

## 1. Course Description

<b>COURSE DESCRIPTION FORM</b>	
<b>Course Code and Title</b>	KM474 MASS TRANSFER II
<b>Course Semester</b>	8
<b>Catalog Description (Content) of the Course</b>	Evaporation, extraction and leaching, drying, cooling towers filtration, crystallization, adsorption and ion exchange, grinding.
<b>Main Textbook</b>	Geancoplins, C.J., Transport Processes and Separation Process Principles (Includes Unit Operations), 4th Edit., Prentice Hall Book Co., London, 2003
<b>Supporting Textbooks</b>	McCabe, W.J., Smith, J.C., Harriot, H., Unit Operations of Chem. Eng., 3rd Edit., McGraw Hill Book Co., London, 1976. • Treybal, R.E., Mass Transfer Operations, McGraw-Hill Book Co., Singapore, 1981.
<b>Course Credit (ECTS)</b>	5
<b>Prerequisites of the Course (Compulsory attendance should be indicated here.)</b>	There is no prerequisite or co-requisite for this course. 70% Attendance
<b>Type of the Course</b>	Compulsory
<b>Instruction Language of the Course</b>	Turkish
<b>Object and Target of the Course</b>	Learning the design and study of the extraction, evaporation, cooling towers, filtration, drying, crystallization, adsorption, ion exchange and grinding in detail.
<b>Learning Outcomes of the Course</b>	1. Learning the application of mass transfer to separation processes. 2. Especially, design calculations of unit operations such as extraction, leaching, evaporation, drying, and filtration, cooling towers, crystallization, grinding, adsorption and ion exchange in detail.
<b>Mode of Delivery</b>	The mode of delivery of this course is face to face
<b>Weekly Schedule of the Course</b>	<p>1. Introduction. General study of separation processes.</p> <p>Week</p> <p>2. Extraction and leaching, analysis of immiscible and partially miscible liquid systems, co- or counter-current and single or multiple effect systems.</p> <p>Week</p> <p>3. Extraction and leaching, analysis of immiscible and partially miscible liquid systems, co- or counter-current and single or multiple effect systems.</p> <p>Week</p> <p>4. Extraction and leaching, analysis of immiscible and partially miscible liquid systems, co- or counter-current and single or multiple effect systems.</p> <p>Week</p> <p>5. Extraction and leaching, analysis of immiscible and partially miscible liquid systems, co- or counter-current and single or multiple effect systems.</p> <p>Week</p> <p>6. Evaporation, energy equations for single and</p>

	<p>Week multiple stage systems, forward, backward and parallel feed, effects of boiling point rising.</p> <p>7. Week Evaporation, energy equations for single and multiple stage systems, forward, backward and parallel feed, effects of boiling point rising.</p> <p>8. Week Evaporation, energy equations for single and multiple stage systems, forward, backward and parallel feed, effects of boiling point rising.</p> <p>9. Week Filtration, basic filtration equation and mathematical analysis.</p> <p>10. Week Filtration, basic filtration equation and mathematical analysis.</p> <p>11. Week Drying, mathematical analysis for different rate curves.</p> <p>12. Week Drying, mathematical analysis for different rate curves.</p> <p>13. Week Adsorption, adsorption types and isotherms, efficient parameters.</p> <p>14. Week Adsorption, adsorption types and isotherms, efficient parameters.</p>																														
<p><b>Educative Activities</b> (Credit will be determined based on the time given for these activities. Should be filled carefully.)</p>	<p>Theoretical Study Hours of Course Per Week Searching in Internet and Library Preparing Reports Mid-Term and Studying for Mid-Term Final and Studying for Final</p>																														
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	Materials			
	Preparing Reports	1	25	25
	Preparing Presentation	0	0	0
	Presentation	0	0	0
	Mid-Term and Studying for Mid-Term	2	10	20
	Final and Studying for Final	1	10	10
	Other	0	0	0
	<b>Total work load</b>			<b>122</b>
	<b>Total work load/25</b>			<b>4,88</b>
	<b>ECTS of the course</b>			<b>5</b>

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.			
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,				x		

		both orally and in writing; Ability to write effective reports and comprehend written reports, make effective presentations,						
	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			
<b>Name of Lecturer(s) and Contact Information</b>		1. Prof. Dr. Atilla MURATHAN E-posta adresi murathan@gazi.edu.tr 2. Prof. Dr.Göksel ÖZKAN gozkan@gazi.edu.tr						