

Study Guide for Comprehensive Exam in Solid Mechanics

The scope for this exam corresponds to the material covered in CIVL 220 and MECH 321.

Scope: Review of forces and equilibrium; friction, internal forces in simple assemblies; axial force, torsion, shear force and bending moment diagrams; concepts of stress and strain, mechanical properties of materials; axial stress, strain and displacements, flexural stress, shear stress in beams; shear stress, shear strain and displacement and power transmission in shafts.

Combined states of stress, transformation of stress and strain at a point, beam deflections and statically indeterminate problems address the elastic deformation of bodies, elastic buckling of centrally-loaded slender columns.

Textbook: Mechanics of Materials, R.C.Hibbeler, 6th Edition.

In the above textbook, the material for the exam is covered in the following paragraphs:

Chapter 1- Stress: 1.1 - 1.6

Chapter 2 - Strain: 2.1, 2.2

Chapter 3 - Mechanical Properties of Materials: 3.1-3.7

Chapter 4 – Axial Load: 4.1- 4.6

Chapter 5 - Torsion: 5.1-5.5

Chapter 6 - Bending: 6.1-6.5

Chapter 7 – Transverse Shear: 7.1-7.5

Chapter 8 – Combined Loadings: 8.1-8.2

Chapter 9 – Stress Transformation: 9.1-9.7

Chapter 10 – Strain Transformation: 10.1-10.6

Chapter 12 – Deflections of Beams and Shafts: 12.1-12.2, 12.5-12.7, 12.9

Chapter 13 – Buckling of Columns: 13.1-13.3

Chapter 14 - Energy Methods: 14.1-14.3

Appendix A: A1-A2