



**COWLEY COLLEGE
& Area Vocational Technical School**

COURSE PROCEDURE FOR

**ENGINEERING ECONOMY
PHS 4555 3 Credit Hours**

Student Level:

This course is open to students on the college level in either the Freshman or Sophomore year.

Catalog Description:

PHS4555- ENGINEERING ECONOMY (3 hrs.)

A method of economic evaluation of engineering alternatives and design, Time value for money and economic impact of taxes, risk and depreciation. This course requires the students to have access to a computer and a TI -89 graphing calculator

Prerequisites:

A minimum grade of C in MTH4435 – Calculus 1

Controlling Purpose:

To Equip the Science and Pre-Engineering students with the knowledge of economic evaluation of engineering alternatives and design, Time value for money and economic impact of taxes, risk and depreciation

Learner Outcomes:

Upon completion of the course, the student will be able to understand and apply fundamental concepts of economic analysis to engineering projects and analysis, apply and utilize specific techniques including present worth, annual equivalent worth, rate of return and others. Appreciate effects of inflation on economic evaluation and account for the impact of depreciation and tax regulations

Units Outcomes and Clock Hours of Instruction for Core Curriculum:

The following outline defines the minimum core content not including the final examination period. Instructors may add other material as time allows.

Evaluation Key:

- A = All major and minor goals have been achieved and the achievement level is considerably above the minimum required for doing more advanced work in the same field.
- B = All major goals have been achieved, but the student has failed to achieve some of the less important goals. However, the student has progressed to the point where the goals of work at the next level can be easily achieved.

- C = All major goals have been achieved, but many of the minor goals have not been achieved. In this grade range, the minimum level of proficiency represents a person who has achieved the major goals to the minimum amount of preparation necessary for taking more advanced work in the same field, but without any major handicap of inadequacy in his background.
- D = A few of the major goals have been achieved, but the student's achievement is so limited that he is not well prepared to work at a more advanced level in the same field.
- F = Failing, will be computed in GPA and hours attempted.
- N = No instruction or training in this area.

UNIT 1: INTRODUCTION TO ENGINEERING ECONOMY-4hrs
(chapters 1)
Outcomes: Upon completing this unit the student should be able to understand and apply the basic concept and use terminology of engineering economics

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Define engineering economics and describe its role in making decisions
						Understand steps used in engineering economy study
						Evaluate ethical decisions
						Perform calculations for interest rates and rates of return, simple interest and compound interest
						Identify and use engineering terminology
						Graphically represent cash flow

UNIT 2: INTEREST RATES AND ECONOMIC EQUIVALENCE – 8 hrs.
(chapters 2, 3 and 4)
Outcomes: Upon completing this unit the student should be able to derive and use engineering economy factors to account for the time value of money and economic equivalence.

A	B	C	D	F	N	Specific Competencies:
						Demonstrate the ability to:
						Understand derivations of commonly used engineering factors that consider time value for money
						Combine engineering economy factors and spreadsheet functions to make equivalence calculations
						Understand and use nominal and effective interest rates in engineering or daily practices.

UNIT 3: PRESENT WORTH AND ANNUAL WORTH ANALYSIS – 8hrs.

(chapters 5 and 6)

Outcomes: Upon completing this unit the student should be able to evaluate most engineering projects proposals using well accepted economic analysis techniques

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to understand how to organize an economic analysis
						Utilize different present worth (PW) techniques to evaluate and select alternatives.
						Utilize different annual worth (AW) techniques to evaluate and select alternatives.

UNIT 4: RATE OF RETURN ANALYSIS- 8hrs.

(chapters 7 and 8)

Outcomes: Upon completing this unit the student should be able to perform ROR evaluations of a single project

A	B	C	D	F	N	Specific Competencies
						Demonstrate the ability to:
						Understand the meaning of rate of return(ROR)
						Use a PW or AW relations to calculate ROR
						Perform ROR evaluations for a single project
						Perform incremental cash flows for ROR analysis
						Evaluate incremental ROR analysis of Multiple alternatives

UNIT 5: BENEFIT/COST ANALYSIS – 4hrs.

