

Basic Electrical Systems (DEMR 1305)



Credit: 3 semester credit hours (3 hours lecture, 0 hours lab)

Prerequisite: None

Course Description

Basic principles of electrical systems of diesel powered equipment with emphasis on starters, alternators, and batteries.

Required Textbook and Materials

1. **Electronics and Electrical Systems** Fundamentals of Service
Author: Deere and Company
ISBN # 0-86691-326-2 ; 8th edition
2. **Diesel Technology** Fundamentals / Service / Repair
Author: Norman, Corinchock, Scharff
Publisher: Goodheart and Willcox Company, Inc
ISBN # 1-59070-770-1
3. **Diesel Technology Workbook** Fundamentals / Service / Repair
Author: Norman, Corinchock, Scharff
Publisher: Goodheart and Willcox Company, Inc
ISBN # 1-59070-771-0
4. Notebook and 8.5" x 11" notebook paper
5. Blue and Black ink pens

Course Objectives

Upon completion of this course, the student will be able to:

- 1) Understand electrical safety and precaution when working with electricity. SCANS: F1.4, F2.3, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3
- 2) Explain basic electrical principles. SCANS: F1.4, F2.3, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3
- 3) Take appropriate preventive maintenance measures and solves problems in the use and operation of equipment. SCANS: F1.4, F2.3, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3
- 4) Explain basic circuit laws. SCANS: F1.4, F2.3, F3.3, F4.1, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3, C5.2, C15.4
- 5) Describe proper use of electrical test equipment. SCANS: F1.4, F2.3, F3.3, F4.1, F9.3, F10.2, F11.3, F13.2, F14.3, F16.3, C5.2, C9.1, C15.4, C16.4, C20.4

SCANS Skills and Competencies

Beginning in the late 1980's, the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) conducted extensive research and interviews with business owners, union leaders, supervisors, and laborers in a wide variety of work

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settings to determine what knowledge workers needed in order to perform well on a job. In 1991 the Commission announced its findings in *What Work Requires in Schools*. In its research, the Commission determined that “workplace know-how” consists of two elements: foundation skills and workplace competencies.

Course Outline

- | | |
|---|-------------------------------|
| A. Electricity and Electrical Safety | E. Electrical components |
| 1. Electrical Safety Systems | 1. Wiring |
| 2. Shop practice and work habit | 2. Switches |
| 3. Noise protection | 3. Resistors |
|
B. Electricity – How it works |
F. Storage Batteries |
| 1. Electrical and Electron theory | 1. How a battery works |
| 2. Introduction to current, voltage, and resistance | 2. Types of batteries |
| | 3. Checking and charging |
| | 4. Handling of battery |
| C. Measuring the Electron |
G. Charging circuits |
| 1. Ohm’s law | 1. Operations of system |
| 2. Types of circuits | 2. Types of systems |
|
D. Diagrams and schematic symbols |
H. Connectors |
| 1. System wiring schematic | 1. Introduction |
| 2. System wiring diagram | 2. Common types of connectors |

Grade Scale

90 – 100	=	A
80 – 89.9	=	B
70 – 79.9	=	C
60 – 69.9	=	D
0 – 59.9	=	F

Course Evaluation

Final grades will be calculated according to the following criteria:

Daily work, quizzes, and homework assignment.	40%
Test over Lecture and Chapters	30%
Outside assignment or class presentation.	10%
<u>Final Exam</u>	20%

Course Requirements

1. Complete specific reading assignments in a timely manner specified by the instructor.
2. Seek out available material on the subject being taught, utilizing the library, periodicals and / or the Internet.
3. Wear sleeved shirts, full length jeans or work pants and preferably leather shoes to class and on campus. No shorts or tank tops are allowed.

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4. Participate in Project Interview when offered.
5. Complete all work book and class assignments.
6. Be present at class sessions and examinations as scheduled.

