Course Code	Course Title	L	T	P	C
17CE019	STABILITY OF STRUCTURES	3	0	0	3

Course Objectives:

1. To evaluate and compare modern techniques and methods in structural stability.
2. The students will become familiar with calculation and experimental methods for defining critical external loads of sleek construction elements and constructions where unstable situations appear, which makes the construction unstable and results in inward or outward flexing.

Course Outcomes:

At the end of the course student will be able to

1. Apprehend the concepts of various structural elements.
2. Precise knowledge about buckling of diverse element.
3. Application of available methods in structural stability issues.

Activities:

1. Analysis of buckling of columns using energy methods and methods of neutral equilibrium
2. Analysis of beam column with concentrated and distributed load condition.
3. Analysis of frame with the methods of neutral equilibrium, matrix method and slope deflection equations.
4. Analysis of plates with different end conditions using energy and finite difference method.

Skills:

1. Able to analyze plate, frame and beam column.
2. Able to form differential equations for plate bucklings.

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 – 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.

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 and Gere, “Theory of Elastic Stability”, Dover Publications, 1961.

REFERENCE BOOKS:

1. Allen and Bulson, “Background to buckling”, McGraw-Hill, 1980.
2. N.G.R.Iyengar, “Elastic stability of structural elements”, Macmillan India Ltd., 2007.