

# University of Toledo

## Construction Engineering Technology

### Master Syllabus

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**Course Title:** Engineering Economics

**Course Code & Number:** ENGT-3600

**Credit Hour Total:** 3 **Weekly Contact Hours Lecture:** 3 **Lab Hours:** 0

**Prerequisite(s):** Junior Standing

**Text:** Engineering Economy 8th Ed. (Blank & Tarquin), McGraw-Hill, 2018,  
ISBN: 978-0-07-352343-9

**Software:** None

**Course Coordinator:** Kissoff

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#### A. **Course Description** (Approved catalog description.)

Fundamentals of economic analysis of engineering projects and capital investment decisions. Review of break-even analyses, rate of return, cost-benefit ratios and tax and inflation implications will be performed.

#### B. **Related Program Outcomes:**

Upon successful completion of the Construction Engineering Technology program, graduates will have:

##### ABET/Student Outcomes

- (1) an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
- (3) an ability to apply written, oral, and graphical communication in broadly defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;

The course also supports coverage of the following curricular areas:

##### Program Criteria

- a) the utilization of techniques that are appropriate to administer and evaluate construction contracts, documents, and codes;
- d) the application of fundamental computational methods and elementary analytical techniques in sub-disciplines related to construction engineering;
- f) the performance of economic analyses and cost estimates related to design, construction, and maintenance of systems associated with construction engineering;

##### Discipline Specific Content

+ Local & global impact of engineering solutions on individuals, organizations and society

Evidence of the success of these outcomes is provided by the collection and analysis of:

- Analytical Final Exam Problem
- Replacement Analysis/Economic Service Life Problem
- Economic Analysis Project

### **C. Course Objectives:**

At the completion of the class the student will have:

1. An understanding of the meaning and basic concepts of Engineering Economy.
2. An understanding of the time value of money and the factors that allow the conversion of money through time.
3. An understanding of the processes of compounding interest.
4. An understanding of the role of inflation in Engineering Economy analysis.
5. The ability to convert given cash based problems into a cash flow using a cash flow diagram.
6. The ability to make analysis decisions based upon the Present or Future Worth or Equivalent Annual Worth of a cash flow.
7. An understanding of the basics of determining the Rate of Return of a proposal and its acceptability compared to the Minimum Attractive Rate of Return.
8. An understanding of the basics of Mutually Exclusive and Independent sets of alternatives and how to choose the optimum solution based on given methods and criteria.
9. An understanding of Benefit/Cost ratios and their use
10. An understanding of the calculation of depreciation and its role in tax calculations and capital gains.
11. An understanding of the ramifications of before and after tax cash flow analysis.
12. The ability to use a computer based software to make standard Engineering Economy calculations.

### **D. Course Outline – Major Content Areas**

1. Cash Flows, Terms and Simple Interest
2. Compound Interest
3. Interest Factors
4. Multiple Factor Usage
5. Present Worth Evaluations
6. Equivalent-Uniform Annual Worth Evaluations
7. Rate of Return Single Projects
8. Rate of Return Evaluations of Multiple Projects
9. Benefit/Cost Ratios
10. Replacement Analysis
11. Bonds

12. Inflation

13. Depreciation

14. Income Tax Basics

15. After Tax Analyses

**E. Suggested Laboratory Tests**

None