(chapter 9)

Outcomes: Upon completing this unit the student should be able to understand public sector projects and select the best alternative on the basis of incremental benefit/cost analysis

A	B	C	D	F	N	Specific Competencies:
						Demonstrate the ability to:
						Explain some of the basic differences between private and public-sector projects
						Calculate benefit/cost ratio and its use to evaluate a single project

UNIT 6: DECISION STUDIES ON REAL WORLD PROJECTS– 4HRS.**(chapters 11 and 13)**

Outcomes: Upon completing this unit the student should be able to perform replacement /retention and Breakeven analysis

A	B	C	D	F	N	Specific Competencies:
						Demonstrate the ability to:
						Explain the fundamental approach and terminology of replacement analysis
						Perform a replacement/retention study between a defender and the best challenger
						Calculate the minimum market(trade-in) value required to make the challenger economically attractive
						Determine the breakeven point of a parameter for one or two alternatives
						Calculate the payback period of a project

UNIT 7 : INCLUDING INFLATION, DEPRECIATION AND INCOME TAXES IN ECONOMIC STUDIES -8hrs**(chapters 14,16 and 17)**

Outcomes: Upon completing this unit the student should be able to consider the effects of inflation, use depreciation/depletions methods and perform after-tax economic evaluations in economic studies

A	B	C	D	F	N	Specific Competencies:
						Demonstrate the ability to:
						Demonstrate the difference that inflation makes on money now and money in future
						Explain deflation
						Calculate the PW of cash flows with adjustments for inflation
						Define and use basic terms of asset depreciation
						Apply straight line(SL), declining balance(DB) and double declining balance (DDB) methods of depreciation
						Explain depletion; apply cost depletion methods
						Know the fundamental terms and relations of after-tax analysis
						Determine cash flow before tax(CFBT) and cash flow after tax(CFAT)
						Understand the impact of pertinent tax regulations on income taxes and depreciation

UNIT 8 : COST ESTIMATION AND INDIRECT COST ALLOCATION – 4 hrs**(chapter 15)**

Outcomes: Upon completing this unit the student should be able to make cost estimates using different methods.

A	B	C	D	F	N	Specific Competencies:
						Demonstrate the ability to:
						Explain bottom up and design to cost (top down) approaches to cost estimation
						Use the unit meth to make preliminary cost estimate
						Use the cost index ratio and cost capacity equations to perform cost estimations
						Explore ethics and profit dilemma

Projects Required:

Term project required.

This includes an Economics of the Business and Operations Plan with summary of assumptions, alternatives considered, analysis of alternatives and sensitivity analysis based on the knowledge the student has gained throughout the semester.

Textbook:

Engineering Economy, L.Blank, A.Tarquin, 7th ed., 2011, McGraw Hill. Please contact Cowley Bookstore for current textbook.

Materials/Equipment Required:

Access to a computer for quizzes and use of Blackboard resources. Computers will be available to the student in the Computer Lab.

Attendance Policy:

Students should adhere to the attendance policy outlined by the instructor in the course syllabus.

Grading Policy:

The grading policy will be outlined by the instructor in the course syllabus.

Maximum class size:

Based on classroom occupancy

Course Time Frame:

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DISCLAIMER: THIS INFORMATION IS SUBJECT TO CHANGE. FOR THE OFFICIAL COURSE PROCEDURE CONTACT ACADEMIC AFFAIRS.

The U.S. Department of Education, Higher Learning Commission and the Kansas Board of Regents define credit hour and have specific regulations that the college must follow when developing, teaching and assessing the educational aspects of the college. A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally-established equivalency that reasonably approximates not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work for approximately fifteen weeks for one semester hour of credit or an equivalent amount of work over a different amount of time. The number of semester hours of credit allowed for each distance education or blended hybrid courses shall be assigned by the college based on the amount of time needed to achieve the same course outcomes in a purely face-to-face format.

Refer to the following policies:

[402.00 Academic Code of Conduct](#)

[263.00 Student Appeal of Course Grades](#)

[403.00 Student Code of Conduct](#)

Disability Services Program:

Cowley College, in recognition of state and federal laws, will accommodate a student with a documented disability. If a student has a disability which may impact work in this class and which requires accommodations, contact the Disability Services Coordinator.