

1.2 What is in this Book?

The aim of this book is to cover the essential concepts involved in solid mechanics, and the basic material models. It is primarily aimed at the Engineering or Science undergraduate student who has, perhaps, though not necessarily, completed some introductory courses on mechanics and strength of materials. Apart from giving a student a good grounding in the fundamentals, it should act as a stepping stone for further study in the field of Solid Mechanics, Continuum Mechanics, or any related field. The philosophy adopted is as follows:

- The mathematics is kept at a fairly low level; in particular, there are few differential equations, very little partial differentiation and there is no tensor mathematics
- The critical concepts – the ones which make what follows intelligible – are highlighted
- The physics involved, and not just the theory, is given attention
- A wide range of material models are considered, not just the standard Linear Elasticity

The outline of the book is as follows: Chapter 2 covers the essential material from a typical introductory course on mechanics; it serves as a brief review for those who have seen the material before, and serves as an introduction for those who are new to the subject. Chapters 3-8 cover much of the material typical of that included in a Strength of Materials or Mechanics of Materials course, and include the elementary beam theory and energy methods. The latter part of the book, Chapters 10-12 cover more advanced material models, namely viscoelasticity, plasticity and viscoplasticity.

