

SOUTHEAST COMMUNITY COLLEGE
TRANSPORTATION DIVISION
JOHN DEERE CONSTRUCTION & FORESTRY EQUIPMENT TECH
COURSE SYLLABUS
January 25, 2023

I. CATALOG DESCRIPTION

Course Number: JDCE1220
Course Title John Deere C&F Electrical/Electronics II
Prerequisite(s): JDCE1110, JDCE1120
Co-requisite(s): None

Catalog Description: This course provides a review of electrical fundamentals then on to electromagnetic and electromechanical components such as relays and solenoids. Battery Identification by type and rating. Battery design and function in 12-volt and 24-volt systems. Battery maintenance, charging and testing along with safety practices for working with lead-acid batteries. The design, function, maintenance, service and diagnostics of starting and charging circuits as well as components including starters, alternators and voltage regulators. Knowledge of electrical and electronic system diagnostics, testing and troubleshooting procedures along with the use of electrical and electronic test equipment including wiring diagrams and schematics will be used to perform hands on electrical diagnostic lab activities.

Credit Hours: 4
Class Hours: 30
Lab Hours: 90
Total Contact Hours: 120

II. COURSE OBJECTIVES: *Course will:*

- A. Review electrical fundamentals, Ohm's law, electromagnetism and electromagnetic induction.
- B. Explain the design and function of electromechanical components used in starting and charging systems.
- C. Explain safety practices to be used with batteries and lead-acid batteries.
- D. Explain battery design and function and how to identify batteries by type and ratings.
- E. Explain how batteries are utilized in 12-volt, 24-volt and split-phase systems.
- F. Explain proper battery maintenance practices.
- G. Demonstrate how to use test equipment for testing batteries, charging systems and starting systems.
- H. Provide hands on experience practicing battery maintenance and testing.
- I. Explain the design and function of charging circuits, alternators, generators and voltage regulators.
- J. Demonstrate charging system testing and diagnostic procedures.
- K. Provide hands on experience servicing charging systems and charging system components.
- L. Explain the design and function of starting circuits, starting motors and system components.
- M. Demonstrate starting system testing and diagnostic procedures.
- N. Provide hands on experience servicing starting systems and starting system components.
- O. Explain electrical system diagnostic practices and procedures.

- P. Provide the opportunity to use wiring diagrams, schematics and symbols for electrical and electronic system diagnostics.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

A. STUDENT LEARNING OUTCOMES: *Student will be able to:*

1. Use knowledge of Ohm's law to diagnose electrical circuits.
2. Understand the design and function of electromechanical components used in starting and charging systems.
3. Work safely with batteries and lead-acid batteries.
4. Understand battery design and function.
5. Identify batteries by type and ratings.
6. Use test equipment for testing and diagnosing electrical circuits, batteries, charging systems and starting systems.
7. Service batteries in 12-volt, 24-volt and split-phase systems.
8. Understand the design and function of charging circuits.
9. Understand the design and function of alternators, generators and voltage regulators.
10. Service, test and diagnose charging system circuits and charging system components.
11. Understand the design and function of starting circuits, starting motors and components.
12. Service, test and diagnose starting system circuits and starting system components.
13. Perform electrical and electronic system diagnostics.
14. Use wiring diagrams, schematics and symbols for electrical system diagnostics.

B. GENERAL EDUCATION LEARNING OUTCOME:

GELO 3: Critical Thinking & Problem Solving

1. Collect, identify, interpret and analyze data.
2. Synthesize information to arrive at reasoned solutions to problems.
3. Acquire and integrate knowledge and construct relationships across disciplines.

IV. CONTENT/TOPICAL OUTLINE

- A. Review of electrical fundamentals and Ohm's law
- B. Review of electromagnetism and electromagnetic induction
- C. Electromechanical components, relays and solenoids
- D. Safety practices for batteries and lead-acid batteries
- E. Battery design, function, types and ratings
- F. Battery maintenance, charging and testing
- G. Batteries in 12-volt, 24-volt and split-phase systems
- H. Battery maintenance and testing lab
- I. Charging circuits and system basics
- J. Alternators and generators, design and function
- K. Voltage regulators
- L. Charging system testing and diagnostics
- M. Charging systems lab
- N. Starting circuits and system basics
- O. Starting motors, design and function
- P. Starting system testing and diagnostics
- Q. Starting systems lab
- R. Electrical system test equipment
- S. Electrical system diagnostics, testing and troubleshooting
- T. Electrical systems diagnostics lab

V. INSTRUCTIONAL MATERIALS

Required text(s): Service Advisor (made available in the classroom)
FOS Electrical/Electronics Systems

Other material(s): Required tool set, safety glasses (regulation Z87), leather shoes, John Deere uniform, colored pencils, notebook, writing instruments, calculator

VI. METHODS OF PRESENTATION/INSTRUCTION

A. Methods of presentation typically include a combination of the following:

1. Small and large group discussion
2. Video presentations
3. Demonstrations
4. Project boards
5. Flip charts
6. Handouts
7. Observations
8. Field trips

VII. METHODS OF EVALUATION

A. Methods of evaluation typically include a combination of the following:

1. Notebook (if required)
2. Quizzes
3. Tests
4. Lab Grades
5. Reflection assignments

Grading will follow the SCC Standard Grade Scale Policy. See **Course Information Document** for specific details on how the course grades are calculated.

VIII. SPECIFIC COURSE REQUIREMENTS:

- A.** Students must complete all tests, projects, assignments, and notebook (if required).
- B.** Students must earn a final grade of 70% (2.0) or higher.
- C.** Program safety rules will be followed. See the **Course Information Document** for any additional safety rules established by the instructor.
- D.** Safety belts will be worn at all times, on or in any motorized vehicle, if equipped.
- E.** Attendance and participation. See **Course Information Document** for attendance and participation policy.