



## AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Electronic Applications in Mechanical Engineering							
Course Code		MME503		Course Level		Second Cycle (Master's Degree)			
ECTS Credit	8	Workload	195 ( <i>Hours</i> )	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		The aim of this course is to provide the student with general mathematical techniques and basic numerical methods used to solve advanced heat conduction problems							
Course Content		The conduction general rate equation. Multidimensional heat conduction. Heat transfer from extended surfaces. Multidimensional steady state heat conduction. Numerical methods on steady state heat conduction. Finite difference methods steady state conduction. Transient heat conduction. Laplace transformation methods. Numerical methods in Transient heat conduction							
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	Yener, Y., Kakaç S., HeatConduction, 4th edition, Taylor & Francis, 2008.
2	Özışık, M. N.,HeatConduction, 2nd edition, Wiley-Interscience, 1993.
3	Jiji, M.L.,HeatConduction, 3rd edition, Springer, 2009.

Week	Weekly Detailed Course Contents	
1	Theoretical	Foundations of heat transfer, general heat conduction equation
2	Theoretical	One-dimensional steady heat conduction
3	Theoretical	Orthogonal functions, Fourier expansions and finite Fourier transforms
4	Theoretical	Orthogonal functions, Fourier expansions and finite Fourier transforms
5	Theoretical	Steady Two-and Three dimensional heat conduction: solutions with separation of variables
6	Theoretical	Steady Two-and Three dimensional heat conduction: solutions with separation of variables
7	Theoretical	Unsteady heat conduction: solutions with separation of variables
8	Intermediate Exam	Midterm Exam
9	Theoretical	Unsteady heat conduction: solutions with separation of variables
10	Theoretical	Solutions with integral transforms
11	Theoretical	Solutions with integral transforms
12	Theoretical	Numerical solutions
13	Theoretical	Numerical solutions
14	Theoretical	Further methods of solution
15	Theoretical	Further methods of solution
16	Final Exam	Final Exam

### Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	16	2	4	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	2	22
Total Workload (Hours)				195
[Total Workload (Hours) / 25*] = ECTS				8
*25 hour workload is accepted as 1 ECTS				

### Learning Outcomes

1	Ability to compute the heat conduction
2	Ability to generate boundary conditions
3	Ability to use solution methods of heat conduction mechanisms
4	Ability to use variables separate method
5	Ability to compute numerical heat conduction
6	Ability to use 2D and 3D modeling technics

### Programme Outcomes (Mechanical Engineering Master's Without Thesis)

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 become 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 gain ability 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	4	4	4	4	2
P2	3	3	4	4	4	2
P3	5	5	5	5	4	4
P4	3	3	3	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	4	4	3	4	3	4
P9	4	3	5	3	4	4
P10	3	4	5	4	4	5
P11	4	5	5	5	5	5
P12	3	4	5	5	3	3

