

Biological Engineering 4290
Senior Engineering Design and Professionalism
Credit Hours: 2 (2 hours lecture)
Fall Semester 2013

Instructor: Daniel Hayes, Ph.D., Room 167 E.B. Doran Building, e-mail: danielhayes@lsu.edu.

Office hours: By appointment.

Course Description: Capstone project selection and design (for building and testing in BE 4292); completion of project feasibility study and outline of design project; ordering necessary parts; design philosophy, teamwork, and communication; economics; product liability and reliability; use of standards and codes; goal setting and time management.

Prerequisite: Senior standing in the College of Engineering and credit for or registration in BE 4303.

Objectives: to develop a team design project for completion in BE 4292. To become familiar with the process and philosophy of design and engineering professionalism.

Accreditation: The Accreditation Board of Engineering and Technology (ABET) has established criteria through which engineering programs, including this one, are accredited. When you complete the Biological Engineering curriculum at LSU, you should be proficient in the objectives listed below. This course and BE 4292 are intended to help you “tie together” all your basic and applied engineering courses in a project-based, pre-professional engineering experience and will assist your mastery of these objectives:

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (b) an ability to design and conduct experiments, as well as to analyze and interpret data
- (c) an ability to design a system, component, or process to meet desired needs
- (d) an ability to function on multi-disciplinary teams
- (e) an ability to identify, formulate, and solve engineering problems
- (f) an understanding of professional and ethical responsibility
- (g) an ability to communicate effectively
- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context
- (i) a recognition of the need for, an ability to engage in life-long learning
- (j) a knowledge of contemporary issues
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

Required Text:

- Engineering Design (4th edition), by George Dieter

References:

- A Mechanical Design Process, by David Ullman
- Creative Problem Solving and Engineering Design, by Edward Lumsdaine, Monika Lumsdaine, and J. William Shelnut
- Fundamentals of Engineering Reference Manual, Michael Lindeburg

- Fundamentals of Engineering Supplied Reference Handbook, National Council of Examiners for Engineering and Surveying
- Strategies for Engineering Communication, by Susan Stevenson and Steve Whitmore

Grading Breakdown:

| | |
|--|-----|
| Homework | 5% |
| (includes design homeworks, progress reports, and notebooks) | |
| Exam on engineering methods | 10% |
| Final project report | 15% |
| Final presentation | 45% |
| Individual grade | 25% |
| (assigned by instructor in consultation with faculty advisor(s)) | |

Late homework assignments will receive 10% off for each day they're late (10% if one day late, 20% if two days late, etc.). Assignments are due to Angie in the front office by 4:00 p.m.

Course grades will be determined on the following scale: A (90 – 100%), B (80 – 89%), C (70 – 79%), D (60 – 69%), F (<59%). Remember, if you are on the border between letter grades, coming regularly to class, participating in class, and following class rules (see below), you will get you the higher letter grade.

Final comments:

Once again, I will do everything I can to make each of you shine in this course! This is it, folks!!! Senior design is extremely important and can have a huge impact on what kind of job you take, what sort of graduate/professional work you do, etc. I am honored to be your instructor in your first *and* your last year of this curriculum! Remember class rules!

- Turn off your cell phone before class starts!
- Cheating and plagiarism will not be tolerated under any circumstances!
- Be respectful of yourself and each other (don't interrupt each other, listen to each other, seek to understand before being understood, and so on)
- Bring questions and comments to class; on-going dialogue about engineering, design, and professionalism will enrich your experiences in this course and will help your design project!
- **Teamwork is the key to success in this course!**
- If you have trouble with your teams, try to work within your team first. If the issue doesn't resolve, please consult with your project advisor and me immediately.
- Slacking will hurt your grade immensely in this course!

Approximate schedule

| Date | Topic | Readings |
|------------------|--|-----------------------------|
| Week 1- Aug 26th | Syllabus and, Dieter: the product design process, Team behavior and tools | Chapter 1, Chapter 3 |
| 2- Sept 2nd | Labor Day | |
| 3- Sept 9th | Need identification and problem definition | Chapter 2 |
| 4- Sept 16th | Gathering information & concept generation and evaluation | Chapter 4 & 5 |
| 5- Sept 23rd | Concept generation and evaluation & In class work | Chapter 5 |
| 6- Sept 30th | Concept generation and evaluation & In class work | |
| 7- Oct 7th | Materials selection | Chapter 8 |
| 8- Oct 15th | Discuss Presentation & Mid-term Exam | |
| 9- Oct 22nd | Mid-term Presentations | |
| 10- Oct 29th | Risk, reliability, and safety | Chapter 11 |
| 11- Nov 4th | Risk, reliability, and safety Cont'd | |
| 12- Nov 11th | In class work | |
| 12- Nov 18th | Practice Presentations (Sign Up) | |
| 13- Nov 25th | Practice Presentations (Sign Up) | |
| 14- Dec 2nd | <i>Final Presentations Time and Loc TBD</i> | |