

Mechanical Engineering (English)

Bachelor

TR-NQF-HE: Level 6

QF-EHEA: First Cycle

EQF-LLL: Level 6

Course General Introduction Information

Course Code:	MEC471			
Course Name:	Heat Exchangers			
Course Semester:	Spring			
Course Credits:	ECTS 6			
Language of instruction:	EN			
Course Requirement:				
Does the Course Require Work Experience?:	No			
Type of course:	Area Ellective			
Course Level:	Bachelor	TR-NQF-HE:6. Master`s Degree	QF- EHEA:First Cycle	EQF-LLL:6. Master`s Degree
Mode of Delivery:	Face to face			
Course Coordinator :	Dr.Öğr.Üyesi GÜVENÇ UMUR ALPAYDIN			
Course Lecturer(s):				
Course Assistants:				

Course Purpose and Content

Course Objectives:	The student should internalize the meaning of the terminology and physical principles
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	<p>associated with the course subjects, heat transfer and fluid mechanics.</p> <p>The student should be able to delineate pertinent transport phenomena for any process or system involving heat exchangers.</p> <p>The student should be able to use requisite inputs for computing heat transfer rates and/or material properties.</p> <p>The student should be able to develop representative models of real processes and systems and draw conclusions concerning process/system design or performance from attendant analysis of products in industrial areas.</p>
Course Content:	<ul style="list-style-type: none"> • Heat Exchanger types • Heat Exchangers Constructions • Heat Exchangers Flow Arrangements • Heat Exchangers Heat Transfer Calculations • Heat Exchangers Pressure Drop • Heat Exchangers Material Selection and Strength of Materials. • Economic Analysis

Learning Outcomes

<p>The students who have succeeded in this course;</p> <p>1) The student should internalize the meaning of the terminology and physical principles associated with the course subjects, heat transfer and fluid mechanics. The student should be able to delineate pertinent transport phenomena for any process or system involving heat exchangers. The student should be able to use requisite inputs for computing heat transfer rates and/or material properties. The student should be able to develop representative models of real processes and systems and draw conclusions concerning process/system design or performance from attendant analysis of products in industrial areas.</p>
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Course Flow Plan

Week	Subject	Related Preparation
1)	• Heat Exchanger types	Course Notes
2)	• Heat Exchanger types	Course Notes
3)	• Heat Exchangers Constructions	Course Notes
4)	• Heat Exchangers Flow Arrangements	Course Notes
5)	• Heat Exchangers Heat Transfer Calculations	Course Notes
6)	• Heat Exchangers Heat Transfer Calculations	Course Notes
8)	• Heat Exchangers Heat Transfer Calculations	Course Notes
9)	• Heat Exchangers Pressure Drop	Course Notes

10)	• Heat Exchangers Pressure Drop	Course Notes
11)	• Heat Exchangers Material Selection and Strength of Materials.	Course Notes
12)	• Heat Exchangers Material Selection and Strength of Materials.	Course Notes
13)	• Economic Analysis	Course Notes
14)	• Economic Analysis	Course Notes

Sources

Course Notes / Textbooks:	<ul style="list-style-type: none"> • Pocket Guide for Air Conditioning Heating Ventilation Refrigeration (SI) ASHRAE Engineering Inc, 1971 Tullie Center, NE Atlanta CA 30329
References:	<ul style="list-style-type: none"> • Isı Değişiricileri, Osman F. Genceli, Birsen Yayınevi, 1999. • Heat Exchangers, Sadık Kakaç , Hongtan Liu , Anchasa Pramuanjaroenkij, CRC Press, 2020 • Sulzer Boiler Plant Handbook, Sulzer Brothers Limited, Winterthur, Switzerland. • Compact Heat Exchangers, Kays W.M., A.L. London, McGrawHill 1964. • Buhar Kazanları Isıl Hesapları, Onat K., O.F. Genceli, A. Arısoy, Teknik Yayıncılık Tanıtım A.Ş., 1998 • Isı ve Kütle Geçişinin Temelleri, Frank P. Incropera David P. DeWitt, Çevirenler: Çeviri kitap; Derbentli T., Genceli O., Güngör A., Hepbaşlı A., İlken Z., Özbalta N., Özgüç F., Parmaksizoğlu C., Uralcan Y., Literatür Yayıncılık, 2001 • Isı Transferi, J.P. Holman, Çeviri Editörü: İlhami Horuz, Nobel Akademik Yayıncılık, 2014 • VDI_Heat Atlas VDI VerlagVerlag GmbH Düsseldorf • Heat and Mass Transfer: Fundamentals & Applications, Fourth Edition, Yunus A. Cengel, Afshin J. Ghajar, McGraw-Hill, 2011 • Standards

Course - Learning Outcome Relationship

No Effect	1 Lowest	2 Medium	3 Highest

	Program Outcomes	Level of Contribution
1)	Having advanced theoretical and practical knowledge supported by textbooks, application tools and other resources containing current information in the field.	
2)	Ability to use advanced theoretical and practical knowledge acquired in the field.	
3)	Ability to interpret and evaluate data, identify and analyze problems, and develop solution suggestions based on research and evidence, using the advanced knowledge and skills	

	acquired in the field.	
4)	To be able to inform relevant people and institutions on issues related to the field; Ability to convey thoughts and solution suggestions to problems in written and oral form.	
5)	Ability to share one's thoughts on issues related to one's field and solutions to problems, supported by quantitative and qualitative data, with experts and non-experts.	
6)	Ability to organize and implement projects and events for the social environment in which one lives with awareness of social responsibility.	
7)	Ability to monitor knowledge in the field and communicate with colleagues by using a foreign language at least at the European Language Portfolio B1 General Level.	
8)	Ability to use information and communication technologies along with computer software at least at the Advanced Level of the European Computer Usage License required by the field.	
9)	Acting in accordance with social, scientific, cultural and ethical values during the collection, interpretation, application and announcement of the results of data related to the field.	
10)	Having sufficient awareness about the universality of social rights, social justice, quality culture and protection of cultural values, environmental protection, occupational health and safety.	
11)	Ability to evaluate the advanced knowledge and skills acquired in the field with a critical approach.	
12)	Ability to identify learning needs and direct learning	
13)	Being able to develop a positive attitude towards lifelong learning.	
14)	Ability to independently carry out an advanced study related to the field.	
15)	Ability to take responsibility individually and as a team member to solve unforeseen complex problems encountered in field-related applications.	
16)	Ability to plan and manage activities aimed at the development of the employees under his/her responsibility within the framework of a project.	

Learning Activity and Teaching Methods

Course	✓
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Measurement and Evaluation Methods and Criteria

Yazılı Sınav (Açık uçlu sorular, çoktan seçmeli, doğru yanlış, eşleştirme, boşluk doldurma, sıralama)	✓
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Homework	✓
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Assessment & Grading

Semester Requirements	Number of Activities	Level of Contribution
Quizzes	10	% 20
Homework Assignments	1	% 15
Midterms	1	% 25
Final	1	% 40
total		% 100
PERCENTAGE OF SEMESTER WORK		% 60
PERCENTAGE OF FINAL WORK		% 40
total		% 100

İş Yüğü ve AKTS Kredisi Hesaplaması

Activities	Number of Activities	Duration (Hours)	Workload
Course Hours	14	3	42
Study Hours Out of Class	60	1	60
Homework Assignments	1	55	55
Quizzes	10	0.1	1
Midterms	1	3	3
Final	1	4	4
Total Workload			165