

ISE 4400/IHE 6400 – Engineering Economy

Course Description

Introduction to analytical methods and techniques for optimizing the economic outcome of technical and managerial decisions. Includes time value of money, annual costs, present worth, future value, capitalized cost break-even analysis, and valuation and depreciation.

Undergraduate/Graduate level – 3 credit hours

Graduate students enrolled in IHE 6400 are required to complete additional problems on both homework and exams, that are optional for undergraduate students. The additional problems for graduate students will require application of in-depth concepts within the learning objectives of the course.

Offered both face-to-face and online

Course Learning Objectives

Students will learn to:

- Systematically make informed, practical, and consistent decisions when evaluating engineering projects
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments that consider the impact of engineering solutions in global, economic, environmental, and societal contexts
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- Demonstrate critical thinking when evaluating the economic aspects of different alternatives in engineering projects.
- Effectively communicate their thought process and final decisions in the economic analysis of engineering projects with a range of audiences.
- Employ the mathematical tools available within MS Excel or similar software to conduct economic analysis of engineering projects.
- Pursue further study in this area through electives, self-study or a review of the literature.

Course Learning Outcomes

After successfully completing this course, students should be able to use the basic theory and concepts of engineering economics to analyze engineering projects. Specifically, the student will be able to:

- Systematically make informed, practical, and consistent decisions when evaluating engineering projects
- Recognize ethical and professional responsibilities in engineering situations and make informed judgments that consider the impact of engineering solutions in global, economic, environmental, and societal contexts
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- Demonstrate critical thinking when evaluating the economic aspects of different alternatives in engineering projects.
- Effectively communicate their thought process and final decisions in the economic analysis of engineering projects with a range of audiences.
- Employ the mathematical tools available within MS Excel or similar software to conduct economic analysis of engineering projects.
- Pursue further study in this area through electives, self-study or a review of the literature.

Tentative Weekly Schedule

Week Topics covered

1. Introduction Making Economic Decisions Making Economic Decisions cont'd
2. Engineering Costs Estimating & Estimating Models Cash Flow
3. Labor Day no class Time Value of Money & Compound Interest Uniform Series & Compound Interest Factors
4. Arithmetic & Geometric Gradient Continuous Compounding Present Worth Analysis
5. Present Worth Analysis cont'd Exam 1 Review Exam 1 (on-line Window)
6. Exam 1 Solutions Cash Flow Analysis Loan Analysis
7. Rate of Return Rate of Return Analysis Rate of Return Analysis cont'd
8. Selection of Alternatives Rate of Return Analysis Future Worth Analysis & Benefit/Cost Ratio
9. Sensitivity and Breakeven Analysis Uncertainty Risk
10. Simulation and Risk Depreciation Depreciation cont'd
11. Spreadsheets and Depreciation Income Taxes Income taxes and Rate of Return

12. Replacement Analysis Spreadsheets and Replacement Analysis Inflation and Price Change
13. Cost of Funds and Opportunity Cost. Minimum Attractive Rate of Return (MARR) Exam 2 Review
14. Exam 2 (on-line window) Economics in the Public Sector Economics in the Public Sector cont'd
15. Final Exam Week