School of Engineering
University of Guelph

ENGG*3240 Engineering Economics

Course Description & Outline - Fall 2010

CALENDER DESCRIPTION

Principle of project evaluation, analysis of capital and operating costs of engineering alternatives, benefit-cost ratio, break even studies, evaluation recognizing risk, replacement and retirement of assets, tax consideration, influence of sources of funds.

PREREQUISITES

MATH*1210 - Calculus

INSTRUCTOR

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TEACHING ASSISTANTS

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CLASS TIME & LOCATION

Lecture	Monday	-	12:30-13:20	ROZH 103
	Wednesday	-	12:30-13:20	ROZH 103
	Friday	-	12:30-13:20	ROZH 103

TEXT BOOK

Newnan, D.G., J. Whittaker, T.G. Eschenbach and J. P. Lavelle, 2009. Engineering Economic Analysis, 2nd Canadian Edition. Oxford University Press, Don Mills, Ontario, Canada.

COURSE OBJECTIVES

1. To acquire and independently apply concepts and techniques of economic analysis used to form engineering decisions.
2. To assess cost implication in engineering design and application.
3. To select a preferred course of action based upon monetary and non-monetary considerations
4. To assess risks and uncertainty associated with engineering economic decisions.

METHOD OF EVALUATION

Problem assignment and a small project	20%
Mid-term Examination	35%
Final Examination	45%

Disclaimer: *The instructor reserves the right to change any or all of the above in the event of appropriate circumstances, subject to University of Guelph Academic Regulations*

MID-TERM and FINAL EXAMINATION

MID-TERM	Date:	October 30, 2010
	Time:	18:00 – 20:00 pm
	Location:	ROZH 101
FINAL	Date:	December 16, 2010
	Time:	11:30 – 13:30
	Location:	To be announced

COURSE ORGANIZATION

- The proposed schedule of topics is shown below.
- Efforts will be made to use Courselink platform for exchange of course information. All students are expected to consult with the course site regularly and will be responsible for the material posted on this site.

List of topics

- Making economic decision, sea of problems, role of engineering economics analysis, decision making process, engineering costs, cost estimation methods, estimation of benefits.
- Cash flow diagram, computing cash flow, time value of money, interest and equivalence, compound interest formulas: single payment, uniform series, arithmetic and geometric gradient series, nominal and effective interest rates and continuous compounding. Assumptions in solving economic problems, economic rules, application of present worth analysis, Annual cash flow analysis, annual cash flow calculation. Analysis period.
- Equivalent Uniform Annual Cost (EUAC). Equivalent Uniform Annual Benefits (EUAB). Annual worth analysis Evaluation of Alternatives with: equal lives, common multiple lives continuous lives and fixed study period.
- Internal rate of return, Minimum attractive rate of return. Present worth versus Interest Rate. Calculation of internal rate of return. Incremental internal rate of return. Multiple IRRs. External Rate of Return (ERR). Modified Internal Rate of Return (MIRR). Selection of best alternative by incremental and graphical analysis.
- Future worth, minimum attractive rate of return, benefit cost and payback period analysis techniques. Sensitivity and break-even analysis
- Concept of depreciation, book value, depreciation methods, depreciation and asset disposal, depreciation for tax purpose (capital cost allowance factor), and calculation of capital coat allowance factor.
- Taxes. Individual and corporate, incremental nature of taxes, combined tax rates. After tax cash flow analysis, taxable income, after tax present worth and rate of return.
- Replacement Analysis. Factors affecting replacement, Replacement analysis techniques. Concept of challenger and defender. Challenger is different from defender. Sequence of identical challengers, challenger is not repeated and defender and challenger with unequal lives. Complications in replacement analysis. After tax replacement analysis.
- Inflation in engineering economy. Measurement of Inflation. Relationship between actual dollar and real dollar. Price Indexes. Inflation and tax calculations. Effect of inflation on MARR and IRR.
- Uncertainty in engineering economic analysis. Range of estimated values for evaluation. Probability and joint probability distributions, expected Value, measurement and consideration of risk
- Economic analysis in the public sector. Public decision factors. Interest rates for public projects Benefit-Cost Ratio, conventional and modified B/C and Incremental B/C. Financing duration and politics of investments
- The role of accounting in engineering economy. Divisions within an organization, Balance sheet and income statement, Assets, liabilities, equity and evaluation of indices (Ratios).

UNIVERSITY POLICY ON ACADEMIC MISCONDUCT

Academic misconduct, such as plagiarism, is a serious offence at the University of Guelph. Please consult the Undergraduate Calendar 2009-2010 and School of Engineering programs guide, for offences, penalties and procedures relating to academic misconduct.
http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml