



ESOGÜ Mechanical Engineering Department
COURSE INFORMATION FORM

SEMESTER	SPRING
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COURSE CODE	151816332	COURSE NAME	HEAT TRANSFER
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SEMESTER	WEEKLY COURSE PERIOD			COURSE OF			
	Theory	Practice	Labratory	Credit	ECTS	TYPE	LANGUAGE
6	3	0	0	3	7	COMPULSORY (X) ELECTIVE ()	ENGLISH

COURSE CATAGORY

Basic Science	Basic Engineering	Mechanical Engineering Profession [if it contains considerable design, mark with (√)]	Social Science
		X	

ASSESSMENT CRITERIA

	Evaluation Type	Quantity	%
MID-TERM	1st Mid-Term	1	%25
	2nd Mid-Term	1	%25
	Quiz		
	Homework	3	3×%5
	Project		
	Report		
	Others (.....)		
FINAL EXAM		1	%35

PREREQUIEITE(S)	151814207/151834207 Engineering Thermodynamics I
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COURSE DESCRIPTION	The course involves the three main modes of heat transfer, conduction, convection, and radiation. A combined approach is followed that will stress both the fundamentals of the rigorous differential description of the involved phenomena and the empirical correlations used for engineering design.
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COURSE OBJECTIVES	A student achieving a passing grade in this course will be able to do basic calculations involving heat as is typical for a mechanical engineer. This includes conduction, convection and radiation heat transfer
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ADDITIVE OF COURSE TO APPLY PROFESSIONAL EDUATION	It is a basic mechanical engineering course dealing with heat exchange between bodies.
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COURSE OUTCOMES	<ol style="list-style-type: none"> Understanding the basic concepts of conduction, convection and radiation heat transfer, to formulate and be able to solve 1D problems Understanding the fundamentals of the relationship between fluid flow, convection heat transfer Applying empirical correlations for both forced and free convection to determine values for the convection heat transfer coefficient Understanding the basic concepts of radiation heat transfer to include both black body radiation and gray body radiation Evaluating radiation view factors using tables and the view factor relationships
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TEXTBOOK	Incropera F and Dewitt F, Fundamentals of Heat and Mass Transfer, 5th Ed” John Wiley & Sons 2007
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OTHER REFERENCES	Çengel. Y. “Heat Transfer” 3 rd Ed. MacGraw Hill, 2006. Lienhard J, “A Heat Transfer Textbook” 4ed, 2000.
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TOOLS AND EQUIPMENTS REQUIRED	Course Management System (Moodle) is incorporated into the external course tools.
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COURSE SYLLABUS

WEEK	TOPICS
1	Introduction. Thermal properties of materials. Fourier Law. Heat conduction. Initial and Boundary Conductions.
2	1D Heat Conduction. Thermal resistance concept.
3	Steady state heat loss from planar composite walls. Steady state heat losses from cylinder and sphere.
4	Heat transfer from extended surfaces. Fin equation, efficiency and effectiveness.
5	Transient heat conduction from bodies. Lumped system analysis
6	Mid-Term Examination 1
7	Convection heat transfer. Basic dimensionless numbers, Re, Pr, Nu and flow equations
8	Externally forced convection. Drag coefficient and Nu for flow over plates, cylinders, spheres. Flow across tube banks, Nu, friction and pressure drop evaluations
9	Internal flow. Parallel plane, circular pipe laminar flow under constant wall temperature and heat flux.
10	Circular pipe turbulent flow under constant wall temperature and heat flux. Non circular pipe flows.
11	Mid-Term Examination 2
12	Natural convection heat transfer.
13	Introduction to radiation. Surface radiation properties. View factors and relations.
14	Net radiation between two black or gray surfaces. Radiation heat transfer in 2-and 3-surface enclosures
15,16	Final Exams

NO	PROGRAM OUTCOMES	3	2	1
1	Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems.		X	
2	Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods.	X		
3	Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods.		X	
4	Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies.	X		
5	In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results.			X
6	Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence.			X
7	Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language.		X	
8	Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement.	X		
9	Understanding of professional and ethical issues and taking responsibility		X	
10	Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development.			X
11	Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions.			X

1:None. 2:Partially contribution. 3: Completely contribution.

Instructor(s): Prof.Dr.Zekeriya ALTAÇ

Signature:

Date:

05.01.2011