Attendance Policy

1. Missing more than 20% of classes will result in an automatic “F” for the course.
2. Absences are counted for unexcused, excused and coming to class late.
3. Missing more than 20% of a class period will count as an absence.
4. Being tardy 3 times equals 1 absence.

If you wish to drop, you are responsible for the drop process. I will not initiate the drop, no matter how many absences or zeroes you have; that is, if you stop coming to class and do not drop, you will earn an F in the course. ***Students are allowed only 6 drops, from any public Institute of higher education, in their lifetime.***

Course Policies

1. **No Cell Phone or Electronic Devices** allowed in class, except in special circumstances and it is approved by the instructor.
All cell phones must be turned off and put away. Text messaging during class time will not be tolerated. Text messaging during an exam will be considered academic dishonesty. The exam will be considered over and the student will receive a zero for the exam.
2. **No** smoking or use of any **tobacco** products allowed
3. Do not bring any **food** or **drinks** in class
4. No visitors allowed in class, including children.
5. Do not disturb lecture for any reason. If you must leave class or come in late, do so without disturbing class.
6. **DRESS CODE: Proper work attire only, NO Open shoes, Short pants, low riding, or sleeveless shirts, will be allowed in any program classrooms.**
7. **No** grades will be **dropped**, No homework or assignments can be made up or accepted after instructor has taken up for grading.
8. **Homework** must be done **in proper outline form, neat and legible**, prepared on **loose leaf (8.5” X 11”) note book paper**, written only on **one** side.
9. Assignment must be turn in at the beginning of class
10. Any student caught cheating will be dropped from class and given an F for the semester grade.

NOTE:

Students who violate any of these policies will be asked to leave class and given an absent for the class period. Students who are continuing disturbing classes will be suspended from class for the remainder of the semester and given an grade of F.

Students may vary in their competency levels on these abilities. You can expect to acquire these abilities only if you honor all course policies, attend classes regularly, complete all assigned work in good faith and on time, and meet all other course expectations of you as a student.

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Disabilities Statement

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

Course Schedule

Week	Topic	Reference
1	Course Introduction and Policies <ul style="list-style-type: none">• Lecture / Syllabus• Review students schedule	Handouts
2	Electrical Safety Introduction <ul style="list-style-type: none">• Lecture• Assignments from chapter	Chapter 1
3/4	Electrical Safety Awareness <ul style="list-style-type: none">• Lecture• Chapter Exercises• Chapter Test	Chapter 1 Handouts
5/6	Electrical Theory <ul style="list-style-type: none">• Lecture from power point• Class Exercises• Homework assignments	Chapter 2 Handouts DVDs power points
7/8	Measuring the Electron <ul style="list-style-type: none">• Lecture/ series and parallel circuits• Ohms law Exercises• Homework assignments	Chapter 2 Handouts DVDs power points
9/10	Diagrams and Schematic Symbols <ul style="list-style-type: none">• Diagrams• Symbols Exercises• Chapter Test 2	Chapter 2 Handouts DVDs power points
11/12	Electrical Components <ul style="list-style-type: none">• Lecture / class assignment• Homework assignments• Chapter Test 3	Handouts DVDs power points Chapter 3
13/14	Storage Batteries and Charging Systems <ul style="list-style-type: none">• Lecture / class exercise• Homework assignments• Chapter Test 5	Handouts DVDs power points Chapter 5 & 6
15	Connectors <ul style="list-style-type: none">• Introduction	Chapter 11 Handouts

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	<ul style="list-style-type: none">• Identify common connectors• Chapter Test 11	
16	Review and final exam <ul style="list-style-type: none">• Semester discussion• Final Exam to be announced• End of semester	Review on test and handout

The course schedule is a proposed schedule. Changes in the schedule may be made based upon the instructor's professional judgment. If you are absent on a day in which changes to the schedule have been announced, it is your responsibility to find out those changes.

REV 1/16/13

Contact Information

Varies by Instructor