هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Aliphatic Organic Chemistry**
Course Code:	**CHEM 231**
Program:	**Bachelor in Chemistry**
Department:	**Chemistry**
College:	**Science**
Institution:	**Jazan University (JU)**

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A. Course Identification

1. Credit hours: 3hrs	**Workload:** 166.2 **ECTS:** 5.9
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 3 / year 2	
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 (Lab)**	30	100%

7. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1	**Lecture**	30
2	**Laboratory/Studio**	30
3	**Tutorial**	
4	**Others** (specify)	
	Total	60

B. Course Objectives and Learning Outcomes

1. Course Description

Course Title	*Course Number*	*Contact Hours*		*Credit unit (CU)*	*Year*	*Level*	*Prerequisite*
		Lect.	*Prac.*				
Aliphatic Organic Chemistry	CHEM 231	2	2	3	2	3	……..

Course objectives: They are to identify the following.

- Identifying and analyzing the structure of organic compounds by recognizing main functional groups, naming the compounds using the I.U.P.A.C. system, and predicting their properties using the type of bonding, hybridization state, intermolecular forces, and stereochemistry.
- Describing the reactions: nucleophilic substitution, elimination, and electrophilic addition, and apply this knowledge to predict the major product in organic reactions, such as those involving hydrocarbons,
alkyl halides, and alkenes.
- analyzing the nature of a reagent: as a nucleophile, or electrophile and use this knowledge to propose the synthesis of organic compounds, such as a hydrocarbon, alkyl halides, alcohols, or alkenes.

- demonstrate proficiency in organic laboratory skills as they pertain to: chemical information, safe handling, use, and disposal of organic compounds; identify different unknown organic compounds and use of instrumentation, and writing laboratory reports following current scientific journal styles.

Syllabus: A-Theoretical contents

Principles of organic chemistry and its importance – molecular structure and properties of organic compounds – functional groups in organic compounds – principle organic reactions – studying different classes of aliphatic organic compounds including; nomenclature, chemical structure, physical properties, methods of preparation, chemical reactions and common uses of: saturated and unsaturated aliphatic compounds

Syllabus: B-Practical contents

Basic knowledge concerning general Safety Rules, Lab Equipment, Basic Laboratory Techniques, Measuring Volume and melting point, Purification of Organic Compounds, and sublimation. Finally, Identification of an unknown liquid and solid organic compounds.

*See attachment

2. Course Main Objective

This course aims to give students the basic knowledge concerning saturated and unsaturated aliphatic organic compounds, , their nomenclature, methods of preparation and their most important chemical reactions.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding** *Upon completion of this course student will be able to*	
1.1	*Demonstrate a broad knowledge and understanding in the hybridization, bonding in organic compounds, the nomenclature of organic compounds, organic reactions, isomerism of organic compounds, reactions, and preparations of alkane, alkene, alkyne, and aromatics. (I)*	K1
1.2	*Describe the reactions: nucleophilic substitution, elimination, and electrophilic addition, and apply this knowledge to predict the major product in organic reactions, such as those involving hydrocarbons, alkyl halides, alkenes, alkynes, and aromatic. (I)*	K2
2	**Skills:** *Upon completion of this course student will be able to*	
2.1	*perform experiments for the investigation and identification of unknown solid organic compounds, and write reports about It. (I)*	S1
2.2	*analyze the nature of a reagent: as a nucleophile or electrophile and use this knowledge to propose the synthesis of organic compounds, and draw their structure, and differentiate between them. (I)*	S2
2.3	*Examine and follow proper procedures and regulations for safe handling, use, and disposal of chemicals (I)*	S3
3	**Values:** *Upon completion of this course student will be able to*	
3.1	*Work as a group leader in cooperation with other colleagues (I)*	V1

C. Course Content

No	List of Topics	Contact Hours
1.	***Introduction to Organic Chemistry***	***1***
2.	***Structure, chemical bonding in organic compounds, and formal charges***	***3***
3.	***Isomerism, types of structural isomerism and types of stereoisomerism.***	***2***
4.	***Functional groups and IR***	***2+ Quiz***
5.	***Organic reactions and Acid-Base reactions***	***4***
6.	***Nomenclature of Alkanes, Alkene, and Alkynes and their cyclic forms.***	***4***
7.	***Alkanes, preparation, reactions, octane number of fuel and their application***	***4***
8.	***Alkenes and alkynes, preparation, reactions and their application***	***4***
9.	***Aromatic compounds, aromaticity, and Nomenclature***	***3+Quiz***
10.	***Electrophilic aromatic substitution for benzene, monosubstituted, disubstituted, and poly-substituted aromatics***	***3***
11.	***Identification of an unknown liquid and solid organic compounds (LAB)***	30
Total		60

