

1. Course Description

COURSE DESCRIPTION FORM																			
Course Code and Title	CHE446 NOVAL SEPARATION TECHNIQUES																		
Course Semester	8																		
Catalog Description (Content) of the Course	Basic concepts, dimensions and unit systems. Material and energy balances, applications to physical and chemical systems																		
Main Textbook	-Issac, H.J., "Century of Separation Science", Marcel and Deccer, New York, 2001.																		
Supporting Textbooks	-Mulder, M., "Basic Principles of Membrane Technology", Kluwer, New York, 1996. -Rousseau, R.W., "Handbook of Separation Process Technology", Wiley, New York, 1987. -Handley A.J., Adlard, E.R., "GAs Chromatographic Techniques and Applications", CRC press, New York, 2001.																		
Course Credit (ECTS)	4																		
Prerequisites of the Course (Compulsory attendance should be indicated here.)	There is no prerequisite or co-requisite for this course. 70% attendance is expected.																		
Type of the Course	Elective																		
Instruction Language of the Course	English																		
Object and Target of the Course	Application of mass transfer theories to new separation principles, learning of different separation techniques,																		
Learning Outcomes of the Course	- Ability of application of separation principles to novel separation processes. - Ability of following technological developments in separation processes. - Ability to do equipment design. - Ability of doing investigation in details for any separation subject.																		
Mode of Delivery	The mode of delivery of this course is face to face																		
Weekly Schedule of the Course	<table> <tr> <td>1.Week</td><td>Mass transfer theories and mass transfer coefficients. Novel separation techniques.</td></tr> <tr> <td>2.Week</td><td>Osmotic separation principles, membrane separation processes</td></tr> <tr> <td>3.Week</td><td>Reverse Osmosis</td></tr> <tr> <td>4.Week</td><td>Microfiltration, Ultrafiltration, Nanofiltration</td></tr> <tr> <td>5.Week</td><td>Dialysis, electrodialysis</td></tr> <tr> <td>6.Week</td><td>Membrane distillation</td></tr> <tr> <td>7.Week</td><td>Membrane distillation</td></tr> <tr> <td>8.Week</td><td>Pervaporation</td></tr> <tr> <td>9.Week</td><td>Gas Separation</td></tr> </table>	1.Week	Mass transfer theories and mass transfer coefficients. Novel separation techniques.	2.Week	Osmotic separation principles, membrane separation processes	3.Week	Reverse Osmosis	4.Week	Microfiltration, Ultrafiltration, Nanofiltration	5.Week	Dialysis, electrodialysis	6.Week	Membrane distillation	7.Week	Membrane distillation	8.Week	Pervaporation	9.Week	Gas Separation
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	10.Week Membrane types			
	11.Week Membrane modules			
	12.Week Chromatographic separation processes. Column calculations.			
	13.Week Project presentations			
	14.Week Project presentations			
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 Homework Preparing report Preparing presentation Presentation Mid-Term and Studying for Mid-Term Final and Studying for Final			
Assessment Criteria		Quantity	Total Contribution (%)	
	Midterm	2	40	
	Homework	5	20	
	Assignment			
	Projects			
	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
	Reading	5	1	5
	Searching in internet and library	3	4	12
	Preparing Reports	1	6	6
	Preparing Presentation	1	5	5
	Presentation	1	3	3
	Mid-Term and Studying for Mid-Term	1	8	8
	Final and Studying for Final	1	9	9
	Other (Homework)	2	5	10
	Total work load			100
	Total work load/25			4
	ECTS of the course			4

Course's Contribution To Program	Number	Program Outcomes	1	2	3	4	5
	1	Adequate knowledge in mathematics pertaining to the relevant discipline; information in these areas to model a			X		
	2	Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.		X			
	3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.	X				
	4	Ability to devise, select, and use modern techniques and tools needed for engineering practice; ability to employ information technologies effectively.	X				
	5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems.	X				
	6	Ability to work efficiently in intra-disciplinary teams.				X	
	7	Ability to work efficiently in multi-disciplinary teams;	X				
	8	Ability to work individually.			X		
	9	Ability to communicate effectively in Turkish/English, both orally and in writing; Ability to write effective reports and comprehend written reports, make effective presentations,		X			
	10	prepare design and production reports, give and receive clear and intelligible instructions.	X				
	11	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.	X				
	12	Awareness of professional and ethical responsibility.	X				
	13	Information about business life practices such as project management, risk management, and change management.	X				
	14	Information about awareness of entrepreneurship, innovation, and sustainable development.	X				
	15	Knowledge about contemporary issues and the global and societal effects of engineering practices	X				

		on health, environment, and safety.					
	16	Knowledge about awareness of the legal consequences of engineering solutions.	X				
	17	Knowledge on standards used in engineering practice.	X				
Name of Lecturer(s) and Contact Information		1. Prof..Dr.Suna BALCI sunabalci@gazi.edu.tr 2. Dr. Öğr. Üyesi Ceren HAKTANIR ceren.oktar@gazi.edu.tr					