Agricultural and Biosystems Engineering – 358 Syllabus

Fall 2014                                           3 credits (2 hr lecture, 1 lab of 3 hr)
11:00 - 11:50 MW (lectures) Room 201               Tom A. Bon
3:00 – 5:50 p.m W (lab) Room 210                    Office: ABEN 202

Office: ABEN 202                                   Phone: 231-7275
e-mail: Thomas.Bon@ndsu.edu

Office hrs: 10:00 – 10:50 M, Tu, W, Th, and F..
Also you can call for an appointment or drop by and see if I am in
my office, I am usually available if I am in my office unless it is
just before a class or meeting.

TITLE: Electrical Energy Applications in Agriculture

Prereq.: Physics 252 or ECE 301

Textbook(s): Agricultural Wiring Handbook 15th ed. or newer by the Rural Electricity
Resources Council and Programmable Logic Controllers by Frank D. Petruzella 4th ed or newer
ISBN-12 978-0-07-351088-0

Student Outcomes:
1. Demonstrate a basic understanding of electrical energy power systems. (abet a)
2. Construct schematic diagrams of electrical circuits and control systems (abet e and k)
3. Develop and implement PLC programs (abet e)

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 one site 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 2000, 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.

REQUIRED RESOURCES:
Textbook, calculator, pencil, eraser, paper

COURSE DESCRIPTION:
Electrical distribution/services, electrical control units, solid state and digital electronics, electromagnetic sensors, and sensing techniques with applications to food, agricultural and biological systems. 2 lectures and 1 three hour laboratory.
**MISSING QUIZZES**

Quizzes **cannot** be made up. If you miss a quiz, your score for the quiz is "0". Quizzes will be unannounced and will be given for one or more of the following reasons:

1. To see if the class understands some concept.
2. To encourage response to questions; if you don't answer questions when asked, you may have to answer them in a quiz.

**MISSING HOMEWORK ASSIGNMENTS**

Homework is an important learning tool. It helps you understand the concepts discussed in class and it helps you develop good problem solving skills, which will be important in later courses and in your professional life. You are expected to complete all homework assignments and hand them in for grading. Homework will be collected at the beginning of class. Homework handed in later will be considered to be LATE and will be subject to a minimum penalty of 10 percent. If homework is more than three days late, you will earn only 50% of your correct points on the assignment.

**Grading:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams (2 or 3 1 hr exams) and quizzes</td>
<td>40%</td>
</tr>
<tr>
<td>Project</td>
<td>10%</td>
</tr>
<tr>
<td>Labs</td>
<td>15%</td>
</tr>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Final exam</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Final Exam is scheduled for Thursday, December 17, 2015, from 8:00 a.m. to 10:00 p.m.**

**SPECIAL NEEDS**

"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"

Students with disabilities needing special consideration are requested to alert me at the first class.

**ACADEMIC HONESTY:**

CEA Honor System: All work in this course must be completed in a manner consistent with NDSU University Senate Policy, Section 335: Code of Academic Responsibility and Conduct (http://www.ndsu.nodak.edu/policy/335.htm) and
the CEA Honor System available at http://www.ndsu.nodak.edu/ndsu/cea/

Penalties for violations can range from assigned seating, failure of the quiz/exam, failure of the course, to expulsion from the university depending on the severity of the offence, instructor’s discretion and honor code board decisions.

**Course Philosophy**

Learning is an active process from the teacher's and from the learner's points of view. Teachers and students have a strong responsibility to one another. My obligations as a teacher include (a) being knowledgeable and current on the subject matter, (b) planning and providing good learning experiences, evaluating work fairly, promptly, and frequently, and (d) assisting you to meet the course goals and to fulfill your needs. Student obligations include (a) reading and completing assignments, (b) participating actively and positively in the learning process, and expressing needs to the teacher.

**Suggestions for Success:**

1. Prepare for class. Skim the reading material and think about the subject matter. A few minutes invested before the material is covered in class is equivalent to hours of pre-exam cramming.
2. Be organized. Do the assignments and submit them on time
3. Ask for help. Consult the instructor and classmates.
4. Develop an attitude of taking a course with the objective of learning as much as you can, rather than taking a course just to get the grade and the credit.
5. When studying, review notes and readings. Then set materials down and write down everything you can recall on paper.