AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Advanced Conduction Heat Transfer								
Course Code	MME619		Couse Level		Third Cycle (Doctorate Degree)				
ECTS Credit	9	Workload	226 *(Hours)*	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)									

Prerequisites & Co-requisities	
Language Requisite	Yes

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., Heat Conduction, 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	6	2	128

Assignment	5	2	3	25
Term Project	1	18	10	28
Quiz	4	3	1	16
Midterm Examination	1	15	2	17
Final Examination	1	10	2	12
			Total Workload (Hours)	226
			[Total Workload (Hours) / 25*] = **ECTS**	9
**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 (English) Doctorate)*	
1	1. In Mathematics, natural sciences and mechanical engineering, department has the sufficient infrastructure; the ability to use the theoretical and practical information for engineering solutions
2	2. The ability to identify, define, and solve the formula for complex engineering problems; the ability to select and apply for the appropriate analytical methods and modelling techniques
3	3. To meet desired needs of a system, system component, or process, analysing and designing skill under realistic constraints; in this respect, the ability to apply the methods of modern design
4	4. The ability to use and choose modern techniques and tools for required engineering applications and; the ability to use information technology effectively
5	5. The ability to design the experiment, collect the data for the experiment and interpret to analysing results
6	6. The ability to use computer software and hardware information, access to information and other information sources
7	7. The ability to work individually and with multidisciplinary teams effectively, taking responsibility self-confidence for complex situations
8	8. The ability to communicate with foreign colleagues by having high level of foreign language knowledge in the field of engineering
9	9. Monitoring the science and technology developments and the ability to renew itself with innovative ideas constantly
10	10. Professional and ethical responsibility awareness
11	11. Having an adequate information and awareness in the subjects of occupational safety, occupational health, social security rights, quality control and management issues of environmental protection
12	12. The ability to appreciate the effects of engineering solutions and applications in universal and social dimensions
13	13. The ability to be enlightened to the experts or non-expert audience groups on the issues related with engineering problems and solutions written and oral
14	14. The ability to have adequate knowledge and skills in the project development and application, manage the activities planning, including the projects to the employees having the responsibility of the project by increasing vocational awareness

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	5	4	5	5	4	5
P2	4	4	5	5	5	5
P3	4	4	5	4	5	5
P4	3	3	5	3	5	4
P5	4	3	3	3	4	4
P6	5	3	4	3	4	4
P7	4	3	5	4	3	5
P8	3	5	4	4	4	5
P9	3	5	5	4	5	5
P10	4	5	3	5	5	5
P11	4	3	5	5	5	3
P12	5	4	5	5	5	4
P13	4	5	5	5	5	5

P14	3	3	3	5	5	4