

Course Overview

This is a two-hour course required of all students majoring in Civil and Environmental Engineering and Electrical Engineering. Students who complete this course will acquire a fundamental knowledge of engineering economy as applied to the economic analysis of construction and operation of various engineering works.

Course Topics

Course topics include the time value of money, equivalence, simple and compound interest, nominal and effective interest rates, present worth and capitalized cost evaluation, equivalent uniform annual worth evaluation, rate of return evaluation, benefit/cost ratio evaluation, depreciation, corporate and individual income tax, and after-tax economic analysis. In addition, the course covers engineering ethics as applied by practicing engineers.

Background

Engineering firms are often faced with how to invest the company's capital. Also, engineers may help clients select among various alternatives or determine if the benefits of a public project outweigh the costs. While intangible factors may be important in decision-making, economic evaluation of alternatives may be accomplished through the use of a collection of mathematical techniques referred to as engineering economy. A benefit from taking this type of course is that many personal decisions (what price automobile is affordable, whether to lease or buy) can be made using the same principles used in engineering firms to make decisions.

The class is classified as a laboratory. Two-hour laboratory classes are held twice weekly.

Course Goals

Upon completion of the course, students should be able to:

1. Demonstrate understanding of the time value of money and apply P, F, A and G factors.
2. Calculate nominal and effective interest rates.
3. Calculate capitalized cost and equivalent uniform annual worth (EUAW) for alternative comparison.
4. Calculate rate of return analysis for alternative comparison, using minimum attraction rate of return (MARR) as a basis.
5. Calculate benefit cost ratio alternative comparison, including associated ethical considerations.
6. Calculate depreciation calculations using straight line (SL), double declining balance (DDB) and modified accelerated cost recovery system (MACRS) methods.

Instructor Information

Instructor: Dr. K. P. Brannan

Office: 311 LeTellier Hall

Phone: 953-7685

e-mail: ken.brannan@citadel.edu

Office Hours: Tues/Thur 3-5 PM. Students are also welcome to come by at other times that I am in.

Grades

Homework	14%
Quizzes and Class Activities	19%
Test 1	21%
Test 2	21%
Final Examination	25%

Course Policies

Attendance

Class attendance is the most important aspect of successful completion of any course. Therefore, class attendance will be taken at the start of each class. If a student must miss class because of illness or other circumstances beyond the control of the student, the instructor should be notified as soon as possible. According to the policy in the catalog, "missing more than 20% of the scheduled class meetings would be considered excessive." Missing an excessive number of classes can, at the discretion of the professor, result in a grade of "F" for the course.

Tests and Final Exam

All tests and final examinations must be taken on the assigned day. Any exceptions to this policy **must** be cleared in advance with the instructor.

Homework Submittal

Homework is usually due by the next class meeting. Late homework will not normally be accepted.

If you know you are going to miss class, notify the professor. You will need to make arrangements regarding when to submit any work missed.

If you miss class due to sickness, notify the professor as soon as possible to discuss when to complete and submit any work missed.

E-mail

Students must check for e-mail messages regularly. Course information may be distributed occasionally via e-mail.

Professionalism

The expectation for students to participate as engineering professionals is implicit.

Grading

Grading is a subjective exercise on the part of the professor, unless a "right or wrong" approach is taken. Subjective grading gives partial credit for a problem that is not completely correct. It is important to remember that in the real world of engineering no partial credit is given for the dam that fails or the bridge that collapses!! *The amount of partial credit given is solely the responsibility of the professor.*

Academic Integrity

The Cadet Honor Code states that a cadet does not lie, cheat, or steal, nor tolerate those that do. The honor system is not limited to cadets but is equally applicable to students in the CGC. Engineers have a trust placed on them by society to ensure that the public safety is held paramount. As such, it is not difficult to extrapolate the cadet honor code to the engineer's code of ethics. People constantly depend on engineers to provide safe bridges, buildings, drinking water, etc. This trust must not be violated. For this reason, any form of cheating will not be tolerated in this class.

It is hard to imagine a student who has been dismissed for cheating being convinced that attempting to gain a few points was worth the loss of an academic career and the anguish of family and friends.

The purpose of this section is to establish an understanding of what is or equally important what is not allowed in this course. The following is a list of acceptable and unacceptable practices.

You are allowed to:

- Discuss homework problems with other students, unless otherwise specified by the professor. This policy is designed to enable students to learn through interchange of ideas with other students. However, it is often advantageous to think through a problem and attempt to work it before discussing the problem with others. A student should make sure that he or she completely understands any work submitted. Finally, although discussion of homework problems with other students is permitted to promote understanding of the material, all the actual work submitted (whether done manually or by computer) must be done by the person whose name appears on the homework.

You are not allowed to:

- Transfer information electronically to or from another student without the permission of the instructor.

- Two or more students may not work an assignment (or a portion of an assignment) on a single computer and then save the assignment to multiple diskettes or media.
- Copy solutions from someone else. After you understand a solution or part of a solution, you must perform the work yourself. Also, students are never to surrender their homework to another student for any period of time.

Additional course information, assignment updates and changes

Course notes, class handouts, and other information will be continually added to the web server during the semester.

Homework Policies

- Format: Given, Req'd, Solution as shown on the attached sheet (required for HW problems)
- Example problem illustrating format: see the file below
- Paper: Engineering or plain white paper with computer prepared homework
- Print and arrange solution neatly
- Cash Flow Diagrams: required on applicable problems
- Due: generally at the beginning of each class
- Late policy: late HW generally not accepted; exceptions must be approved by the instructor
- Show all work

Academic Support

If you need accommodations because of a disability, please inform me immediately. Please see me privately after class, or at my office.

- Office Location: 311 LeTellier Hall

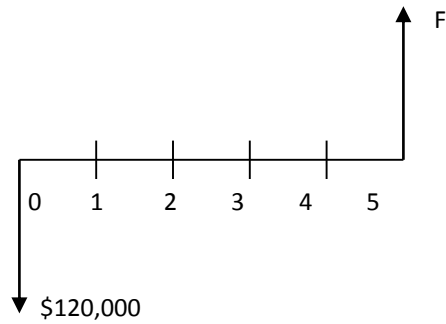
To request academic accommodations (for example, a note taker), students must also register with the Academic Support Center (<http://www.citadel.edu/academicsupportcenter/>). It is the campus office responsible for reviewing documentation provided by students requesting academic accommodations, and for accommodations planning in cooperation with students and instructors, as needed and consistent with course requirements.

Example Problem (this shows required format for homework problems)

GIVEN: Company X is considering purchase of new surveying equipment
 Similar equipment was purchased 5 years ago at \$120,000
 $i = 6\%$

REQ'D: Equivalent value of the equipment today

SOLUTION:



example using interest tables

$$F = \$120,000 \left(\frac{F}{P}, 6\%, 5 \right)$$

$$F = (\$120,000) (1.3382)$$

$$F = \$160,584$$

example using equations

$$F = \$120,000 \left(\frac{F}{P}, 6\%, 5 \right)$$

$$F = (\$120,000) (1 + i)^n$$

$$F = (\$120,000) (1 + 0.06)^5$$

$$F = \$160,587$$