1. CEE 3710 – Principles of Engineering Economy

2. Course credit hours: 2
   Contact hours per week: 2
   Credit category: Engineering Topics

3. Course coordinator: Jessica Oswalt

4. Textbook: Fundamentals of Engineering Economic Analysis, 1st edition (2nd edition in Fall 2020), by John A. White, Kellie S. Grasman, Kenneth E. Case, Kim LaScola Needy, and David B. Pratt, 2014 (2020).

   Supplemental materials:
   a. WileyPLUS online course access

5. Course information:

2020 Catalog description	Concepts and techniques useful in the economic evaluation of engineering alternatives.
Prerequisite(s)	MATH 1920
Course type	Required

6. Course instructional outcomes:

Course Outcome No.	Course Outcome (CO)	ABET Student Outcome
CO1	Understand and use economic terminology and concepts related to the time value of money and economic equivalence, including simple and compound interest, sunk costs, opportunity costs, breakeven, and effects of uncertainty	2
CO2	Develop cash flow diagrams and perform interest rate calculations using single payment, uniform series, and gradient series factors, and calculate nominal and effective interest rates	1
CO3	Evaluate project alternatives using economic criteria including present worth, equivalent uniform worth, future worth, benefit-cost ratio, rate of return, and payback period	4
CO4	Assess the effects of depreciation and taxes on cash flows and project selection	4

ABET criterion 3 Student Outcomes addressed by this course:

SO No.	Student Outcome (SO)
3.1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
3.2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3.4	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

7. Course topics:
   1. Time value of money concepts and terminology
   2. Interest factors: present worth, future worth, uniform series, gradient series, geometric series
   3. Compounding frequency
   4. Concept of equivalence
   5. Comparison of economic alternatives using present worth, annual worth, future worth, benefit-cost, and discounted payback period analysis
   6. Capitalized worth
   7. Rate of return analysis: internal and external rates of return for single and multiple alternatives
   8. Dealing with uncertainty: breakeven, sensitivity, and risk analysis methods
   9. Depreciation: methods: straight line, declining balance, MACRS
   10. Income taxes for capital projects financed with retained earnings and with borrowed capital
   11. Leasing versus purchasing an asset

   Program criteria (curriculum) addressed by this course:
   1. Apply probability and statistics to address uncertainty
   2. Explain basic concepts in project management, business, public policy, and leadership

8. Additional topics, assignments, or requirements for dual-level (4000/5000) course:
   N/A

9. Date: 07/14/2020