



New Jersey Institute of Technology M&IE – Course Syllabus
IE 334. Engineering Economy and Capital Investment.
3 credits, 3 contact hours (3;0;0).
By Prof. Bengu

Instructor Information	Course Identification
Instructor: Prof. Bengu E-mail: bengu@njit.edu Office Hours: Before and after classes & others by appointment or ZOOM MR 4:00pm – 5:00:pm @ITC 2305or office ME322	Course Number: IE334 Course Name: Engineering Economy Course Location: ITC 2 nd floor Class Times: MR 2:32pm – 3:50pm Prerequisites: Restriction:junior standing.

Course Description/Overview IE 334, Engineering Economy and Capital Investment (3;0;0)

This course provides an introduction to engineering economics with a focus on utilization and evaluation of capital investment analysis techniques. Key topics include the time value of money, cost of capital, net present value, future value, payback periods, and life cycle cost. Students will learn to make decisions involving multiple investment choices and replacement options, depreciation, uncertainty, and risk.

The course emphasizes problem-solving and the use of computer tools, particularly spreadsheets, to analyze cash flows, including costs, revenues, and benefits occurring at different times and in various forms. Students will evaluate engineering projects using methods such as equivalent worth, benefit-cost analysis, and rate of return.

By the end of the course, students will complete a group semester project . Upon completion of projects, the students build a personal loan analysis tool that can be used in their future careers, as feel as personal financial planning.

The course introduces these fundamentals of engineering cost analysis concepts with emphasis on problem solving and utilizing computer tools. **A high level usage of spreadsheet** is recommended and serves as the vehicle to illustrate many of the concepts, especially graphs for the Analysis of cash flows including cost, revenue, and benefits that occur at different times and in various forms. Evaluation of engineering projects using equivalent worth, benefit-cost, and rate of return, statistical risk are illustrated.

Course Policies

- 1. Attendance is mandatory.** A student who misses > 5 classes will be dropped, without credit. Getting to class late or leaving early counts as half an absence.
- 2. You must bring the textbook to class.** The text illustrates examples and homework that will be done in class. You must study it before the class.
- 3. Homework and projects** must be submitted in hard copy at the beginning of class on the due date. They will not be accepted late except for special circumstances (*such as jury duty or medical problem*), for which you must provide documentation. Semester project will consist of a written report for by the group and oral presentation by all team members. All submitted work (*including exams*) must include all members name and student ID, e-mail for feedback, and conformance of NJIT honor code with signatures. The TOC, table of contents page needs initials of those contributed in each section.
- 4. Plagiarism** results in zero credit for the assignment and/or an XF grade in the course.
- 5. Cell phones** must be turned off during class and are not permitted during exams.

Course Resources

Course Website: Canvas <<http://canvas.njit.edu>> will be used for course material.

Required Course Text

- ✓ **Engineering Economic Analysis, 14th Edition, Newnan, and Lavelle and Eschenbach, , Oxford University Press. (ISBN [9780190931919](#) 14th edition**
- ✓ Study Guide for Engineering Economic Analysis, 14th Edition, Newnan and Wheeler, Oxford University Press. (optional)

Grading System

Letter Grade	Percentage	Grade points/credit	Rating
A	93% & above	4.00	Excellent
A-	88% – 92%	3.50	Very good
B	82% – 86%	3.00	Good
B-	76% – 81%	2.50	Above average
C	70% – 75%	2.00	Average
C-	65% – 69%	1.50	Below average
D	60% - 64%	1.00	Inferior
F	59% and below	0.00	Failure
I	Incomplete; given only when a student is unable to complete a segment of the course because of circumstances beyond the student's control. A grade of incomplete may be given only after approved in writing by the odos@njit.edu office of dean of students.		
X	Conditional, with no grade points per credit; given only when the student is at fault in failing to complete a minor segment of a course, but in the judgment of the instructor does not need to repeat the course. It must be made up within the next semester in residence or the grade becomes a failure (F). A (X) grade is computed into the grade point average as a (F) grade.		

