

Preface

Mechanical Engineering Principles aims to broaden the reader's knowledge of the basic principles that are fundamental to mechanical engineering design and the operation of mechanical systems.

Modern engineering systems and products still rely upon static and dynamic principles to make them work. Even systems that appear to be entirely electronic have a physical presence governed by the principles of statics.

For clarity, the text is divided into **three sections**, these being:

Part 1 Statics and strength of materials

Part 2 Dynamics

Part 3 Heat transfer and fluid mechanics

Mechanical Engineering Principles covers the following syllabuses:

- (i) **National Certificate/Diploma** courses in Mechanical Engineering
- (ii) **Mechanical Engineering Principles** (Advanced GNVQ Unit 8)
- (iii) **Further Mechanical Engineering Principles** (Advanced GNVQ Unit 12)
- (iv) **Any introductory/access/foundation course** involving Mechanical Engineering Principles at University, and Colleges of Further and Higher education.

Although pre-requisites for the modules covered in this book include GCSE/GNVQ intermediate in

Mathematics and Science, **each topic considered in the text is presented in a way that assumes that the reader has little previous knowledge of that topic.**

Mechanical Engineering Principles contains over **280 worked problems**, followed by over **470 further problems** (all **with answers**). The further problems are contained within some **130 Exercises**; each Exercise follows on directly from the relevant section of work, every few pages. In addition, the text contains **260 multiple-choice questions** (all **with answers**), and **260 short answer questions**, the answers for which can be determined from the preceding material in that particular chapter. Where at all possible, the problems mirror practical situations found in mechanical engineering. **330 line diagrams** enhance the understanding of the theory.

At regular intervals throughout the text are some **7 Assignments** to check understanding. For example, Assignment 1 covers material contained in Chapters 1 to 4, Assignment 2 covers the material in Chapters 5 to 7, and so on. No answers are given for the questions in the assignments, but a **lecturer's guide** has been produced giving full solutions and suggested marking scheme. The guide is offered free to those staff that adopt the text for their course.

At the end of the text, a list of relevant **formulae** is included for easy reference.

'Learning by Example' is at the heart of *Mechanical Engineering Principles*.

John Bird and Carl Ross
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