Instructor: Prof. Bengu

New Jersey Institute of Technology M&IE – Course Syllabus

IE 334. Engineering Economy and Capital Investment.

3 credits, 3 contact hours

Instructor Information

E-mail: bengu@njit.edu

Office Hours: Before and after classes and others by appointment
TR 4:00pm – 5:00:pm or by appointment @ME332

Course Identification

Course Number: IE334
Course Name: Engineering Economy
Course Location: ITC 2nd floor -2305
Class Times: MR 2:30pm – 3:54pm

Prerequisites Restriction:
Junior Standing.

Course Description/Overview: Introduction to the Principles of Engineering Economics

IE 334. Engineering Economy and Capital Investment. 3 credits, 3 contact hours.
Engineering Economic Analysis offers comprehensive coverage of financial and economic decision-making for engineers, using the principles of engineering economics for the utilization and evaluation of capital investments. The emphasis is on the fundamental concepts of problem-solving using life-cycle costs, and the time value of money as well as the cost of capital, net present value, and payback, depreciation, and decisions involving multiple-choice replacement, uncertainty/risk. The evaluation of engineering projects using equivalent worth, benefit-cost, rate of return, and statistical risk is illustrated. These concepts are introduced with the use of computer tools. High-level usage of spreadsheets is required as they serve as the vehicle to illustrate many of the concepts, especially for the analysis of cash flows, including costs, revenues, and benefits that occur at different times and in various forms. Upon completion of the semester project, students will build a personal loan analysis tool that can be used in the future.

Course Policies

1. ***Attendance is mandatory***. A student who misses > 5 classes will be dropped, without credit. Arriving late or leaving early counts as half an absence
2. ***Bring the textbook to class.*** Includes examples, homework that will be done in 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 to ***odos@njit.edu***.
   Semester projects will consist of a written report and oral presentations. All submitted work *(including exams)* must include your name and student ID, e-mail and conformance of NJIT honor code.
4. ***Plagiarism*** results in zero credit or an XF grade for the assignment in the course.
5. ***Cell phones & electronics*** must be turned off during class and are not permitted during exams. ***Make sure you move all electronics away from you during exams.***

Course Resources

Course Website: Canvas.njit.edu

Required Course Text

1. Engineering Economic Analysis, 14e Edition, Newnan, and Lavelle and Eschenbach, , Oxford University Press. **Print ISBNs**: 9780190932008, 0190932007
   Digital ISBNs: 9780190931940, 0190931949

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 when approved in writing by the dos@njit.edu 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 or the grade beomes 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 **(study cases & final project)**	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 odos@njit.edu for approval.

Collaboration/Plagiarism Rules: *Specific course rules or policies regarding collaboration/electronics*

Example: Unauthorized use of Cell phones, Tablets, Smart Watches or any other electronic devices in the classroom is prohibited. Information exchanges on these devices during class violate the ***Academic Integrity Code of New Jersey Institute of Technology*** will be submitted to the dean of students (dos@njit.edu).

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

Week 1

Chapter 1 – Course 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)

-Start Reading CASE STUDIES. Choose any 2 of them to present in the class.
-Also read the PROJECT definition to understand what is expected of you to learn from the lectures and spreadsheet applications. Ask questions in the class on how to get ready.

Week 2

Chapter 2 – Engineering Cost and Benefits

Engineering costs and estimates – fixed, variable, break event (2 class)
Complete your Homework, start using Excel if needed help, ask for it.
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)

You must build your own compounding table-if need help ask for it.
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 ***(covers Chapters 1-5)***

Chapter 6 – Annual Cash Flow

Annual and future worth equivalent cash flow (2 class)

Get ready for CASE STUDY1 presentation

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: TBA

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 ***(covers Chapters 5-9)***

Chapter 10 – Uncertainity

Get ready for CASE STUDY2 presentation

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 – rationing capital

*Repl*acement

Week 16

□ Project portfolio analysis – rationing capital

□ Inflation & Min. rate of return

Class review

Project Hard/Soft Copy Final Submission and Presentation (Group Size:2)

Final Week

Reading Day (no class scheduled)

Final Exam ***(covers all studied)***

University Policies

Academic regulations and procedures are governed by University policy. Academic dishonesty cases will be handled in accordance the University's policies.

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.***