هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

اعتماد NCAAA T4 2020

Course Specifications

Course Title:	**STEREOCHEMISTRY**
Course Code:	**CHEM 437**
Program:	**Bachelor in Chemistry**
Department:	**Chemistry**
College:	**College of Science**
Institution:	**Jazan University (JU)**

Table of Contents

A. Course Identification

1. Credit hours: 2h Workload: 110 ECTS: 3.9
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: **Level 7 / Year 4**
4. Pre-requisites for this course (if any)**:** **none**
5. Co-requisites for this course (if any)**:** **none**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	27	90%
2	**Blended**		
3	**E-learning**	3	10%
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	30
2	**Laboratory/Studio**	
3	**Tutorial**	
4	**Others** (specify)	
	Total	30 CH

B. Course Objectives and Learning Outcomes

1. Course Description

Course Title	*Course Number*	*Contact Hours (CH)*		*Credit unit (CU)*	*Year*	*Level*	*Pre-requisite*
		Lec.	*Prac.*				
Stereochemistry	CHEM 437	2	0	2	4	7	-

Course objectives

- To identify the dynamic and static stereochemistry concepts.
- To identify different shapes of organic compounds and nomenclature of chiral compounds.
- To distinguish between chiral and achiral compounds.
- To identify of the spatial models, sequence rules and priority
- To identify some organic reactions (addition, elimination, and rearrangement) and their stereochemistry.

Syllabus: A-Theoretical contents

General introduction of stereochemistry – isomerism- conformation - spatial models - sequence rules - *Cis*- and *Trans*- stereoisomerism - chirality and prochirality - optical activity – Enantiomers and diastereomers - meso compound - Dynamic Stereochemistry including, addition, elimination and rearrangement reactions.

Syllabus: B-Practical contents

none

*See attachment

2. Course Main Objective

This course aims to give students basic principles of stereo models, projections, symmetry and dynamic and static stereochemistry.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	**Demonstrate** a broad, knowledge and understanding in the *basic information of stereochemistry, the distinguish between static and dynamic stereochemistry, enantiomers and diastereomers. (M)*	K. 1
1.2	*Describe* the essential facts, principles and theories across the identification of the absolute configuration of chiral compounds using Cahn -Ingold _Prelong system, and Fischer Projections. *(M)*	K. 2
2	**Skills :**	
2.1	**Demonstrate** the knowledge and skills required to solve problems about the specific rotation of optically active compounds, enantiomeric excess of both enantiomers, and modeling of chemical systems. *(P)*	S1
2.4	*Make effective use of communication, and online technology about chemistry topics in order to improve their basic knowledge in writing (report and paper/*	S4

CLOs		Aligned PLOs
	poster) with a good verbal and clear scientific language about steriochemistrty. (I)	
3	**Values:**	

C. Course Content

No	List of Topics	Contact Hours
1	**Chapter 1: Conformations of Alkanes and Cycloalkanes:** Conformations of Alkanes and Cycloalkanes: Constitutional Isomers of Alkanes. Drawing Newman Projections. Conformational Analysis of Ethane and Propane Conformational Analysis of Butane Stability of Cycloalkanes.	***4***
2	Conformations of Cyclohexane Drawing Chair Conformations Monosubstituted Cyclohexane cis-trans Stereoisomerism **Chapter 2: Stereoisomerism:** Introduction to Stereoisomerism. Designating Configuration Using the Cahn-Ingold-Prelog System .	***4***
3	Designating Configuration Using the Cahn-Ingold-Prelog System. Optical Activity. Stereoisomeric Relationships: Enantiomers and Diastereomers.	***4***
4	**Chapter 3: Elimination Reactions:** Introduction to Elimination Reaction-Stereoisomerism in Alkenes. Possible Mechanisms for Elimination; E1, E2 mechanism Drawing the Products of an E2 Reaction. Regioselective and Stereoselective of E2 Reactions	***3 + 1 Exam***
5	The E1 Mechanism Drawing the Complete Mechanism of an E1 Process and rearrangement of carbocations.	***2***
6	**Chapter 3: Addition Reactions** Introduction to Addition Reactions, Hydrohalogenation -Acid-Catalyzed Hydration.	***6***
7	Acid-Catalyzed Hydration. Halogenation- General Revisions.	***3+1 Exam***
8	***Presentation Session***	2
Total		30 CH

***1CH=50 min.**

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 and Understanding**		
1.1	**Demonstrate** a broad, knowledge and understanding in the *basic information of stereochemistry, the distinguish between static and dynamic stereochemistry, enantiomers and diastereomers. (M)*	Lectures, group discussion and assignments	Examinations, tests, quizzes, and assignments
1.2	*Describe* the essential facts, principles and theories across the identification of the absolute configuration of chiral compounds using Cahn - Ingold _Prelong system, and Fischer Projections. *(M)*	Lectures, group discussion and assignments	Examinations, tests, quizzes, and assignments
2.0	**Skills**		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.1	**Demonstrate** the knowledge and skills required to solve problems about the specific rotation of optically active compounds, enantiomeric excess of both enantiomers, and modeling of chemical systems. *(P)*	Lectures, group discussion, Examination and assignments	Examinations, tests, quizzes, and assignments
2.4	*Make effective use of communication, and online technology about chemistry topics in order to improve their basic knowledge in writing (report and paper/ poster) with a good verbal and clear scientific language about stereochemistry* (I)	research activities / project-based learning / Technology-enabled learning	assignments and reports / project / seminar / report
3.0	**Values**		

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	**Homework assignment (H.W. 1)**	**2**	2
2	**Lecture Quizzes (Q1)**	**5**	2
3	**Mid-term exam (MID. 1)**	**8**	15
4	**Homework assignment (H.W. 2)**	**10**	2
5	**Lecture Quizzes (Q2)**	**12**	2
6	**Mid-term exam (MID. 2)**	**14**	15
7	**Presentation Session**	14	2
8	**Final Exam**	**17**	60
	Total		100

***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:

- ***Instructor will be available for academic counseling on daily basis for at 4h/day during office hours.***
- ***The office hours are listed in the instructor time table and delivered to students in the first lecturer in each semester.***
- ***Instructor is available in a WhatsApp group with student.***
- ***E-mail and Telephone number are delivered to student for any help during semester***

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	**1-Organic Chemistry, David R. Klein (Johns Hopkins University), John Wiley & Sons, Inc., 2010.**
Essential References Materials	**2. Stereochemistry, R K Sharma, Discovery Publishing House, 2007.** **3. Organic Stereochemistry, Robinson, Oxford University Press N Delhi, 2005.** **4. Organic Chemistry, T.W. Graham Solomons and Craig B. Fryhle.** **5. A Guide Book to Mechanism in Organic Chemistry, Peter Sykes.**

Electronic Materials	**Some course contents and materials are posted on Black board sites.**
Other Learning Materials	https://chem.libretexts.org/Special:Search?qid=&fpid=230&fpth=&query=steriochemistry&type=wiki

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	***Lecture room(s) for groups of 50 students***
Technology Resources (AV, data show, Smart Board, software, etc.)	***Smart board, Data show, Black board, internet***
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	none

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and Assessment	***Student***	***Likert-type Survey (CES)*** ***Indirect***
Extent of achievement of course learning outcomes	***Instructor & Course coordinator***	***Class room evaluation (direct & indirect)***
Quality of learning resources	***Program coordinator***	***Indirect***
Exam Quality assessment	***Assessment committee***	***Indirect***

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	**Chemistry Department Council**
Reference No.	42 / 35 /102 112
Date	17 /09 /1442 Corresponding to 28 / 04 /2021