



## IE 031: Engineering Economics

Term: 2020 Winter Session

Instructor: Staff

Language of Instruction: English

Classroom: TBA

Office Hours: TBA

Class Sessions Per Week: 5

Total Weeks: 3

Total Class Sessions: 15

Class Session Length (minutes): 240

Credit Hours: 4

### Course Description:

This course studies the basic concepts of finance, accounting, and engineering economics. Students will learn the skills to assess the costs and benefits of engineering investments, such as product and technology development programs and capital purchases. Topics discussed in this course include cost concepts, financial statements, company economic environment, analysis of time value of money, comparison of project alternatives before and after taxes, cash flows, replacement analysis, risk management, and financial cash statements.

Prerequisite: MATH 021 Calculus II.

### Course Materials:

*Engineering Economy*, 17th edition, William G. Sullivanf

### Course Format and Requirements:

Students are expected to attend all lectures. Each lecture will build on the knowledge acquired in the previous one and, if you miss a class, you are responsible for getting the lecture notes from your classmates.

Please do not use electronic devices such as phones, iPads, computers, etc. during the lectures.



### Grading Scale:

**A+: 98%-100%**

**A: 93%-97%**

**A-: 90%-92%**

**B+: 88%-89%**

**B: 83%-87%**

**B-: 80%-82%**

**C+: 78%-79%**

**C: 73%-77%**

**C-: 70%-72%**

**D+: 68%-69%**

**D: 63%-67%**

**D-: 60%-62%**

**F: Below 60%**

### Course Assignments:

#### **Quizzes**

Quizzes will usually consist of True-False, multiple choice and short answer questions. Quizzes cannot be made up and will typically take 10 minutes or less. Five quizzes will be given through the whole semester.

#### **Homework**

Homework must be turned in at the specified due date prior to the beginning of class. No late assignments will be accepted. Homework assignments are to be done individually.

#### **Project**

Students will form into teams of 3-4 members and each team will be assigned a topic to work on. The group project will provide you with the opportunity to demonstrate your mastery of Engineering Economy concepts. Your project will be graded based on a class presentation, a report and a team peer rating.

#### **Exams**

There will be two midterm exams and a final exam. All exams (midterms and final) will be in class and closed book.

**Course Assessment:**

Quizzes	10%
Project	20%
Homework	5%
Midterm Exam 1	20%
Midterm Exam 2	20%
Final Exam	25%
Total	100%

**Course Schedule:**

Week 1- Class 1	Week 1- Class 2
Overview of the course; Go through syllabus; Self-introduction; Students form discussion group Introduction, discuss class expectations, learning objectives and the overall scope for the course Engineering Economy Principles and Wiley Plus Tutorial	Cash Flow Diagrams, conventions; Single cash flows Future worth; Present worth; Kirchhoff's Laws, Dependent Sources <b><u>Assign Team</u></b>
Week 1- Class 3	Week 1- Class 4
<b><u>Quiz 1</u></b> Multiple Cash Flows: Irregular series; Uniform series of cash flows Compounding Frequency; Periodic Interest Rate Approach; Effective and nominal interest rates; Equivalence	Interest Payments and Principal Payments; Bond Investment; Variable Interest Rates; Annual Percentage Rates Present Worth Analysis: Methods of comparing economic worth
Week 1- Class 5	Week 2- Class 6



<p>Present Worth Analysis: Equivalence of methods</p> <p><b><u>Midterm Exam 1</u></b></p>	<p>Ranking and incremental methods;</p> <p>Before-tax vs. After-tax analysis</p> <p>Present Worth Analysis: Equal vs. Unequal lives;</p> <p>A single alternative</p> <p><b><u>Project Checkpoint 1</u></b></p>
<p>Week 2- Class 7</p>	<p>Week 2- Class 8</p>
<p>Benefit-Cost analysis;</p> <p>Discounted Payback;</p> <p>Capitalized Worth;</p> <p>Class exercises, examples</p> <p>Present Worth Calculations</p> <p><b><u>Quiz 2</u></b></p>	<p>Annual worth:</p> <p>Single alternative</p> <p>Multiple alternatives</p> <p>Future worth:</p> <p>Single alternative</p> <p>Multiple alternatives</p>
<p>Week 2- Class 9</p>	<p>Week 2- Class 10</p>
<p>Future worth:</p> <p>Portfolio analysis</p> <p>Internal Rate of Return:</p> <p>Single alternative</p> <p>Multiple alternatives</p> <p><b><u>Quiz 3</u></b></p>	<p>External Rate of Return:</p> <p>Single alternative</p> <p>Multiple alternatives</p> <p><b><u>Midterm Exam 2</u></b></p>
<p>Week 3- Class 11</p>	<p>Week 3- Class 12</p>
<p>Replacement analysis;</p> <p>Fundamentals;</p> <p>Replacement analysis: Cash flow and opportunity cost;</p> <p>Optimum replacement interval</p> <p><b><u>Project Checkpoint 2</u></b></p>	<p><b><u>Quiz 4</u></b></p> <p>Depreciation;</p> <p>Straight line and declining balance;</p> <p>Modified accelerated cost recovery system (MACRS)</p> <p>Income Taxes;</p> <p>Corporate income taxes</p>
<p>Week 3- Class 13</p>	<p>Week 3- Class 14</p>
<p>After-tax analysis using retained earnings;</p> <p>After-tax analysis using borrowed capital</p>	<p>Inflation: After-tax analysis;</p> <p>After-tax analysis with borrowed capital</p>



Inflation: The meaning and measure of inflation; Before-tax analysis <b><u>Quiz 5</u></b>	<b><u>Project Presentation</u></b>
Week 3- Class 15	
Break Even, sensitivity analysis and risk analysis; Ethics in Engineering Economy <b><u>Project Presentation</u></b>	<b><u>Final Exam (Non-cumulative): TBA</u></b>

### **Academic Integrity:**

Students are encouraged to study together, and to discuss lecture topics with one another, but all other work should be completed independently.

Students are expected to adhere to the standards of academic honesty and integrity that are described in the Shanghai Normal University's *Academic Conduct Code*. Any work suspected of violating the standards of the *Academic Conduct Code* will be reported to the Dean's Office. Penalties for violating the *Academic Conduct Code* may include dismissal from the program. All students have an individual responsibility to know and understand the provisions of the *Academic Conduct Code*.

### **Special Needs or Assistance:**

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.