

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



**MASTER SYLLABUS**

**COURSE NUMBER – COURSE NAME  
ECON 370 – Engineering Economics**

**Created by: Karen Spellacy and Lucas Craig**

**Updated by:**

**School of Business and Liberal Arts**

**Department: Business**

**Semester/Year: FALL 2020**

A. **TITLE:** Engineering Economics

B. **COURSE NUMBER:** ECON 370

C. **CREDIT HOURS:** 3 credit hour(s) per week for 15 weeks

- One hour (50 minutes) of lecture per week 3  
 Two to three hours of lab or clinical per week  
 Two hours of recitation per week  
 40 hours of internship

D. **WRITING INTENSIVE COURSE:** Yes  No

E. **GER CATEGORY:** None:  Yes: GER  
*If course satisfies more than one: GER*

F. **SEMESTER(S) OFFERED:** Fall  Spring  Fall & Spring

G. **COURSE DESCRIPTION:**

This course will expose students to economic theory through the use of mathematical modeling with a focus on economic decision making for engineers. Microeconomics topics will include supply and demand market analysis, and profitability. Macroeconomics topics will include the aggregate market, economic indicators, fiscal policy and monetary policy. The course will include segments of the engineering economic analysis covered in the Professional Engineering exam such as the application of different economic analysis methods utilized in evaluating the viability of a project and its alternatives, concepts of replacement decisions, capital-budgeting decisions, and project risk and uncertainty. Students will be exposed to specific issues of economic analysis of the private sector versus the public sector.

H. **PRE-REQUISITES:** None  Yes  If yes, list below:

MATH 121

**CO-REQUISITES:** None  Yes  If yes, list below:

**I. STUDENT LEARNING OUTCOMES: (see key below)**

By the end of this course, the student will be able to:

<u>Course Student Learning Outcome</u> <u>[SLO]</u>	<u>Program Student Learning Outcome</u> <u>[PSLO]</u>	<u>GER</u> <i>[If Applicable]</i>	<u>ISLO &amp; SUBSETS</u>	
Use supply and demand to determine an equilibrium and predict changes in an equilibrium in response to market changes			5-Ind, Prof, Disc, Know Skills ISLO ISLO	None Subsets Subsets Subsets
Compare and contrast economic profits with accounting profits			5-Ind, Prof, Disc, Know Skills ISLO ISLO	None Subsets Subsets Subsets
Identify economic indicators and utilize them to articulate the state of the economy and prescribe monetary and fiscal policy			5-Ind, Prof, Disc, Know Skills ISLO ISLO	PS Subsets Subsets Subsets
Conduct and interpret a cost-benefit analysis for an engineering project			2-Crit Think ISLO ISLO	CA Subsets Subsets Subsets
Compare the life cycle cost of multiple projects using present worth, annual cost, payback and break-even analysis			2-Crit Think ISLO ISLO	CA Subsets Subsets Subsets
Make a quantitative decision between alternate facilities or systems using Benefit/Cost Ratio analysis			2-Crit Think ISLO ISLO	PS Subsets Subsets Subsets

Evaluate the feasibility of a project or system by estimating cash demands as a function of time and comparing these with estimated cash flows from available funding sources			2-Crit Think ISLO ISLO	PS Subsets Subsets Subsets
Explain and evaluate probabilistic risk			5-Ind, Prof, Disc, Know Skills ISLO ISLO	None Subsets Subsets Subsets
Compute the depreciation of an asset using standard depreciation techniques			5-Ind, Prof, Disc, Know Skills ISLO ISLO	None Subsets Subsets Subsets
Communicate the results of an economic modeling process to management and other non-specialist in an informative and professional manner. Include in the communication and articulation of assumptions underlying these models, and the effects on the modelling process when these assumptions do not hold.			1-Comm Skills ISLO ISLO	W Subsets Subsets Subsets

