Syllabus
Engr. 361
Engineering Economics

Instructor: Dr. B. C. Paul
Office- Engineering Building E10
Office Phone – 453-7923

Textbook: Engineering Economic Analysis
Eighth Edition
Donald G. Newnan
Jerome P. Lavelle
Ted G. Eschenbach

Purpose of Course: Most of the engineering projects that you will undertake during your career will have to meet three major tests in order to be built. (1)- The project must be technically sound and workable. Most of the classes that you will take as part of your degree are intended to ensure that you have the knowledge and background to design technically sound and workable projects. (2)- In a free market economy the project must make an economically attractive investment. If your technically sound engineering design cannot make money, no one will build it. This is where this class comes in. As an engineer it is not part of your B.S. degree program to make you an expert in business and finance, but it is necessary that you know how to assess whether the earnings from a project will satisfy investors sufficiently to obtain the capital to build the project. This is the class where you will learn how to assess whether the earnings potential of a project will make it the type of project in which people will invest. (3)- The project must be legal to complete (a big part of this has to do with environmental soundness). Your individual degree program may or may not provide training for you in this last area.

In addition to teaching you how to assess the economic viability of your engineering projects this class also has the added goal of showing you how investment decision techniques that work in engineering can also be used to help you increase your personal wealth and avoid financial mistakes.

Grading

Being realistic, this is a two credit hour class that many will perceive to be one of those peripheral classes that you have to get through to get your diploma. Indeed, unlike many of your classes that are designed to make you expert in some specific field, this class is only intended to make you familiar enough with how investment decisions are made that you can determine whether people will invest in your engineering projects and designs. While your instructor would argue that whether someone will build your project is as important as whether the design is technically sound, it is recognized that the amount of time one can spend on 2 credit hours in a brutal 15 hour engineering schedule is limited. With this in mind, the assignments given in this class are limited in size. Some have taught this class with large numbers of problems with the view that the best
way to teach engineering economics is to provide enough exercises to beat the methods of engineering economics into the students. The limited homework sets given in this class are sufficient to allow you to see how things discussed in lecture are done, and to help you gage whether or not you have learned how to do the problems. They are not sufficient for purposes of “drilling” the techniques and procedures or having you learn by the sheer mass of the number of times you have performed a particular task. Similarly with reading assignments and the text book, this class has been designed with the view that your major topical learning resource is class attendance and lecture notes.

With these constraints in mind this class has been designed with a two tier learning structure. The first tier is mandatory learning and assessment resources. For topical learning this class is designed around the concept that you will attend class and that the things you will be tested on should all be found in the lectures. In short, everything you will need to pass or even “ace” the course will be found in the lectures. The lectures are presented with a series of power point slides. These slides are being made available on the web for supplemental purposes. Because the slides on the web do not and cannot contain all the words, thoughts, questions or answers that are part of the lectures, it should be cautioned that most people cannot pass this course simply by looking at the slides on the web.

Assignments. For “hands on” mandatory learning there will be a series of about 7 short assignments given through the semester. The mandatory learning exercises will form 50% of your grade. Each assignment is equally weighted. It is permissible for students to work on these assignments in groups but each individual is responsible for their own homework submission and the homeworks are graded based on what is written (or rather, what the instructor perceives has been written). As a warning, there will from time to time be students who abuse group work situations and simply attempt to copy the work of others. Obviously, these students are eliminating one of the learning tools intended for this material and are potentially placing their ability to pass the course in jeopardy. Most “copy the homework” students make mistakes or take short-cuts in copying that make their homework much more obvious than they think, and create numerous “opportunities” to loose points during the grading process. Thus the “copy class” students often loose many of the points they thought they were gaining. The second problem comes during tests when students cannot work in groups and there is no one available to copy from. With only 50% of the points on homework, getting points by copying without learning the material is likely to lead to unhappiness when grades come out.

Tests. Two tests will be used for mandatory learning assessment. These tests are given at midterm and final and constitute the remaining 50% of your grade. Each test will be equally weighted. Although the tests are not comprehensive, the material taught in this course builds over time, giving the final a comprehensive-like character. Tests are the individual work of each student. They are given in an open-book, open-notes format. You will be permitted to use calculators (including financial and programmable calculators), or even lap-top computers equipped with software of your own choosing (except that the computer cannot be used to solicit the help of other individuals over the
The tests generally have one or two questions only and require you to develop, set-up, and solve the problem from the information given.

