Preface

All of the basic principles, techniques, and tools of undergraduate engineering economics are covered in this second edition. The textual material, examples, and problems are designed to meet the needs of a two- or three-semester/quarter credit hour *service course* for all disciplines of engineering, engineering technology, and engineering management. The printed and electronic versions are suitable for different course formats. Especially helpful are the *website-based podcasts,* which incorporate voice-over animated and annotated PPT slides. These podcasts serve as supplemental and support materials for students in any course format—resident, online, or distance education.

FEATURES — NEW AND OLD

Notable enhancements for this edition are in the areas of new or upgraded topics, teaching and learning aids, and website materials.

New Topics

- *Ethics* and its important connection to economic decisions are introduced in Chapter 1 and discussed further in Chapter 7 on public-sector projects.
- *Risk analysis* is expanded with its own new Chapter 14, which also introduces simulation with random sampling utilizing simple spreadsheet functions.
- *External rate of return* material is expanded with the modified ROR method (MIRR) and return on invested capital (ROIC) methods covered, along with hand solution and spreadsheet illustrations.

New Teaching and Learning Aids

- *Final answers* to 1/3 of the end-of-chapter problems are presented in a new Appendix C. Full solutions are available on the website.
- *Financial calculator usage* is included throughout the formative chapters, with an introduction to calculator-based solutions presented in Chapter 2 in parallel with spreadsheet functions.
- *Tax tables* for corporations and individuals utilize the same format as IRS tables.
- *Spreadsheets screen shots* are streamlined and more colorful for clearer understanding of content and the approach to problem solution.
- *Using Spreadsheets* (Appendix A) is updated to Excel© 2010.
- *End-of-chapter problems* number in excess of 870 with approximately 2/3 of them new or rewritten for this edition.

- *Solutions* using factors, calculator, and spreadsheet functions are presented for selected examples and end-of-chapter problems throughout the formative chapters.

New Website Materials

- *Podcasts,* incorporating voice-over animated and annotated PPT slides that summarize the essential topics are available on the website (www.mhhe.com/blank). (An icon in the margin of the text identifies material included in these podcasts.)
- *A detailed solution* is available in open access form for every end-of-chapter problem that has its final answer in Appendix C.
- *Live spreadsheets* for all examples, plus an *image library* of all tables and figures in the text.

The familiar features that make this an easy-to-use and quick-to-learn-from text continue to be included.

- *Purpose statement* and *learning outcomes* at the beginning of each chapter with outcomes tied to individual sections.
- *Examples* in each section, taken from different engineering disciplines, are maintained from the first edition, plus several new examples to better illustrate current topics and solution approaches.
- *Spreadsheet and calculator applications* are primarily concentrated in a final section of each chapter, allowing incorporation of electronic solutions or omission of this technology, at the discretion of the professor.
- Large number of *end-of-chapter problems* that cover all aspects of the text's material in each section.
- *Multiple-choice questions* for each chapter that are useful in a review for the FE Exam. Alternatively, these problems can be used as additional problems or for review prior to a course exam. These can be easily incorporated into auto-grade systems for online and distance-learning course structures through course management systems such as Blackboard.
- *Solutions manual, lecture slides,* and *image library of figures* are available online for each chapter with password protection for adopters.

USES OF TEXT

The writing style emphasizes brief, crisp coverage of principles, techniques, and alternative selection guidelines based on time-value-of-money computations. This book is developed in order to reduce the time necessary to present, grasp, and apply the essentials of engineering economic analysis. Most chapters that cover the fundamentals of the subject include hand, calculator, and spreadsheet solutions. More complex solutions that utilize a spreadsheet are separately shown in a final section of each chapter.

Students should have attained a sophomore or higher level to thoroughly understand the engineering context of the techniques and problems addressed. A background in calculus is not necessary; however, a basic familiarity with engineering

terminology in a student's own engineering discipline makes the material more meaningful and, therefore, easier to learn and apply.

The text may be used in a wide variety of ways in an undergraduate course—from a few weeks that introduce the basics of engineering economics, to a full two- or three-semester/quarter credit hour course. For senior students who have little or no background in engineering economic analysis in earlier courses, this text provides an excellent senior-level introduction as the *senior project* is designed and developed.

Engineering economy is one of the few engineering topics that is equally applicable to both individuals and corporate and government employees. It can analyze personal finances and investments in a fashion similar to corporate project finances. Students will find this text serves well as a reference throughout their courses and senior design projects, and especially after graduation as a reference source in engineering project work.

Because various engineering curricula concentrate on different aspects of engineering economics, sections and chapters can be covered or skipped to tailor the text's usage in print or electronic forms. For example, cost estimation that is often of more importance to *chemical engineering* is concentrated in a special chapter. Public sector economics for *civil engineering* is discussed separately. After-tax analysis, cost of capital, and decision-making under risk are introduced for *industrial and systems engineering* and *engineering management* curricula that include a shortened course in engineering economy. Examples treat areas for *electrical, petroleum, mechanical,* and other engineering disciplines.

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We welcome comments and corrections that will improve this text or its online learning materials. Our e-mail addresses are lelandblank@yahoo.com and atarquin@utep.edu.

Lee Blank and *Tony Tarquin*