ESOGU CIVIL ENGINEERING DEPARTMENT
COURSE INFORMATION FORM

Course Title	Course Code
STRUCTURAL ANALYSIS II	**151416347**

Semester in Program	Number of Course Hours per Week		ECTS Credit
	Theory	Practice	
6	4		5

Course ECTS Credit Distribution				
Basic Sciences	**Engineering Sciences**	**Design**	**General Education**	**Social**
	3	2		

Language of Instruction	Course Level	Course Type
Turkish	Undergraduate	Compulsory

Prerequisite	
Objectives of the Course	This course is designed to emphasize an up to date approach for the treatment of fundamental methods, and introduces the student to computer applications. The course aims to provide theory and application of structural analysis as it applies to trusses, beams and frames.
Brief Course Content	Introduction to structural analysis. Force method, Displacement methods: Slope deflection, moment distribution, special topics. Stiffness method, derivation of element stiffness matrices, assembly procedures.

	Learning Outcomes of the Course	Contributed POs	Teaching Methods *	Assessment Methods **
1	Analyze statically indeterminate structures by force method.	1, 2, 3, 4	1, 6,10	A, B/D
2	Analyze indeterminate structures using Slope Deflection Method.	1, 2, 3, 4	1, 6,10	A, B/D
3	Analyze indeterminate structures using Moment Distribution Method.	1, 2, 3, 4	1, 6,10	A, B/D
4	Matrix methods for structural analysis, Generate element stiffness matrices in local and global coordinate systems, assemble structural stiffness matrix and recover member forces	1, 2, 3, 4	1, 6,10	A, B/D
5	Influence lines for statically indeterminate structures	1, 2, 3, 4	1, 6,10	A, B/D
6				
7				
8				

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

****Assessment 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

*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:**Induvidual 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	**1. Bryant G. NIELSON & Jack C McCORMAC**, Structural Analysis, Wiley 2017 **2. K. M. LEET, C. M. UANG, A. M. GILBERT,** Fundamentals of Structural Analysis**,** McGraw- Hill, 2008
Supplementary Resources	**1. F. Karadoğan, S. Pala, E.Yüksel, Y. Durgun,** Yapısal Çözümleme, Cilt II, Birsen Yayınevi, 2015 **2. M. Ruhi AYDIN, Yapı Statiği Cilt II,** Esogü yayın no:79 **3. SAP 2000**
Necessary Course Material	

Course Weekly Schedule	
1	Introduction to statically indeterminate structures. Advantages and disadvantages of statically indeterminate structures. Methods of anayzing statically indeterminate structures.
2	Force Method of analysis. Primary structure. Beams and Frames with two or more redundants
3	Maxwell's Law of Reciprocal Deflections. Support settlement.
4	Analysis of Externally Redundant Trusses, Analysis of Internally Redundant Trusses
5	Analysis of Composite Structures. Temperature Changes, Shrinkage, Fabrication Errors, and So On
6	Slope-Deflection Method. Frames with Sidesway Prevented
7	Slope-Deflection Method. General Frames with Sidesway.
8	Mid-Term Exams
9	Moment Distribution Method. Frames with Sidesway Prevented
10	Moment Distribution Method. General Frames with Sidesway.
11	Stiffness Matrix for Flexural (Beam) Elements, Matrix Stiffness Method Applied to Beams. Solving for Member End Forces. Plotting Deflections
12	Stiffness Matrix for Combined Axial and Flexural (Frame) Elements, Transformation Matrix for Inclined Frame Element, Matrix Stiffness Method Applied to Frames.
13	Solving for Member End Forces.
14	Influence Lines for Statically Indeterminate Beams. Qualitative Influence Lines for Indeterminate Beams and Frames, Influence Lines for Determining Loading Scenarios for Continuous Systems.
15	
16,17	Final Exams

Calculation of Course Workload			
Activities	**Count**	**Time (Hour)**	**Total Workload (Hour)**
Weekly classroom time	14	4	56
Weekly study time (review, reinforcing, preparation)	14	4	56
Homework	5	5	25
Taking a quiz			
Studying for a quiz			
Oral exam			
Studying for an oral exam			
Report writing (Preparation and presentation time included)			
Project (Preparation and presentation time included)			
Presentation (Preparation time included)			
Mid-Term Exam	1	2	2
Studying for Mid-Term Exam	1	5	5
Final Exam	1	2	2
Studying for Final Exam	1	5	5
		Total workload	**151**
		Total workload / 30	**5.03**
		Course ECTS Credit	**5**

Assessment	
Activity Type	**%**
Mid-term	30
Quiz	
Homework	20
Bir öğe seçin.	
Bir öğe seçin.	
Final Exam	50
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 problems.	
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.	5
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.	
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	4
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.	4
12		

INSTRUCTORS				
Prepared by	Prof.Dr. Yunus Özçelikörs	Prof.Dr. Mizan Doğan	Ass.Prof.Dr. Hakan Erol	
Signature(s)				

Date:17.07.2024