

**Electricity and Electronic Applications – ASM 354**  
**Agricultural Systems Management**  
**Class #3035**

Fall, 2019

**Lecture:** 9:30 – 10:20 am., Tu & Th (ABEN 208)

**Laboratory:** 2:00 – 4:50 pm, Tu (ABEN 210)

3 credits

Shafiqur Rahman, PhD

Morrill Hall #206

701.231.7336 (Office)

[s.rahman@ndsu.edu](mailto:s.rahman@ndsu.edu)

**Office hour:** 10:30-11:30 am, Th (Morrill 206)

You can also make an appointment or drop by and see if I am in office.

**Title:** Electricity and Electronic Applications

**PreReq:** Math 103 or 104 or higher.

**Text:**

- Fundamentals of Electricity in Agriculture, Gustafson and Morgan, 3<sup>rd</sup> edition 2004, and
- Agricultural Wiring Handbook, 16<sup>th</sup> edition

**Course Objectives:**

Students are expected to develop an understanding of:

- 1) Basic electrical principals
- 2) Basic electrical wiring
- 3) Acquainted with power distribution
- 4) Plan an electrical system for farmstead
- 5) Understand motors, controls, lighting, and solid state electronics, and
- 6) Basics of solar and wind power
- 7) Work with the national electric codes.

**Modes of Presentation:**

Lecture with Power Point

Guest Speakers (possible)

Problem solving/demonstrations

**Ref:**

- Gerrish, H. H., W. E. Dugger, and R. M. Roberts. 2009. Electricity and Electronics, 10<sup>th</sup> Edition,

**BLACKBOARD:** Blackboard will be used for announcements, class presentations, and temporary grade presentation

**Tentative Lecture Schedule (Subject to change):**

<b>Date</b>	<b>Topic</b>
27-Aug	Introduction
29-Aug	Basic terms and definitions
3-Sep	Basic terms and definitions
5-Sep	Resistive Networks
10-Sep	Resistive Networks
12-Sep	Inductance, capacitance, and phase relations
17-Sep	Inductance, capacitance, and phase relations
19-Sep	Basic electrical wiring
24-Sep	Power generation & distribution
<b>26-Sep</b>	<b>Test</b>
1-Oct	Planning the electrical distribution system ( <b>Guest lecture, Mr. Knutson, Cass County Electric Co.</b> )
3-Oct	Planning the electrical distribution system
8-Oct	Planning the residential electrical distribution system
10-Oct	Planning the residential electrical distribution system
15-Oct	Solar and Wind Power
17-Oct	Solar and Wind Power
22-Oct	Direct electrical controls and devices
24-Oct	Direct electrical controls and devices ( <b>Guest lecture, Mr. Larson, CNH</b> )
29-Oct	Electric motors
31-Oct	Standby power units
5-Nov	Lighting systems
<b>7-Nov</b>	<b>Test</b>
12-Nov	Lightning and lightning protection
14-Nov	Electrical safety ( <b>Mr. Mike Mead Cass County Electric Co.</b> )
19-Nov	Relays
21-Nov	PLC/Sensors
26-Nov	PLC/Sensors
<b>27-29-Nov</b>	<b>HOLIDAY!!!! Thanksgiving</b>
3-Dec	Stray voltage problem in agriculture
5-Dec	Review
<b>9-13-Dec</b>	<b>Dead Week</b>
<b>10-Dec</b>	<b>Review</b>
<b>19-Dec</b>	<b>FINAL EXAM, 3:30-5:30 PM @ABEN 208</b>

**Tentative Lab Schedule: Subject to change**

<b>Date</b>	<b>Laboratory Topic</b>
3-Sep	Introduction to lab group/VOM/Amp probe/Circuit tester usage and test equipment
<b>10-Sep</b>	<b>Big Iron</b>

17-Sep	Wiring and conductor sizing/Overload protection-Fuses/Circuit breakers/GFCI
24-Sep	Wiring I
1-Oct	Electromagnets and Transformers
8-Oct	<b>Service entrance</b>
15-Oct	Three-Phase
22-Oct	<b>Jemco Electric Motor Repair Co (TBD)</b>
29-Oct	<b>Prairie Sun Community Solar tour (Chris Erickson, Cass County Electric)</b>
5-Nov	Demonstration panel
12-Nov	Wiring II
19-Nov	<b>John Deere Main plant and Power Electronics facility, Mr. Steve Jorissen</b>
26-Nov	Magnetic starters/controls/switches/Sensors
3-Dec	PLC

These are tentative dates for tests and material to be covered, the actual dates and material may vary. **That is why attendance is important.** Any change in schedule will be notified ahead of time.

