COURSE IDENTIFICATION FORM

Course Code and Name: IM5042 STRUCTURAL ANALYSIS				**Department of :** CIVIL ENGINEERING / MASTER PROGRAMME			
Semester	**Theoretic Hour**	**Practice Hour**	**Total Hour**	**Credits**	**ECTS**	**Education Language**	**Type: Compulsory Elective**
Atumn/Spring	3	0	3	3	5	Turkish	Optional
Prerequisite (s)							
Instructor	Assoc. Prof. Erkan POLAT					**Mail :** erkanpolat@munzur.edu.tr **Web :**	
Course Assistant						**Mail :** **Web :**	
Groups / Classes							

Course Aim	To provide comprehensive knowledge of linear first-degree displacement methods for the statically indeterminate structural analysis and understand the limitations of these methods.
Course Goals	• Understand displacement methods for structural analysis and how they differ from force methods. • Learn the limitations of first-degree linear elastic structural analysis. • Understand how structural analysis programs work and their limitations. • Acquire the ability to select and create appropriate elements for modeling a structure. • Decide which properties of a structure can be neglected and which are important. • Identify errors in structural models.
Course Learning Outs and Proficiencies	• Students will learn the mathematical modeling of engineering problems. • They will learn how to create and analyze the established model in software packages. • They will learn to evaluate the results of the solved model in terms of accuracy.
Course Basic and Auxiliary Contexts	• Course Notes • McGuire Gallagher and Ziemian, Matrix Structural Analysis, 2nd Ed. John Wiley & Sons Inc, 2000 • Kassimali, Matrix Analysis of Structures, CL-Engineering, 1999.
Methods of Give a Lecture	The course will be conducted in class.

		If Available, to Sign (x)	General Average Percentage (%) Rate
Assessment Criteria	**Midterm Exam**	**X**	**30**
	Homework		**20**
	1. Quiz		
	2. Quiz		
	3. Quiz		
	Oral Examination		
	Practice Examination (Laboratory, Project etc.)		
	Final Exam	**X**	**50**

Semester Course Plan

Week	Subjects
1	Introduction: Goals, Definitions, Coordinate Systems, Elements Support Types, Timoshenko Beam Theory, Introduction to Computer Modeling
2	Introduction to SAP2000 - Computer-Based Structural Analysis SAP2000 - Computer-Based Structural Analysis
3	Review of Matrix Methods and Linear Algebra Springs: Displacement and Force Methods, Stiffness Matrix of Bar Elements
4	Trusses - Manual Stiffness Method Overview of MathCad and MS Excel
5	Trusses - Basic Stiffness Method Boundary Conditions: Methods for 1s and 0s, Large Number Method
6	Vector/Coordinate Transformations, Beams - Direct Stiffness Method Trusses - Example of Direct Stiffness Method
7	Midterm Exam Slope Deflection: Derivation of Stiffness Matrix for Beam Elements, Cantilever Forces
8	Beams - Manual Stiffness Method Beams - Basic Stiffness Method Using Static and Compatibility Matrices
9	Checking Solutions: Displacements at Joints, Support Settlement in Beams Frames - Basic Stiffness Method, Including/Excluding Axial Effects
10	Frames - Direct Stiffness Method Frames - Derivation of Global Stiffness Matrix
11	Frames - Example of Direct Stiffness Method, Review Buckling, Element End Degrees of Freedom
12	Example of Element End Degrees of Freedom
13	Shear Deformations, Symmetry, and Other Modeling Techniques
14	Final Exam