

**STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK**



COURSE OUTLINE

SOET 370 – ENGINEERING ECONOMICS

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CANINO SCHOOL OF ENGINEERING TECHNOLOGY
Computer Information Systems / Information Technology
September 2014

SOET 370 – ENGINEERING ECONOMICS

- A. **TITLE:** Engineering Economics
- B. **COURSE NUMBER:** SOET 370
- C. **CREDIT HOURS:** 3
- D. **WRITING INTENSIVE COURSE:** No
- E. **COURSE LENGTH:** 15 weeks
- F. **SEMESTER(S) OFFERED:** Fall or Spring
- G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY:**
3 lecture hours per week
- H. **CATALOG DESCRIPTION:** This course emphasizes the strong correlation between engineering design and manufacturing of products/systems and the economic issues they involve. The basic concepts of the time value of money and economic equivalence is applied throughout the course. Each engineering problem/project progressively incorporates different cash flows, the cost of funds, capital, operational and maintenance costs, salvage value, depreciation, amortization, and taxation. Students learn to apply different economic analysis methods – like present worth, annual-equivalent worth, rate-of-return, life-cycle cost, cost/benefit etc – in evaluating the economic viability of a project, as well as the comparison of mutually exclusive alternatives. The course also introduces concepts of replacement decisions, capital-budgeting decisions, and project risk and uncertainty, and exposes students to specific issues of economic analysis of the private sector versus the public sector. Applications to a variety of engineering fields’ actual cases are stressed throughout the course.
- I. **PRE-REQUISITES/CO-COURSES:**
- a. Pre-requisite(s): MATH 121 – College Algebra, or MATH123 – Pre-Calculus Algebra and Trigonometry. Additionally, students must have at least junior status or permission of instructor.
 - b. Co-requisite(s): None
- J. **GOALS (STUDENT LEARNING OUTCOMES):**
By the end of this course, the student will be able to:

<i>Course Objective</i>	<i>Institutional SLO</i>
1. Apply the appropriate engineering economics analysis method(s) for problem solving: present worth, annual cost, rate-of-return, payback, break-even, benefit-cost ratio.	1. Crit. Thinking 4. Prof. Competence
2. Evaluate the cost effectiveness of individual engineering projects using the methods learned and draw inferences for the investment decisions.	1. Crit. Thinking 4. Prof. Competence
3. Compare the life cycle cost of multiple projects using the methods learned, and make a quantitative decision between alternate facilities and/or systems.	1. Crit. Thinking 4. Prof. Competence
4. Compute the depreciation of an asset using standard depreciation techniques to assess its impact on present	1. Crit. Thinking 4. Prof. Competence

or future value.	
5. Apply all mathematical approach models covered in solving engineering economics problems: mathematical formulas, interest factors from tables, Excel functions and graphs. Estimate reasonableness of the results.	1. Crit. Thinking 4. Prof. Competence
6. Examine and evaluate probabilistic risk assessment methods.	1. Crit. Thinking 4. Prof. Competence
7. Compare the differences in economic analysis between the private and public sectors. Recognize the limits of mathematical models for factors hard to quantify.	1. Crit. Thinking 4. Prof. Competence
8. Develop and demonstrate teamwork, project management, and professional communications skills	2. Communic. Skills 3. Inter/Intra P. Skills

K. TEXT:

Chan S. Park, Contemporary Engineering Economics, 5th ed., Pearson Prentice Hall, 2010,
Print: ISBN-10: 0-13-611848-8, ISBN-13: 978-0-13-611848-0.
eText: ISBN-10: 0-13-611853-4, ISBN-13: 978-0-13-611853-4

L. REFERENCES:

M. EQUIPMENT: Technology Enhanced Classroom

N. GRADING METHOD: A – F

O. MEASUREMENT CRITERIA/METHODS:

- Assignments (Problems/Projects)
- Quizzes / Tests
- Exams
- Class Participation / Team Work

P. DETAILED COURSE OUTLINE:

I. Engineering Economic Decisions

- A. Role of Engineers in Business
- B. Economic Decisions versus Design Decisions
- C. Large Scale Engineering Projects and Types of Strategic Engineering Economic Decisions
- D. Fundamental Principles of Engineering Economics

II. Interest Rate and Economic Equivalence

- A. Interest: The Cost of Money
- B. Economic Equivalence
- C. Development of Formulas for Equivalence Calculation
- D. Unconventional Equivalence Calculations

III. Understanding Money and Its Management

- A. Nominal and Effective Interest Rates
- B. Equivalence Calculations with Effective Interest Rates and with Continuous Payments
- C. Changing Interest Rates
- D. Debt Management
- E. Investing in Financial Assets

IV. Present-Worth Analysis

- A. Project Cash Flows
- B. Initial Project Screening Methods: payback Screening and Discounted Cash Flow Analysis
- C. Variations of Present-Worth Analysis
- D. Comparing Mutually Exclusive Alternatives

V. Annual Equivalent-Worth Analysis

- A. Annual Equivalent-Worth Criterion
- B. Capital Costs versus Operating Costs
- C. Applying Annual-Worth Analysis
- D. Life-Cycle Cost Analysis
- E. Design Economics

VI. Rate-of-Return Analysis

- A. Rate of Return and Methods of Finding It
- B. Internal Rate-of-Return Criterion
- C. Mutually Exclusive Alternatives

VII Cost Concepts Relevant to Decision Making

- A. General Cost Terms; Classifying Costs for Financial Statements
- B. Cost Classifications for Predicting Cost Behavior
- C. Future Costs for Business Decisions
- D. Estimating Profit from Production

VIII. Depreciation and Corporate Taxes

- A. Asset Depreciation: Economic versus Accounting
- B. Book and Tax Depreciation Methods (MACRS)
- C. Depletion
- D. Income Tax Rate to be Used in Economic Analysis
- E. The Need for cash Flow in Engineering Economic Analysis

IX. Developing Project Cash Flows

- A. Cost-Benefit Estimation for Engineering Projects
- B. Developing Cash Flow Statements

X. Project Risk and Uncertainty

- A. Origins of Project Risk
- B. Methods of Describing Project Risk: Sensitivity, Break-Even and Scenario Analysis

XI Special Topics in Engineering Economics

- A. Replacement Decisions
- B. Capital Budgeting Decisions
- C. Economic Analysis in the Service Sector

Q. LABORATORY OUTLINE: N/A