AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Advanced Radiation Heat Transfer								
Course Code	MME501		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	8	Workload	194 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	The aim of this course is to inform engineering methods about radiation, which is one of the heat transfer modes.								
Course Content	Fundamental concepts and radiation intensity and solid angles. Relation to emission, irradiation and radiosity. Blackbody and gray radiation. Surface absorption, reflection and transmission. View factors. Radiation exchange between gray surfaces and net radiation method. Electrical analogy. Radiation shields. Gaseous radiation. Heat radiation transfer at the steam boiler.								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion, Project Based Study, Individual Study, Problem Solving								
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	15
Final Examination	1	60
Quiz	4	15
Assignment	5	5
Term Assignment	1	5

Recommended or Required Reading	
1	Modest, M.F., Radiative Heat Transfer, Academic Press, 2nd Edition, 2003.
2	Incropera, F.P., DeWitt, D. P., Fundamentals of Heat and Mass Transfer, 5th edition, Wiley, 2001.
3	Siegel, R., Thermal Radiation Heat Transfer, 4th edition, Taylor & Francis, 2001.

Week	Weekly Detailed Course Contents	
1	Theoretical	Fundamentals of Radiation
2	Theoretical	Direct Heat Transfer With Radiation
3	Theoretical	Total Heat Transfer With Radiation in a Closed Volume Enclosed By Non-Absorptive Environment
4	Theoretical	Total Heat Transfer with Radiation in a Closed Volume Enclosed By Absorptive Environment
5	Theoretical	Applications of Heat Transfer
6	Theoretical	Applications of Heat Transfer
7	Theoretical	Radiation-Convection-Conduction Triple Boundary Condition
8	Intermediate Exam	Midterm Exam
9	Theoretical	Radiation-Convection-Conduction Triple Boundary Condition
10	Theoretical	Temperature Measurement with Radiation
11	Theoretical	Kirchhoff Laws
12	Theoretical	Monte-Carlo Methods
13	Theoretical	Determination of Mean Rays
14	Theoretical	Radiation by a Black Body in Definite Wave Integrals
15	Theoretical	Emissivity of Atmosphere Containing CO2 and Vapor, Solar Radiation
16	Final Exam	Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	16	4	2	96
Assignment	5	0	3	15
Term Project	1	15	10	25
Quiz	4	4	1	20

Midterm Examination	1	15	2	17
Final Examination	1	20	1	21
			Total Workload (Hours)	194
			[Total Workload (Hours) / 25*] = **ECTS**	8
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	To be able to learn radiation heat transfer mechanisms
2	To be able to learn blackbody and gray surface radiation
3	To be able to learn radiation shields
4	To be able to learn figure coefficients
5	To be able to calculate radiation between surfaces
6	To be able to learn gaseous radiation

Programme Outcomes *(Mechanical Engineering (English) Master)*	
1	To be able to access wide and deep information with scientific researches in the field of Engineering, evaluate, interpret and implement the knowledge gained in his/her field of study
2	To be able to complete and implement “limited or incomplete data” by using the scientific methods
3	To be able to consolidate engineering problems, develop proper method(s) to solve and apply the innovative solutions to them
4	To be able to develop new and original ideas and method(s), to develop new innovative solutions at design of system, component or process
5	To be able to gain comprehensive information on modern techniques, methods and their borders which are being applied to engineering
6	To be able to design and apply analytical, modeling and experimental based research, analyze and interpret the faced complex issues during the design and apply process
7	To be able to gain high level ability to define the required information and data
8	To be able to work in multi-disciplinary teams and to take responsibility to define approaches for complex situations
9	To be able to transfer of the process and results of studies at national and international environments systematic and clear verbal or written
10	To be able to be aware of social, scientific and ethical values guarding adequacy at all professional activities and at the stage of data collection, interpretation, and announcement
11	To be able to become aware of new and developing application of profession and ability to analyze and study on those applications
12	To be able to interpret engineering application’s social and environmental dimensions and it’s compliance with the social environment

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4	L5	L6
P1	4	3	4	4	3	3
P2	5	5	5	4	3	4
P3	5	5	5	5	4	4
P4	3	4	4	3	3	3
P5	4	4	3	3	3	3
P6	4	4	4	5	4	4
P7	5	4	4	4	4	4
P8	3	5	4	3	5	3
P9	5	4	5	4	4	5
P10	3	4	5	4	4	5
P11	4	5	5	5	5	5
P12	3	4	5	5	3	3