MAULANA AZAD NATIONAL INATITUTE OF TECHNOLOGY,
BHOPAL - 462003

Name of Program	B.Tech. (Civil Engineering)	Semester III	Year 2022
Name of Course	Structural Analysis -I		
Course Code	CE211 (New scheme)		
Core/Elective/Other	Core		

Prerequisite:	
1.	Mathematics (Differentiation, integration, calculus etc.)
2.	Engineering Mechanics
3.	Mechanics of Solids
Course Outcomes:	
1.	The students will be able to apply knowledge of structural analysis to analyze various structures to evaluate internal forces and deformation due to external loading.
2.	The design forces thus evaluated will help for designing of RCC/PSC/Steel structures and to check the permissible deformation for safe and economical design.
3.	The internal forces evaluated will help to design a steel structure or any other type of structure and to check the permissible deformation for safe and economical design.
Description of Contents in brief:	
1.	Principal stresses and strains: Stresses in 2D/3D system, generalized Hook's law, uniaxial and biaxial stress systems, stress transformation, principal planes and principal stresses and strains, Mohr's circle of stresses
2.	Theory of simple bending: Pure bending, Relationship between bending stresses and radius of curvature, Moment carrying capacity of section, Shearing stresses in beams, Shear stresses across a few standard sections
3.	Deflection in determinate beams: Deflection of beams by double integration method, Macaulay's method, Deflection of beams by moment area and conjugate beam methods for cantilever and simply supported beams subjected to point loads, U.D.L. and varying loads
4.	Columns and Struts: Short columns subjected to axial loads, Eccentrically loaded columns, concept of stability , Euler's buckling loads for long columns with different end conditions, Effective length, Rankine's formula, Secant formula
5.	Analysis of Three hinged arch: Analysis of three hinged circular and parabolic arches for static loads, bending moment diagrams, Influence line diagrams
6.	Cables and Suspension bridges: Equilibrium of cable subjected to concentrated loads, cable subjected to a uniformly distributed load, cable with ends at different levels, forces on anchor cables and towers, stiffening girder
List of Text Books:	
1.	Structural Analysis-I: S.S. Bhavikatti
2.	Theory of Structures: B.C. Punamia
3.	Indeterminate structures: U.C. Jindal
List of Reference Books:	
1.	Basic Structural Analysis: Wilbur and Norris
2	Structural Analysis: R.C. Hibbeler
3	Indeterminate Structural Analysis: C.K. Wang
URLs:	
1.	www.nptel.ac.in
2.	www.civilsimplified.com
3.	www.nicee.org

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