EGR 3380 ENGINEERING DESIGN I (Junior Design)
Class: MWF 8:00 – 8:50 am ECS 109-MW
Lab: Thursday 12:30 – 3:15 pm ECS 109
Spring 2011

Motivation: This class and its senior-year counterpart are classes that will give you a significant advantage in the engineering marketplace during your first few years of employment. Most engineering graduates who terminate their formal education at the BS or MS level will find employment as "design engineers" early in their careers. Therefore, the exposure to, and practice of, engineering design that you receive in this course will likely be directly applicable to your future.

Furthermore, we hold that design is really the culmination of engineering; it is engineering in its highest form. It is the place where your honed skills in math, science, and engineering analysis collide with your creativity and imagination. Engineering design is a "full-brain" activity, employing both the analytical and creative halves of your brain.

Therefore, we as your professors, and you as the students, will, together, attempt to explore the answers to these questions during the semester:

What is engineering design?
How does engineering design differ from engineering analysis?
How does one go about the design process?
What does being an engineer look like professionally? ethically? interpersonally?

Team Structure: Most professional design is accomplished by groups of individuals working toward a common goal. In order to better prepare you for this environment, we will be forming teams of students with mixed majors to accomplish a specified design goal. Although difficult to assess quantitatively, your ability to function on a team has direct bearing on your future success as an engineer. It is our hope, therefore, that the practice you receive in this course will help cultivate the social skills and habits of professionalism that will help you succeed.

Course Objectives:

This is a professional practice course. The objective is to create a professional environment in the classroom in which engineers engage in professional development, continuing education, and carry out product design projects for their company or organization.

Specifically, this course should advance your knowledge and abilities in the following areas:

- Designing a system, component, or process to meet desired needs
- Functioning on multi-disciplinary teams
- Identifying, formulating, and solving engineering problems
- Understanding professional and ethical responsibility
- Communicating effectively
- Using techniques, skills, and modern engineering tools necessary for engineering practice
- Applying knowledge of mathematics, science, and engineering
- Cultivating innovation and the entrepreneurial mindset

About Your Instructors:

Dr. Byron Newberry, office in Rogers 200G, 710-4709, Byron_Newberry@baylor.edu
Prof. Brian Thomas, office in Rogers 300D, 710-4190, Brian_Thomas@baylor.edu

Textbook: None. (However, project materials will cost approximately the equivalent of a textbook.)

Catalog Data: Introduction to the engineering design process via team-based projects encompassing the design, construction and testing of an engineering device or system. Projects will emphasize oral, written, and graphical communications skills and topics related to engineering professionalism.

Prerequisite: Upper division admission.

Class Attendance:

Professionals in the workplace are expected to be in attendance and on time for all their work activities. The teamwork nature of the course assignments means that your presence and participation, or lack thereof, directly impacts the quality of the work done by you *and* your coworkers. We have created an attendance policy that attempts to cultivate a workplace professionalism that will be of direct benefit to you, both now and in the future. This policy is as follows:

- Excused Absences: Absences are excused for legitimate reasons. An absence justification form must be filed with the instructors within one week of the date of absence (or last date of absence if multiple days). Any absences not justified within one week will be recorded as unexcused.
    - Company business: absences will not be penalized if you are away on pre-approved official business of either the university or of the class.
    - In addition, you may utilize "sick leave" – absences will not be penalized if you were verifiably ill (i.e., doctor's note).
- Unexcused absences: Absences without legitimate reason will result in grade penalties that are analogous to the potential reduced pay raises, lack of promotions, or job termination that an engineer may receive as a result of excessive absenteeism. Unexcused absences will be penalized at the following rate:
    - Four or more unexcused absences will result in a ½ letter grade penalty (A→B+, B+→B, etc.).
    - Seven or more unexcused absences will result in a whole letter grade penalty (A→B, B+→C+, etc.).
    - Ten or more unexcused absences will result in failure of the course (F).
- Repeatedly being late for work is also unacceptable in the professional workplace. Therefore, tardiness will be penalized at the following rate:
    - 3 tardies = 1 absence

Attendance will be recorded at the start of every class session without exception. Attendance grade penalties will be enforced at the end of the semester without exception. Note: In addition to the direct grade penalties described above, absences and tardies may also negatively influence your GAF value (discussed on next page).

Course Grade: A combination of scores on individual assignments and team assignments will be the basis for determining your final grade. A numerical average will be computed for each student as described below. The assignments and values given below are a good faith estimate of your graded work for the semester. *However, due to the dynamic and open-ended nature of this design class there may be changes to this as necessary during the semester (deleted assignments, added assignments, modified assignments).* Any such changes will be relatively minor and you will be informed if/when they occur.

Furthermore, we acknowledge that the assessment of many of the assignments of this class is subjective. In particular, judgments about your project's overall quality, implementation, and conceptual merit, as well as the quality of your written and oral communication, have substantial subjective elements. This fact sometimes causes significant distress to engineering students. However, in the assessing of your work, we will be calling upon our own education, experience, and professionalism.

Individual Work	**85pts**
Career Plan Briefing	20 pts
Résumé	10 pts
Journals	10 pts
CAD Assignments 9 @ 5 pts	45 pts

Team Work **270 pts**

Design Project

	Document	Presentation	Hardware	
Conceptual Design Phase	-	10 (PCDR) 20 (CDR)	-	
Subsystem Design Phase	20 (DS1)	20 (PDR1)	20 (SST)	
System Integration Phase	20 (DS2)	20 (PDR2)	20 (SIT)	
Preliminary System Design Phase	20 (DS3)	20 (PDR3)	20 (PST)	
Final Design Phase	30 (FR&FDS)	10 (FDR)	20 (CT)	
TOTALS	90	100	80	270

Your final average will be computed as: [(Ind. Work) + (Team Work)*GAF]/355 * 100%

The GAF is the "Grade Adjustment Factor," which is a value that is nominally 1.0, but which may be greater or less that 1.0 for any individual. Simply being on a team does not guarantee that an individual will receive the same credit for the team's work efforts. Most people who carry their fair shares of the team workload will receive a GAF of 1.0. A few who contribute to their team above and beyond expectations may receive a GAF > 1.0. Any whose contributions fall short of minimal expectations may receive a GAF < 1.0.

Your GAF will be assigned at the end of the semester. Factors upon which it will be based include: peer evaluations; journals; attendance; instructor observations of your team during labs, presentations, team/instructor meetings, and workshops.