

STATICS AND STRENGTH OF MATERIALS - TABLE OF CONTENTS

STATICS – CHAPTERS 1 TO 5

CHAPTER 1. VECTORS

This chapter covers the definition of vectors, finding resultants by adding vectors using graphical and analytical methods and finding the equilibrant force.

CHAPTER 2. EQUILIBRIUM AND FREE BODY DIAGRAMS

This chapter covers the concept of static equilibrium, introduces the equations of equilibrium and the concept of free body diagrams. Support types and Newton's third law are also covered.

Chapter 3. EQUILIBRIUM OF A PARTICLE

This chapter explores equilibrium of a particle subject to concurrent force systems.

Chapter 4. EQUILIBRIUM OF A RIGID BODY

This chapter introduces the concept of moment of a force, Varignon's theorem and rotational equilibrium.

Chapter 5. TRUSSES

This chapter covers truss analysis of statically determinate structures by method of joints.

STRENGTH OF MATERIALS – CHAPTERS 6 - 14

Chapter 6. STRESSES AND STRAINS

This chapter covers the effects of externally applied loads on a deformable body including internal stresses and strains.

Chapter 7. STRESS-STRAIN RELATIONSHIP

This chapter covers the concept of the stress-strain relationship of materials and the important material properties determined from standard tests.

Chapter 8. AXIAL FORCES: APPLICATIONS

This chapter covers Poisson's ratio, effects of gravity and self-weight of a member, and common definitions including mass and weight, density, linear mass density, and linear weight.

CHAPTER 9. TEMPERATURE VARIATION EFFECTS

This chapter covers the strains and potential stresses induced in a material due to changes in temperature.

CHAPTER 10. FORCES IN BEAMS

This chapter investigates internal forces developed a beam and shear and bending moment diagrams.

Chapter 11. PROPERTIES OF SECTIONS

This chapter covers the properties of sections including centroids, moment of inertia, section modulus and radius of gyration.

Chapter 12. STRESSES IN BEAMS

This chapter covers the bending and shear stresses developed in beams.

Chapter 13. DEFLECTIONS

This chapter covers the calculations of beam deflections and introduces the principle of superposition.

Chapter 14. COMPRESSION AND BUCKLING

This chapter gives an introduction to the concept of compression and buckling, column slenderness and the basis for standards of column design. Lateral torsional buckling of beams is also introduced in this chapter.