

Course Code	Course Title	L	T	P	C
20SE015	STABILITY OF STRUCTURES	3	0	0	3

PRE-REQUISITE COURSES: APPLIED MATHEMATICS, STRENGTH OF MATERIALS, STRUCTURAL ANALYSIS.

COURSE OBJECTIVES:

The objective of this course deals with stability problems in structural forms and systems. Study the concept of buckling of column, frames, torsional and plates.

COURSE OUTCOMES:

At the end of the course student will be able to

CO's	Course Outcomes	PO's
1	The buckling concept of column and Frames	2,3
2	Apply the torsional bucking and plates for buckling concept	1,2
3	Apply the inelastic behaviour of materials and analyse the inelastic character of column	1,2,3
4	To analyse the frame structures	2,3
5	To analyse the plate structures	2,3

SKILLS:

- ✓ Able to analyze plate, frame and beam column.
- ✓ Able to form differential equations for plate buckling

UNIT-I:

BUCKLING OF COLUMNS: Introduction – concepts of stability – methods of Neutral Equilibrium– Euler column – Eigen value problem – Axially loaded column – Eccentrically loaded column.

UNIT-II:

ENERGY PRINCIPLE: Raleigh Ritz method – Galerkin method – Numerical methods (New mark's difference and matrix methods).

UNIT-III:

BEAMS AND BEAM COLUMNS: Introduction – Theory of beam column - lateral buckling of beams – Beam column with concentrated and distributed loads – Effect of axial load on bending stiffness.

UNIT-IV:

BUCKLING OF FRAMES: Introduction – Modes of buckling – Critical load using various methods –Neutral equilibrium – Slope deflection equations, matrix method - Analysis of rigid jointed frames with and without sway

UNIT-V:

BUCKLING OF PLATES: Differential equation of plate bucklings – critical load on plates for various boundary conditions – Energy method – Finite difference method.

TEXT BOOKS:

1. Alexandar Chajes, “Principles of Structural Stability Theory”, Prentice Hall, New Jersey,1980.
2. Timoshenko.S.P, and Gere.J.M, “Theory of Elastic Stability”, McGraw Hill Book Company, 1963.

REFERENCES:

1. Ashwini Kumar, “Stability Theory of Structures”, Allied publishers Ltd., New Delhi, 2003.
2. Chajes, A. “Principles of Structures Stability Theory”, Prentice Hall, 1974.
3. Gambhir, “Stability Analysis and Design of Structures”, springer, New York, 2004.
4. Simitser.G.J and Hodges D.H, “Fundamentals of Structural Stability”, Elsevier Ltd., 2006.
5. Allen and Bulson, “Background to buckling”, McGraw-Hill, 1980.
6. N.G.R.Iyengar, “Elastic stability of structural elements”, Macmillan India Ltd., 2007.