# IENG 577 ADVANCED ENGINEERING ECONOMY
# SPRING 2014

Prerequisites: IENG 377 or equivalent, or instructor consent

**Text: Required** A. **Advanced Engineering Economics**
Chan S. Park and Gunter P. Sharp-Bette, 1990
John Wiley and Sons
OR
B. **IENG 577 Advanced Engineering Economy** by University Reader(Book Store or order on-line)

Optional Notes: Understanding a Company's Finances: a Graphical Approach - W.R. Purcell
**Accounting & Costing Fundamentals**, Dr. L. T. Moore(you are to download file)
**Skills and Knowledge of Cost Engineering**, 3rd. Edition(a copy will be provided for your use)

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Tentative Schedule

| Week | Topic | (pages for Park-Sharp-Bette) Assignment Due Thursday of week |
|---|---|---|
| 1(6-10) | Introduction, Accounting & Costing Fundamentals<br>Purcell Diagrams, Financial Flows | Notes: T-Account Problems<br>pages 18-22 |
| 2(13-17) | Accounting & Cash Flows<br>Project Team Formation(Int'l Mix) | T-Account Problems p 43-49<br>PSB p 8-33 Probs 1,3,4,5,6 |
| 3(20-24) | Accounting & Cash Flows<br>(No class on Jan 20) | |
| 4(27-31) | Engineering Economy Review<br>**Test 1 Jan 27** | PSB p 45-65 Chapter 2-1,3,5,9,10<br>Chapter 2-15,19,20 |
| 5(3-7) | How to Depreciate Property – IRS Pub 946<br>http://www.irs.gov/pub/irs-pdf/p946.pdf5<br>MACRS Schedule Derivation | Chapter 4-2,10,11<br>Chapter 4-16,22 |
| 6(10-14) | Modeling & Transformation Techniques | PSB p 100,102,118-121<br>Chapter3-2(cash flow 2 only), 4,5 |
| 7 (17-21) | Measures of Investment Worth – Single Project | PSB 201-240<br>Chapter 6-1,7 + assigned Problem |
| 8(24-28) | **Test 2 Feb 24**<br>Project & Cost Control | S&K notes Ch9 Probs 1-5 |
| 9(3-7) | **Project 1 due March 7**<br>Project & Cost Control | S&K notes Ch 10,11 |
| (10-14) | **SPRING BREAK** | |
| 10(17-21) | Project 1 Demonstrations<br>Project & Cost Control | S&K notes, Ch13-Sample Prob 5<br>(show how 49.1 is determined) |
| 11(24-28) | **Project 2 due March 26**<br>Risk Analysis and Converting Point Estimates | Risk Analysis Triangle & Normal |
| 12(31-4) | Capital Budgeting Models(Chapter 8)<br>Project 2 Demonstrations **Test 3 April 4** | PSB 279-305, 315-318<br>Assigned Problems |
| 13(7-11) | Capital Budgeting Models(Planning Horizons)<br>**Project 3 due April 11** | Chapter 8-4(budget of $ 15,000 instead of $ 13,000), 8-12 |
| 14(14-18) | Make-up Classes, Project Demonstrations | |
| 15(21-25) | Project 3 Demonstrations, Course Evaluations, Review, Make-up | |
| 16( 28-2) | Final Exam Friday May 2 @ 8-10 | |

**Evaluation & Grading**

| **Evaluation** | | **Grading** |
|---|---|---|
| Midterm Exams | 30% | A > 90% |
| (3@ 10%) | | 90 > B > 80% |
| Final Exam | 30% | 80 > C > 70% |
| Project 1 | 16% | 70 > D > 60% |
| Project 2 | 8% | F < 60% |
| Project 3 | 8% | |
| Homework | 8% | |

**Project 1.** A computer model will be developed which will:

1) Consider multiple cash flows as
   a) single payments(5)
   b) uniform series payments(3)
   c) geometric gradients
      i) amount(2)
      ii) percent(2)
   d) ramp(2)
   e) escalation(inflation)(2)
   f) decay(2)
   g) growth(2)
   h) decreasing ramp(2)
2) Consider various depreciation schemes
   a) MACRS(200%)
   b) MACRS(150%)
   c) Straight Line
3) Consider Tax Rate Variations
4) Consider Sale of Asset Before End of Depreciation(1/2 and full depreciation)
5) Evaluate the parameters for a time period of at least 20 years
6) Determine the PW of the cash flows before taxes, after taxes; PW of the profits: PW of the Depreciation. The Tax Rate and Capital Gains Tax can be different.
7) Consideration of evaluations in constant dollars and current dollars

The report will contain a sample output and discussion of the relationships used in the model. A report describing the model is required. A test problem will be given to illustrate the model performance. Projects are team projects with 2 members, occasionally 3 members or can be done individually in special circumstances. Weekly reports, one page maximum, on team progress indicating what the individual members are doing will submitted weekly starting in week 6.

