

## SYLLABUS

Course name: MEC 441 Finite Element Analysis			Department: Mechanical Engineering			
Semester	Methods of Education					Credit (ECTS)
	Lecture	Homework	Term Project	Midterm	Final	
2022-2023/ Fall Semester	3	2	1	1	1	4
Language	English					
Compulsory (C) /Elective (E)	E					
Prerequisites	Recommended: Linear Algebra, Mechanics of Materials, Composite Materials					
Course Contents	<ul style="list-style-type: none"><li>▪ Introduction to finite element analysis.</li><li>▪ Finite element formulation.</li><li>▪ One-dimensional elements.</li><li>▪ Analysis of trusses.</li><li>▪ Analysis of frames.</li><li>▪ Plane stress and plane strain.</li></ul>					
Course Objectives	<ul style="list-style-type: none"><li>▪ Deliver basics of finite element analysis in structural components.</li><li>▪ Combine theoretical information with a commercial software (e.g., Matlab, Abaqus, etc).</li></ul>					
Learning Outcomes and Competences	<ul style="list-style-type: none"><li>▪ Gain competencies in the applications of finite element analysis.</li><li>▪ Demonstrate ability to compose/present a paper in the scope of term project.</li></ul>					
Textbook and /or References	<ul style="list-style-type: none"><li>▪ Text-book: Jacob Fish, Ted Belytschko, A First Course in Finite Elements, Wiley Interscience, 2007.</li><li>▪ Robert D. Cook, David S. Malkus, Michael E. Plesha, Robert J. Witt, Concepts and Applications of Finite Element Analysis, John Wiley &amp; Sons, Inc., 2002.</li><li>Other books:</li><li>▪ G. Z. Vyiadjis, P.I. Kattan, Mechanics of Composite Materials with MATLAB, Springer, 2005.</li><li>▪ O.O. Ochoa, J.N. Reddy, Finite Element of Composite Laminates, Kluwer Publishers, 1992.</li></ul>					
Assessment Criteria			If any, mark as (X)		Percentage (%)	
	Midterm Exam		(X)		30	
	Homework		(X)		10	
	Term Project		(X)		10	
	Final Exam		(X)		50	
Instructor	Assoc. Prof. Dr. Hande YAVUZ					
Week	Subject					
1	Introduction to finite element analysis.					
2-3	Finite element formulation.					
4-5	One-dimensional elements- axial element					
6-7	One-dimensional elements- flexural element One-dimensional elements- torsional element					
8	MT Exam.					
9-10	Analysis of trusses.					
11-12	Analysis of frames.					
13-15	Plane stress and plane strain. Presentation of term projects.					
16	Final Exam.					