

Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering  
 Mechanical Engineering Department  
 2021-2022 Spring Semester  
**SYLLABUS**

<b>Code/Name</b>	MEC 302 / Heat Transfer
<b>Type</b>	Required
<b>Credit/ECTS</b>	6/6
<b>Hour per Week</b>	4 (4+0+0)
<b>Level/Year</b>	Undergraduate/3
<b>Semester</b>	Spring
<b>Classroom</b>	D-109
<b>Content</b>	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**

<b>Textbooks</b>	<b>Primary</b> Çengel YA, Ghajar AJ, <i>Heat and Mass Transfer: Fundamentals and Applications</i> , 6 <sup>th</sup> edition, McGraw-Hill, 2020.
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<b>Objectives</b>	<ul style="list-style-type: none"> <li>• To analyze the basic principles and modes of heat transfer.</li> <li>• To identify, formulate, and solve engineering problems involving thermal conduction, natural and forced convection, and radiation with applications.</li> <li>• Apply energy balances and empirical correlations to model and analyze thermal systems.</li> <li>• Know basic heat exchanger designs and analysis techniques.</li> </ul>
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<b>Course Outcomes</b>	<p>In this course students will be able to:</p> <p>CO1 Recognize different mechanisms of heat transfer</p> <p>CO2 Formulate the general heat conduction equation and solve the steady heat conduction</p> <p>CO3 Demonstrate the use of Fourier's law of conduction to calculate the thermal resistance and heat flow rate using thermal resistance networks</p> <p>CO4 Analyze heat transfer from finned surfaces</p> <p>CO5 Analyze transient conduction problem in the lumped system</p> <p>CO6 Solve 2-D or 1-D unsteady problems using numerical techniques</p> <p>CO7 Use the appropriate correlations to determine convection heat transfer for external and internal flows</p> <p>CO8 Analyze heat exchangers and the overall heat transfer coefficient</p> <p>CO9 Develop a clear understanding of the fundamentals of thermal radiations and calculate the amount of heat transfer by radiation between two surfaces</p>
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**Weekly Schedule of Topics**

W	Topic
1	Introduction and modes of heat transfer
2	Heat conduction equation
3	Steady heat conduction
4	Steady heat conduction
5	Fins
6	Transient heat conduction
7	Numerical methods in heat transfer
8	Introduction to convection

9	External forced convection
10	Internal forced convection
11	Natural convection
12	Heat exchangers
13	Heat exchangers
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	5	5	2	3	0	2	3	0	2	5	0
CO2	5	5	2	3	0	2	3	0	2	5	0
CO3	5	5	2	3	0	2	3	0	2	5	0
CO4	5	5	2	3	0	2	3	0	2	5	0
CO5	5	5	2	3	0	2	3	0	2	5	0
CO6	5	5	2	3	0	2	3	0	2	5	0
CO7	5	5	2	3	0	2	3	0	2	5	0
CO8	5	5	2	3	0	2	3	0	2	5	0
CO9	5	5	2	3	0	2	3	0	2	5	0

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

**Special Conditions**

- The consequence of the violation of the attendance rule is to receive a grade of DZ.
- Neither lecture notes nor PPT slides will not be shared.

**Requirements**

<b>Evaluation</b>	Midterm Exam	30%
	Quizzes	10%
	Assignment	20%
	Final Exam	40%
	<b>Total</b>	<b>100%</b>

**Course Policy**

1. You must attend at least 70% of the sessions including the add-drop period. Otherwise, you will receive a grade of DZ.
2. English should always be used to communicate with one another.
3. The mobile phone should be switched off and put away during the class.
4. 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**

Name/Surname	Alparslan Topcu	Email	alparslan.topcu@alanya.edu.tr
Room	D-002	Office Hours	Tuesday: 10:30 – 11:30 Thursday: 11:00 – 13:00