ABEN 486 – Design Project 1
Fall Semester 2022
2 credits

Instructor: Mr. Brian Gregor

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Office Hours: 10:00 AM to 2:00 PM Tuesday & Thursday or by arrangement.

Textbook: There is no assigned textbook for this course.

Class Meeting Days and Times: T & Th, 2:00 to 3:15 p.m.

Location: NDSU Ag & Bio Sys 201

Bulletin Description:

Capstone learning experience involving principles of design, project management, and evaluation. Student teams define a capstone project in their area of interest. 2 lecture/laboratory. Prereq: Senior standing.

Course Objectives:

1. To design a system, component, or process to meet desired needs in machine systems, processing systems, and natural resources and environmental systems problem incorporating the necessary engineering, biological, and/or biosystems information. (ABET 1 and 2)
2. To use techniques, skills, and modern engineering tools necessary for engineering project to accomplish objective 1. (ABET 6 &7)
3. To develop written, oral, and graphical methods necessary to communicate the work done in a manner appropriate to the audience. (ABET 3)
4. To consider engineering standards, multiple realistic constrains, environmental, safety factors (as applicable) in the design. (ABET 4)
5. To work in a team setting to accomplish the capstone design project. (ABET 5)

Required Student Resources:

No textbook is required for this course. Students are expected to utilize information and resources from previous coursework and to seek other necessary sources of information and other resources pertinent to their particular capstone project.

Purpose:

ABEN 486 and ABEN 487 are the capstone design sequence for students majoring in Agricultural and Biosystems Engineering (ABEN). During this course, student teams work on actual problems that have been proposed by industrial, university or individual cooperators.

Aspects of this course include innovation, analysis, synthesis, and communication. Each concept is important to successful design engineering. The goal of this sequence of courses is to develop a solution to a problem to the point of an experimental prototype or final specification drawings and documents as the requirements of the project dictate.

Communication is important in this class. An engineer must sell his/her ideas to others. They must provide suitable information to allow proper completion of the project. Communication involves verbal, written, drawn, and numerical calculations to present and describe a project. Teams will be expected to maintain regular contact with their cooperators, faculty consultants, and the instructor, preferably on at least a weekly basis.

ABEN 486 is a complete iteration of the design process. Its goal is to present the cooperator and department with a completed design report that covers the alternatives explored and the proposed design. This includes report, complete drawings as applicable, design calculations, bill of materials, etc.

ABEN 487 is more for verification and a second iteration if needed. In addition, the semester will include more presentations of the design including presentation at the Ag. Tech Expo, and developing a report for entry into one of the ASABE Design contests (AGCO or K. K. Barnes). In addition, a final report including a summary of the results of testing, modeling, and/or prototyping will be developed.

Requirements:

All work is to be done on a computer (except in-class items and scratch calculations). All homework turned in must have few errors in spelling, syntax, and grammar.

Report writing assignments should be written in Times New Roman, 12-point font and double-spaced. A written project proposal and semester report are required. Each team will present their project proposal and semester report and will be evaluated by faculty and staff who will attend the proposal presentation.

The reports for ABEN 486 are a **team effort**. The project report by each team should be written in third person. No "I", "we", "my", "our", "you", "your" etc. should be in the report. The Project Report needs to be presented to NDSU Center for writers for corrections. The suggested corrections should be incorporated into the report. Evidence of this interaction must be provided.

An electronic journal is to be maintained by each team, cataloging project work activities. Journals will be periodically reviewed by instructor and provide documentation for part of the "Project On-Plan Status" grade component.

Each team will have an advisor or advisors with expertise in the subject matter of their project. Teams will meet periodically with their advisor for updates and advice on the project. The advisor will have input on the final grade.

Grading:

Items		Weight
Project Charter		2%
Stand-up Team Reports (+, 0, - for grades)		2%
(Graded: Good 95%, Satisfactory 75%, Needs Improvement 50%)		
Activity Log		2%
(Graded: Good 95%, Satisfactory 75%, Needs Improvement 50%)		
Project Initiation Proposal		6%
Draft Review Submitted for Feedback (Graded 0 or 2%)	2%	
Project Initiation Proposal Document	2%	
Project Initiation Proposal Presentation	2%	
Project Plan		27%
Draft Review Submitted for Feedback (Graded 0 or 2%)	2%	
Project Plan Documentation	20%	
Project Plan Presentation	5%	
Technical Design Direction		27%
Draft Review Submitted for Feedback (Graded 0 or 2%)	2%	
Design Direction Documentation	20%	
Design Direction Presentation	5%	
Semester Report		14%
Draft Review Submitted for Feedback (Graded 0 or 2%)	2%	
Center for Writers Leveraged (Graded 0 or 2%)	2%	
Written Report	10%	
Project On-Plan Status (Actual Project Status versus Project Plan)		2%
(Graded: Good 95%, Satisfactory 75%, Needs Improvement 50%)		
Individual Assignments (Team Applications, Quizzes, etc)		8%
Team Work (instructor interpretation of peer reviews, logs, class participation)		7%
(Graded: Good 95%, Satisfactory 75%, Needs Improvement 50%)		
Sponsor and Mentor Evaluations		3%
	Total	**100%**

No grading curve will be applied.

>= 90% is an A
>= 80% and < 90% is a B
>= 70% and < 80% is a C
>= 60% and < 70% is a D
< 60% is an F

Late assignments docked one letter grade per working day late. Working days are Monday, Tuesday, Wednesday, Thursday and Fridays, except when defined as a holiday by the NDSU Academic calendar.

Individual grades heavily based on team grades, but are influenced by individual assignments, cooperator and peer evaluations.

