



MECH 431

Engineering Economics

Mon Wed Fri, 4-5 pm, Hugh Dempster Pavilion 310

Instructor

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Teaching Assistants

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This syllabus and schedule is subject to change.

Course Description: Discounted cash flows. Sources of funds, cost of capital. Effects of depreciation, taxes, inflation. Evaluation and comparison of economic models for engineering projects. Replacement decisions. Public project analysis. Risk analysis. Project control, inventory analysis, simulation.

Prerequisite(s): None.

Credit Hours: 3

Text(s): *Engineering Economic Analysis*, 4rd Canadian Edition

Author(s): Donald G. Newnan, John Whittaker, Ted G. Eschenbach, and Jerome P. Lavelle;

ISBN: 978-0-19-902511-4

Course Objectives:

At the completion of this course, students will be able to:

1. Explain fundamental concepts of engineering economics
2. Use basic financial tools required for engineering decision making (time value of money, taxes, inflation, risk)
3. Perform discounted cash flow calculations to choose between competing engineering projects
4. Prepare and analyze basic financial reports (balance sheets, income statements, etc.)
5. Evaluate corporate performance and competitiveness based on relevant information in financial reports
6. Assess and quantify the uncertainty and risk associated with engineering projects and evaluate investment alternatives
7. Understand the implications of engineering economics in the public sector, including triple bottom line accounting and the role of externalities
8. Develop a business plan

Grade Distribution:

Assignments (5)	10%
Project (Business Plan)	20%
Midterm	25%
Final Exam	45%

Course Policies:

• General

- To pass the course, you must achieve a weighted average of at least 50% on the combination of the midterm and final exam, otherwise the grade will be capped at 49%.
- Students using laptops in class are asked to sit in the back rows to avoid distracting other students.
- Phones and other devices must be on silent during the lectures.
- Quizzes and exams are closed book, closed notes. Formula sheets and compound interest tables will be provided.

• Assignments

- Students are expected to work independently. **Offering** and **accepting** solutions from others is an act of **plagiarism**, which is a serious offense and **all involved parties will be penalized according to the Academic Honesty Policy**. Discussion amongst students is encouraged, but when in doubt, direct your questions to the professor or teaching assistants.
- **Late assignments will not be accepted except in the case of illness or other acceptable circumstances.**
- Grading of assignments is based on a combination of attempting to solve the problem (credit/no credit) and grades for the full solution. After the assignment is submitted, as a class we will have a lottery to randomly choose two assignment questions for full grading. The remaining questions are given full marks if a serious attempt to solve the problem is made. Late submissions (after the lottery) will be capped at the maximum score for the credit/no-credit questions only. For example, if the two questions fully graded are worth 12 points (out of the maximum 30), score on late assignments will be capped at 18 points.

• Attendance and Absences

- Students are responsible for all missed work, regardless of the reason for absence. It is also the absentee's responsibility to get all missing notes or materials.

Academic Integrity:

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of

plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the Presidents Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

For more information please visit: <http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,286,0,0>

Tentative Course Outline:

The weekly coverage might change as it depends on the progress of the class.

Week	Content
January 6-10	<ul style="list-style-type: none">• Introduction, Engineering Costs and Cost Estimation• Chapter(s): 1
January 13-17	<ul style="list-style-type: none">• Accounting and Engineering Economy• Chapter(s): 2
January 20-24	<ul style="list-style-type: none">• Interest and Equivalence, Equivalence for Repeated Cash Flows• Chapter(s): 3 & 4• A1 Due Wednesday Jan. 22
January 27-31	<ul style="list-style-type: none">• Present Worth Analysis, Annual Cash Flow Analysis• Chapter(s): 5 & 6
February 3-7	<ul style="list-style-type: none">• Rate of Return Analysis, Benefit-Cost Ratio and Other Analysis Techniques• Chapter(s): 7 & 8• A2 Due Wednesday Feb. 5
February 10-14	<ul style="list-style-type: none">• Business Plan and Workshop• Midterm, Wednesday Feb. 12, 4PM
February 17-21	<ul style="list-style-type: none">• Midterm break, no class
February 24-28	<ul style="list-style-type: none">• Selecting a MARR, Risk Analysis• Chapter(s): 9 & 10
March 2-6	<ul style="list-style-type: none">• Income, Depreciation, and Cash Flow• Chapter(s): 11• A3 Due Wednesday Mar. 4
March 9-13	<ul style="list-style-type: none">• After-Tax Cash Flows• Chapter(s): 12
March 16-20	<ul style="list-style-type: none">• Replacement Analysis• Chapter(s): 13• A4 Due Wednesday Mar. 18
March 23-27	<ul style="list-style-type: none">• Inflation and Price Change• Chapter(s): 14• Business Plan Due - midnight Mar. 27
March 30-April 3	<ul style="list-style-type: none">• Public Sector Analysis, Triple Bottom Line, Externalities• Chapter(s): N/A• A5 Due Friday Apr. 3
April 6-8	<ul style="list-style-type: none">• Final Review• Chapter(s): N/A