1. Course Description

COURSE DESCRIPTION FORM	
Course Code and Title	CHE302 MASS TRANSFER I
Course Semester	6
Catalog Description (Content) of the Course	Diffusivity, molecular diffusion flux and Fick's laws. Mass transfer coefficients in laminar and turbulent flows. Mass transfer between phases. Mass transfer theories. Analogy theories. Continuous and stage wise contact processes. Gas absorption and distillation.
Main Textbook	McCabe, J. H,Smith, C. J., Harriot, H, "Unit Operations of Chemical Engineering", McGrawHill BookCo., 7th Edition, Boston, 2005.
Recommended Textbooks	• Treybal, R.E., Mass Transfer Operations, McGraw-Hill Book Co., Singapore, 1981. • Geankoplis, C.J., Transport Processes and Separation Process Principles (Includes Unit Operations), 4th Ed., Prentice Hall Book Co., London, 2003. • Uysal, B.Z., KütleTransferi, 2nd Ed., Gazi Üniversitesi Yayınları, 2003. • Bird, R.B., Steward, W. E., Lightfoot, E.N., Transport Phenomena, 2nd Ed., John Wiley and Sons, 2002.
Course Credit (ECTS)	6
Prerequisites of the Course (Compulsory attendance should be indicated here.)	There is no prerequisite or corequisite for this course.70 % attendance is compulsory.
Type of the Course	Compulsory
Instruction Language of the Course	English
Object and Target of the Course	Learning the principles of mass transfer which is a transport phenomenon and the basis of separation processes, investigation of basic methods of application of separation processes. Detailed investigation of gas absorption and distillation.
Learning Outcomes of the Course	Fundamentals of mass transfer,analogy of mass, momentum and heat transfer, application of separation processes, detailed design calculations for gas absorption and distillation in detail.
Mode of Delivery	The mode of delivery of this course is face to face.
Weekly Schedule of the Course	**1st Week:** Introduction, mass transfer mechanisms and diffusion coefficient. **2nd Week:** Calculation of diffusivity in gas, liquid and porous media; Fick's laws. **3rd Week:** Equation of continuity, mass transfer in stagnant fluids and in laminar flows, shell balances. **4th Week:**Mass transfer coefficients in laminar and turbulent flows. **5th Week:** Mass transfer theories; Film, Penetration and Surface renewal theories, Analogy. **6th Week:** Phase equilibria, interfacial mass transfer, tworesistance theory. **7th Week:** General classification of separation processes. **8th Week:** Single and multi-stage contact processes. **9th Week:** Continuous contact processes. **10th Week:** Gas Absorption **11th Week:** Vapor-liquid equilibria, batch distillation, flash distillation **12th Week:** Binary distillation and use of x-y diagram **13th Week:** Use of H-x,y diagram in distillation calculations. **14th Week:** Multi-component distillation.

Educative Activities
(Credit will be determined based on the time given for these activities. Should be filled carefully.)

Weekly theoretical course hours
Reading
Web survey and library inquiry
Report preparation
Midterm exams and preparation for midterm exams
Final exam and preparation for final exam

Assessment Criteria

	Quantity	Total Contribution (%)
Midterm	2	40
Homework	3	5
Assignment	0	0
Projects	1	10
Practice	0	0
Quiz	1	5
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	0	0	0
Reading	14	3	42
Searching in Internet and Library	4	4	16
Designing and Applying Materials	0	0	0
Preparing Reports	4	3	12
Preparing Presentation	0	0	0
Presentation	0	0	0
Midterm and Studying for Midterm	2	12	24
Final and Studying for Final	3	4	12
Other	0	0	0
Total work load			148
Total work load/25			5.92
ECTS of the course			6

Course's Contribution To Program

No	Program Learning 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 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 on health, environment, and safety.	X				
	16	Knowledge about awareness of the legal consequences of engineering solutions.	X				
	17	Knowledge on standards used in engineering practice.	X				
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