



The Islamic University of Gaza
Civil Engineering Department

COURSE TITLE: STRUCTURAL ANALYSIS, ECIV 3314

SEMESTER: First Semester 2025

TEXT BOOK: Structural Analysis, by R.C. HIBBELER, TENTH Edition (in SI Units), Prentice Hall, Inc. 2020.

REFERENCE:

- Fundamental of Structural Analysis, by Leet, Chia and Uang , McGraw-Hill Science, 2010.
- Structural Analysis using Clasical and Matrix Methods by Jack McCormac, John Wiley & Sons, 2014
- Structural Analysis, by Aslam Kassimali, Cengage Learning, 2014
- Any Structural Analysis Book

INSTRUCTOR: Prof. MOHAMMED ARAFA, Phone: 2644400 Ext. 2812, Email: marafa@iugaza.edu.ps

PREREQUISITE: Mechanics of Materials (ECIV 2313)

COURSE AIMS:

This course aims at understanding basic principles and methods for Structural analysis and to practice problem solving in determining the structural loads and member forces, Analysis of statically determinate structures, Trusses, Internal loading (Moment, Shear diagram), Cables, Arches, Influence lines, and deflections of the structural system.

COURSE INTENDED LEARNING OUTCOMES:

- Understanding the different type of structures and loading
- Analysis of Statically determinate structures.
- Draw Shear Force and Bending Moment diagrams for a beam and a Frame
- Calculate the deflection of structures due to load system using deferent methods.
- Draw the influence line of determinate structures
- Analyzing of real structure problems.
- Using ROBOT structural analysis software in Analysis of simple structures
- This Course is considered the basis and prerequisite of many courses specially: Structural Analysis II, Advance structural Analysis, Reinforced Concrete Design and Design of Steel Structure.

COURSE OUTLINES:

The students are expected to be able to apply the theory to structures involving the strategy in the process of formulation, execution, and the diagrammatic interpretation of the results. They are expected to be able to apply the concept in:

- Analysis of Statically Determinate Structures such as beams, frames, and trusses.
- Internal Loading In Structural Member (Shear/Moment Diagram)
- Cables and Arches
- Influence Lines For Statically Determinate Structures
- Deflections of Structures

EXAMS AND GRADING POLICY:

Homework, Quizzes and Class Participation	20 points
Midterm Exam	30 points
Final Exam	50 points
Total	100 Points

POLICIES:

Student with absences that exceed 25% will not be permitted to take the final exam.

Penalty will be assigned for late delivery. (Homework may **not be accepted** after deadline)

Detailed Course Outline and Homework Assignment

	Introduction-Type of Structures and Loads		Homework
1.	1.1-1.2	Introduction, Classification of Structures	2, 4, 5, 8, 9, 17
	1.3-1.4	Loads, Structural Design	
	3 Lectures (Week 1)		
2.	Analysis of Statically Determinate Structure		F2.3, F2.7 1, 2, 4, 9, 11, 15, 20, 22, 25, 27, 29, 37, 42
	Idealized Structure, Principle of Superposition		
	Equation of Equilibrium, Determinacy and Stability		
	Application		
	5 Lectures (Week 2&3)		
3.	Analysis of Statically Determinate Trusses		F3.2, F3.11 1, 4, 5, 8, 10, 11, 19, 21, 24, 27, 29, 34, 39, 45
	3.1-3.2	Common Type of Trusses, Classification of Trusses	
	3.3-3.4	The Method of Joints, Zero-Force Members	
	3.5	The method of Sections	
	3.6-3.7	Compound Trusses, Space Trusses	
	5 Lectures (Week 4&5)		
4.	Internal Loading Developed in Structural Members		F4.2, F4.17, 7, 11, 13, 16, 24, 26, 28, 32, 36, 39, 40, 43, 51
	4.1-4.2	Internal Loading, Shear and moment function	
	4.3	Shear and moment diagrams for a beam	
	4.4	Shear and moment diagrams for a frame	
	4.5	Moment diagram by the method of superposition	
	5 Lectures (Week 4&5)		
5.	Cables and Arches		1, 3, 6, 8, 10, 13, 18, 19, 20, 21
	5.1-5.3	Cables, Cables subjected to concentrated loads and uniformly distributed load	
	5.4-5.5	Arches, Three-Hinged Arch	
	3 Lectures (Week 6)		
6.	Influence Line for Statically Determinate Structures		F6.2, F6.6, F6.8 5, 6, 9, 11, 12, 16, 18, 22, 38, 39, 60, 66, 68, 71
	6.1-6.2	Influence Lines, Influence Lines for Beams	
	6.3	Qualitative Influence Lines	
	6.4	Influence Line for Floor Girders	
	6.5	Influence Line for Trusses	
	6.6	Max. Influence due to a series of concentrated Loads	
	6.7	Absolute Max. Shear and Moment	
	5 Lectures (Week 7&8)		
7.	Deflection		P7.1, P7.5 F7.6, F7.17, F7.18 6, 10, 11, 18, 19, 22, 23, 36
	7.1-7.2	Deflection and Elastic Curve, Elastic Beam Theory	
	7.3	The Double Integration Method	
	7.4	Moment Area Method	
	7.5	Conjugate-Beam Method	
	4 Lectures (Week 9&10)		
8.	Deflection Using Energy Method		F8.5, F8.19, 5, 15, 17, 23, 26, 32, 36, 42, 49, 53
	8.1-8.3	Principle of Work, Strain Energy and Virtual Work	
	8.4	Principle of Virtual Work: Trusses	
	8.7	Principle of Virtual Work: Beams and Frames	
	8.8	Virtual Strain Energy Caused by Axial Load, Shear, Torsion and Temperature	
	5 Lectures (Week 11&12)		

Good Luck