### Grading:

You will have the following categories of work in the course. Your lowest quiz score will be dropped. Your final grade in the course will be determined by a grade percentage ranging from 0 to 100%. The weighted grade percentage will be computed as follows: 1) divide the total points earned in each work category by the total points possible for that work category, 2) multiply the numbers from step (1) by the weight percentages for each respective work category, and 3) add the results. The weighted grade percentage will be converted to a letter grade using the following straight grading scale. Quiz, lab, and test raw scores will be posted on Blackboard for informational purposes only. *You are encouraged to develop your own spreadsheet to estimate your course grade based on your quiz, lab, and test scores.*

Item	Weighted % of total grade
Homework	10%
Quizzes	15%
Laboratory reports	10%
Tests (two 50 min exams)	35%
Final exam	<u>30%</u>
<b>Total</b>	<b>100%</b>

**The cut off for letter grades are: => 90% = A; =>80% = B; =>70% = C; =>60% = D**

### Homework assignment and class project policies:

You are expected to complete all homework assignments and **hand them in for grading on time.** Assignments are **to be done step by step, typed or LEGIBLY handwritten in ink.** A handwritten assignment must be legible to receive full credit. Illegible and/or hard-to-follow solutions will not receive full credit. **Marks will be deducted if steps are not shown in the assignment.** Homework will be collected at the beginning of class on the due date. **No late submissions of homework are accepted.**

### **Exams and quizzes policies:**

Students are expected to take the **tests at the appointed time and date** unless other arrangements are made with the instructor. The tests will be combinations of types of questions, which may include short answer, problems, multiple choice, and fill in the blank questions, depending on what works best for the material covered. **Quizzes may be given throughout the semester and may be either announced or unannounced.** There are **no make-ups for quizzes or tests, except in medical, family emergencies, or interview cases.** Missed tests, exams, and quizzes will receive zero points unless missed for an acceptable reason and with advance notification where possible. **The final exam will be comprehensive. Marks will be deducted if steps are not shown in word problem(s) in the test(s).**

Class attendance is expected in accordance with NDSU University Senate Policy 333: Class Attendance Policy and Procedure (<https://www.ndsu.edu/fileadmin/policy/333.pdf>). All class materials will be posted on the BB. If you miss class, the instructor will provide handouts upon your return if asked; you are responsible for obtaining notes from a classmate.

Laboratory reports will be due one week after the laboratory exercise is completed. **Reports are to be typed or LEGIBLY handwritten in ink.** Mark will be deducted for illegible and/or hard-to-follow handwritten lab report.

### **Resources needed by the Students:**

- Access to Blackboard for materials.
- The textbooks
- A calculator (preferably scientific)

### **Important Notification**

#### **General:**

Information presented in the class will be a combination of material from the course book as well as other resources. It is imperative that students practice good attendance in order to properly learn the materials.

***Academic Honesty:*** All students taking any course in the College of Agriculture, Food Systems, and Natural Resources are under the Honor System (<http://www.ag.ndsu.edu/academics/honor-system-1>). The Honor System is a system that is governed by the students and operates on the premise that most students are honest and work best when their honesty, and the honesty of others, is not in question. It functions to prevent cheating as well as penalize those who are dishonest. It is the responsibility of the students to report any violations of the honor pledge to the instructor, honor commission or the Dean of the College of Agriculture, Food Systems, and Natural Resources.

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](http://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 or military personnel with special circumstances or who are activated are encouraged to notify the instructor as early as possible.

### **Attendance**

According to NDSU Policy 333, attendance in classes is expected. Students are responsible for getting any information or announcements made if the class absence is necessary.

### **Use of Cell Phones, iPods, MP3 Players, and Other Electronic Devices:**

All participants in this class are subject to NDSU University Senate Policy 158: Acceptable use of Electronic Communications Devices (<http://www.ndsu.edu/fileadmin/policy/158.pdf>).

As a courtesy to other students and the instructor, all cell phones, iPods, MP3 players, and other electronic devices except handheld calculators should be turned off or placed in a vibrate-only mode during class time. Initiating phone calls, text message, or other types of messages during class time - including those to friends, family, classmates, coworkers, or supervisors—is unacceptable unless there is a genuine emergency. Examples of emergencies include weather-related school closing announcements; fire, bomb, or other threats to public safety and well-being; and other incidents in which the NDSU system is or could be activated to provide broadcast messages to the NDSU community.

Use of cell phones or other portable electronic devices for communication, transmission, retrieval, or storage of information during the administration of a test or quiz may be considered an incident of **academic dishonesty**. One exception to this policy is the use of handheld calculators for computational purposes. Use of cell phones or similar devices as a calculator during tests and quizzes will not be allowed because it is difficult to distinguish such activity from sending and receiving text messages, which could obviously be interpreted as a form of academic dishonesty.

### **Dead Week Policy:**

The NDSU Dead Week policy is available at <http://www.ndsu.edu/registrar/dates/deadweek/>.

### **Important Dates: (<https://www.ndsu.edu/registrar/dates/2020/>)**

August 26

Classes begin at 4:00 p.m.

**September 2**

**Labor Day holiday (no classes/offices closed)**

September 4	Last day to add classes via Campus Connection
September 4	Last day for no-record drop of classes @ 100% refund
September 4	Last day to withdraw to 0 credits @ 100% refund
September 10	Financial Aid applied to Student Accounts
September 16	Last day to submit request to audit, pass/fail
September 20	Undergraduate fall graduation application due
September 20	Graduate student fall Graduate Degree applications due
October 4	Last day to Withdraw to Zero Credits @ 75% refund
October 18	Grades of Incomplete convert to F
November 4	Spring registration begins
<b>November 11</b>	<b>Veteran's Day (no classes/offices closed)</b>
November 15	Last day to drop classes with record (W)
November 15	Last day to withdraw to 0 credits
November 15	Late fees applied to unpaid account balances
<b>November 27-29</b>	<b>Thanksgiving (offices open on Wednesday &amp; Friday)</b>
December 2	Fall commencement participation deadline
<b>December 9-13</b>	<b>Dead Week</b>
<b>December 16-20</b>	<b>Final Examinations</b>
December 20	Commencement
<b>December 24</b>	<b>Fall grade access begins online</b>