

ENGR 3400: Engineering Economics

This course is required for all Engineering majors.

Course Coordinator:

Gene Dixon

Catalog Description:

Analysis of cash flows including cost, revenue, and benefits that occur at different times. Evaluation of engineering projects using equivalent worth, benefit-cost, and rate of return including impact of depreciation, taxes, and statistical risk.

Course Structure:

Two 75-minute lectures and one two-hour laboratory/recitation session per week (three credits)

Prerequisites:

MATH 3307, Mathematical Statistics I

Required Materials:

1. *Engineering Economic Analysis, 9th Edition*, Newnan, Eschenbach, and Lavelle, Oxford University Press, 2004. (ISBN 0-19-516807-0)
2. *Study Guide for Engineering Economic Analysis, 9th Edition*, Newnan and Wheeler, Oxford University Press, 2004. (ISBN 0-19-517149-7)

Course Learning Outcomes:

Upon completion of this course, students shall be able to:

- Analyze costs and apply basic accounting principles (cost)
- Apply the principles and methods of valuing projects and investments (Discounted cash flows)
- Use cost indices and nominal and effective interest rates (discounted cash flows; incremental, average, sunk and estimating cost)
- Analyze alternative projects (project selection, lease/buy/make, replacement)
- Apply depreciation, taxes, and inflation influences in project analysis (breakeven, benefit cost)
- Use integrated spreadsheet software to solve engineering economics problems

Lecture Topics:

- Course introduction, syllabus review, Spreadsheets (1 class)
- Accounting concepts and financial statements (1 class)
- Engineering costs and estimates – fixed, variable, break even(2 class)
- Cash Flows, compounding, and time value of money (1 class)
- Introduction to economic equivalence: present future and annual worth (2 class)
- Arithmetic series, geometric gradient, rates (2 class)
- Nominal and effective rates, compounding periods, spreadsheets (2 class)
- Present worth (2 class)
- Annual and future worth equivalent cash flow (2 class)
- Rate of Return (1 class)
- Project comparison using IRR and incremental analysis (2 class)
- Other Techniques – B-C, Payback (1 class)
- Sensitivity and Uncertainty (1 class)
- Depreciation – basic and historical, MACRS (1 class)
- Depreciation and income taxes (2 class)
- Replacement analysis (2 class)
- Inflation & Min. rate of return (1 class)
- Project portfolio analysis – rationing capital (1 class)
- Exams (2 classes)

- Case Study (2 classes)

Relevant Program Outcomes:

Graduates of the Engineering Program will demonstrate

c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

d) an ability to function on multi-disciplinary teams.

e) an ability to identify, formulate and solve engineering problems.

h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context

Professional Component Content:

Math/Science: 0;

Engineering: 3 credits;

General Education: 0

Assessment Requirements:

Student Work Samples:

- Assignment showing economic analysis of a project
- Assignment showing knowledge of contemporary issues

Targeted Exam Questions:

- Solution of engineering problems

Student Course Survey

Last Review:

November 29, 2007 by Gene Dixon