Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering
Mechanical Engineering Department

SYLLABUS

Code/Name	MCE 302 / Heat Transfer
Type	Required
Credit/ECTS	4/5
Hour per Week	4 (4+0+0)
Level/Year	Undergraduate/3
Semester	Spring
Classroom	A203
Content	Mechanisms of heat transfer. Heat conduction equation and solutions of steady one-dimensional problems. Steady heat conduction, thermal resistance network, and fins. Transient heat conduction and approximate analytical solutions. Numerical methods in heat conduction. Internal and external forced convection. Natural convection. Boiling and condensation. Radiation heat transfer. Heat exchangers.
Prerequisites	
Textbooks	***Primary*** Çengel YA, Ghajar AJ, *Heat and Mass Transfer: Fundamentals and Applications*, 6th edition, McGraw-Hill, 2020.
Objectives	• To analyze the basic principles and modes of heat transfer. • To identify, formulate, and solve engineering problems involving thermal conduction, natural and forced convection, and radiation with applications. • Apply energy balances and empirical correlations to model and analyze thermal systems. • Know basic heat exchanger designs and analysis techniques.
Course Outcomes	In this course students will be able to: CO1 Recognize different mechanisms of heat transfer CO2 Formulate the general heat conduction equation and solve the steady heat conduction CO3 Demonstrate the use of Fourier's law of conduction to calculate the thermal resistance and heat flow rate using thermal resistance networks CO4 Analyze heat transfer from finned surfaces CO5 Analyze transient conduction problem in the lumped system CO6 Solve 2D or 1D unsteady problems using numerical techniques CO7 Use the appropriate correlations to determine convection heat transfer for external and internal flows CO8 Analyze heat exchangers and the overall heat transfer coefficient

Weekly Schedule of Topics

W	Topic
1	Introduction and basic concepts
2	Heat conduction equation
3	Steady heat conduction
4	Steady heat conduction
5	Transient heat conduction
6	Numerical methods in heat transfer
7	Fundamentals of convection
8	External forced convection

9	Internal forced convection
10	Natural convection
11	Boiling and Condensation
12	Heat exchangers
13	Fundamentals of thermal radiation
14	Radiation heat transfer

Professional Contribution	Ability to understand, analyze, improve and manage heat transfer mechanisms

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1	2	2	5	2	1	5	2	3	2
CO2	2	1	5	2	3	5	2	1	2	3	2
CO3	2	5	2	3	5	4	1	2	3	2	5
CO4	2	5	4	5	3	2	1	5	2	3	2
CO5	1	5	2	3	5	2	1	5	2	5	1
CO6	2	2	2	2	2	5	2	5	3	5	2
CO7	1	3	5	2	3	2	3	5	1	2	3
CO8	2	3	5	1	2	3	4	2	3	1	2

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Special Conditions	• Students work in groups for project and presentations.	
Requirements		
Evaluation	Midterm Exam	35%
	Quizzes	25%
	Final Exam	40%
	Total	100%
Rubric	NA	
Course Policy	1. Students are required to attend at least 70% of the theoretical and 80% of lab/application sessions including add-drop period. Otherwise, you will receive a grade of DZ. Health reports and other official or nonofficial excuses are not accepted. 2. Late attendance is not accepted. 3. English should always be used to communicate with one another during class sessions. 4. The mobile phone should be switched off and put away during the class. 5. Illegal copies of the textbooks and other course materials cannot be used for the classwork and exams.	
Cheating & Plagiarism	• Copying or letting someone to copy your work on exams, assignments, or reports is cheating. • Cutting and pasting text, figures, and tables from web sources or any other electronic source is plagiarism. • A consequence of academic dishonesty is to receive a grade of FF for the course.	

Instructor

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Room	228	Office Hours	

Prepared by Mehmet Kanoğlu