

Engineering Economy (Dual Enrollment) – Elective

Overview

The Engineering Economy course is designed to teach students about the time value of money, cash flows occurring at different times with different amounts, and equivalence at different interest rates. These concepts will be used to evaluate engineering project proposals using well-accepted economic analysis techniques, such as present worth, future worth, capitalized cost, life-cycle costing, annual worth, rate of return, or benefit/cost analysis. Additionally, techniques such as replacement/retention studies, breakeven analysis, and payback analysis help make informed decisions about future uses of existing assets and systems.

Objectives

- Use interest formulas to evaluate various cash flow patterns
- Determine the effect of payment period and compound period on effective interest rate
- Evaluate business and engineering projects using methods such as present worth analysis, annual equivalence analysis, and rate of return analysis
- Explain depreciation methods used in accounting and the effect on income taxes
- Evaluate replacement problems
- Conduct a benefit cost analysis
- Calculate the economic consequence of inflation

Assessment

Students will be assessed using homework assignments, quizzes, and exams.

Course Essentials

Equipment	Cost/Unit
Standard Calculator	\$0 if student already owns one

Semester Course Outline

Unit 1: Cash Flows	Graphically represent cash flows
Unit 2: Time Value of Money	Economic Equivalence, simple and compound interest, MARR
Unit 3: Interest and Equivalence	Present to Future to Annuity equivalencies, Linear and geometric gradients, Shifted series
Unit 4: Equivalence for repeated Cash Flows	Nominal and Effective Interest Rates, varying interest rates
Unit 5: Present Worth Analysis	Equal life alternatives, different life alternatives, Capitalize Cost, Payback Period
Unit 6: Annual Worth Analysis	Advantages of AW, Capital Recovery, Perpetual Life
Unit 7: Return on Investment	Calculate rate of return, External Rate of Return
Unit 8: Replacement Analysis/Break Even	Economic Service Life, Breakeven analysis for one or two options
Unit 9: Inflation	PW, FW, and CR with inflation, calculate real interest rates
Unit 10: Depreciation	Straight Line, Double Declining Balance, MACRS, depletion
Unit 11: Taxes	CFBT/CFAT, After tax analysis, After tax replacement