

# HEAT AND MASS TRANSFER

<b>1</b>	Course Title:	HEAT AND MASS TRANSFER	
<b>2</b>	Course Code:	GMD3207	
<b>3</b>	Type of Course:	Compulsory	
<b>4</b>	Level of Course:	First Cycle	
<b>5</b>	Year of Study:	3	
<b>6</b>	Semester:	5	
<b>7</b>	ECTS Credits Allocated:	3.00	
<b>8</b>	Theoretical (hour/week):	2.00	
<b>9</b>	Practice (hour/week):	2.00	
<b>10</b>	Laboratory (hour/week):	0	
<b>11</b>	Prerequisites:		
<b>12</b>	Language:	English	
<b>13</b>	Mode of Delivery:	Face to face	
<b>14</b>	Course Coordinator:	Dr. Öğr. Üyesi PERİHAN YOLCI ÖMEROĞLU	
<b>15</b>	Course Lecturers:		
<b>16</b>	Contact information of the Course Coordinator:	pyomeroglu@uludag.edu.tr	
<b>17</b>	Website:		
<b>18</b>	Objective of the Course:	The course aims; to explain the main concepts of heat and mass transfer which are the main engineering courses; to inform their application in food industry; to teach how basic concepts of heat and mass transfer can be used to design a process or equipment in food industry	
<b>19</b>	Contribution of the Course to Professional Development:		
<b>20</b>	Learning Outcomes:		
		<b>1</b>	to explain the heat and mass transfer mechanisms
		<b>2</b>	to understand the basic principles of steady and unsteady heat and mass transfer
		<b>3</b>	to understand the importance of heat and mass transfer in Food Engineering unit operations
		<b>4</b>	to have capability in making heat and mass transfer balances and to understand the analogy between them
		<b>5</b>	to make design, analysis, solving and evaluation for any heat and mass transfer system given
		<b>6</b>	to learn the design of the heat exchangers
		<b>7</b>	to demonstrate ability to learn independently and/or working in a team
		<b>8</b>	
		<b>9</b>	
		<b>10</b>	
<b>21</b>	Course Content:		
		<b>Course Content:</b>	

Week	Theoretical	Practice
1	Introduction to Heat Transfer Mechanism	Problems solving
2	One dimensional steady state conduction heat transfer	Problem solving
3	One dimensional steady state conduction heat transfer continued	Problem solving
4	Transient heat conduction	Problem solving
5	Introduction to Convection and External forced convection	Problem solving
6	Internal forced convection	Problem solving
7	Free convection, boiling and Condensation	Problem solving
8	Heat exchanger	Problem solving
9	Heat exchanger-continues	Problem solving
10	Radiation Heat Transfer	Problem solving
11	Intorudction to mass transfer, diffusion	Problem solving
12	Molecular diffusion	Problem solving
13	Unsteady state mass transfer, convective mass transfer	Problem solving
14	Two phase diagrams	Problem solving
22	Textbooks, References and/or Other Materials:	<ul style="list-style-type: none"> <li>• Çengel Y.A. 1998. Heat Transfer? A Practical Approach, McGraw?Hill.</li> <li>• Geankoplis C. 1993. Transport Process and Unit Operations. Third Edition. Prentice Hall</li> <li>• Incropera F:P., Dewitt D.P. 2007. Fundamentals of Heat and Mass Transfer. 7th edition. John Wiley &amp; Sons Inc.</li> <li>• Erden Alpay, "Mass Transfer and Mass Transfer Operations", Ege Üniversitesi Yayınları</li> <li>• KILIÇ, M., YİĞİT, A. 2004. ISI TRANSFERİ, Alfa Yayınevi, Bursa,</li> <li>• David, P. Kessler, Robert, A. Greenkorn, Momentum, Heat and Mass Transfer Fundamentals, Marcel Deccer Inc.</li> </ul>
23	Assesment	
<b>TERM LEARNING ACTIVITIES</b>		<b>NUMBE R</b>
		<b>WEIGHT</b>
Midterm Exam	1	20.00
Quiz	2	10.00
Home work-project	1	10.00
Final Exam	1	60.00
Total	5	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	2.00	28.00
Practicals/Labs	14	2.00	28.00
Self study and preperation	14	1.00	14.00
Homeworks	1	8.00	8.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	2.00	2.00
Others	4	2.00	8.00
Final Exams	1	2.00	2.00
Total Work Load			90.00
Total work load/ 30 hr			3.00
ECTS Credit of the Course			3.00

**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	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK5	5	5	5	4	0	0	0	0	0	0	0	0	0	0	0	0
ÖK6	5	0	5	4	0	0	0	0	0	0	0	0	0	0	0	0
ÖK7	0	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0

**LO: Learning Objectives PQ: Program Qualifications**

<b>Contribution Level:</b>	<b>1 very low</b>	<b>2 low</b>	<b>3 Medium</b>	<b>4 High</b>	<b>5 Very High</b>
----------------------------	-------------------	--------------	-----------------	---------------	--------------------