هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification
(Bachelor)

Course Title:	Modern Organic Synthesis
Course Code:	ICHM452-2
Program:	Bachelor of Science in Industrial Chemistry
Department:	Department of Physical Sciences
College:	College of Science
Institution:	Jazan University
Version:	TP-153 (2024)
Last Revision Date:	13 February 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: (7th Level/ 4th Year.)

4. Course general Description:

Course title	Course code	Contact Hours			Credit Hours	Year	Level	Prerequisite	Corequisite
		Lec	Tut	Lab					
Modern Organic Synthesis	ICHM 452-2	0	0	4	2	4th	7th	CHEM 336-2	-

This course covers the study of modern different methods used in organic synthesis through teach the student the concept of synthetic design.

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

Chem 336-2

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

None

7. Course Main Objective(s):

1. Enabling the student to understand the basics of retrosynthesis.
2. To learn the concept of protecting functional groups.
3. To supply the student with the basics of functional group transformations.
4. Enabling the students to formation of new carbon-carbon single bonds.
5. To develop the skills of formation of carbon-carbon π bonds.
6. To learn about ring synthesis.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	60	100%
2	E-learning		
3	Hybrid • Traditional classroom		

No	Mode of Instruction	Contact Hours	Percentage
	• E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	
2.	**Laboratory/Studio**	60
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		*60 hr*

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, students are able to:*			
1.1	**Demonstrate a thorough understanding of the tools used in the organic synthesis, green synthesis, retro synthesis and functional group transformations (M).**	**K1**	**lab demonstrations / whole group and small group discussion**	**Objective questions, Essay Questions**
1.2	**Describe and explain types of organic reactions, retro synthesis, protection of functional groups and methods of formation of new carbon-carbon single bond and carbon-carbon π bonds. (M).**	**K2**	**lab demonstrations / whole group and small group discussion**	**Objective questions, Essay Questions**
2.0	Skills; *Upon completion of the course, students are able to:*			
2.1	**Design synthesis methods based on oxidation, nitration, nucleophilic addition reactions as well as Polymerization and flow reactions. (M)**	**S1**	**lab demonstrations / whole group and small group discussion**	**Objective questions, Essay Questions**
2.2	**Perform experiments to prepare derivatives of organic compounds. (M)**	**S2**	**lab demonstrations / whole group and small group discussion**	**Objective questions, Essay Questions**
2.3	**Classify and assess laboratory hazards,**	**S3**	**lab demonstrations /**	**Objective**

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	practice risk minimization, and conduct safe laboratory practices. . (M)		whole group and small group discussion	questions, Essay Questions
2.4	Employ chemical safety skills in laboratory, industry and other work environment(M)	S4	lab demonstrations / whole group and small group discussion	Objective questions, Essay Questions
2.5	Communicate scientific information and research findings effectively in writing laboratory reports, research papers and orally, using clear and concise scientific language. (M)	S5	lab demonstrations / whole group and small group discussion	Objective questions, Essay Questions
3.0	**Values, autonomy, and responsibility;** *Upon completion of the course, students are able to:*			
3.1	Work in groups and teams in cooperation with other colleagues. (I)	V 1	lab demonstrations / whole group and small group discussion	Practical group work Rubric
3.2	Recognize a chemist's ethical and scientific responsibilities.	V2	Recognize a chemist's ethical and scientific responsibilities.	Recognize a chemist's ethical and scientific responsibilities.

C. Course Content

No	List of Topics	Contact Hours
1.	General Safety Rules, Lab Equipment and Laboratory techniques	2
2.	Acetylation: O-acetyl, N-acetyl, S-acetyl	8
3.	Nitration	6
4.	Oxidation	8
5.	Nucleophilic addition to carbonyl group	8
6.	Synthesis of heterocycles	12
7.	Polymerization	8
8.	Flow reaction	4
9.	Electrolysis in the organic synthesis	4
Total		60 *hr*

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	*Periodic Exams*	*During semester*	*25%*
2.	*Lab work*	*During semester*	*35%*
6.	*Final Exam*	*16*	*40%*
	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	**W.Carruthers, Some modern methods of Organic synthesis, Cambridge University Press, UK.**
Supportive References	**1. F.A.Carey and R.J. Sundberg,Advanced Organic Chemistry,Part-B, Plen Press.** **2- H.O.House and W.A.Benjamin, Modern Synthetic Reactions** ***Vogel's textbook of practical organic chemistry, A. Vogel, A. Tatchel, B. Furnis, A. Hannaford, and P. Smith, 5th Ed., Prentice Hall, 1996.***
Electronic Materials	***https://chem.libretexts.org*** **http://orgchem.colorado.edu/hndbksupport/ochemlabtech.html**
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lab room for a group of 25student
Technology equipment (projector, smart board, software)	Smartboard, Data show, Blackboard, Internet
Other equipment (depending on the nature of the speciality)	Power source, Balance, water bath, R.B flasks different sizes, Test tubes, Condensers different sizes

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Student	Likert-type Survey CES)

Assessment Areas/Issues	Assessor	Assessment Methods
		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 Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Physical Sciences Department Council
REFERENCE NO.	Meeting (3)
DATE	12/03/2024 -02/09/1445