**IE 2308 Economics for Engineers**

**Fall 2015 - Syllabus**

**Instructor:** Dr. N. N. McCollom, PE

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**Office Hours:** Tuesday & Thursday 5:30 pm to 6:45 pm (other times by appointment and by phone/e-mail)

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**Section Information:** IE 2308-002

**Time and Place of Class Meetings:** Monday and Wednesday, 7:00PM – 8:20 PM, WH 311

**Course Purpose:** This class provides students with the basic decision making tools required to analyze engineering project alternatives in terms of their worth and cost, an essential element of engineering practice. Students are introduced to the concept of the time value of money and the methodology of basic engineering economy techniques. The class also provides students with the background to enable them to pass the Engineering Economy portion of the Fundamentals of Engineering exam. The class has many applications in personal life. This course satisfies the University of Texas at Arlington core curriculum requirement in social and behavioral sciences.

**Description of Course Content:** Methods used for determining the comparative financial desirability of engineering alternatives. Provides the student with the basic tools required to analyze engineering alternatives in terms of their worth and cost, an essential element of engineering practice. The student is introduced to the concept of the time value of money and the methodology of basic engineering economy techniques. The course will address some aspects of sustainability and will provide the student with the background to enable them to pass the Engineering Economy portion of the Fundamentals of Engineering exam.

**Student Learning Outcomes:**

* Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information.
* Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication.
* Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions.
* Social Responsibility: to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national and global communities.

**Required Textbook:** Basics of Engineering Economy, 2nd Edition, Leland T. Blank and Anthony Tarquin,

ISBN-13 9780073376356

**Descriptions of major assignments and examinations and grading:**

* Examinations: Three exams counting 75% (25% each) of total grade.
* Project: 10% of total grade (due at the beginning of class). This must be completed in order to receive a grade in the class. It is a “key assignment”.
* **Weekly** quizzes/homework. (15%) Homework and/or reading will be assigned at most class sessions. Homework may be collected the next class session or a pop quiz may be given over the assigned material. Name and student ID must be **printed** on any papers handed in. The assignments may not be current on the IE Web. It’s your responsibility to get them in class or from another student if you miss class.
* Missed exam: There is a single comprehensive makeup exam at the end of the semester if one exam is missed by an **excused** absence. You must notify me before the exam if you are unable to take it on the scheduled date.
* Missed daily quizzes/homework: No makeup for daily quizzes or homework. One or two daily quizzes/homework with the lowest score(s) will be dropped.
* Late homework/project: Once the class starts, late homework or project assignments that come in during the class will have a minimum of 20% docked. Late homework will not be accepted after two class periods past the due date. A late project, past the due date, will lose a minimum of one grade (10+ points). Not submitting the project will result in an ‘incomplete’ grade for the course.

**Key Assignment Assessment:** The project will be the key assignment for this class. Each of the Student Learning Outcomes listed on this syllabus will be assessed for the project. The project will be turned in via Blackboard and evaluated for originality by SafeAssign. In addition, a paper copy will be submitted on the due date for grading.

**Attendance and Drop Policy:** You are responsible for the material presented in class when you are absent. You must provide advanced notice if you will be out for an exam. You may drop this course through the University published last day to drop.

**Topics Covered:**

* Foundations of Engineering Economy
* Factors: How Time and Interest Effect Money
* Nominal and Effective Interest Rates
* Present Worth Analysis
* Annual Worth Analysis
* Rate of Return Analysis
* Benefit/Cost Analysis and Public Sector Projects
* Breakeven, Sensitivity and Payback Analysis
* Replacement and Retention Decisions
* Effects of Inflation
* Estimating Costs
* Depreciation Methods
* After-tax Economic Analysis
* Alternative Evaluation Considering Multiple Attributes and Risk

***Tentative* Key Schedule Dates:** *As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. –Neal N. McCollom.*

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| 29 September | Exam 1 (Ch 1-4) |
| 3 November | Exam 2 (Ch 5-7) |
| 4 November | Last day to drop course (undergraduate students) |
| 17 November | Project due |
| 8 December | Last normal class session |
| 15 December, 8:15 PM | Exam 3 (Ch 8, 9, 12,13) – not comprehensive – 1 hr 20 min |

**General Policies/Guidelines:**

* If you require an accommodation based on disability, please meet with me in the privacy of my office, during the first week of the semester, to make sure you are properly accommodated.
* All tests and quizzes are open book, closed notes (1 formula sheet 8.5 x 11” is allowed for tests). The formula sheet may not include worked problems. You must turn in your formula sheet with your exam. Please bring your UTA ID card to all tests.
* Students must work alone on tests and quizzes. No sharing of any materials may occur during tests and quizzes including books, calculators, formula sheets, etc.
* Selected exercises from the text will be assigned as homework. A subset of these homework assignments may be collected and graded. When homework is assigned, you will be told whether it will be collected and graded. Recommendation: Do the homework – it will help you learn.
* Students need to individually turn in homework assignments, e.g. one assignment turned in per student with your name on it. However, homework can be worked jointly with other students.
* If you miss an exam, you must have an approved excuse (i.e. from a medical doctor with contact information indicating you were too ill to sit for an exam or have gotten permission from the instructor at least a couple of days in advance of the exam).
* Cell Phones / pagers / etc. should be turned off or set to vibrate during class. Any necessary calls and communication should be made outside the class. Please be courteous to the instructor and your fellow classmates.

