Course Specification
(Bachelor)

Course Title:	STEREOCHEMISTRY
Course Code:	437CHEM-2
Program:	Bachelor of Science in Chemistry
Department: :	Physical Sciences
College: :	College of Science
Institution:	Jazan University (JU)
Version: :	TP-153 2024
Last Revision Date:	7/5/2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (2 hrs…)

2. Course type

A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☒ Required		☐Elective		

3. Level/year at which this course is offered: (Level 7/ year 4.)

4. Course general Description:

4. Course general Description

Course Title	*Course Number*	*Contact Hours (CH)*		*Credit unit (CU)*	*Year*	*Level*	*Pre-requisite*
		Lec.	*Prac.*				
Stereochemistry	*437CHEM2*	*2*	*0*	*2*	*4*	7	*232CHEM3*

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

Course objectives: They are to identify the following.

- *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, sequences 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 - mesocompound - Dynamic Stereochemistry including, addition, elimination and rearrangement reactions.

Syllabus: A-Practical contents

none

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

232CHEM-3

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

None

7. Course Main Objective(s):

This course aims to give students the basic principles of photochemistry and its chemical and biological applications

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	30	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**	30
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		30

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**; (Upon completion of the course, student will be able to)			
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)	Lecture group work discussion	Objective Q
1.2	Describe the essential facts, principles and theories across the identification of the absolute	K(1.2)	Lecture group work discussion	Short answer Questions

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	configuration of chiral compounds using Cahn -Ingold _Prelong system, and Fischer Projections. (M)			
2.0	**Skills**; (Upon completion of the course, student will be able to)			
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)	S(2.1)	lecture group work discussion	Solving Problems & chart analysis
2.2	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)	S((2.4)	project-based learning Technology-enabled learning	Research presentation rubric
3.0	**Values, autonomy, and responsibility**; (Upon completion of the course, student will be able to)			
3.1	Act with integrity and good ethics in chemistry profession and their obligation to society (M)	V(3.2)	Research activities	Ethic check rubric

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.	3
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.	5

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.	5
5	The E1 Mechanism Drawing the Complete Mechanism of an E1 Process and rearrangement of carbocations.	3
6	Chapter 3: Addition Reactions Introduction to Addition Reactions, Hydrohalogenation -Acid-Catalyzed Hydration.	5
7	Acid-Catalyzed Hydration. Halogenation- General Revisions.	4
8	Presentation Session	1
Total		**30**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	HW	7-8	5
2.	Mid-term Exam1	6-8	15
3.	Mid-term Exam2	12-14	15
4.	Presentation Session	15	3
4.	Ethic check	15	2
5.	Final EXAM	16-17	60
...	Total		100%

*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	**Organic Chemistry, David R. Klein (Johns Hopkins University), John Wiley & Sons, Inc., 2010.**
Supportive References	**. Stereochemistry, R K Sharma, Discovery Publishing House, 2007.** **. Organic Stereochemistry, Robinson, Oxford University Press N Delhi, 2005.** **. Organic Chemistry, T.W. Graham Solomons and Craig B. Fryhle.** **. 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. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room(s) for groups of 50 students
Technology equipment (projector, smart board, software)	Smart board, Data show, Black board, internet
Other equipment (depending on the nature of the specialty)	none

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Likert-type Survey CES) Indirect
Effectiveness of Students assessment	Instructor & Course coordinator	Classroom evaluation (direct & indirect
Quality of learning resources	Program coordinator	Indirect
The extent to which CLOs have been achieved	Assessment committee	Indirect
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Physical Sciences Department Council
REFERENCE NO.	Psci2415
DATE	28/03/1446 Corresponding to 1 / 10 /2024

H. Attachments

1- Practical Work

none

2- Blue Print

Course Name	STEREOCHEMISTRY
Course Code	437 CHEM2

PLOs	K1	K2	S1	S2	S3	S4	V1	V2
CLOs	1.1	1.2	2.1			2.2		3.1
Marks	14	25	56	-	-	3	-	2

Learning Domain	PLOs	CLOs	Assessment Type	Assessment Tool	No of Questions	Marks of the Assessment	Weight of the Assessment
Knowledge & understanding	K1	1.1 (12M)	HW	Objective Q	4	2	2
			Mid-term	Objective Q	4	4	4
			Final Exam	Objective Q	8	8	8
	K2	1.2 (23M)	HW	Short answer Questions	2	2	2
			Mid-term	Short answer Questions	3	8	8
			Final Exam	Short answer Questions	3	15	15
Skills	S1	2.1 (55M)	HW	Solving Problems & chart analysis	1	1	1
			Mid-term	Solving Problems & chart analysis	4	18	18
			Final Exam	Solving Problems & chart analysis	4	37	37
	S4	2.2 (3M)	Research presentation	Research rubric	-	-	1
				PPT design	-	-	1
				Oral discussion	-	-	1
Value	V2	3.1 (2)	Research ethic check	ethic check rubric	-	-	2
TOTAL		100					100