**Project 2.** The computer model will be expanded to evaluate the 10 different criteria of Chapter 6 for a project. The results should be for any receipts or expenses, and should be on a before tax and after tax basis. A report describing the model is required and an illustrative example. Also, consideration should be made for mid-year cash flows as well as end-of-year cash flows.

**Project 3.** A computer program will be developed to evaluate the risk of a project as presented in the AACE Skills and Knowledge section. The model should be able to accept MACRS depreciation and the sale of the asset before the depreciation schedule is complete. Determine the present worth of the cash flows after taxes, before taxes, present worth of the depreciation as well as the probability that the project will have a loss. The normal distribution is used and the mean and standard deviation values should be included; the triangular distribution can also be added as an option. A report describing the model is required with an illustrative example.

Homework is due on the last day of class of the assigned week. Students will be expected to present problems in class. Only a select number of the assignments will be used for grading. Homework is 8 % of the grade.

Attendance will be taken during the first 10 minutes of class and late is counted as absent. Class attendance is strongly encouraged and seating will be assigned to aid in the taking of attendance. Students with more than 10 absences(includes excused absences) will not receive a passing grade for the course. Attendance records will begin the second week of classes. Students who miss an exam without prior arrangements will be given a grade of zero for the missed exam. Students who have conflicts with exam dates must make arrangements prior to the exam. Make-up exams can be taken early or during the last week of classes if other times are not mutually convenient Exam bonus points may be given for performance quizzes in class and will be given only to those in class based upon their performance with no make-ups. Project trips with notice of less than 3 weeks is not an excuse for missing a test, these students will take the test early. Notes are not permitted for exams unless specific approval is stated.
Eating is not permitted in the classroom during class and hats are not to be worn during class except for health or special religious practices. Cell phones must be turned off during class unless special permission has been obtained before class **– the penalty for disruption is that the individual must bring donuts(or equivalent) for the entire class at the next class period.**

Students are encouraged to become student members of AACE, International or ICEAA and attend the NSPE meetings on campus.

**Non-discrimination Statement**: I expect to maintain a positive learning environment based upon open communication, mutual respect, and non-discrimination(race, sex, age, disability, veteran status, religion, sexual orientation, color, or national origin) in this course. If you anticipate any type of accommodation in order to participate in this class, please make the appropriate arrangements with Disability Services(293-6700) and advise me of those arrangements. Suggestions for improving the positive learning environment in this class will be appreciated.

**Academic Dishonesty Statement**

WVU expects that every member of its academic community shares the historic and traditional commitment to honesty, integrity, and the search for truth. Students participating in academic dishonesty activities may receive penalties such as an unforgivable F for the course or a grade of zero. Academic dishonesty is defined to include but is not limited to any of the following:

1. **Plagiarism** is defined in terms of proscribed acts. Students are expected to understand that such practices constitute academic regardless of motive. Those who deny deceitful intent, claim not to have known that the act constituted plagiarism, or maintain what they did was inadvertent are nevertheless subject to penalties when plagiarism has been confirmed. Plagiarism includes, but is not limited to: submitting, without appropriate acknowledgment, a report, notebook speech, outline, theme, thesis, dissertation, or other written, visual, or oral material that has been copied in whole or in part from the work of others, whether such source is published or not, including( but not limited to) another individual's academic composition, compilation, or other product, or commercially prepared paper.
2. **Cheating and dishonest practices** in connection with examinations, papers, and projects, including, but not limited to:
   a. Obtaining help from another student during examinations.
   b. Knowingly giving help to another student during examinations, taking an examination or doing academic work for another student, or providing one's own work for another student to copy and submit as his or her own.
   c. **The unauthorized use of notes, books or other sources of information during examinations**. The unauthorized use of calculators or computers programmed with formulas, equations, or notes, which have not been approved by the instructor for your use on the exam.
   d. Obtaining without authorization an examination or any part thereof.
3. **Forgery, misrepresentation or fraud**:
   a. Forging or altering, or causing to be altered, the record of any grade in a grade book or other educational record.
   b. Use of University documents or instruments of identification with intent to defraud.
   c. Presenting false data or intentionally misrepresenting one's records for admission, registration, or withdrawal from the University or University course.
   d. Knowingly presenting false data or intentionally misrepresenting one's records for personal gain.
   e. Knowingly furnishing the results of research projects or experiments for the inclusions in another's work without proper citation.
   f. Knowingly furnishing false statements in any University academic proceeding.

**Academic Integrity Statement: - Syllabus Statement**

The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the Student Conduct Code http://studentlife.wvu.edu/office_of_student_conduct/student_conduct_code. Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see me *before* the assignment is due to discuss the matter.