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** *Upon completion of this course student will be able to*		
1.1	Demonstrate a broad knowledge and understanding in the hybridization, bonding in organic compounds, the nomenclature of organic compounds, organic reactions, isomerism of organic compounds, reactions, and preparations of alkane, alkene, alkyne, and aromatics. (I)	Lecture	MCQ in Final exam
1.2	*describe Chemical phenomena using organic chemical principles and understanding the reactions of the organic Compounds. (I)*	Lecture	Embedded Q Final exam
2.0	**Skills** *Upon completion of this course student will be able to*		
2.1	*perform experiments for the investigation and identification of unknown solid organic compounds, and write reports about It. (I)*	Lab. Work	Lab. report
2.2	*demonstrate ability in critical thinking for the nomenclature and draw the structure of organic compounds and differentiate between them.* ***(I)***	Lecture	Embedded Q Final exam
2.3	Examine and follow proper procedures and regulations for safe handling, use, and disposal of chemicals (I)	Group work Lab. Work	Oral Exam MCQ in safety
3.0	**Values** *Upon completion of this course student will be able to*		
3.1	Work as a group leader in cooperation with other colleagues (I)	Lab Group work	Oral Exam

2. Assessment Tasks for Students

#	Assessment task*		Week Due	Percentage of Total Assessment Score
1	**Homework 1**		3	2.5 (2.5%)
2	**Group work rubric**		8	0 (0%)
3	**Quiz in Safety**		9	0 (0%)
4	**Mid-term exam**		10	15 (15%)
5	**Homework 2**		11	2.5 (2.5%)
6	**Practical**	**Sheet**	14	10
		Final practical exam		20 — 30 (30%)
8	**Final Exam**		16	50 (50%)
	Final		100	

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

E. Student Academic Counseling and Support

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

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

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Organic Chemistry **(**tenth edition**) Written by T. W. Graham** Solomons **and Craig B. Fryhle http://chemistry.com.pk/books**
Essential References Materials	**Organic Chemistry, 9e Written by Jr. Leroy G. Wade, Jan William Simek, et al**
Electronic Materials	• https://www.khanacademy.org/science/organic-chemistry • https://www.organic-chemistry.org/ • https://en.wikipedia.org/wiki/Organic_chemistry • https://www.masterorganicchemistry.com/organic-1/
Other Learning Materials	• https://www.youtube.com/watch?v=cAxJw_W05ZY • https://www.chemguide.co.uk/orgmenu.html • https://www2.chemistry.msu.edu/faculty/reusch/virttxtjml/intro1.htm

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	1 Lecture room(s) for groups of 50 students
Technology Resources (AV, data show, Smart Board, software, etc.)	Smartboard, Data show, Blackboard, Zoom, and internet
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements, or attach a list)	***Glassware, chemicals, hotplates, water bathes, flam, electrical balance, UV lamb, and IR.***

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and Assessment	Students	Likert-type Survey (CES) **Indirect**
The extent of achievement of course learning outcomes	***Instructor & Course coordinator***	Classroom evaluation **(direct & indirect)**
Quality of learning resources		**Indirect**
Exam Quality assessment		**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

Laboratory Experiments

While specific laboratory experiments vary depending on the instructor and the semester, the following list is representative of the experiments that are used:

	Content	Page	Week	Notes
1.	General Safety Rules, Lab Equipment, and Basic Laboratory techniques.	4-11	Week 1	
2.	Measuring volume and melting point	10-12	Week 2	
3.	Purification of Organic Compounds and sublimation	13-23	Week 3	
4.	Simple Liquid Organic Compounds, Identification of hydrocarbons and alcohols	25-35	Week 4	
5.	Identification of Phenols, Aldehydes, and Ketones	45-50	Week 5	
6.	Identification of Carboxylic acid and amines	68-75	Week 6	
7.	Scheme of Simple Liquid Organic Compounds	78	Week 7	
8.	Revision	78	Week8	
9.	Exam of Simple Liquid Organic Compounds		Week 9	
10.	Simple Solid Organic Compounds and identifications of carbohydrates	89-94	Week 10	
11.	Identification of Carboxylic acid, salts of carboxylic acids, and urea	95-102	Week 11	
12.	Identification of Aniline salts	108-112	Week 12	
13.	Scheme of Simple Solid Organic Compounds	113	Week 13	
14.	Revision	115	Week 14	
15.	Final Exam		Week 15	