

EQUILIBRIUM OF MASS AND ENERGY

1	Course Title:	EQUILIBRIUM OF MASS AND ENERGY	
2	Course Code:	GMD2216	
3	Type of Course:	Compulsory	
4	Level of Course:	First Cycle	
5	Year of Study:	2	
6	Semester:	4	
7	ECTS Credits Allocated:	4.00	
8	Theoretical (hour/week):	2.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	-	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. AKIN BURAK ETEMOĞLU	
15	Course Lecturers:	Yrd.Doç.Dr. Erhan PULAT	
16	Contact information of the Course Coordinator:	e-posta: aetem@uludag.edu.tr telefon: 0 224 2941976 adres: UÜMMF, Makine Müh. Bölümü	
17	Website:		
18	Objective of the Course:	Teaching of fundamental principles of heat and mass balance.	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	Application of mass and energy conservation to open systems.
		2	Analysis of vapour compression refrigeration and heat pump cycles and comprehension of these cycles in food processes.
		3	Application of mass and energy conservation principals to ideal gas mixtures.
		4	Learning of moist air thermodynamics and usage of psychrometric diagram for possible application areas in food engineering.
		5	Calculate convective mass transfer rates in food engineering processes.
		6	Calculate transient mass transfer rates in food engineering processes.
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21	Course Content:		
		Course Content:	
Week	Theoretical	Practice	
1	Introduction to open system analysis		
2	Steady State Steady Flow (SSSF) processes and some engineering applications		

3	Uniform State Uniform Flow (USUF) processes and examples from application areas			
4	Analysis of vapour compression refrigeration and heat pump cycles			
5	Ideal gas mixtures and models applied these mixtures			
6	Gas-water vapour mixtures, psychrometry and thermodynamics of moist air			
7	Mass and energy balance in moist air processes and designation of these processes on the psychrometric diagram			
8	Review of the preview subjects, midterm exam			
9	Principles of mass transfer, diffusion, Fick's law			
10	Analogy between heat and mass transfer			
11	Mass convection and applications			
12	Mixtures, Henry law			
13	Transient mass transfer			
14	Heat exchangers			
22	Textbooks, References and/or Other Materials:	1. Mühendislik Termodinamiğın Temelleri, Cilt 1 ve Cilt 2, R. Yamankaradeniz, Nobel Yayın Dağıtım, Ekim 2004, Ankara.		
Activites		Number	Duration (hour)	Total Work Load (hour)
Theoretical		4	2.00	28.00
Practicals/Labs		0	0.00	0.00
Self study and preperation		12	2.00	28.00
Homeworks		4	5.00	20.00
Projects		0	0.00	0.00
Field Studies		0	0.00	0.00
Midterm exams		1	10.00	10.00
TERM LEARNING ACTIVITIES		NUMBE	WEIGHT	
Others		2	10.00	20.00
Midterm Exam		1	12.00	12.00
Final Exams		1	12.00	12.00
Total Work Load				118.00
Home work-project		4	10.00	3.93
Total work load/ 30 hr		4	10.00	
ECTS Credit of the Course				4.00
Total		8	100.00	
Contribution of Term (Year) Learning Activities to Success Grade		50.00		
Contribution of Final Exam to Success Grade		50.00		
Total		100.00		
Measurement and Evaluation Techniques Used in the Course				
24	ECTS / WORK LOAD TABLE			

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	5	4	0	3	4	0	0	0	0	0	0	0	0	0	0	0
ÖK2	5	4	0	3	4	0	0	0	0	0	0	0	0	0	0	0
ÖK3	5	4	0	3	4	0	0	0	0	0	0	0	0	0	0	0
ÖK4	5	4	0	3	4	0	0	0	0	0	0	0	0	0	0	0
ÖK5	5	4	0	3	4	0	0	0	0	0	0	0	0	0	0	0
ÖK6	5	4	0	3	4	0	0	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low			2 low			3 Medium			4 High			5 Very High			