

HEAT AND MASS TRANSFER

1	Course Title:	HEAT AND MASS TRANSFER	
2	Course Code:	GMD2205	
3	Type of Course:	Compulsory	
4	Level of Course:	First Cycle	
5	Year of Study:	2	
6	Semester:	3	
7	ECTS Credits Allocated:	4.00	
8	Theoretical (hour/week):	3.00	
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. MUHİDDİN CAN	
15	Course Lecturers:	Prof.Dr.Akın B. ETEMOĞLU	
16	Contact information of the Course Coordinator:	e-posta: can@uludag.edu.tr telefon: 0 224 2941957 adres: UÜMF, Makine Müh. Bölümü	
17	Website:		
18	Objective of the Course:	<p>The primary objective of this course is to give students knowledge about heat and mass transfer operations in real-world engineering applications.</p> <p>1. To train students in understanding of the basic principles of heat and mass transfer applications.</p> <p>2. To provide knowledge about economical, environmental and ethical effects of heat and mass transfer operations</p>	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	Define and calculate heat conduction problems
		2	Define and solve heat convection problems
		3	Calculate radiation problems
		4	Calculate thermo-physical properties of foods.
		5	Define drying operations.
		6	Design and analyse the thermal systems
		7	Present solutions in clear and understandable way.
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21	Course Content:		
		Course Content:	
Week	Theoretical	Practice	
1	Introduction, course objectives, motivation, application areas of heat and mass transfer operations in food engineering.		
2	Modes of heat transfer.		

3	Introduction to heat conduction. General heat conduction equation	
4	Steady-state heat conduction.	
5	Transient heat conduction. Lumped systems analysis.	
6	Transient heat conduction in large plane walls, long cylinders and spheres.	
7	Thermo-physical properties of foods. Quiz-1	
8	Midterm exam	
9	Physical mechanism of convection. Boundary layer. Laminar and turbulent flows. Dimensionless numbers (Nu, Re, Pr, Gr, St).	
10	Differential convection equations (mass, momentum and energy). External convection	
11	Internal convection. Natural convection.	
12	Radiation heat transfer.	
13	Mass transfer principles.	
14	Drying theory.	
22	Textbooks, References and/or Other Materials:	<p>1. KILIÇ, M., YIĞİT, A. 2004. ISI TRANSFERİ, Alfa Yayınevi, Bursa, 467 s.</p> <p>2. Y.A.Çengel, Heat Transfer – A Practical Approach, McGraw-Hill. Singapore, 932 p.</p> <p>3. F.P. Incropera, D.P. DeWitt, Fundamentals of Heat and Mass Transfer, John Wiley and Sons, Inc. 880 p.</p>
23	Assesment	
TERM LEARNING ACTIVITIES		NUMBER
		WEIGHT
Midterm Exam	1	30.00
Quiz	1	10.00
Home work-project	0	0.00
Final Exam	1	60.00
Total	3	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		
24	ECTS / WORK LOAD TABLE	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	12	1.50	18.00
Homeworks	8	4.00	32.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	8.00	8.00
Others	1	8.00	8.00
Final Exams	1	10.00	10.00
Total Work Load			118.00
Total work load/ 30 hr			3.93
ECTS Credit of the Course			4.00

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	4	5	4	3	3	1	1	2	2	2	1	0	0	0	0	0
ÖK2	4	5	4	3	3	1	1	2	2	2	1	0	0	0	0	0
ÖK3	4	5	4	3	3	1	1	2	2	2	1	0	0	0	0	0
ÖK4	4	5	4	3	3	1	1	2	2	2	1	0	0	0	0	0
ÖK5	4	5	4	3	3	1	1	2	2	2	1	0	0	0	0	0
ÖK6	3	5	5	3	3	1	1	2	2	2	1	0	0	0	0	0
ÖK7	1	1	1	1	3	4	4	2	2	2	1	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				