

نموذج توصيف مقرر
Course Description Form

Name of College\Faculty : Science

Name of Department: Chemistry

اسم الكلية:

اسم القسم العلمي:

Course Name	Colloid and Surface Chemistry	اسم المقرر
Course No.	0420421	رقم المقرر
No. of Credits	3	عدد الوحدات
Theoretical Hours	3	عدد الساعات النظرية
Practical Hours	0	عدد الساعات المحلّية
Course topics		مواضيع المقرر
1. Introductory colloid science 2. Properties of colloidal systems 3. Colloidal stability 4. Properties of interfaces 5. Charged interface. 6. Emulsions and microemulsions 7. Colloid characterization techniques 8. Physical and chemical adsorption. 9. Catalytic surfaces. 10. Surface characterization techniques.		
Text book: (Name, Author , Year , Publisher)		عنوان الكتاب : (الاسم ، المؤلف ، سنة الطبع ، دار النشر)
Colloids and Interfaces with Surfactants and Polymers: an introduction, Jim Goodwin, Wiley, <u>Latest Edition</u> .		
References: (Name , Author , Year . Publisher)		عنوان المرجع : (الاسم ، المؤلف ، سنة الطبع ، دار النشر)
-Introduction to Colloid and Surface Chemistry, D. J. Shaw, Butterworth Heinmann Ltd, <u>Latest Edition</u> .		

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	Sections Included
CH.1	The Nature of Colloids	1-11
CH.2	Macromolecules and Surfactants	9
CH.4	Forces of Repulsion	1-8
CH.5	The Stability of Dispersion	1-6
CH.6	The Wetting of Surfaces by Liquids	1-9
CH.7	Emulsions and Microemulsions	1-4
CH.8	Characterization of Colloidal Particles	1-3, 5-6, and 8-11
CH.5	The Solid-Gas Interface	All (from the reference book)

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 concepts of colloidal systems.	• Describe and classify colloidal systems.	x		
2	To highlight the stability of colloids.	• Understand the (DLVO) theory.	x		

		- Explain the phenomena of flocculation, coagulation and coalescence. - Specify different attractive forces, electrostatic repulsion and total potential. - Explain criteria for stability of colloid systems.			
3	To study the surface properties of interfaces.	- Define surface and interfacial tension. - Interpret adsorption and orientation at interfaces. - Explain surface energy. - Discuss contact angles, wetting and liquid spreading. - Explain the origin of surface charge. - Interpret the electric double layer for a charged particle.	x		
4	To describe two important colloidal systems, emulsion and microemulsion.	- Define surfactant. - Appreciate the importance of the Krafft temperature and cloud point in surfactant stability. - Understand micellization phenomena. - Explain the thermodynamics of micellization. - Discuss factors affecting the (CMC). - Describe the structure of micelles and molecular packing. - Discuss the formation and stability of emulsion and microemulsion. - Explain the physicochemical properties of microemulsions. - Interpret general surfactant phase diagrams.	x		
5	To introduce basic characterization techniques for	Calculate colloidal particle size and distributions.	x		

	colloidal particles.	- Understand the scientific basics of scattering techniques and their application to colloidal systems. - Explain the general features of (electron) optical imaging systems. - Explain the viscosities of colloids. - Explain the surface charge and electrophoresis of colloidal systems.			
6	To introduce definitions and properties of solid surfaces.	- Distinguish between physisorption and chemisorption. - Summarize the adsorption isotherm models (Langmuir model, the BET model). - Calculate the surface area. - Discuss the rates of surface processes. - Explain basic surface concepts such as adsorption, isotherms, Miller index, unit cells. - Explain the catalytic activity and selectivity at surfaces (heterogeneous catalysis).	x		
7	To illustrate modern techniques for characterization of some selected catalytic surfaces.	- Use different techniques for characterization of catalytic systems (XRD, XPS and UPS spectroscopy, electron microscopy, atomic force microscopy....). - Determine surface area and pore structure. - Understand the importance of colloid and surface science in industry and daily life applications.	x		
Fields	Physical Chemistry				
Skills					
Coordinator (Name and Rank) :	Physical Chemistry Coordinator				
Signature and stamp :					



Date:

10/11/2025