1. Course Description

COURSE DESCRIPTION FORM	
Course Code and Title	CHE321 HEAT TRANSFER
Course Semester	5
Catalog Description (Content) of the Course	Heat transfer by conduction. Natural and forced heat transfer by convection. Heat transfer in phase changing systems. Heat transfer by radiation. Design and applications of the heat exchangers.
Main Textbook	Holman, J. P., "Heat Transfer", McGraw Hill Book Comp., 10th Ed., New York, 2010.
Recommended Textbooks	• McCabe, W.J., Smith, J.C., Harriot, H., "Unit Operations of Chemical Engineering", Mc Graw Hill Book Comp., 7th Ed., Boston, 2005. • Incropera, F.P., DeWitt, D.P., "Fundamentals of Heat and Mass Transfer", 6th Ed. , NewYork, 2006. • Geankoplis, C.J., Transport Processes and Unit Operations", Prentice Hall Int. Edition, 3rd Ed., New Jersey, 1993. • Kern, Q., "Process Heat Transfer", 3rd Ed., McGraw Hill Book Co., 1989. • Özışık, M.N, Beyazıtoğlu, Y., "Elements of Heat Transfer", McGraw Hill Book Co., 1989.
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	• Basic concepts/principles of heat transfer mechanisms. • Heat exchanger designs and their applications.
Learning Outcomes of the Course	Understanding the basic concepts and principles of various heat transfer mechanisms. Teaching design rules of heat exchangers and their applications.
Mode of Delivery	The mode of delivery of this course is face to face.
Weekly Schedule of the Course	**1st Week:** Introduction, 2nd law of Thermodynamics, Heat Transfer Mechanisms. **2nd Week:** Heat transfer by conduction. Steady state, one-dimensional general conduction heat transfer equation. Multilayer systems. Heat transfer resistance. **3rd Week:** Heat transfer by conduction. Steady state, one-dimensional general conduction heat transfer equation. Multilayer systems. Heat transfer resistance. **4th Week:** Heat transfer by conduction. Steady state, one-dimensional general conduction heat transfer equation. Multilayer systems. Heat transfer resistance. **5th Week:** Heat transfer by conduction. Steady state, one-dimensional general conduction heat transfer equation. Multilayer systems. Heat transfer resistance. **6th Week:** Heat transfer by convection; natural and forced convection. Parallel and counter-current flow. Overall heat transfer coefficient, number of transfer units. **7th Week:** Heat transfer by convection; natural and forced convection. Parallel and counter-current flow. Overall heat transfer coefficient, number of transfer units.

	8th Week: Heat transfer by convection; concurrent and countercurrent flows. **9th Week:** Heat exchangers. Fins. **10th Week:** Heat exchangers. Shell and tube heat exchangers. **11th Week:** Heat exchangers, overall heat transfer coefficient. Shell and tube heat exchangers, condensers, extended surfaces. Optimization of heat exchangers. **12th Week:** Radiation heat transfer, emissivity, absorptivity, and transmissivity. View angles, view factors. Shielded systems and electric circuit analogy. **13th Week:** Radiation heat transfer. Radiation shields and nodes. **14th Week:** Heat transfer in agitated vessels. Heat exchangers used in industry.
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				

Name of Lecturer(s) and Contact Information

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