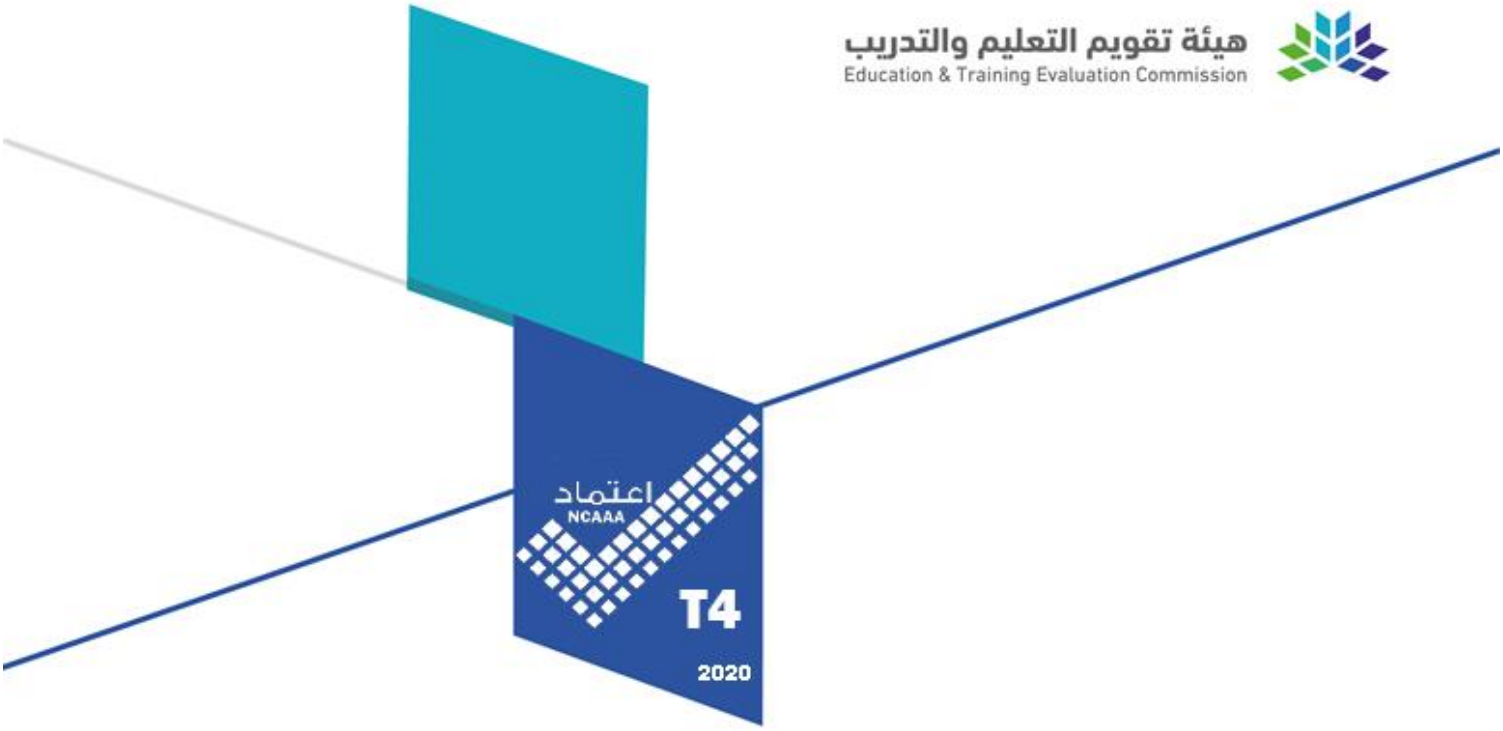
هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission



Course Specifications

Course Title:	***Chemistry of polymer***
Course Code:	***CHEM 446***
Program:	***Bachelor in Chemistry***
Department:	***Chemistry***
College:	***College of Science***
Institution:	***Jazan University (JU)***

Table of Contents

A. Course Identification

1. Credit hours: 2h **Workload:** 111 **ECTS:** 4.0	
2. Course type	
a.	University ☐ College ☐ Department ☑ Others ☐
b.	Required ☑ Elective ☐
3. Level/year at which this course is offered: Level 8 / Year 4	
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**		

7. Contact Hours (based on academic semester)

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

B. Course Objectives and Learning Outcomes

1. Course Description

Course Title	*Course Number*	*Contact Hours (CH)*		*Credit unit (CU)*	*Year*	*Level*	*Pre-requisite*
		Lec.	*Prac.*				
Chemistry of polymer	*CHEM 446*	*2*	*0*	*2*	*4*	*8*	*none*

This course aims to give students the basic principles of photochemistry and its chemical and biological applications

Course objectives: They are to identify the following.

