

# HOW TO USE THIS BOOK

## 1 HOW ENGINEERS AND STUDENTS CAN USE THIS BOOK

How you use this book depends on what you intend to use it for. If you are a practicing engineer or an engineering student and have purchased this book as your first handbook, it will probably sit in your bookcase until you have a specific need. If you are preparing for the Fundamentals of Engineering (FE or EIT) examination, however, a few words of guidance may help.

- Make sure you have a copy of the NCEES Handbook, the only reference material allowed in the exam.<sup>1</sup> Become familiar with its format, layout, and organization. However, because the handbook is not suitable as a study aid, use the *Engineer-In-Training Reference Manual* to prepare for the exam.
- Use the subject titles along the side of each page—the minor tab names correspond to the chapter titles, while the major tab names roughly correspond to the FE exam subjects as listed in the NCEES Handbook. (See Chap. 64 for a listing of these subjects.)
- It is most efficient to skim through a chapter and familiarize yourself with the subjects included before starting the practice problems. Then you will know the location of each subject if you need a quick review.
- It isn't necessary to solve every problem in the practice problems. The number of practice problems you solve will depend on how much time you have and how skilled you already are in each area.
- You will soon recognize that some subjects appear in more than one chapter. You should use the index liberally to learn all there is about a particular subject. Most subjects have secondary or tertiary indexing, which means you should be able to find them no matter how you look them up. Many of the FE exam problems are definition problems; therefore, in addition to studying each subject from the material in this book, be sure you are familiar with the location of each subject in the NCEES Handbook.

<sup>1</sup>If you don't receive a copy of this from your state engineering licensing board upon registering for the exam, you can purchase one from Professional Publications, Inc., by calling 1-800-426-1178.

- Although the FE examination uses essentially all SI units, a few subjects may require use of customary U.S. (English) units. If you decide to work in customary U.S. units, you will find many equations in which the quantity  $g/g_c$  appears. For calculations at standard gravity, the numerical value of this fraction is 1.00. Therefore, it is necessary to incorporate this quantity only in problems with non-standard gravity, or when you are being meticulous with units.

## 2 HOW INSTRUCTORS CAN USE THIS BOOK

If you are teaching a review course for the FE examination without the benefit of recent, first-hand experience, use the material in this book along with the NCEES Handbook as guides to prepare your lectures. You should emphasize the subjects in each chapter and their corresponding locations in the NCEES Handbook, and avoid subjects that are omitted. You can feel confident that subjects omitted from this book are rarely, if ever, found on the FE exam.

It has always been my goal to over-prepare my own students. For that reason, the examples and practice problems are more difficult than actual examination problems. Also, you will recognize that it is more efficient to cover several procedural steps in one practice problem than to ask simple "one-liners" having multiple-choice answers. That is the reason that there are no multiple-choice practice problems in this book (although all problems on the FE exam are multiple choice).

There are many practice problems for each major examination subject. All problems are assigned in my review courses. To do all the problems requires approximately 15 hours of preparation each week.

Capacity assignment is the goal of my courses. If you assign 15 hours of practice problems, and a student can only put in 10 hours of preparation, that student will have worked to his or her capacity. After the actual FE examination, your students will honestly say that they could not have prepared any more than they did in your course.

Homework assignments in my courses are not individually graded. Instead, the students are given the solutions to all practice problems in advance. However, each student must turn in a completed set of problems for credit each week. I address special needs or questions written on the assignment by exception.

I have found that a 14-week format works well for an FE review course. There is one three-hour lecture with a short intermediate break each week. The following table outlines the basic course format that has worked well for me. If you can, adding lecture time will be appreciated by the students; reducing the time seems inappropriate.

#### Typical FE Review Course Format

meeting	subject covered	chapters
1	introduction to the examination; mathematics	1-4, 11, 12, 64
2	mathematics	5-7
3	mathematics	8-10
4	engineering economy	13
5	thermodynamics	20-23, 31
6	power and refrigeration cycles	25-28
7	fluid flow and hydraulic machines	14-19, 24
8	chemistry	29, 30
9	electricity	46, 47
10	electricity	48-51
11	materials science	34-38
12	mechanics of materials	39-41
13	statics	32, 33
14	dynamics	42-45

Lecture coverage of some examination subjects is necessarily brief; others are not covered at all. These omissions are intentional; they are not the result of scheduling omissions. For one thing, time is not on our side in a review course. For another, the benefit to covering certain subjects is only minimal. For example, I have found that very few people try to learn modeling and systems analysis. Unless you have two quarters in which to teach your FE review course, your students' time can be better spent covering other subjects.

All the skipped chapters are assigned as floating assignments to be made up in the students' "free" time.

I strongly believe in exposing my students to a realistic sample examination, but I no longer use an in-class sample exam. Since the review course usually ends only a few days before the real FE examination, I hesitate to make students sit for four hours in the late evening to take a "final exam." Rather, I distribute a sample examination at the first meeting of the review course and assign it as a take-home exam.

There are many other ways to organize an FE review course depending on the available time, budget, and intended audience. For example, review courses offered by faculty to graduating seniors are usually much more condensed than in-house courses offered by companies for their employees. However, all good course formats have the same result: the students struggle with the work load during the course, and then they breeze through the examination after the course.