

Structural Analysis – I

Course Code CE-206	Credit Hours 3-0
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Course Description

This course offers ability to calculate structural deformation and support reactions and internal forces for determinate structures with bar elements (trusses, beams, frames). Methods for analysis focus on classical methods suitable for application without computer programs.

Text Book:

1. Structural Analysis-8th edition by RC Hibbler

Reference Book:

1. Structural Analysis by Alexander Chajes 2nd edition 1900.
2. Fundamental structural analysis by W.J Spencer 1988.
3. Elementary Structural Analysis by Charles Head Norris, John Benson Wilbur and SenolUtku 4th edition.

Prerequisites :

Nil.

ASSESSMENT SYSTEM FOR THEORY

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15
Assignments	10	5-10
Mid Terms	25	25
Project	-	5-10
End Semester Exam	50	45-50

ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assesment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1	Introduction to Structural Analysis of determinate structures <ul style="list-style-type: none">• Types of Structures• Structural idealization and loads Redundancy and Stability of Structures

2-3	<p>Analysis of Statically Determinate Pin Jointed Structures/Trusses</p> <ul style="list-style-type: none"> • Method of Joints • Method of Sections
4-5	<p>Analysis of Statically Determinate Rigid Jointed Plane Frames</p> <ul style="list-style-type: none"> • Axial Force Diagrams • Shear Force Diagrams <p>Bending Moment Diagrams</p>
6	<p>Analysis of Moving Load Response for Statically Determinate Structures</p> <ul style="list-style-type: none"> • Influence Lines for Beam Reactions • Influence Lines for Shear Force and Bending Moments in Statically Determinate Beams and paneled girders <p>Calculation of maximum stress function (reaction, shear, bending moment, axial force) in these structures</p>
7	<p>Analysis of Moving Load Response for Statically Determinate Structures</p> <p>Influence Lines for member forces in pin jointed frames</p>
8	<p>Deflection methods (Double Integration) and Related Problems</p>
9	<p>Mid Semester Exam</p>
10	<p>Deflection methods (Moment-Area Theorem) and Related Problems</p>
11	<p>Deflection methods (Conjugate beam method) and Related Problems</p>
12-14	<p>Application of Energy Methods for finding deflections of Determinate Structures:</p> <ul style="list-style-type: none"> • Virtual work/Unit Load method for beams, frames, Trusses <p>Castigliano's Second Theorem for beams, frames and Trusses</p>
15	<p>Analysis of Cables and Suspension Bridges</p>
16	<p>Analysis of Three Hinged Arches</p>
17-18	<p>End Semester Exam</p>

Practical: Nil.