

1. Course Description

COURSE DESCRIPTION FORM	
Course Code and Title	CHE469 ADSORPTION
Course Semester	7
Catalog Description (Content) of the Course	Rate equations and equilibrium relations in adsorption and ion exchange. Determination techniques of properties and structure of sorbents. Design of adsorption and ion exchange columns. Industrial applications.
Main Textbook	Lowell, S., Shields, JE, Thomas, MA, Thommes, M., "Characterization of Porous Solids and Powders: Surface Area, Pore Size, and Density", Kluwer, London, 2004
Supporting Textbooks	1. Yang, R.T., Adsorbents: Fundamental and Applications, Wiley, Newyork, 2003 2. Rouquerol, F., Rouquerol, J., Sing, K., "Adsorption by Powder Porous Solids", Academic Press, Newyork, 1999 3. Do, D.D., "Adsorption Analysis: Equilibrium and Kinetics", Series on Chem. Eng., Vol. 2, Imperial College Press, Signapore, 1998 4. Rutven, D.M., "Principles of Adsorption and Adsorption Processes", Wiley, Newyork, 1984 5. Gregg, S.T., Sing, K.S.W., "Adsorption, Surface Area and Porosity", 2nd Ed., Academic Press, Newyork, 1982 6. Smith, J.M., "Chemical Engineering Kinetics", 3rd ed., Mc Graw-Hill Co., New York, 1981
Course Credit (ECTS)	4
Prerequisites of the Course (Compulsory attendance should be indicated here.)	There is no prerequisite or co-requisite for this course
Type of the Course	Elective
Instruction Language of the Course	English
Object and Target of the Course	- To introduce the place and importance of adsorption and ion exchange in separation proceeses. - Rate and equilibrium relation development in adsorption processes. - Teaching of adsorbent property determination techniques. - Application of thought knowledge to equipment design. - To teach the necessary methods for the engineering applications of related theories.
Learning Outcomes of the Course	- Application of adsorption in separation processes. - Equipment design and engineering application ability. - Gain of written and oral communication skills with the given homework, term project studies.
Mode of Delivery	The mode of delivery of this course is face to face
Weekly Schedule of the Course	1. Week Separation processes and separation with adsorption. Transport phenomena in porous solids. 2. Week Diffusion and determination of effective diffusion coefficient. 3. Week Diffusion and determination of effective diffusion coefficient. 4. Week Separation processes/adsorption by porous materials. 5. Week Separation processes/adsorption by porous materials. 6. Week Separation processes/adsorption by porous materials. 7. Week Separation processes/adsorption by porous materials. 8. Week Separation processes/adsorption by porous materials. 9. Week Characterization of porous adsorbents. 10. Week: Characterization of porous adsorbents. 11. Week: Column design and regeneration methods. 12. Week: Industrial adsorbents and engineering applications. 13. Week: Industrial adsorbents and engineering applications. 14. Week: Term paper presentation. 15. Week: Term paper presentation.

Educative Activities <i>(Credit will be determined based on the time given for these activities. Should be filled carefully.)</i>	Theoretical Study Hours of Course Per Week Reading Searching in Internet and Library Preparing Reports Preparing Presentation Presentation Mid-Term and Studying for Mid-Term Final and Studying for Final								
Assessment Criteria			Quantity	Total Contribution (%)					
		Midterm	2	45					
		Homework							
		Assignment							
		Projects	1	15					
		Practice							
		Quiz							
		Contribution of In-term Studies to Overall Grade		60					
		Contribution of Final Examination to Overall Grade		40					
		Attendance							
Workload of the Course		Activity	Total Week Count	Weekly Duration (in hour)	Total Workload in Semester				
		Theoretical Study Hours of Course Per Week	14	3	42				
		Practicing Hours of Course Per Week							
		Reading	5	1	5				
		Searching in Internet and Library	5	3	15				
		Designing and Applying Materials							
		Preparing Reports	1	4	4				
		Preparing Presentation	1	2	2				
		Presentation	1	2	2				
		Mid-Term and Studying for Mid-Term	2	7	14				
		Final and Studying for Final	1	5	5				
		Other							
		Total work load			89				
		Total work load/25			3.56				
		ECTS of the course			4				
Course's Contribution To Program	Number	Program Outcomes			1	2	3	4	5
	1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied information in these areas to model and solve engineering problems.							X
	2	Ability to identify, formulate, and solve complex engineering problems; ability to						X	

