GENERAL

engineering economy by degarmo

Published: September 3, 2026 | Index ID: #-

Engineering Economy by Degarmo: A Comprehensive Guide

When you hear the phrase **engineering economy**, most engineers think of the intersection between technical feasibility and financial viability. It is the discipline that equips engineers to make informed decisions about projects, investments, and resource allocation. One of the most influential resources in this field is the textbook **Engineering Economy by Degarmo**. Whether you are a first year engineering student, a seasoned professional seeking a refresher, or an instructor looking for a reliable reference, this book offers a clear, structured, and practical approach to economic analysis in engineering contexts.

What Is Engineering Economy?

Historical Context

Engineering economy has its roots in the early 20th century, when industrialization demanded rigorous cost benefit analyses for large infrastructure projects. Over the decades, the discipline has evolved from simple cost accounting to sophisticated financial modeling that incorporates time value of money, risk, and uncertainty. Today, it is a core component of engineering curricula worldwide, reflecting the need for engineers to understand both technical and economic dimensions of their work.

Key Concepts and Principles

The discipline revolves around several foundational ideas:

- Time Value of Money – Money today is worth more than the same amount in the future due to potential earning capacity.
- Cash Flow Analysis – Tracking inflows and outflows over the life of a project.
- Net Present Value (NPV) – The discounted sum of future cash flows, indicating the project's profitability.
- Internal Rate of Return (IRR) – The discount rate that makes NPV zero, used to evaluate investment attractiveness.
- Payback Period – Time required for a project to recover its initial investment.
- Cost of Capital – The expected return required by investors or lenders.
- Risk Analysis – Assessing how uncertainty impacts financial outcomes.

These concepts form the backbone of the analytical tools presented in **Engineering Economy by Degarmo**.

About the Author: William J. Degarmo

Career Highlights

William J. Degarmo, a distinguished professor of mechanical engineering, has devoted more than four decades to engineering education. His research spans thermodynamics, heat transfer, and, notably, engineering economics. Degarmo’s textbooks are renowned for their clarity, depth, and real world applicability.

Contributions to Engineering Education

Beyond authorship, Degarmo has mentored countless students, developed curricula, and served on editorial boards for leading engineering journals. His commitment to making complex economic concepts accessible has

earned him accolades from both academia and industry.

The Book: Engineering Economy by Degarmo

Publication History

First published in the early 1980s, **Engineering Economy by Degarmo**has undergone several revisions to stay current with evolving economic theories and technological advancements. The latest edition incorporates contemporary case studies, updated formulas, and expanded discussion on risk analysis.

Target Audience

The book is designed for:

- Undergraduate engineering students in mechanical, civil, electrical, and industrial engineering courses.
- Graduate students pursuing specialized courses in project management and financial engineering.
- Practicing engineers and managers who need a solid foundation in cost analysis and investment appraisal.
- Academic instructors seeking a reliable text for their courses.

Core Topics Covered

Each chapter of the textbook is carefully structured to build from basic principles to advanced applications. Key areas include:

1. Fundamentals of engineering economy and the time value of money.
2. Cash flow analysis and the calculation of present and future values.
3. Investment appraisal techniques: NPV, IRR, payback period, and profitability index.
4. Capital budgeting and cost of capital estimation.
5. Depreciation methods and tax implications.
6. Risk analysis, including sensitivity and scenario analysis.
7. Cost estimation for design, manufacturing, and operations.
8. Environmental and sustainability considerations in economic evaluation.

Teaching Methodology

Degarmo’s pedagogical approach is rooted in problem solving. Each chapter contains a mix of theoretical explanations, worked examples, and practice problems that gradually increase in complexity. This structure encourages students to apply concepts immediately, reinforcing learning through active engagement.

Sample Chapter Overview

Take, for instance, Chapter 4 on “Investment Appraisal Techniques.” The chapter begins with a real world scenario—a company evaluating a new production line—followed by step by step calculations of NPV and IRR. It then explores how different discount rates affect decision outcomes and concludes with a discussion on selecting the most appropriate appraisal method based on project characteristics.

Why Engineering Economy Matters in Modern Engineering

Cost Analysis and Decision Making

Engineering projects rarely exist in a vacuum. Every design decision has cost implications that can influence the viability of the entire project. By mastering engineering economy, engineers can quantify these implications, compare alternatives, and recommend the most cost effective solutions.

Investment Appraisal Techniques

Large infrastructure projects, such as bridges or power plants, often involve substantial upfront costs. Investment appraisal techniques allow decision makers to evaluate whether the projected benefits justify the expenditures, ensuring that public and private funds are allocated wisely.

Risk Assessment and Uncertainty

Engineering projects are subject to technical, market, and regulatory uncertainties. The book's coverage of risk analysis equips engineers with tools to model these uncertainties, assess their financial impact, and devise mitigation strategies.

Using the Book as a Learning Tool

Study Tips and Techniques

To get the most out of **Engineering Economy by Degarmo**, consider the following strategies:

- Read the introductory sections of each chapter before diving into problem sets.
- Work through the examples in the order presented; they are intentionally sequenced to build intuition.
- Use the end of chapter practice problems as self assessment; compare your solutions with the provided answers.
- Form study groups to discuss challenging concepts and share insights.
- Apply the concepts to personal projects or workplace scenarios to see real world relevance.

Practical Applications and Projects

Degarmo's textbook includes numerous case studies that mirror industry scenarios. For instance, a chapter on "Depreciation and Tax Implications" uses a manufacturing plant example to illustrate how tax policy affects net cash flows. Students can replicate such analyses using spreadsheet software, thereby gaining hands on experience with financial modeling.

Online Resources and Supplementary Materials

Many publishers offer companion websites featuring additional practice problems, video lectures, and downloadable worksheets. These resources can deepen understanding and provide alternative explanations for challenging topics.

Review and Reception

Academic Feedback

Educators consistently praise the book for its clarity and structured approach. Reviewers highlight the balance between theory and application, noting that the book's real world examples help students bridge the gap between classroom learning and professional practice.

Industry Perspective

Engineers and managers in consulting, manufacturing, and construction industries appreciate the book's focus on practical tools. Many professionals cite it as a foundational reference when conducting cost analyses or preparing investment proposals.

FAQs About Engineering Economy by Degarmo

What makes this textbook different from other engineering economics books?

Degarmo's text stands out for its emphasis on problem solving, real world case studies, and clear step by step

explanations. Unlike some theoretical texts, it prioritizes actionable insights that students can apply immediately.

Is the book suitable for self study?

Absolutely. The logical progression of topics, coupled with abundant practice problems, makes it an excellent resource for independent learners.

Does it cover the latest developments in sustainability economics?

The latest edition includes sections on environmental cost analysis and sustainability metrics, aligning with contemporary industry priorities.

Are there supplemental online tools?

Many publishers provide an accompanying website with calculators, templates, and additional practice questions that complement the textbook.

Can I use this book for graduate coursework?

While primarily aimed at undergraduate students, the depth of analysis and advanced topics make it a valuable resource for graduate courses in project management and financial engineering.

Conclusion

Engineering economics is a vital skill set for any engineer who wants to contribute meaningfully to project planning, budgeting, and decision making. **Engineering Economy by Degarmo**delivers this knowledge through a well structured, application focused approach that has earned it a respected place in engineering curricula worldwide. Whether you are a student beginning your journey or a professional seeking to refine your analytical toolkit, this textbook offers the clarity, depth, and real world relevance needed to master the economics of engineering.

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