AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Finite Element Analysis								
Course Code	MME507		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	8	Workload	202 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	The objective of the course is to teach the basic fundamentals of finite element method with emphasis on the underlying theory, assumptions, and modelling issues as well as providing hands on experience using finite element software to model, analyse and design systems of relevance to engineers.								
Course Content	Numerical solution technique, Finite element method, Built the model one, two and three dimensions, Element types, real constant, Material properties, Built the model, Mesh generation, Solution, Review the results, Sample problems with ANSYS software: Structural analyses, Thermal Analyses and Couple field analyses.								
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	Hughes T. J. R, The Finite Element Method: Linear Static and Dynamic Finite Element Analysis, Dover Publications, 2000.
2	Bathe K. J.,Finite Element Procedures, Prentice-Hall, 1996
3	Reddy J. N., An Introduction to the Finite-Element Method, 3rd edition, McGraw-Hill, 2005.

Week	Weekly Detailed Course Contents	
1	Theoretical	Introduction to finite element analysis
2	Theoretical	Review of basic concepts in math and mechanics
3	Theoretical	1D and 2D finite element methods
4	Theoretical	Steady and unsteady advection-diffusion problems
5	Theoretical	Different stabilized formulations of incompressible momentum equations
6	Theoretical	Direct and iterative techniques for the solution of linear algebraic systems
7	Theoretical	Direct and iterative techniques for the solution of linear algebraic systems
8	Intermediate Exam	Midterm Exam
9	Theoretical	Heat transfer problems with free and forced convection
10	Theoretical	Heat transfer problems with free and forced convection
11	Theoretical	Error estimation and adaptive refinement
12	Theoretical	Formulation and fluid structure interaction
13	Theoretical	Other advanced topics
14	Theoretical	Other advanced topics
15	Theoretical	Other advanced topics
16	Final Exam	Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	4	3	98
Assignment	5	0	4	20
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)	202
			[Total Workload (Hours) / 25*] = **ECTS**	8
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	Have knowledge about numerical solution technique
2	Understanding main principle of the numerical solution technique such as finite element method
3	Ability to make structural analysis by the finite element method
4	Ability to make thermal analysis by the finite elements method
5	Ability to apply finite element method to micro scale fluidic problems

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