Design of different ways to nomenclature the heterocyclic compounds	Library visits Web-based	posters demonstration
2.4	The student can pick the appropriate methods for the preparation of heterocyclic compounds	E-learning by virtual class room	Homework
2.5	Development of reverse thinking skill (back thinking) and the student's acquiring the training skill to choose the suitable method for heterocyclic compounds preparation	Web-based study	long and short essays
2.6	Student invents different ideas for the construction of many of the heterocyclic compounds		Portfolios
2.7	The student is planning to make a research programme in the field of chemistry of heterocyclic compounds and their effectiveness		
3.0	**Competence**		
3.1	Demonstrating the skills in the usage of computer, network, and software programs related to chemistry; e.g. chem-draw, microsoft excel, power point and word	Class discussions	Performance on in-practical exams.
3.2	Ability to work independently to handle chemicals and data	Research activities	Work on research activity.
3.3	Ability to communicate results of work to classmate and participation in class or laboratory discussions		Overall student performance in Lab. discussions
3.4	Demonstrate an ability to work effectively in a team with generating a new competition spirit		Cross questions after finishing laboratory work
3.5	Demonstrating the effective oral communication skills		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Midterm Exam**	**6-15**	**20 %**
2	**Assignments (Homework + Activities+ Attendance +periodic short exams)**		**10%**

#	Assessment task*	Week Due	Percentage of Total Assessment Score
3	Practical Exam	16	30%
4	Final exam	17-18	40%
5	Total		100 %
6			
7			
8			

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

- **We have faculty members to provide counseling and advice.**
- **Office hours: During the working hours weekly.**
- **Academic Advising for students.**

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	• Eric Scriven, Christopher A. Ramsden "Advances in heterocyclic chemistry" 1st Ed., published: 1st June, Vol. 126, 2018. **Hardcover ISBN:** 9780128152096, **Imprint:** Academic Press. Elsevier • Eric Scriven, Christopher A. Ramsden "Advances in heterocyclic chemistry" 1st Ed., published: 3rd February, Vol. 125, 2018. **ardcover ISBN:** 9780128152102, **Imprint:** Academic Press. Elsevier. • Eric Scriven, Christopher A. Ramsden "Advances in heterocyclic chemistry" 1st Ed., published: 4th January, Vol. 124, 2018. **E-Book ISBN:** 9780128137611, **Hardcover ISBN:** 9780128137604, **Imprint:** Academic Press, Elsevier • Gordon Gribble, John Joule "Progress in heterocyclic Chemistry" 1st Ed., Published: 5th September, Vol. 29, 2017. **E-Book ISBN:** 9780081023112, **Hardcover ISBN:** 9780081023105, **Imprint:** Elsevier • Alan R. Katritzky, Christopher A. Ramsden, John A. Joule " Advances in heterocyclic Chemistry" 1st Ed., Published 7

	Novmber, Vol. 113, 2014. **ISBN** 10 0080958435, **ISBN** 13 9780080958439, I**mprint**: Elsevier / The Lancet
Essential References Materials	• Eric Scriven, Christopher A. Ramsden "Advances in heterocyclic chemistry" 1st Ed., published: 4th April, Vol. 123, 2017. **E-Book ISBN:** 9780128121955, **Hardcover ISBN:** 9780128120927, **Imprint:** Academic Press, Elsevier. • Eric Scriven, Christopher A. Ramsden "Advances in heterocyclic chemistry" 1st Ed, published: 25th March, Vol. 122, 2017. **E-Book ISBN:** 9780128119938, **Hardcover ISBN:** 9780128119730, **Imprint:** Academic Press Elsevier. • Eric Scriven, Christopher A. Ramsden " Heterocyclic Chemistry in the 21st century: A Tribute to Alan R. Katritzky" 1st Ed., Published: 4th January Vol. 121, 2017. **E-Book ISBN:** 9780128120705, **Hardcover ISBN:** 9780128111741, **Imprint:** Academic Press • Gordon Gribble, John Joule "Progress in heterocyclic Chemistry" 1st Ed., Published: 3rd September, Vol. 28, 2016. **E-Book ISBN:** 9780080994093, **Hardcover ISBN:** 9780080994062, **Imprint:** Elsevier
Electronic Materials	• **http://www.chemweb.com** • **http://www.sciencedirect.com** • **http://www.rsc.org**
Other Learning Materials	-

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Classrooms capacity (30) students. • Providing hall of teaching aids including computers and projector
Technology Resources (AV, data show, Smart Board, software, etc.)	• Room equipped with computer, projector and TV.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	• No other requirements.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
1. Strategies for Obtaining Student Feedback on Effectiveness of Teaching Complete the questionnaire evaluation of the course in particular		
Observations and the assistance of colleagues.	Faculty	Indirect
Independent evaluation for extent to achieve students the standards.	Program leader	Indirect
Independent advice of the duties and tasks.	Program leader	Indirect
2. Processes for Improvement of Teaching		
Workshops for teaching methods.	Faculty	Direct
Continuous training of member staff.	Faculty	Direct
Review of strategies proposed.	Peer reviewer	Indirect
Providing new tools for learning.	Program leader	Direct
The application of e-learning.	Program leader and student	Direct and Indirect
Exchange of experiences internal and external.	Others and Program leader	Direct and Indirect
3. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution)		
Check marking of a sample of exam papers, or student work.	Program leader	Direct
Exchange corrected sample of assignments or exam basis with another staff member for the same course in other faculty.	Program leader and others in another faculty	Direct
4. Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.		
Periodic Review of the contents of the syllabus and modify the negatives.	Peer reviewer and program leader	Direct and Indirect
Consult other staff of the course.	program leader and Faculty	Direct and Indirect

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Hosting a visiting staff to evaluate of the course.	Faculty	Direct

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	

Received by: Dr. Ismail Althagafi **Department Head**

Signature: **Date: 20/12/2019**