

## **Agricultural and Biosystems Engineering**

### **ABEN 487 – Senior Design Project II**

Class Information:

Credit – 2

Spring 2011 (Term: 1130)

Room: ABEN 208

Time: 11:00 am- 12:15 pm; Tu, Th

Instructor:

Dr. Ganesh Bora

ABEN 105

Phone: 701-231-7271

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**Office Hours:** By appointment or drop in.

**Textbook:** No textbook assigned

**Course Goals:**

- 1) To complete the design of the system, component, or process to meet desired needs in an agricultural system, biomaterials system, or environmental system problem incorporating necessary engineering, biological, and/or biosystems information
- 2) To develop a prototype or model of the solution and test the prototype or model, if possible.
- 3) To participate in the Ag Technology Expo in the department.
- 4) To make a final oral project presentation as a team incorporating suitable presentation software.
- 5) To incorporate the project results, information and feedback into the comprehensive written report

### **ABET Accreditation**

ABET is the Accreditation Board for Engineering and Technology. ABET is a specialized accreditation agency meaning it certifies specific programs at a college or university as compared institutional accreditation agencies that examine an entire college or university. Each accredited department must be reviewed by a site visit at least once every six years. The method of accreditation has changed with the ABET 2000 initiative. Every department has a set of evaluation criteria it has developed and submits to ABET. These criteria form the evaluation basis for the department by the ABET reviewers. The

Agricultural and Biosystems Engineering Department criteria developed for the last ABET accreditation visit, in 2006, are listed below. Please examine these criteria, especially the ones mentioned previously that apply to the ABEN 486-487 sequence.

*Educational Objective 1: Provide students with technical knowledge, design, and problem solving skills that are foundational to their engineering careers by ensuring that graduates have ability to:*

- a. Apply knowledge of mathematics, science, and engineering.*
- b. Design and conduct experiments, as well as to analyze and interpret data.*
- c. Design a system, component, or process to meet desired needs.*
- e. Identify, formulate, and solve engineering problems.*
- k. Use techniques, skills, and modern engineering tools necessary for engineering practice.*

*Educational Objective 2: Provide learning and practice experiences that build student interpersonal and collaborative skills and the capacity for productive careers by ensuring that graduates have:*

- d. An ability to function on multi-disciplinary teams.*
- 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 the global and societal context.*
- i. A recognition of the need for and an ability to engage in lifelong learning.*
- j. A knowledge of contemporary issues.*

*Educational Objective 3: Provide students with specialized (discipline-specific) knowledge, educational depth, and breadth to meet the challenges of changing careers and opportunities in agricultural and closely related biological industries by ensuring that graduates have competencies in one or more of the following areas:*

- l(i) Apply engineering skills to agricultural systems.*
- l(ii) Apply engineering skills to biomaterials systems.*
- l(iii) Apply engineering skills to environmental systems.*

Criterion 4. Professional component from the 2003-2004 Criteria for Accrediting Engineering Programs also states the following:

***Students must be prepared for engineering practice through the curriculum culminating in a major design experience based on the knowledge and skills acquired in earlier course work and incorporating engineering standards and realistic constraints that include most of the following considerations: economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political.***

The underlined areas in the previous paragraph must be addressed in the written report along with the other aspects of the design project. Each section should have a heading and the content, even if the content is an explanation of why the consideration does not apply to the particular project.

## **Purpose:**

Design Project II is a continuation of Design Project I. Successful completion of your project is the key goal. This includes developing your project into a prototype, plans and specifications, and any other materials to complete your project. Your major items are to develop your final oral presentation and written reports. Other items are a poster presentation at the Agricultural Technology Expo, the progress reports, and your cooperator's evaluation and team participation of your work.

Provide weekly progress reports and action plans to the cooperators and instructor via e-mail.