<b>KEY</b>	<b><u>Institutional Student Learning Outcomes [ISLO 1 – 5]</u></b>
<b>ISLO #</b>	<b>ISLO &amp; Subsets</b>
<b>1</b>	<b>Communication Skills</b> Oral [O], Written [W]
<b>2</b>	<b>Critical Thinking</b> <i>Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</i>
<b>3</b>	<b>Foundational Skills</b> <i>Information Management [IM], Quantitative Lit./Reasoning [QTR]</i>
<b>4</b>	<b>Social Responsibility</b> <i>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</i>
<b>5</b>	<b>Industry, Professional, Discipline Specific Knowledge and Skills</b>

\*Include program objectives if applicable. Please consult with Program Coordinator

J. **APPLIED LEARNING COMPONENT:** Yes  No

If YES, select one or more of the following categories:

- |   |  |
|---|--|
| <input type="checkbox"/> Classroom/Lab      | <input type="checkbox"/> Civic Engagement              |
| <input type="checkbox"/> Internship         | <input type="checkbox"/> Creative Works/Senior Project |
| <input type="checkbox"/> Clinical Placement | <input type="checkbox"/> Research                      |
| <input type="checkbox"/> Practicum          | <input type="checkbox"/> Entrepreneurship              |
| <input type="checkbox"/> Service Learning   | (program, class, project)                              |
| <input type="checkbox"/> Community Service  |  |

K. **TEXTS:**

Chan S. Park. Contemporary Engineering Economics, 6th ed. New Jersey: Pearson-Prentice Hall, 2017.

L. **REFERENCES:**

N/A

M. **EQUIPMENT:** None  Needed:

N. **GRADING METHOD:** A-F

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

Homework	25%
Exams (3)	60%
Final Exam / Project	15%

P. **DETAILED COURSE OUTLINE:**

**I. Microeconomics**

- a. Opportunity Cost
- b. Supply and Demand

**II. Macroeconomics**

- a. Aggregate Demand and Supply
- b. Economic Indicators
- c. Fiscal Policy
- d. Monetary Policy

**III. Engineering Economic Decisions**

- a. Role of Engineers in Business
- b. Economic Decisions versus Design Decisions
- c. Large Scale Engineering Projects and Strategic Engineering Economic Decisions

#### **IV. Interest Rate and Economic Equivalence**

- a. Interest: The Cost of Money**
- b. Money Market and Interest Rate**
- c. Economic Equivalence**
- d. Development of Formulas for Equivalence Calculation**
- e. Unconventional Equivalence Calculations**

#### **V. 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**

#### **VI. Present-Worth Analysis**

- a. Project Cash Flows**
- b. Initial Project Screening Methods**
- c. Variations of Present-Worth Analysis**
- d. Comparing Mutually Exclusive Alternatives**

#### **VII. Annual Equivalent-Worth Analysis**

- a. Positive Time Preference**
- b. Present and Future Values**
- c. Annual Equivalent-Worth Criterion**
- d. Capital Costs versus Operating Costs**
- e. Applying Annual-Worth**
- f. Analysis Life-Cycle Cost**
- g. Analysis Design Economics**

#### **VIII. Rate-of-Return Analysis**

- a. Rate of Return and Methods of Finding It**
  - 1. Marginal Efficiency of Capital**
- b. Internal Rate-of-Return Criterion**
- c. Mutually Exclusive Alternatives**

#### **IX. Cost Concepts Relevant to Decision Making**

- a. General Cost Terms; Classifying Costs**
- b. Cost Classifications for Predicting Cost Behavior**
- c. Future Costs for Business Decisions**
- d. Estimating Profit from Production**

#### **X. 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**

#### **XI. Developing Project Cash Flows**

- a. Cost-Benefit Estimation for Engineering Projects**
- b. Developing Cash Flow Statements**

**XII. Project Risk and Uncertainty**

**a. Origins of Project Risk**

**b. Methods of Describing Project Risk: Sensitivity, Break-Even and Scenario Analysis**

**XIII. Special Topics in Engineering Economics**

**a. Replacement Decisions**

**b. Capital Budgeting Decisions**

**c. Economic Analysis in the Service Sector**

**Q. LABORATORY OUTLINE: None  Yes**