1. ***Nomenclature , classification and synthesis of polymers***
2. ***Mechanisms and kinetics of polymer reactions***
3. ***structural morphology and composition of polymeric materials (Crystallinity and Amorphous polymers)***
4. ***Physical properties (Thermal ,mechanical and molecular weight distribution) of polymeric materials***
5. ***The applications of polymeric materials (packaging-Medical)***

Syllabus: A-Theoretical contents

The course is divided into 4 sections:

Polymer solution behaviours - Physical and structural morphology of polymers - Mechanical and thermal properties of polymers

Syllabus: A-Pratical contents

none

2. Course Main Objective

This course aims to give students the fundamental principles of polymer chemistry, mechanism, kinetics, morphological structure and its chemical industrial applications.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding** ***Up on completing this course, student will be able to***	
1.1	***Demonstrate a broad knowledge and understanding in polymer chemistry topics as, polymer monomer, polymerization, tacticity, crystalline and amorphous polymers, stress and strain , …. etc*** ***(M)***	K1
1.2	describe the behaviours and properties of polymers as a function of their morphology, composition, thermal properties. ***….etc*** ***(M)***	K2
2	**Skills :** ***Up on completing this course, student will be able to***	
2.1	***Demonstrate the knowledge and skills required to calculate the rate of polymerization reaction and solve problems in molecular weight***	S1

CLOs		Aligned PLOs
	distribution as well as calculate activity ratios in copolymer equation …….. etc (M)	
2.2	*Use communication and on line technology to prepare a report/poster on selected polymer chemistry topic* (M)	S4

C. Course Content

No	List of Topics	Contact Hours
1	*Nomenclature , classification and synthesis of polymers*	*4*
2	*Mechanisms and kinetics of free radicals- ionic polymerization*	*4*
3	*Copolymerization and copolymer equation*	*5*
4	*Polymer solution behaviours*	*3 + 1 Exam*
5	*Molecular weight distribution and polydispersity index*	*2*
6	*Thermal and mechanical properties*	*5*
7	*Techniques and applications of polymer chemistry*	*3+1 Exam*
8	*Presentation Session*	*2*
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** **Upon completion of the course, student will be able to:**		
1.1	*Demonstrate a broad knowledge and understanding in polymer chemistry topics as, polymer monomer, polymerization, tacticity, crystalline and amorphous polymers, stress and strain , …. etc (M)*	• *lecture* • *group work discussion*	*oral* *written examinations* *Quizzes* *HW*
1.2	describe the behaviours and properties of polymers as a function of their morphology, composition, thermal properties. *….etc* *(M)*	• *lecture* *group work discussion*	*oral* *written examinations* *Quizzes* *HW*
2.0	***Skills*** **Upon completion of the course, student will be able to:**		
2.1	*Demonstrate the knowledge and skills required to calculate the rate of polymerization reaction and solve problems in molecular weight distribution as well as calculate activity ratios in copolymer equation ……etc (M)*	• *lecture* *group work discussion*	*oral* *written examinations* *Quizzes* *HW*
2.2	*Use communication and on line technology to prepare a report/poster on selected polymer chemistry topic (M)*	*research activities* *project-based learning* *Technology-enabled learning*	*assignments* *reports / project rubric*

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	*Homework assignment (H.W. 1)*	*2*	*1*
2	*Lecture Quizzes (Q1)*	*5*	*5*
3	*Mid-term Exam (MID. 1)*	*8*	*15*
6	*Mid-term exam (MID. 2)*	*14*	*15*
7	*Presentation Session*	*14*	*4*
8	*Final EXAM*	*17*	*60*
	Total Exam		100

***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:

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

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Introduction to Physical Polymer Science, Fourth Edition Author(s): L.H. Sperling 2006 John Wiley & Sons, Inc.
Essential References Materials	• **Polymer Physics (Chemistry) by M. Rubinstein and Ralph H. Colby, 2003.** ***Photochemistry, Past, Present and Future; Angelo Albini, Springer-Verlag Berlin Heidelberg 2016, ISBN 978-3-662-47976-6***
Electronic Materials	***Some course contents and materials are posted on Black board sites***
Other Learning Materials	• https://www.longdom.org/scholarly/physical-chemistry-for-polymers-journals-articles-ppts-list-202.html • https://www.routledge.com/Polymers-for-Packaging-Applications/Alav • https://www.youtube.com/results?search_query=polymer+solutions • https://pubs.acs.org/doi/abs/10.1021/ed029p105. • https://chem.libretexts.org/Special:Search?qid=&fpid=230&fpth=&query=polymer+chemistry&type=wiki

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.)	***Smart board, Data show, Black board, internet***
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	***none***

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of Teaching and Assessment	***Student***	***Likert-type Survey CES) Indirect***
Extent of achievement of course learning outcomes	***Instructor & Course coordinator***	***Class room evaluation (direct & indirect***
Quality of learning resources	***Program coordinator***	***Indirect***
Exam Quality assessment	***Assessment committee***	***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