Elastic Stability & Behaviour of Metal Structures

Concept of stability, static, dynamic and energy criterion of stability; Beam-columns; differential equations for beam-columns, beam-columns subjected to transverse load, beam-columns subjected to end moments, application of Trigonometric series.

Elastic buckling of bars and frames; Euler column formula, buckling of frames, torsional buckling, pure torsion of thin-walled bars of open cross section, nonuniform torsion of thin-walled bars of open cross section, buckling by torsion and flexure, warping torsion.

Lateral buckling of beams; differential equations for lateral buckling, lateral buckling of beams in pure bending, lateral buckling of a cantilever beam and a simply supported I beam, , Torsional stability of beams
bending of thin plates; bending of plates by distributed lateral load.

Behaviour of Metal Structures

Structural steel, brittle fracture and fatigue, plastic behaviour of flexural member, plastic analysis of beams and rigid frames, upper and lower bound theorems, mechanism and equilibrium methods, plastic design of beams and frames, design of light weight gauge sections

Books:

- Timoshenko, S.P. and Gere, J.M., Theory of elastic stability, 1963, McGraw-Hill, London,
- D.O.Brush and B.O.Almorth, " buckling of bars, plates and shells".

Arya & Ajmani,"Design of Steel Structures"
B.G.Neal," Plastic Methods of Structural Analysis", Chopman & Hall
Galambus, T.V., " Structural Members and Frames", Prentice Hall INC.
Trahair, N.S., "The Behaviour and Design of Steel Structures", Chapman & Hall, London-1977.