COURSE OBJECTIVES

The main objectives of this course are:

1. To introduce the concepts and methods of engineering economics.
2. To develop the required skills in economic analysis to make sound economic and financial decisions.
3. To improve the efficient use of available resources in engineering projects.

CALENDAR DESCRIPTION

Introduction to engineering economics; cash flow calculations; methods of comparison of alternatives; structural analysis; replacement analysis; public projects; depreciation and income tax; effects of inflation; sensitivity analysis; break-even analysis; decision making under risk and uncertainty.

COURSE TOPICS

2. **Time Value of Money**: Interest and interest rates, Compound and simple interest, Effective and nominal interest rates, Continuous compounding, Cash flow diagrams
3. **Cash flow analysis**: Compound interest factors for discrete compounding, Compound interest factors for single disbursements, Compound interest factors for annuities, Future amount, present worth, sinking fund factor
4. **Comparison methods**: Relations among projects, Minimum acceptable rate of return (MARR), Present worth and Annual worth comparisons, Comparisons of alternatives with unequal lives, Internal rate of return (IRR), IRR comparisons, External rate of return (ERR), ERR comparisons.
5. **Depreciation and financial accounting**: Depreciation and depreciation accounting, Elements of financial accounting
6. **Replacement decisions**: Reasons for replacement or retirement, Capital costs and other costs, Defender and challenger are identical, Challenger is different from defender
7. **Taxes**: Personal and corporate income taxes, Corporate tax rates, Before and after tax MARR, The effect of taxation on cash flows, Present Worth and Annual Worth Tax Calculation, IRR tax calculations, Specific rules in Canada
8. **Inflation**: Measuring inflation rate, Economic evaluation with inflation, Effect of inflation on the MARR, Effect of inflation on the IRR

9. **Public sector decision making**: Market failure, remedies for market failure, Decision making in the public sector

10. **Project Management**: project management lifecycle, project management tools, Gantt charts, critical path method.

11. **Dealing with uncertainty and risk**: Sensitivity analysis, break even analysis, Basic concepts of probability, Decision trees

**REQUIRED TEXT:**


**MARKING SCHEME:**

5 Quizzes: 15%;

3 Assignments: 15%

Midterm Test 20%

Final Examination 50%

**COURSE INSTRUCTOR:**

Dr. George Hadjisophocleous

Email: george.hadjisophocleous@carleton.ca

Phone: 520-2600 ext.5801

Office: ME 3454

Office hours: Thursdays 2:00 – 4:00

**TEACHING ASSISTANTS:**

TBA

**LECTURES:**

Tuesdays and Thursdays 16:05 – 17:25
ACADEMIC ACCOMMODATIONS
Requests for Academic Accommodation
You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

Pregnancy obligation
Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Religious obligation
Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf

Academic Accommodations for Students with Disabilities
If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. carleton.ca/pmc

Survivors of Sexual Violence
As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and is survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support

Accommodation for Student Activities
Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf

For more information on academic accommodation, please contact the departmental administrator or visit: students.carleton.ca/course-outline