نموذج توصيف مقرر
Course Description Form

Name of College\Faculty : Science — **اسم الكلية:**

Name of Department: Chemistry — **اسم القسم العلمي:**

Course Name	Physical Chemistry of Polymers	**اسم المقرر**
Course No.	0420426	**رقم المقرر**
No. of Credits	3	**عدد الوحدات**
Theoretical Hours	3	**عدد الساعات النظرية**
Practical Hours	0	**عدد الساعات المحلية**

Course topics — **مواضيع المقرر**

1. Introduction to polymer science
2. Molecular weight of polymers
3. Kinetics of polymerization reactions
4. Polymer solution
5. Thermodynamics of polymer solution
6. Polymer structure and physical properties

Text book: (Name, Author , Year , Publisher) — **عنوان الكتاب : (الاسم ، المؤلف ، سنة الطبع ، دار النشر)**

Polymer Chemistry by R. Seymour and C. Carraher, Marcel Dekker Inc, New York, Latest Edition.

References: (Name , Author , Year . Publisher) — **عنوان المرجع : (الاسم ، المؤلف ، سنة الطبع ، دار النشر)**

1. Polymer Chemistry, an Introduction by M. P. Stevens, Oxford University Press, New York, 1999, Latest Edition.
2. Textbook of Polymer Science by F. W. Billmeyer, John Wiley, 1995, Latest Edition.
3. Chemistry and physics of high polymer by F. W. Billmeyer, 1999, Latest Edition.

Prerequisites					متطلبات المقرر	
Grading	Exams	50	%		الاختبارات	آلية رصد المقرر
	Quizzes	10	%		امتحانات قصيرة	
	H.W.	0	%		واجبات	
	Project (field study)	0	%		مشاريع (دراسة ميدانية)	
	Final	40	%		الاختبار النهائي	
	100%					

Chapters included:

Chapter	Topic	page
CH.1	Introduction to polymer science	1-18
CH.2	Molecular weight of polymers	49-82
CH.3	Kinetics of polymerization reactions	83-94, 207-212
CH.4	Polymer solution	185-190
CH.5	Thermodynamics of polymer solutions	437-453
CH.6	Polymer structure and physical properties	459-481

Course objectives					
No.	Course Objectives (Learning Outcomes)	Example(s) of relevant (Topics and activities)	Recommended Level to satisfy the objectives		
			High	Medium	Low
1	To introduce the basic concept of polymeric materials.	• Understand the basic concept of large molecules. • Identify the chemical structure and morphology of polymeric materials. • Apply different methods to measure the various averages molecular weight of the polymer. • (Light scattering, osmotic pressure and semipermeable membranes, sedimentation methods and viscosity).	X		

		• Predict the distribution functions of polymer conformations.			
2	To emphasize the chemical and physical characteristics of polymeric materials.	• Distinguish different types of polymerization reactions to illustrate different molecular mechanisms, free radical mechanisms and ionic mechanisms. • Understand the behaviour of polymer in solutions (solubility, phase separation, fractionation and swelling). • Discuss the thermodynamics of polymer solutions. • Identify the components of the polymeric solution and calculate its partial molar quantities. • Understand the chemical potential in ideal and real solutions. • Describe phase equilibria of macro ions.	**X**		
3	To correlate the polymer structure and its physical properties.	• appreciate the relation of polymer structure to its physical properties. • discuss the mechanical properties of solid polymers. • understand properties involving large deformation. • discuss properties of the commercially important polymers. • explain the thermal characteristic of high polymer.	**X**		
Fields	Physical Chemistry				
Skills					
Coordinator (Name and Rank) :		Physical Chemistry Coordinator			
Signature and stamp :					
Date:		**10/11/2025**			