The final oral presentation will be on May 3rd, 2011. Cooperators, Faculty, Extension staff, graduate students, and undergraduate students will be invited to the presentation. The expectations of the presentation will be to explain what your project was, how you came to a solution to the project, what the solution was, and why your solution is the best solution available under the given constraints. An open question/answer period will follow the presentation. Plan your presentation to be about 30 minutes long with a 10 minute question and answer session following your presentation.

The final written report will contain all the information you presented in your final oral report to the full and the materials contained in the draft report. It is required to show necessary depth required to explain the work your team did. Evidence of successive editing in the final written report is required. A draft report is needs to be prepared and submitted to Center for Writers for corrections. The corrected draft report should be submitted to the instructor on March 24, 2011. **The Draft Report will be graded.** The draft report must be submitted in time, so that the instructor can provide proper feedback for the final report. The written report must follow the technical report writing guide lines.

The department will need 5 copies of the finalized report (1 for me to grade, 1 for our files, and 3 for the departmental outcome assessments team to evaluate). In addition, you will need to produce the number of copies requested by your cooperator and generally 1 copy each for the team members. You should talk to your cooperator for copying costs.

Feedback surveys from the teams will be collected and factored into the grade development of the individual team members. Basically, this will involve looking at the grades from the team developed items.

## The Project Report should include

- Front Matter (title page, table of content, list of tables, list of figures, list of symbols)
- Introduction:
  - o Problem Statement
  - o Rationale and Society impacts,
  - o Objective of the project
- Literature review in details about previous similar work:
- Materials and Methodology:
  - o Definition and evaluation of alternative designs:
  - o Preliminary design
  - o Materials required
  - o Final Design
  - o **Economic; environmental; sustainability; manufacturability; ethical; health and safety; social; and political impact**
  - o Statistical analysis if needed
- Results and Discussion
- Conclusion

(The project report should be written in third person. No “I”, “we”, “my”, “our”, “you”, “your” etc. should be in the report).

## Grading:

<u>Item</u>	<u>% Term Weight</u>
Poster Session at Ag. Tech. Expo.	5%
First Draft correction by Center for Writers	5%
Draft of Report	10%
Cooperator Evaluation	15%
Peer Evaluation/Team participation	10%
Note book	5%
Final Oral Presentation	15%
Final Written Report	35%
	Total 100%

Grades: A=90-100%, B=80-89.5%, C=70-79.5%, D=60-69.5%, F=<60%

**All the reports should be submitted on time. Late submission of reports will not be accepted.**

### **Progress and action plan reports:**

The progress and action plan report is expected by 5:00 p.m. each Thursday starting January 27, 2011. E-mail the progress and action report to your cooperator with a cc to your instructor. Each report will include the following items:

- progress accomplished over the last week
- how the progress compares to the previous week's plans
- progress to be accomplished during the coming week
- items that have delayed progress (if applicable)
- any requests for help, information, meetings needed from the cooperator
- any requests for help, information, meetings needed with the instructor

### **Key dates:**

Date:            Item(s)

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Jan. 11	Introduction
Jan. 18	Team Meetings (2 teams)
Jan. 20	Team meetings (2 teams)
Jan. 24	Team meetings (2 teams)
Feb. 07	Technical Report Writing: Ms. Mary Pull of Center for Writers
Mar. 24:	First Draft of Written Report due

Dates for Guest Lectures will be announced later. More team meetings will be scheduled with prior information.

Feb. 12      Ag. Technology Expo. All teams are expected to participate in the show. Judges (show and faculty) will judge project and the results used to issue a grade for the poster session. In addition, all ABEN 487 and ASM 475 teams presenting have the potential to win \$100 for the best capstone project category (not eligible for the Grand Champion or Reserve Grand Champion unless the show committee has changed the rules since last year).

The schedules are tentative and subjected to change. Additional class meetings or changes will be announced in advance in Blackboard and E-mail.

Presentations are interview level dress. Business casual for non – presenting class member, no hats to be worn during the presentation by capstone students.

**May 5:                      Final reports are due. The instructor needs 5 bound copies.**