



**THE OHIO STATE UNIVERSITY**  
COLLEGE OF ENGINEERING

# Economic Evaluation and Optimization in Civil and Environmental Engineering

## CIVILEN 3080

**Credit Hours:**

3.00 - 3.00

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**Course Levels:**

Undergraduate (1000-5000 level)

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**Course Components:**

Lecture

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**Course Description:**

Fundamentals of engineering economics and optimization for civil and environmental engineering planning and design.

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**Prerequisites and Co-requisites:**

Prereq or concur: 2060 (406), and enrollment in CivilEn or EnvEng major.

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**Course Goals / Objectives:**

- Be skilled in the mathematics of compound interest and financial equivalence
  - Be able to identify the best alternative from a small set of mutually exclusive alternatives based upon economic principles
  - Be skilled in the formulation and appropriate use of linear, nonlinear, and integer mathematical programs for Civil and Environmental Engineering design problems
  - Be able to apply the mechanics of expected value- and expected utility-based decision analysis, represent the problems in decision trees, and understand the behavioral interpretations of the criteria and representations
  - Be able to formulate and represent value of information problems, perform the mathematical calculations involved, and understand the intuition of value of perfect and sample information
  - Be skilled in graphical solutions to mathematical programs and in the use of available software for solving linear programs
  - Be able to determine the relative performance of factors and parameters by interpreting sensitivity analysis output from linear programming models
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**Course Topics:**

- Theory and application of compound interest and equivalence equations
  - Economic evaluation of alternatives
  - Economic impact of depreciation, taxes, and inflation
  - Fundamentals of Expected Utility Decision Analysis: expected value and expected utility; utility assessment; decision trees, value of perfect and sample information, decision tree representations
  - Introduction to Mathematical Programming: terminology; objective function and constraint formulation; distinction among linear and nonlinear programs; graphical solutions; sensitivity analysis; LP software and output interpretation
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**Designation:**

Required