



## Course Specifications

<b>Course Title:</b>	<b>Polymer Chemistry</b>
<b>Course Code:</b>	<b>4024581-3</b>
<b>Program:</b>	<b>Chemistry</b>
<b>Department:</b>	<b>Chemistry</b>
<b>College:</b>	<b>Applied Science</b>
<b>Institution:</b>	<b>Umm Al-Qura University</b>

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## A. Course Identification

<b>1. Credit hours:</b>	<b>3 hours</b>
<b>2. Course type</b>	
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"/>
<b>3. Level/year at which this course is offered:</b>	<b>8<sup>th</sup> level / 4<sup>th</sup> year</b>
<b>4. Pre-requisites for this course (if any):</b>	Chemistry of petroleum and Petrochemicals (4024572-3)
<b>5. Co-requisites for this course (if any):</b>	

### 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 the academic semester)

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

## B. Course Objectives and Learning Outcomes

### 1. Course Description

This course includes definition, classification, nomenclature, properties, preparation, and application of a wide range of polymers.

### 2. Course Main Objective

By the end of this course, students will be familiar with basic concepts of polymer chemistry.

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
1	<b>Knowledge and Understanding</b>	
1.1	Name and classify polymers	<b>K2</b>
1.2	Recognize the physical, thermal and mechanical properties and applications of polymers	<b>K2</b>
1.3	Discuss the type of mechanism of polymerization reactions according	<b>K1</b>

CLOs		Aligned PLOs
	to different theories	
<b>2</b>	<b>Skills</b>	
2.1	Demonstrate a synthetic method for polymers	<b>S1</b>
2.2	Predict the expected product of different polymers	<b>S2</b>
2.3	List proper instruments used to study the physical, thermal and mechanical properties of polymers	<b>S1</b>
2.4	Adapt and practice chemical processes for the construction of some of the polymers	<b>S3</b>
2.5	Use computers and the internet to find all information related to polymers and their applications	<b>S5</b>
<b>3</b>	<b>Values</b>	
3.1	Write and present a chemical report related to polymer chemistry.	<b>V2</b>
3.2	work individually and in a team to perform a specific experiment or prepare a report on the polymer chemistry	<b>V3</b>
3.3	Demonstrate commitment to professional and academic values and ethics	<b>V1</b>

### C. Course Content

No	List of Topics	Contact Hours
1	Introduction and definitions	2+2E
2	Polymer classifications	2
3	The molecular weight of polymers	2
4	Condensation polymers - addition polymers	4
5	Copolymerization and block copolymers	2+2E
6	Physical properties of polymers	4
7	Thermal properties of polymers	2+1E
8	Mechanical properties of polymers	2+1E
9	Polymer applications	2+2E
<b>Total</b>		<b>30</b>

### D. Teaching and Assessment

#### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	Name and classify polymers	Lectures	Mid-term and final exams
1.2	Recognize the physical, thermal, and mechanical properties and applications of polymers	Lectures, lab work, and E-Learning	Mid-term and Final Exams Practical Lab exam Assignments and

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
			activities on the blackboard
1.3	Discuss the type of mechanism of polymerization reactions according to different theories	Lectures and Lab work	Mid-term and final exams
<b>2.0</b>	<b>Skills</b>		
2.1	Demonstrate a synthetic method for polymers	Lectures and Lab work	Mid-term and final exams
2.2	Predict the expected products of different polymers	Lectures and Lab work	Mid-term and final exams
2.3	List proper instruments used to study the physical, thermal and mechanical properties of polymers	Lectures and E-Learning	Assignments and activities on the blackboard
2.4	Adapt and practice chemical processes for the construction of some of the polymers	Lab work	Practical Lab exam
2.5	Use computers and the internet to find all information related to polymers and their applications	Self-Directed Private Study	Assignments and activities on the blackboard
<b>3.0</b>	<b>Values</b>		
3.1	Write and present a chemical report related to polymer chemistry.	Lab work	Practical Lab report and Exam
3.2	work individually and in a team to perform a specific experiment or prepare a report on the polymer 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 (Report & Exam)	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 the 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 students/ one faculty member).

Office hours of the instructor: during the working hours weekly.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	John McMurry's " <i>Organic Chemistry, 8<sup>th</sup> edition, International Edition</i> " 2011, Brooks/Cole.
<b>Essential References Materials</b>	1- Odian, G., <i>Principles of Polymerization</i> , 4 <sup>th</sup> ed; John Wiley and Sons, Inc.: 2004  Painter, P. and Coleman, M., <i>Essentials of Polymer Science and Engineering</i> . DEStech Publications. Inc.: 2009
<b>Electronic Materials</b>	Course handouts PPT
<b>Other Learning Materials</b>	

### 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom with the capacity of (30) students. A laboratory with the capacity of (15) students Including all practical facilities
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Teaching halls and laboratories are equipped with data shows.
<b>Other Resources</b> (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**

