



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Finite Element Analysis in Heat Transfer and Fluid Dynamics							
Course Code		MME621		Course Level		Third Cycle (Doctorate Degree)			
ECTS Credit	9	Workload	226 (<i>Hours</i>)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		The aim of this course is to inform finite elements methods in heat transfer and fluid dynamics							
Course Content		Finite element methods, Formulation in finite element methods, Formulation of steady state heat conduction equation, implementation of Computer Code							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Discussion, Case Study, Project Based Study, Individual Study					
Name of Lecturer(s)									

Prerequisites & Co-requisites

Language Requisite	Yes
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Assessment Methods and Criteria

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

Recommended or Required Reading

1	R. W. Lewis, Perumal Nithiarasu, Kankanhalli Seetharamu, Fundamentals of the Finite Element Method for Heat and Fluid Flow, Wiley, 1st Edition, 2004.
2	J. N. Reddy, D. K. Gartling, The Finite Element Method in Heat Transfer and Fluid Dynamics, 3rd edition, CRC Press, 2012

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction, some discrete systems
2	Theoretical	Finite element methods
3	Theoretical	Formulation in finite element methods
4	Theoretical	Formulation of steady state heat conduction equation
5	Theoretical	Steady State Heat Conduction in One Dimension
6	Practice	Radial Heat Flow in a Cylinder
7	Theoretical	Radial Heat Flow in a Cylinder
8	Intermediate Exam	Midterm Exam
9	Theoretical	Steady State Heat Conduction in Multi- dimensions
10	Theoretical	Transient Heat Conduction Analysis
11	Theoretical	Convection Heat Transfer
12	Theoretical	Convection in Porous Media
13	Theoretical	Some Examples of Fluid Flow and Heat-Transfer Problems
14	Theoretical	Implementation of Computer Code
15	Theoretical	Implementation of Computer Code
16	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	16	3	3	96
Seminar	5	5	2	35
Term Project	1	15	10	25



Quiz	4	4	1	20
Midterm Examination	1	20	3	23
Final Examination	1	25	2	27
Total Workload (Hours)				226
[Total Workload (Hours) / 25*] = ECTS				9
*25 hour workload is accepted as 1 ECTS				

Learning Outcomes

1	Assessment knowledge about finite element methods
2	Learning Formulation in finite element methods
3	Learning Steady State Heat Conduction in Multi-dimensions
4	Assessment of knowledge about computer applications utilizing finite element method
5	Assessment of ability to solve problems by utilizing codes

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
P1	4	5	5	5	5
P2	5	5	5	5	4
P3	4	4	5	5	4
P4	4	5	4	4	4
P5	5	5	4	3	4
P6	5	4	3	3	3
P7	5	3	5	5	3
P8	3	4	4	4	3
P9	5	5	5	4	5
P10	5	5	5	4	5
P11	3	5	4	5	4
P12	5	4	5	5	3
P13	5	3	5	5	3
P14	3	5	5	4	3