**Expectations for Out-of-Class Study**: Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 6 hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc.

**Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://wweb.uta.edu/ses/fao>).

**Americans with Disabilities Act:** The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at [www.uta.edu/disability](http://www.uta.edu/disability) or by calling the Office for Students with Disabilities at (817) 272-3364.

**Academic Integrity:** All students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

*I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*

*I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

Instructors may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents’ Rule* 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University.

**Student Support Services**:UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at [www.uta.edu/resources](http://www.uta.edu/resources).

**Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

**Student Feedback Survey:** At the end of each term, students enrolled in classes categorized as lecture, seminar, or laboratory shall be directed to complete a Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

**Final Review Week:** A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**IE 2308-002 Fall 2015 Project Assignment**

**Report Due 7:00 pm Nov 17th 2015, Oral presentations to be made during the Nov 17th and 19th classes.**

As described in the course syllabus, this is the “key assignment” project involving data collection & analysis that should be fun and enable you to use your knowledge from class for practical application. The project should improve your grade since it will count as 10% of the course grade. But as a reminder, since the project is a *key assignment* as defined by the College of Engineering, you must successfully complete it in order to avoid an incomplete (X) in the class.

Among other things you should have by the time you graduate from an ABET accredited engineering program are: ***”(h) the broad education necessary to understand the impact of engineering solutions in global/societal context” and “(i) recognition of the need for, and an ability to engage in life-long learning”****.* This project will help illustrate the principle that “you learn by doing” and will help you link Engineering Economics knowledge to real life planning for your life following graduation.

**Project description:** We all know that we cannot plan for every possible event in our future. However, for the purpose of this project you are going to develop an experimental plan for the first 20 years of your life *following* graduation. How things really happen in the future may or may not work out as planned, but at least you can think about this as an interesting real-world application of Engineering Economy. The first part of the project involves simply documenting year by year events that you think have a high probability of occurrence in your life. For example, at year 0 (immediately following graduation), perhaps you will enter the engineering workforce, or maybe you are planning to attend graduate school immediately following your graduation, or maybe you are thinking of delaying entry into the engineering workforce by a few years to join the Peace Corps. Are you thinking of graduate school later while working? Many engineers decide to obtain additional education in their field or at least attend short courses in topical areas from time to time to stay current. Do you plan to buy a house? How often will you buy a car? Are you planning to have a family? What about cars for the kids? What about charitable donations and/or tithes? What about a vacation home or a boat? Will you apply for your Professional Engineering license? Do you anticipate caring for an elderly relative? Don’t forget your taxes! There are many, many questions to think about over the next 20 years. You can be creative – this is not meant to be a hard and fast plan. For the purpose of financial calculations, you need to be as realistic as possible. Tax rates and estimates of salary increases, including big jumps when completing additional education (like a Masters or PhD), can be obtained from the library and the internet.

**Additional requirements:** Each project must be neatly typed and include a cover sheet that at a minimum contains your name and the project assignment. The ability to communicate professionally is a very important part of this project. Your report should include an introduction and a concise and clear definition of all events in on a year by year basis over 20 years. One short paragraph per year should be sufficient to provide this information. You should include a short bibliography with references (including the textbook). You should also list and briefly describe assumptions you have made for interest rates, regular raises, tax rates, etc. Use MS Excel for financial data organization, year by year, and of course, for the computations. After all the data has been entered, you will need to compute your net present value (NPV) for your plan and discuss what conclusion(s) you have reached as a result of the exercise. The money you earn from your planned job(s) or investments will be treated as your expected gross revenues (G). Assume you liquidate all your assets at the end of 20 years for the purposes of calculating your NPV.

As part of your conclusion(s), **you must specifically address how this project relates to the two ABET criteria discussed in paragraph two above**: ”(h) the broad education necessary to understand the impact of engineering solutions in global/societal context” and “(i) recognition of the need for, and an ability to engage in life-long learning”.

**Oral presentation:** In 3 minutes or less describe the results of the project (e.g. what you did for 20 years – briefly!) and what you learned as a result of the project. What did you enjoy and/or dislike about the project? This part will also be graded so be organized and prepared to present.

**This should be a fun project that helps your grade and allows you to use your knowledge from class for practical application!** You are expected to be at both sessions to hear your classmates ‘life story’.