**Second Tier Learning Resources**  
In addition to the first tier of learning resources (lectures, assignments, and tests) there are supplemental learning resources that you may use to help you better understand a subject (indeed some people learn poorly from lectures or need the repetition that can be found in reading assignments). For this reason, this syllabus gives a list of all major topics covered in the course and a parallel list of readings in your textbook that cover the same or similar material. These readings are not “assigned” and it is up to you to determine whether you have either the time or the need to read them. For people who benefit from repetition, are confused by the instructors approach to the subject and need a different perspective, or people who simply learn better from print than words, these supplemental readings will be helpful. The readings will not provide additional material not covered in lecture that then appears on a test. The textbook is a learning resource, not a source of mandatory reading. It should also be pointed out that some students become confused when the textbook and the instructor present the same ideas or concepts in different ways. These students may actually be harmed by doing supplemental reading. Ultimately, the individual student must decide how they learn best. This course has been designed to try to accommodate more than one learning style.

When presented with the idea that the text-book is for supplemental reading, some students will question whether they need to “invest” in the textbook at all. In addition to the readings, the text-book contains summary lists of key formulas at the front of the book and tables of “cash discounting factors” at the end. These can be a valuable resource for quick reference on tests. Some but not all of the homework will be taken from the text-book. A student that does not have the textbook would have to copy problems from other individuals. To be sure, the price of “xeroxing” a few problems from a text-book will be considerably less than the price of the text-book, but there are issues of convenience and access that only the individual student can assess.

In addition to supplemental readings that will be drawn from the textbook this class will also have optional drill exercise lists of problems from the textbook. These problems will not be turned in or graded, but may provide additional practice for students that feel they need repetition to reliably learn the subject matter.

**Grade Assessment.** Grades in this course will be strictly percentage based. There is no curve either to take from students a well deserved good grade or to spare students the impact of a bad grade. The points used in grade assessment come 50% from assignments and 50% from tests. The average percentage from assignments and tests then becomes the basis for the grade. The break points for grades are
90% and above A  
80% and above B  
70% and above C  
60% and above D  
everything else F

Grades on individual assignments and tests, will be based on a point structure which will be used to evaluate students written assignment and test submissions. Those points will be given on the basis of what is written or more directly, the instructors interpretation and understanding of what is written. While every attempt is made to grade papers on an objective basis there is undoubtedly a subjective component. In recognition of the fact that grading, however carefully done, will always be imperfect, this class will utilize a “round up” rule. The round up rule is that any fractional part of a percentage point will always round up to the next whole number. In other words 79.0001 and 79.8 both will round up to 80, while 79 even will be 79 even. The idea behind this obviously non-mathematical rounding procedure is that if a student is within a fraction of a percent of a grade break-point, the grading procedures in this class are too imperfect to tell the difference between that student and someone just over the percentage line. This procedure gives the benefit of the doubt to the student. Do remember though, 79 even is still 79 even and the minimum score for a B is 80%.

### Class Topics

<table>
<thead>
<tr>
<th>Concept</th>
<th>Slides</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why there is a time value of money</td>
<td>5-19</td>
<td>pg. 73-82</td>
</tr>
<tr>
<td>Writing down cash flows</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four Components of Interest Rates</td>
<td>20-31</td>
<td>No Equivalent Coverage</td>
</tr>
<tr>
<td>Real and Nominal Rates of Return</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compounding Interest</td>
<td>32-43</td>
<td>pg. 85-93</td>
</tr>
<tr>
<td>Future Value of a Present amount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Review #1</td>
<td>44-47</td>
<td></td>
</tr>
<tr>
<td>Discounting Cash Flows to a Single Point in Time</td>
<td>48-63</td>
<td>Same as Above</td>
</tr>
<tr>
<td>Present Value of Money in the Future</td>
<td>64-72</td>
<td>Same as Above</td>
</tr>
<tr>
<td>Converting Present Values to Annuities</td>
<td>73-86</td>
<td>pg. 101-103</td>
</tr>
<tr>
<td>Review #2</td>
<td>87-102</td>
<td></td>
</tr>
</tbody>
</table>