BAE 403
Design in Biosystems Engineering, II:
Formulation and Development

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Course Description:
A cumulative or capstone design course in which student design teams solve open-ended problems by applying design methods appropriate to the practice of biosystems and agricultural engineering. Student teams formulate, develop and present design solutions through oral presentations, written reports and drawings and specifications.

Learning Outcomes:
Working as a member of a design team, upon successful completion of BAE 403, each student will:

- Understand the various roles that constitute a design team and how team members interact for maximum productivity (10%).
- Define an open-ended design problem and apply previously-learned engineering principles in the formulation and development of a solution (25%).
- Utilize and demonstrate effective oral and written communication in presenting a design proposal and a preliminary design report (40%).
- Apply appropriate ethical principles, as well as ensure an appropriate and viable solution to an open-ended design problem (5%).
- Apply sound manufacturing, economic and safety considerations in the development of a design solution (5%).
- Utilize CAD software, spreadsheets, presentation software, etc. in the development and presentation of a design solution (5%).

Grading 403
Homework 20%
Revised Second Quarterly Report 10%
Third Quarterly Report: 20%
  Oral (Individual) 5 %, Written (Team) 15 %
Final Report: 30%
  Oral (Individual) 10 %, Written (Team) 20 %
Meeting Project Milestones/Engineering Notebook 10%
Professionalism (i.e., attendance) 5%
Marketing Materials 5%
Total 100%

Final grades will be assigned as follows: > 90 A, 80 - 89 B, 70 - 79 C, 60 - 69 D, < 59 E
**Attendance:** Participation in the oral presentations when scheduled is essential and failure to do so, except in the case of illness (with physician's statement) or an emergency (with notification of the instructor as soon as possible), will result in no points awarded. Your senior design experience will consist of in class lectures, in class design team meetings, outside of class design team meetings, individual work on the team project and on the individual projects. You will write reports individually and in teams and be evaluated the same way. You will present in teams, but you will be evaluated as individuals. There will be an exam over lecture material. For this reason, your presence and attention at every lecture is imperative.

**Assignments:**
- Lecture assignments are to be turned in at the beginning of lecture.
- Project assignments (i.e. milestones) are to be emailed to Dr. Crofcheck on or before the due date. If you are going to miss the deadline, you must send an email to Dr. Crofcheck explaining why the assignment will be late and when you will be turning in the assignment. Be sure to cc: everyone on the team, including the faculty advisor.
- Reports are not necessarily due during class. You must turn in a hard copy of the report to Dr. Crofcheck or leave it in her mailbox. If for some reason you are going to miss the deadline, you must email Dr. Crofcheck.

**Reports:**
There will be four quarterly written reports for your project. You are responsible for being sure that everything required is included in the report. You are responsible for checking the score sheet for each report before turning in the report. You are responsible for making sure your report is the best it can possibly be.

**Assessment of ABET Outcomes**
- b. Design and conduct experiments, as well as to analyze and interpret data.
- c. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- d. Have an ability to function on multidisciplinary teams.
- f. Understand professional and ethical responsibility.
- g. Effectively communicate interpersonally, formally, and technically whether oral or written.
- j. Appreciate contemporary issues arising from industrially-relevant design questions.
- k. Use techniques, skills and modern engineering tools necessary for engineering practice.