PREFACE

Mechanics is now a well established discipline which has vital relevance to science and technology. The fact that

- manned space flights take place
- high speed trains have been developed
- precision bombing is a reality

are all testament to the practical application of mechanical theories.

The subject itself can be divided into Statics (bodies at rest) and Dynamics (bodies in motion); the majority of the text is about describing motion and what causes motion. The final chapter, Physical Structures, is about Statics. Behind the application is the concept of a mathematical model, which represents mathematically the situation under study. This is usually, but not always, based on the assumptions of

Newton's Laws of Motion

These will be dealt with in this text, and their many applications developed. Above all it is our intention to show that mechanics is an interesting, practical and important topic, which embraces both the real world and our mathematical world.

This text has been produced for students and includes examples, activities and exercises. It should be noted that the activities are **not** optional but are an important part of the learning philosophy in which you are expected to take a very active part. The text integrates

- **Exposition** in which the concept is explained;
- **Examples** which show how the techniques are used;
- **Activities** which either introduce new concepts or reinforce techniques;
- **Discussion Points** which are essentially 'stop and think' points, where discussion with other students and teachers will be helpful;
- **Exercises** at the end of most sections in order to provide further practice;
- **Miscellaneous Exercises** at the end of most chapters, providing opportunities for reinforcement of the main points of the chapter.

Discussion points are written in a special typeface as illustrated here.

Note that answers to the exercises are given in a separate section. You are expected to have a calculator available throughout your study of this text and occasionally to have access to a computer.

Some of the sections, exercises and questions are marked with an asterisk (*). This means that they are either **not** central to the development of the topics in this text and can be omitted without causing problems, or they are regarded as particularly challenging.

Any enquiries regarding this text should be addressed to

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