



Course Specifications

Course Title:	Chemistry of Aliphatic Compounds
Course Code:	4022132-3
Program:	Chemistry
Department:	Chemistry
College:	Applied Science
Institution:	Umm Al-Qura University

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A. Course Identification

1. Credit hours:
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 3 rd level / 2 th year
4. Pre-requisites for this course (if any): General Chemistry
5. Co-requisites for this course (if any): not applicable

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	74%
2	Blended		
3	E-learning	√	26%
4	Distance learning		
5	Other		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	22
2	Laboratory/Studio	30
3	Tutorial	--
4	Others (E-learning + Exams + office hours)	15
	Total	67

B. Course Objectives and Learning Outcomes

1. Course Description

The course includes definition of nature, methods of nomenclature, properties, applications and preparations of different families of aliphatic compounds.

2. Course Main Objective

By the end of this course student will be familiar with basic concepts in organic chemistry including classification, nomenclature, and preparation of aliphatic compounds.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	Knowledge and Understanding	
1.1	Name and classify the aliphatic compounds	K2
1.2	Recognize the physical, chemical properties and applications of aliphatic compounds.	K2
1.3	Explain the mechanism of reactions of aliphatic compounds and their interconversions based on the theoretical background.	K1
2	Skills :	

CLOs		Aligned PLOs
2.1	Apply the IUPAC rules for nomenclature of all aliphatic compounds	S1
2.2	Predict the expected product and mechanism of different reactions of aliphatic compounds.	S2
2.3	Explain the different strategies for preparation of aliphatic compounds	S1
2.4	Practice chemical processes and techniques for identification and investigation of aliphatic compounds.	S3
2.5	Use computers and internet to find all information related to aliphatic compounds and their applications	S5
3	Values:	
3.1	Write and present a chemical report related to aliphatic chemistry.	V2
3.2	work individually and in a team to perform a specific experiment or preparing a report on the aliphatic chemistry	V3

C. Course Content

No	List of Topics	Contact Hours
.1	Introduction to organic chemistry: Carbon atom, types of bonding, hybridization, functional groups, classification of aliphatic compounds and importance of organic compounds in our life	1+1E = 2
.2	Hydrocarbons: classification, physical properties	1
.3	Alkanes: structure (chain isomerism), physical properties, nomenclature (common and IUPAC names)	1+1E =2
.4	Chemical reactions of alkanes: halogenation (free radical mechanism), nitration, sulfonation, isomerization, combustion.	1
.5	Methods of preparation of Alkanes and economic importance	1E
.6	Alkenes: structure (geometrical and positional isomerism), physical properties, nomenclature (common and IUPAC names)	1
.7	Chemical reactions of alkenes: addition reactions to double bond and electrophilic addition mechanism, oxidation, polymerization	2
.8	Methods of preparation of alkanes and economic importance	1E
.9	Alkynes: structure, nomenclature (common and IUPAC names) and methods of preparation of alkynes	1
10	Chemical reactions of alkynes: addition reactions to triple bond, oxidation, polymerization, acidity of acetylenes.	1+1E = 2
11	Alkyl halides: structure, nomenclature (common and IUPAC names) and methods of preparation of alkyl halides	1
12	Chemical reactions of alkyl halides: substitution reactions and their mechanisms (SN1 and SN2) and synthetic importance	1 +1E =2
13	Alcohols and ethers: structure, nomenclature (common and IUPAC names) and methods of preparation.	1
14	Chemical reactions of alcohols and ethers, acidity of alcohols, and synthetic importance and applications	1+1E = 2
15	Carbonyl Compounds: structure, nomenclature (common and IUPAC names) and methods of preparation of aldehydes and ketones	1
16	Chemical reactions of Carbonyl Compounds: addition to carbonyl group, condensation, reduction, oxidation, Cannizzaro's reaction and reactions of α -	4

	hydrogen atoms (haloform and aldol condensation).	
17	Carboxylic acids: structure, nomenclature (common and IUPAC names) and methods of preparation.	1 + 1E = 2
18	Chemical reactions of Carboxylic acids: Acidity, halogenation, esterification, reduction, reactions of α -hydrogen atoms (halogenation) and derivatives of carboxylic acids	1
19	Amines: structure, nomenclature (common and IUPAC names) and methods of preparation.	1
20	Chemical reactions of amines: Basicity, alkylation, acetylation, reaction with nitrous acid, and Heinsberg's rection	1
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 and Understanding		
1.1	Name and classify the aliphatic compounds	Lectures	Mid-term and final Exams
1.2	Recognize the physical, chemical properties and applications of aliphatic compounds.	Lectures Lab work E-Learning	Mid-term and final Exams Practical Lab exam Assignments and activities on blackboard
1.3	Explain the mechanism of reactions of aliphatic compounds and their interconversions based on the theoretical background.	Lectures	Mid-term and final Exams
2.0	Skills		
2.1	Apply the IUPAC rules for nomenclature of all aliphatic compounds	Lectures Web based study.	Mid-term and final Exams
2.2	Predict the expected product and mechanism of different reactions of aliphatic compounds.	Lectures	Mid-term and final Exams
2.3	Explain the different strategies for preparation of aliphatic compounds	E-Learning Mind Mapping	Assignments and activities on blackboard
2.4	Practice chemical processes and techniques for identification and investigation of aliphatic compounds.	Lab work	Practical Lab exam
2.5	Use computers and internet to find all information related to aliphatic compounds and their applications	Self-Directed private Study	Assignments and activities on blackboard
3.0	Values		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.1	Write and present a chemical report related to aliphatic chemistry.	Lab work	Practical Lab report and Exam
3.2	work individually and in a team to perform a specific experiment or preparing a report on the aliphatic chemistry	Lab work	Practical Lab report and Exam

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	E-learning	All weeks	5%
2	Assignments and activities	All weeks	5%
3	Mid-term Exam	6	20%
4	Practical Lab Work (Reports and Exams)	11	30%
5	Final Exam.(2 hours exam)	12	40%

*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 :

- A faculty member was assigned to provide counseling and advice (about 20-25 student/ one faculty member).
- Office hours of the instructor: during the working hours weekly.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	John McMurry's " <i>Organic Chemistry, 8th edition, International Edition</i> " 2011 , Brooks/Cole.
Essential References Materials	<ol style="list-style-type: none"> 1. Amit Arora "<i>Introductory Organic Chemistry</i>" 2006, Discovery Publishing House New Delhi 2. John McMurry's "<i>Organic Chemistry, 8th edition, International Edition</i>" 2011, Brooks/Cole. 3. T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "<i>Organic Chemistry, 11th Edition, International Student Version</i>" 2013, John Wiley & Sons.
Electronic Materials	<ul style="list-style-type: none"> • Lecture Hand-out available as a PowerPoint presentation. • 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.)	Classroom with capacity of (30) students. A laboratory with capacity of (15) students Including all practical facilities
Technology Resources (AV, data show, Smart Board, software, etc.)	Teaching halls and laboratories are equipped with data show.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	See attached list

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Program leader, curriculum committee; external reviewers	Direct
Extent of achievement of CLO's	Peer Reviewer	Direct
Quality of learning resources	Students, faculty members and External reviewers	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	Quality committee and department counsel
Reference No.	
Date	2022

Head of Chemistry Department

Dr Moataz Morad

