Fundamentals of Engineering Economics, 2nd ed

By Chan S. Park, Prentice-Hall, NJ, 2008.

This rather comprehensive book, although intended for use in a one-semester course on engineering economics, would be an excellent addition to any engineer's reference library. The material is organized in such a way that it can be used to either study the topic for the first time or to quickly review the basic concepts.

Each chapter starts with an example from everyday life illustrating a common economics problem for which the material in the chapter provides a solution. Additional examples are included to illustrate the use of the formulas and to solve practical problems.

Another general feature of the book is the presentation of Excel workbooks to carry out the calculations for which they are appropriate. Example workbooks are elegantly presented with all the terms properly labeled and the cell formulas shown in boxed inserts. These workbooks can facilitate the creation of a software library that would be most useful in solving these problems. A summary of Excel financial functions, presented inside the back cover of the book, is also useful.

The book is divided into four parts consisting of about three chapters each. The first part deals with the time value of money and the basic formulas required to do compound interest calculations. The formulas are then applied to help understand money management, interest rates, and debt management. In this section, a chapter is devoted to the analysis of equivalence calculations in the face of inflation. The material in this first part forms the basis for the analysis techniques presented in the rest of the book. By organizing the book in this way, the author places the key formulas and concepts right at the beginning, where they belong. Many economics books have these formulas dispersed throughout the discussion of their application, making them difficult to find. The key formulas are also summarized inside the front cover of the book for quick reference.

The three chapters in the second part of the book present three methods for analyzing the economics of engineering projects and exclusive alternatives: present worth analysis, annual equivalence analysis, and rate-of-return analysis. The annual equivalence analysis method is the conversion of this worth of a project to a series of uniform annual amounts for the life of the project. This method is quite useful in estimating the cost of capital for a project that has no income, as for example, a project to remove a pollutant from a waste stream, or to make the process safer. By expressing the cost of capital as an annual equivalent amount, the cost of the project capital can be expressed in terms of incremental cost per unit mass of product.

The first chapter of the third part deals with depreciation and taxes. As with other topics, the concepts are presented exhaustively, with an explanation of depreciation and the different methods to calculate capital recovery, their effect on this worth, and the various rates of corporate taxation. Chapter 9 presents cash flow analysis of engineering projects, stressing the importance of the timing of the cash flows, and the organizing of them in three categories for estimating them: operating, investing, and financing activities. The effects of inflation and rate-of-return are considered, as well as the costs of equity and debt. Part three closes with a chapter on project risks and their estimation. Sensitivity analysis, break-even analysis, and scenario analysis are presented in detail. Probabilistic vs. risk-adjusted discount rate are also discussed.

The last part of the book is dedicated to three special topics, replacement strategies, cost-benefit analysis for public projects, and understanding the financial statements of corporations. The concepts are presented with the same thoroughness as the rest of the book.

At the end of each chapter except the first the author presents numerous problems, more than sixty for each chapter. This is a most important feature for a textbook to be used in an academic course. The appendix also contains three sets of self-test questions with their answers, and review questions for the *Fundamentals of Engineering* exam. The book has a companion website with the usual instructor and student aids, plus some special tools for depreciation, loan, and cash flow analysis, links to financial news, tax rates, consumer price index, and the like. The templates for Excel workbooks available on the webpage are for the first edition of the book, but most of them also apply to the second edition.

In summary, this is an excellently organized and prepared economics book. Students and engineers alike will benefit from it.

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