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: Tuesdays and Thursdays 11:30 – 12:00

**TEACHING ASSISTANTS:**

TBA

**LECTURES:**

Tuesdays and Thursdays 10:05 – 11:25
ACADEMIC ACCOMMODATIONS

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

**Pregnancy obligation**: write to me 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: [http://www.carleton.ca/equity/](http://www.carleton.ca/equity/)

**Religious obligation**: write to me 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: [http://www.carleton.ca/equity/](http://www.carleton.ca/equity/)

**Academic Accommodations for Students with Disabilities**:

“The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (*if applicable*). **Requests made within two weeks will be reviewed on a case-by-case basis.** After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website ([www.carleton.ca/pmc](http://www.carleton.ca/pmc)) for the deadline to request accommodations for the formally-scheduled exam.”