

Course No.	CE 215005
Course Title	Stability of Structures
Credits	L T P Cr 3 1 0 4
Prerequisites	-

Course Contents:

Buckling of Columns: Introduction, Method of Neutral Equilibrium, The Critical Load of the Euler Column, Linear Column Theory-An Eigenvalue Problem, Boundary Conditions, Effective-Length Concept and Design Curve, Higher-Order Differential Equation for Columns, Large-Deformation Theory for Columns, The Behavior of Imperfect Columns, Eccentrically Loaded Columns, Inelastic Buckling of Columns, Tangent Modulus Theory

Approximate Methods of Analysis: Introduction, Conservation of Energy Principle, Calculation of the Critical Load Using an Approximate, Deflection Curve, Principle of Stationary Potential Energy, Rayleigh-Ritz Method, Buckling Load of Column with Variable Cross Section, Galerkin's Method, Method of Finite Differences, Higher-Order Derivatives, Matrix Stiffness Method-Flexural Members, Matrix Stiffness Method-Compression Members

Beam Columns: Introduction, Beam Column with Concentrated Lateral Load, Beam Column with Distributed Lateral Load, Effect of Axial Load on Bending Stiffness-Slope-Deflection Equation, Failure of Beam Columns, Design of Beam Columns-Interaction Equation

Buckling of Frames: Introduction, Modes of Buckling, Critical Load of a Frame Using Neutral Equilibrium, Calculation of Critical Loading Using Slope-Deflection Equations, Stability of a Frame by Matrix Analysis

Torsional Buckling: Introduction, Torsional Load-Deformation Characteristics of Structural Members, Strain Energy of Torsion, Torsional and Torsional-Flexural Buckling of Columns, Lateral Buckling of Beams, Lateral Buckling of Rectangular Beams in Pure Bending, Buckling of I Beams by Energy Method, Lateral Buckling of Cantilever Beam by Finite Differences

Recommended Books:

1. Principles of Structural Stability Theory by Alexander Chajes, Prentice Hall, N.J., 1974
2. Theory of elastic stability by Stephen Timoshenko, Dover Publications inc. New York, 1989
3. Stability of structures Z. P. Bažant, Zdenek P. Bazant, Luigi Cedolin, Dover Publications, 2003
4. Fundamentals of Structural Stability By George Simitses, Dewey H Hodges, Elsevier Science · 2006