

# Preface

The licensing of aircraft maintenance engineers is covered by international standards, the purpose of which is to ensure that those engaged in aircraft maintenance are appropriately qualified and experienced. This book is one of a series of texts, designed to cover the essential knowledge base required by aircraft-certifying mechanics, technicians and engineers engaged in engineering maintenance, overhaul and repair activities on commercial aircraft. In addition, this book should appeal to members of the armed forces and students attending training and educational establishments engaged in aircraft engineering maintenance and other related aircraft engineering learning programmes.

The book covers the essential underpinning mathematics, physics, electrical and electronic fundamentals, and basic aerodynamics necessary to help understand the function and operation of the complex technology used in modern aircraft.

Chapter 1 provides an introduction to the aircraft maintenance engineering industry at large. Here you will find information on the nature of the industry, the types of job role that you can expect, the current methods used to train and educate you for such roles, an overview of airworthiness regulation under which you are required to work, and the safety culture associated with aircraft maintenance, safety being a very important part of the industry. In addition, in Appendices A, B and C, you will find information on: opportunities for licence training, education and career progression, together with details on some national and international licensing, examination, training and education centres.

Chapter 2 on elementary *non-calculator mathematics* covers all of that laid down in Module 1 of the ECAR Part-66 syllabus that is essential for all those wishing to practise as Category A certifying mechanics and Category B certifying engineers. In addition, binary, octal and hexadecimal

number systems are covered, to provide the necessary underpinning mathematics needed later, when studying the electronic and avionic systems modules. However, even with the addition of number systems, the authors feel that this level of non-calculator mathematics is insufficient as a prerequisite to support the study of the physics and the related technology modules that are to follow. For this reason, and to assist students who wish to pursue other related qualifications, Chapter 3 *Further Mathematics* has been included. The more traditional mathematical topics of algebra, trigonometry, statistics and calculus are covered in this chapter, to a level deemed necessary to support the further study of general *aeronautical engineering* topics.

Chapter 4 *Physics* provides full coverage of the ECAR Part-66 Module 2 syllabus, for Category A certifying mechanics and *all* Category B certifying engineers, to the depth required for both mechanical B1 and avionic B2 certifying engineers.

Chapter 5 *Electrical Fundamentals* and Chapter 6 *Electronic Fundamentals* comprehensively cover the syllabuses contained in ECAR Part-66 Module 3 and ECAR Part-66 Module 4, respectively, to a knowledge level suitable for Category B2 avionic certifying engineers. Module 5 (“Digital Techniques and Electronic Instrument Systems”) is covered in a separate book within Taylor and Francis’s *Aerospace and Aviation Engineering* series.

Chapter 7 *Basic Aerodynamics* has been written to provide complete coverage of the ECAR Part-66 Module 8 syllabus, to a depth suitable for both B1 and B2 certifying engineers.

In view of the international nature of the civil aviation industry, all aircraft engineering maintenance staff need to be fully conversant with the SI system of units and must be able to demonstrate proficiency in manipulating the *English units* of measurement adopted by international aircraft manufacturers, such

as the Boeing Aircraft Company. Where considered important, the English units of measure will be emphasized alongside the universally recognized SI system. Chapter 4 provides a thorough introduction to SI units, and here you will also find mention of the English (Imperial) system of units. Appendix D provides a comprehensive set of SI tables of units and SI to Imperial conversion tables, together with examples of their use.

To reinforce the subject matter for each major topic, there are numerous worked examples and Test Your Understanding (TYU) written questions that are designed to enhance learning. In addition, you will find a representative selection of multiple-choice question sets at the end of each major section, within the relevant chapters. The answers to all of these questions are in Appendices F and G.

In order to provide readers with examination practice questions, Appendix E provides a large

collection of multiple-choice questions organized as a series of revision papers. These have been graded to simulate the depth and breadth of knowledge required by individuals wishing to practise at the mechanic (Category A) or engineer (Category B) level. The revision question papers should be attempted after you have completed your study of the appropriate chapter. In this way, you will obtain a clearer idea of how well you have grasped the subject matter at the module level. Note also that Category B knowledge is required by those wishing to practise at the Category C level. Individuals hoping to pursue this route should make sure that they thoroughly understand the relevant information on routes, pathways and examination levels given in Chapter 1.

We wish you every success with your studies and hope that this book provides you with plenty of food for thought.