

ABEN 486 – Design Project 1
Fall Semester 2019
2 credits

Instructor: Dr. Tom Bon

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Office hrs: 9:30 to 10:30 a.m. M, T, W, Th, & F. Also by appt. or just drop by and see if I am available.

Textbook: There is no assigned textbook for this course.

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

Location: ABEN 208

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 the particular capstone project they are working on.

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 consultant, 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 this 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 secondary report summarizing the results of testing, modeling, and/or prototyping will be developed. More on this later in the semester.

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. 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.

A note book should be maintained by each student to catalog all activities about their project work. Note books will be periodically checked by instructor to ensure consistent entries.

Each team will have a faculty advisor who has expertise in the subject matter of their project. Teams will meet periodically with their advisor for updates and advice on the project. The faculty advisor will have input on the final grade.

Grading (team grading):

<u>Items</u>	<u>Weight</u>
Proposal Presentation	5%
Written Project Proposal	10%
Project Oral Presentation	20%
-Draft and practice run 8 %	
- Presentation evaluation 12 %	
Semester Team Written Report	35%
Update reports as required – 15 %	
Final copy of report - 20%	
Cooperator evaluation of team	20%
<u>Team Work (includes maintaining records for instructor)</u>	<u>10%</u>
Total	100%

Grade assigned:

>= 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

There is a team aspect to the grading of the course. The initial grade will be the team grade. Then there is also a peer evaluation within teams. This may be used to adjust the individual's grade with respect to the team grade. For example, a common evaluation I have used is to split an imaginary \$10,000 among your other partners. You do not include yourself in this split. You

can also make donations to charity, but donations to charity (other than to round off to the nearest whole cent or dollar are negative evaluation points against your teammates). You must explain your decision for each allocation. The results are averaged and then adjustments may be made.

For example, a team of three individuals has a project). Since each person is dividing \$10,000 between two individuals the expected average rating for each person would be \$5,000. What if the actual values come out to be \$5,500, \$5,000, and \$4,000. Lets also say the team earned a grade of 88% for the term. How this would be allocated would be $\$5,500/\$5,000 * 88\% = 96.8\%$, and 88%, and 70.4%. The team members would get grades of A, B, and C respectively for the term. Obviously there are some concerns and/or problems on this team. We would try to address these issues to have a more successful spring semester. Also the instructor does reserve the right to inject a little mercy into things. For example, unless there were very major problems, I would probably limit the drop to no more than 2 letter grades. There are also other evaluation tools and I may elect to use one of them near the end of the semester.

The semester report is a full report covering the first complete iteration of the project. If not completed in the fall semester, it will result in an incomplete and a group reduction in grade of 15%.

ATTENDANCE STATEMENT

“According to [NDSU Policy 333 \(www.ndsu.edu/fileadmin/policy/333.pdf\)](http://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 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.*

Important Dates

Date	Day	Description
Aug 26	Mon	Classes begin at 4:00 p.m.
Aug 27	Tue	First full day of classes
Sep 2	Mon	HOLIDAY — Labor Day (<i>no classes, offices closed</i>)
Sep 3	Tue	Last day for Campus Connection Wait Lists to run
Sep 4	Wed	Last day to Add classes via Campus Connection* Permit needed after this date.
Sep 4	Wed	Last day for no-record Drop of classes @ 100% refund* (<i>full semester classes only</i>)
Sep 4	Wed	Last day to Withdraw to Zero Credits @ 100% refund* (<i>full semester classes only</i>)
Sep 4	Wed	Attempted credits calculated for financial aid SAP (11:59 p.m.)**
Sep 4	Wed	Eligible Pell/TEACH/ND Grants/Scholarships based on enrollment at 11:59 p.m.
Sep 10	Tue	Financial aid applied to NDSU account balances
Sep 11	Wed	Payments due for NDSU account balances*
Sep 16	Mon	Last day to submit requests to Audit, Pass/Fail
Sep 20	Fri	Undergraduate/Professional Fall Degree Applications due
Sep 20	Fri	Graduate student Fall Graduate Degree Applications due
Sep 23	Mon	Last Day to Add Full Semester Classes. Permit & Appeal needed after this date.
Oct 4	Fri	Last day to Withdraw to Zero Credits @ 75% refund* (<i>full semester classes only</i>).
Oct First	Week	Spring registration schedule available
Oct 15	Tue	Late fees applied to unpaid account balances (11:59 p.m.)
Oct 18	Fri	Grades of 'Incomplete' convert to 'F'
Oct 21	Mon	2nd half (8-week session) of Fall semester begins

Date	Day	Description
Nov 3	Sun	Last day to Withdraw to Zero Credits @ 50% refund* (<i>full semester classes only</i>). No refunds issued for withdraw to zero credits after this date.
Nov 4-24	Mon	Spring registration begins online based on total credits completed
Nov 11	Mon	HOLIDAY — Veterans Day (<i>no classes, offices closed</i>)
Nov 15	Fri	Last day to Drop classes with 'W' record*
Nov 15	Fri	Last day to Withdraw to Zero Credits for Fall
Nov 15	Fri	Late fees applied to unpaid account balances (11:59 p.m.)
Nov 15	Fri	Graduate student Initial Disquisition submission for December graduation
Nov 25	Mon	Open registration for spring
Nov 27-29	Wed-Fri	HOLIDAY — Thanksgiving (<i>no classes; offices closed Thursday, offices open Wednesday& Friday</i>)
Dec 2	Mon	Fall Commencement Participation deadline
Dec 9-13	Mon-Fri	Dead Week
Dec 10	Tue	Grade entry begins
Dec 13	Fri	Last day of Fall classes
Dec 15	Sun	Late fees applied to unpaid account balances (11:59 p.m.)
Dec 16-20	Mon-Fri	Final Examinations
Dec 20	Fri	Graduate student Final Disquisition copy due for December graduation
Dec 20	Fri	Commencement ceremony (2:00 p.m. in Sanford Health Athletic Complex)
Dec 24	Tue	Grades due (12:00 p.m.)
Dec 24	Tue	Fall grade access begins online (late evening)
Dec 25	Wed	HOLIDAY — Christmas Day Observed (<i>offices closed</i>)

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)

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.

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

Honor Code

CoE Honor Pledge

“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 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](#), 5b).”

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.
 - o 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.

Tentative Schedule:

ABEN 486. Fall Semester 2018

Date	Topic, Event, Due Date, etc.
Tuesday, August 27, 2018	Introduction
Thursday, August 29, 2018	
Tuesday, September 3, 2018	
Thursday, September 5, 2018	
Tuesday, September 10, 2018	
Thursday, September 12, 2018	
Tuesday, September 17, 2018	
Thursday, September 19, 2018	
Tuesday, September 24, 2018	
Thursday, September 26, 2018	
Tuesday, October 1, 2018	
Thursday, October 3, 2018	
Tuesday, October 8, 2018	
Thursday, October 10, 2018	
Tuesday, October 15, 2018	
Thursday, October 17, 2018	
Tuesday, October 22, 2018	
Thursday, October 24, 2018	
Tuesday, October 29, 2018	
Thursday, November 31, 2018	
Tuesday, November 5, 2018	

Thursday, November 7, 2018

Tuesday, November 12, 2018

Thursday, November 14, 2018

Tuesday, November 19, 2018

Thursday, November 21, 2018

Tuesday, November 26, 2018

Thursday, November 28, 2018 Thanksgiving Day, No classes. Be thankful!

Tuesday, December 3, 2018

Thursday, December 5, 2018

Tuesday, December 10, 2018

Thursday, December 12, 2018