Health and Safety Expectations

While masks are not required as we begin the 2022 fall semester, NDSU administration has determined that faculty may request mask use in their classroom. Unless the extenuating circumstances develop or the NDSU policy changes, I do not require that you wear a mask in this class.

Where possible, please spread out within the classroom, including not sitting in the first row of the classroom, to maximize social distancing.

ATTENDANCE STATEMENT

"According to NDSU Policy 333 (www.ndsu.edu/fileadmin/policy/333.pdf), attendance in classes is expected." Students who have an absence should notify the instructor in advance of the absence, if possible, to make arrangements for the make-up work. If it is not possible to provide advance notice, the student should inform the instructor as soon as possible after the absence to make arrangements for missed work.

Academic Honesty:

The academic community is operated on the basis of honesty, integrity, and fair play. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at www.ndsu.edu/academichonesty.

Students with special requirements: *Any students with disabilities or other special needs, who need special accommodations in this course are invited to share these concerns or requests with the instructor as soon as possible. The instructor may ask for verification and that, plus other assistance, can be requested from Disability Services in the Lower Level of the NDSU Library (231-8463). http://www.ndsu.edu/disabilityservices/.*

Veterans and Military Personnel:

Veterans and student service members with special circumstances or who are active are encouraged to Notify the instructor as soon as possible and are encouraged to provide Activation Orders.

Students with Special Needs and/or Circumstances:

Any students with disabilities who need accommodations in this course are encouraged to speak with the instructor as soon as possible to make appropriate arrangements for these accommodations. All students are welcome to record lectures.

COE Honor Pledge:

All students are required to have a signed copy of the Engineering Honor Pledge on file with their major department. http://www.ndsu.edu/cea/ug-honor-code.php

> **"On my honor I will not give nor receive unauthorized assistance in completing assignments and work submitted for review or assessment. Furthermore, I understand the requirements in the College of Engineering and Architecture Honor System and accept the responsibility I have to complete all my work with complete integrity. Students who are suspected of academic dishonesty may not withdraw from the course in which dishonesty is suspected while the case is under review by the Honor Commission (NDSU Policy 335.b)**

Academic Dishonesty Defined (Source: ⬛NDSU Policy 335, 2a-m)
Academic misconduct (intentional or otherwise) includes but is not limited to the following:

1. Plagiarizing, i.e., submitting work that is, in part or in whole, not entirely one's own, without attributing such portions to their correct sources.
    - Cases of apparently unintentional plagiarism or source misuse must be handled on a case-by-case basis and in the context of the instructor's policies. Unintentional plagiarism may constitute academic misconduct.
    - Improper attribution of sources may be a symptom of bad writing and not plagiarism. Instructors are encouraged to recognize that citation skills are developed over time and are contextual.
2. Receiving, possessing, distributing or using any material or assistance not authorized by the instructional staff member in the preparation of papers, reports, examinations or any class assignments to be submitted for credit as part of a course or to fulfill other academic requirements.
3. Unauthorized collaborating on individual assignments or representing work from unauthorized collaboration as independent work.
4. Having others take examinations or complete assignments (e.g., papers, reports, laboratory data, or products) for oneself.
5. Stealing or otherwise improperly obtaining copies of an examination or assignment before or after its administration, and/or passing it onto other students.
6. Unauthorized copying, in part or in whole, of exams or assignments kept by the instructional staff member, including those handed out in class for review purposes.
7. Altering or correcting a paper, report, presentation, examination, or any class assignment, in part or in whole, without the instructional staff member's permission, and submitting it for re-evaluation or re-grading.
8. Misrepresenting one's attendance or the attendance of others (e.g., by PRS or attendance sheet) in a course or practical experience where credit is given and/or a mandatory attendance policy is in effect.
9. Fabricating or falsifying information in research, papers, or reports.
10. Aiding or abetting academic misconduct, i.e., knowingly giving assistance not authorized by the instructional staff member to another in the preparation of papers, reports, presentations, examinations, or laboratory data and products.
11. Unauthorized copying of another student's work (e.g., data, results in a lab report, or exam).
12. Tampering with or destroying materials, (e.g., in order to impair another student's performance).
13. Utilizing false or misleading information (e.g., illness or family emergency) to gain extension or exemption on an assignment or test.

Some Information Concerning ABET:

Table 1. Program educational objectives and supporting student outcomes.

Graduates are expected to have established themselves as practicing engineers who, within a few years of graduation:

1   Successfully address emerging engineering challenges in the design or evaluation of machine systems, processing systems, and natural resources and environmental systems affecting the production of food, feed, and other biobased products;

Technical learning outcomes include student outcomes* (a), (b), (c), (e), and (k);
- a)   Ability to apply mathematics, science and engineering principles.
- b)   Ability to design and conduct experiments, analyze and interpret data.
- c)   Ability to design a system, component, or process to meet desired needs.
- e)   Ability to identify, formulate and solve engineering problems.
- k)   Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

2   Effectively use professional communication, critical thinking, and interpersonal skills as team leaders and team members;

Communicational learning outcomes include student outcomes (d) and (g);
- d)   Ability to function on multidisciplinary teams.
- g)   Ability to communicate effectively.

3   Responsibly serve the public and their employers by participating in professional development and by maintaining the highest standard of professional ethics.

Contextual learning outcomes include student outcomes (f), (h), (i), and (j):
- f)   Understanding of professional and ethical responsibility.
- h)   The broad education necessary to understand the impact of engineering solutions in a global and societal context.
- i)   Recognition of the need for and an ability to engage in life-long learning.
- j)   Knowledge of contemporary issues.