



COURSE INFORMATION FORM

Course Name	Course Code
MATRIX METHODS IN STRUCTURAL ANALYSIS	151418717

Semester	Number of Course Hours per Week		ECTS
	Theory	Practice	
8	3	0	6

Course Category (Credit)				
Basic Sciences	Engineering Sciences	Design	General Education	Social
	2	4		

Course Language	Course Level	Course Type
Turkish	Undergraduate	Elective

Prerequisite(s) if any	Structural Analysis I-II
Objectives of the Course	This course is designed for students to advance in analysis of statically indeterminate structures using matrix formulation.
Short Course Content	Subject-Scope-Course Order, Matrices and Some Selected Matrix Operations, Simple Uses of Some Computer Programs in Solving Structural Systems, Structural Modeling-Discretization of Continuous Systems, Introduction to Matrix Displacement Method over Plane member Systems, Solution of truss systems, Solution of frame systems

Learning Outcomes of the Course	Contributed PO(s)	Teaching Methods *	Measuring Methods **
1 Can analyze beams using matrix displacement method.	1, 2, 3	1, 2, 5, 10	A, D
2 Can analyze trusses using matrix displacement method.	1, 2, 3	1, 2, 5, 10	A, D
3 Can analyze frames using matrix displacement method.	1, 2, 3	1, 2, 5, 10	A, D
4			
5			
6			
7			
8			

*Teaching Methods 1:Expression, 2:Discussion, 3:Experiment, 4:Simulation, 5:Question-Answer, 6:Tutorial, 7:Observation, 8:Case Study, 9:Technical Visit, 10:Trouble/Problem Solving, 11:Individual Work, 12:Team/Group Work, 13:Brain Storm, 14:Project Design / Management, 15:Report Preparation and/or Presentation

**Measuring Methods A:Exam, B:Quiz, C:Oral Exam, D:Homework, E:Report, F:Article Examination, G:Presentation, I:Experimental Skill, J:Project Observation, K:Class Attendance; L:Jury Exam

Main Textbook	Lecture Note
Supporting References	Hibbeler, R.C., 2009, "Structural Analysis", 8th edition, Pearson Education Prezemieniecki, J.S. Theory of Matrix Structural Analysis, Dover Pub. ISBN 04866-49482, 1985. Clough, R. W., Penzien, J. Dynamics of Structures, McGraw-Hill, 1996.
Necessary Course Material	

Course Schedule	
1	General definitions, matrices and matrix operations
2	Simple use of computer programs
3	Structural modeling-discretization of continuous systems
4	Plane member Systems
5	Obtaining the stiffness matrix for truss elements
6	Obtaining the transformation matrix
7	Numerical examples
8	Mid-Term Exam
9	Obtaining the stiffness matrix for plane frame elements
10	Obtaining the transformation matrix
11	Computer aided truss system solutions
12	Computer aided frame system solutions
13	Support collapse in hyperstatic systems
14	Temperature effect in hyperstatic systems
15	Manufacturing defects in hyperstatic systems
16,17	Final Exam

Calculation of Course Workload			
Activities	Number	Time (Hour)	Total Workload (Hour)
Course Time (number of course hours per week)	14	3	42
Classroom Studying Time (review, reinforcing, prestudy,....)	14	6	84
Homework	7	5	35
Quiz Exam			
Studying for Quiz Exam			
Oral exam			
Studying for Oral Exam			
Report (Preparation and presentation time included)			
Project (Preparation and presentation time included)			
Presentation (Preparation time included)			
Mid-Term Exam			
Studying for Mid-Term Exam			
Final Exam	1	2	2
Studying for Final Exam	1	15	15
Total workload			178
Total workload / 30			5,93
Course ECTS Credit			6

Evaluation	
Activity Type	%
Mid-term	
Quiz	
Homework	40
Bir öge seçin.	
Bir öge seçin.	
Final Exam	60
Total	100

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (PO) (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)		
NO	PROGRAM OUTCOME	Contribution
1	Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering	4
2	Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods.	4
3	Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that	5
4	Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies.	4
5	In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results.	
6	Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence.	
7	Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language.	
8	Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement.	3
9	Understanding of professional and ethical issues and taking responsibility	
10	Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development.	
11	Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions.	

LECTUTER(S)			
Prepared by	Assist.Prof.Dr. Hakan EROL		
Signature(s)			

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