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

• 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.
- 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

WeekTopics covered
1. IntroductionMaking Economic DecisionsMaking Economic Decisions cont'd
3. Labor Day no classTime Value of Money & Compound InterestUniform Series & Compund Interest Factors
4. Arithmetic & Geometric GradientContinuous CompoundingPresent Worth Analysis
5. Present Worth Analysis cont'dExam 1 ReviewExam 1 (on-line Window)
6. Exam 1 SolutionsCash Flow AnalysisLoan Analysis
7. Rate of ReturnRate of Return AnalysisRate of Return Analysis cont'd
8. Selection of AlternativesRate of Return AnalysisFuture Worth Analysis & Benefit/Cost Ratio
9. Sensitivity and Breakeven AnalysisUncertainty Risk
10. Simulation and RiskDepreciationDepreciation cont'd
11. Spreadsheets and DepreciationIncome TaxesIncome 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