هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission
اعتماد
NCAAA
2024
TP-153

Course Specification
(Bachelor)

Course Title:	**Polymers and Petrochemicals**
Course Code:	**CHM 1428**
Program:	**Bachelor of Science in Chemistry**
Department:	**Chemistry**
College:	**Science**
Institution:	**Imam Mohammed Ibn Saud Islamic University**
Version:	2024 V1
Last Revision Date:	13 October 2024

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A. General information about the course:

-1. Course Identification

1. Credit hours: 2 (2 Lectures, 0 Tutorials, 0 Lab)					
2 (2 Lectures, 0 Tutorials, 0 Lab)					
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:					
This course provides students with an introduction to Polymers Chemistry and Petrochemicals, methods of preparation, physical properties and application as well extended to Petrochemicals Process and Chemistry. **Topics covered in the course include An Introduction to Polymer Chemistry, main synthetic methods including mechanism of Polymer, Reactions of Polymers, Distillation, Application in Petroleum Chemistry and Petrochemical Process.**					
5. Pre-requirements for this course (if any)**:**					
CHM1321 Heterocyclic Chemistry					
6. Co-requisites for this course (if any)**:**					
None					
7. Course Main Objective(s):					
At the end of this course the student will be able to: • **Know the fundamentals of Polymer's Chemistry and Petrochemicals** • **Understand the importance of the subject to pursue their career in academia or industry.** • **Describe the physical properties of different polymers will be one of the outcome, and combination with industrial process.**					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	**30**	**100%**
2	E-learning	**0**	**0**
3	Hybrid • Traditional classroom • E-learning	**0**	**0**
4	Distance learning	**0**	**0**

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	**30**
2.	**Laboratory/Studio**	**0**
3.	**Field**	**0**
4.	**Tutorial**	**0**
5.	**Others (specify)**	**0**
Total		30

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

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	**List raw materials for petrochemicals.**	**K1; K2**	▪ Lectures and Group Discussions ▪ A Private study including home exam.	• Quizzes • Discussion • Participation • Exams
1.2	**Memorize information about various petrochemical processes and products.**	**K1; K2**	▪ Lectures with group discussion. ▪ Think, talk, and discuss about Petrochemical Process in Petrochemicals and industry	• Quizzes • Discussion • Exams
1.3	**recognize the basic concepts of Polymer Chemistry.**	**K1; K3**	▪ Lectures and Group Discussions ▪ A Private study including home exam.	▪ Quizzes ▪ Discussion ▪ Exams
1.4	**outline Polymers types Chemically, physically and of Polymerization Process.**	**K1; K3**	▪ Lectures with group discussion. ▪ Think, talk and discuss about Polymers types, Polymerization and Reactions process.	▪ Quizzes ▪ Home exam Oral discussions.

Code	Course Learning Outcomes	Code of PLOs aligned with program	Teaching Strategies	Assessment Methods
2.0	Skills			
2.1	**Differentiate between petroleum and petrochemicals.**	**S2; S3**	• Formal lectures • Interactive lectures • Problem-solving • - Brainstorming ▪ Group discussions	▪ Questions in Lectures. ▪ Short Quizzes and Exams. ▪ Participation ▪ Oral Discussion,
2.2	**Compare among different petrochemical products, i.e. properties and uses.**	**S2; S3**		
2.3	**To summarize the Polymerization Process according to their physical properties required.**	**S1; S3**	• Lectures and Group Discussion • A Private study including home exam.	• Quizzes • Discussion • Participation
2.4	**To demonstrate Oral Communication to outline Polymers types, Polymerization Process, and the Petrochemical Process in Petroleum Chemistry orally and mentally, with improving technical writing skills through writing of mini- Reports, with operating electronic mail and Network in communicating with others.**	**S2, S3, S4**	• Lectures with group discussion. • Think, talk and discuss about Polymers types, Polymerization and Reactions process.	• Oral Discussion marks
3.0	Values, autonomy, and responsibility			
3.1	**Demonstrate the ability to work both individually and in a work team to answer questions and solve problems in this course.**	**V1; V2**	• Team-based learning • Group discussions	• Homework Presentation (Poster, PowerPoint or Review)

C. Course Content

No	List of Topics	Contact Hours
1.	Primary Raw Materials for Petrochemicals	2
2.	Hydrocarbon & Nonhydrocarbon intermediates	4
3.	Chemicals Based on Methane, Ethylene, Propylene, butene and benzene	6
4.	An Introduction to Polymer Chemistry	2
5.	Step Polymerization (Condensation Polymerization)	4
6.	Radical Chain Polymerization	4
7.	Reactions of Polymers	4
8.	Synthetic Petroleum-Based Polymers.	4
	Total	30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes, Attendance, Participation, Home Exams	All the semester	20 %
2.	Midterm Exam 1	Around 6th & 7th week	20 %
3.	Midterm Exam 2	Around 11th & 12th week	20 %
4.	Final Exam	Around 16-17th week	40 %
5.	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	• **Chemistry of PETROCHEMICAL PROCESSES, Sami Matar & Lewis F. Hatch, 2nd Edition, 2000 by Gulf Publishing Company, Houston, Texas. ISBN: 978-0-88415-315-3**
Supportive References	• ***Principles of Polymerization*** **,** George Odian, John Wiley and sons Inc. Wiley Interscience, 4 th Edition, 2004. ISBN 0-471-27400-3. • ***Textbook of Polymer Science,*** Fred W. Billmeyer, Wiley-Interscience, 3rded, 1984, , ISBN: 978-0-471-03196-3

	• ***Polymer Science and Technology,*** Joel R. Fried, Prentice-Hall , 2nd ed., 2003, ISBN-10: 0137039557
Electronic Materials	• **Blackboard**
Other Learning Materials	None

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Each of the classroom should be equipped with a whiteboard and a projector, with a maximum of 20 students.
Technology equipment (projector, smart board, software)	The rooms are equipped with data show, Smart Board, WI-FI access.
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	**Direct:** Questionnaire.
	Course Responsible	**Direct:** Course e-Portfolio. **Indirect:** Second examiner checklist-Course report.
	Peer Reviewer	**Direct:** Questionnaire. **Indirect:** External assessor report.
Effectiveness of Students' assessment	Program Leaders	**Direct:** Course e-Portfolio. **Indirect:** Course report.
	Students	**Indirect:** Second examiner checklist-Course report.
Quality of learning resources	Faculty (Academic Advisory)	**Direct:** course Entrance/Exit. **Indirect:** Observations - Accreditation review.
	Program Leaders	**Direct:** Course e-Portfolio. **Indirect:** Course evaluation survey- Observations- Syllabus review- Accreditation review.
The extent to which CLOs have been achieved	Course Responsible	**Direct:** Exams - Course e-Portfolio. **Indirect:** Second examiner checklist-Course report.

Assessment Areas/Issues	Assessor	Assessment Methods
	Program Leaders	**Indirect:** Exams.

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**COUNCIL OF DEPARTMENT OF CHEMISTRY**
REFERENCE NO.	**7 (NO. 2/3)**
DATE	**29/3/1446 - 2/10/2024**