Grading Policy

Grades will be based on the following formula:

6 Homeworks (or more)	10%
2 Projects Submissions (Same Topic)	20%
Midterm 1	20%
Midterm 2	20%
Final Exam	25%
Instructor Assessment : Class attendance/participation Team Work & Integrity	5%
Total	100%

Late Assignments

They will not be accepted late except for special circumstances (*such as jury duty or medical problem*), for which you must provide documentation to dos@njit.edu (dean of students) and then get approval to be accepted by the instructor.

Collaboration/Plagiarism Rules

Specific course rules or policies regarding collaboration on graded academic exercises.

Example: Cell phones, iPods, or any other electronic devices are not to be used in the classroom. Information exchanges on these devices during class are also prohibited and violate the Academic Integrity Code of New Jersey Institute of Technology.

University Policies

Academic regulations and procedures are governed by University policy. Academic dishonesty cases will be handled in accordance the University's policies by the office of the dean of students odos@njit.edu.

If you have a disability that could affect your performance in this class or that requires an accommodation under the Americans with Disabilities Act, please see me and Affirmative Action Office as soon as possible so that we can make appropriate arrangements.

The Affirmative Action Office has asked that you be made aware of the following:

New Jersey Institute of Technology complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990. If you have a disability and need a reasonable accommodation for equal access to education or services at New Jersey Institute of Technology, please call the Dean of Students Office, at 973-596-3470.

Academic Integrity:

Every student should read the University Code on Academic Integrity (<http://www.njit.edu/academics/integrity.php>). All work that you represent as your own must, in fact, be your own. Work done by others must be given proper credit.

Course Schedule

(Based on class progress deviations may occur- consult with instructor)

Week 1

Course introduction

Chapter 1 – Introduction

- Course introduction, syllabus review, Spreadsheets (1 class)
- Application of Making Economic Decisions – the process of decision making and common ethical concerns for engineers (1 class)

Week 2

Chapter 2 – Engineering Cost and Benefits

Engineering costs and estimates – fixed, variable, break event (2 class)

**Check Last day to drop full semester courses with a refund*

Week 3

Chapter 3 – Interest and Equivalence

Cash Flows, compounding, and time value of money (1 class)

- Introduction to economic equivalence: present future and annual worth (2 class)

HW Due: TBA

**Check Last day to drop full semester courses without a grade appearing on the academic record - No Refund*

Week 4

Chapter 4 – Equivalence for Repeated Cash Flows

- Cont.' economic equivalence: present future and annual worth (2 class)

HW Due: TBA in class -

Week 5

Chapter 5 – Present Worth Analysis

- Arithmetic series, geometric gradient, rates (2 class)
Nominal and effective rates, compounding periods, spreadsheets

Week 6

Midterm #1 (Chapters 1-5)

Chapter 6 – Annual Cash Flow

Annual and future worth equivalent cash flow (2 class)

Week 7

M 2/25 Chapter 6 –Annual Cash Flow (cont.)

W 2/27 Chapter 7 – Rate of Return

Week 8

Chapter 7 – Rate of Return (cont.)

HW Due: TB

Check Last day to drop full semester courses with a grade of 'W'

Week 9

Break (no class scheduled)

Week 10

Chapter 8 – Choosing best Alternative

Project # 1 Step 1 Completion is Due.

Week 11

Chapter 9 – Other techniques

- Project comparison using IRR and incremental analysis (2 class)
- Other Techniques – B-C, Payback (1 class)

HW Due: TBA

Week 12

- Project comparison using IRR and incremental analysis (2 class)
- Other Techniques – B-C, Payback (1 class)

Midterm #2 (Chapters 5-9)

Chapter 10 – Uncertainty

Week 13

Chapter 11 –

- Depreciation – basic and historical, MACRS (1 class)
- Depreciation and income taxes (2 class)

HW Due: TBA

Week 14

Chapter 11 – cont.'

- Depreciation and income taxes (2 class)

Chapter 12 – Project portfolio analysis – rationing capital

HW Due: TBA

Week 15

- Project portfolio analysis – Review of Projects.

Review of Projects

Week 16

□ Review of Projects

Class review

Project Hard/Soft Copy Final Submission

Final Week

Reading Day (no class scheduled)

Final Exam