AGTC 123: POWER EQUIPMENT ELECTRONICS

Proposer:

Name:	Email:
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Effective Term:
Spring 2025

Credit Status:
Credit - Degree Applicable

Subject:
AGTC - Agricultural Technology

Course Number:
123

Discipline:

And/Or	(	Discipline	)
	(	Agricultural Engineering (Equipment and machinery, farm mechanics)	
Or		Agricultural Production (Animal science, plant science, beekeeping, aquaculture)	)

Catalog Title
Power Equipment Electronics and Electrical Systems

Catalog Description
This course will teach students the fundamentals of electrical systems used in agricultural power equipment. Wiring schematics and diagrams will be used to teach students about the function, operation and troubleshooting of the many electrical circuits on tractors and other equipment used in agriculture.

Method of Instruction:
Laboratory
Lecture and/or Discussion

Course Units/Hours:

Course Units Minimum:
3

Lecture Hours Minimum (week)
2

Lab Hours Minimum (week)
3

Total Contact Hours Minimum (semester)
87.5

Total Outside Hours Minimum (semester)
70

Total Student Learning Minimum Hours (semester)
157.5

Repeatability:
No

Open Entry/Exit:
No

Field Trips:
Not Required

Grade Mode:
Standard Letter

TOP Code:
011600 - * Agricultural Power Equipment Technology

SAM Code:
C - Clearly Occupational

Course Content

Methods of Assessment:
Mulitple choice tests
Problem solving assignments or activities
Problem solving quizzes or exams
Project
Skill demonstrations

Course Topics:

	Course Topics
1	Electrical theory including atomic structure and electron theory.
2	Ohm's law and its application to troubleshooting.
3	Electrical troubleshooting tool use including digital multimeters and oscilloscopes.
4	12 and 24 volt cranking circuits
5	12 and 24 volt charging circuits
6	Lighting, accessories and control systems
7	Electrical schematics their use and application to troubleshooting.
8	Controller area network (CAN) protocol
9	Telematics and remote diagnostics
10	Basic troubleshooting of electrical systems
11	Emerging technologies

Course Objectives:

	Course Objectives
1	Explain electrical principles such as electron theory and magnetism
2	Describe Ohm's law and be able to use it for troubleshooting electrical systems.
3	Use and explain remote monitoring systems and the ability to remotely diagnose electrical issues.
4	Use electrical measurement tools such as digital multimeters and oscilloscopes to measure electrical values like voltage, amperage resistance and frequency.
5	Identify, isolate and repair problems in 12 and 24 volt cranking systems.
6	Identify, isolate and repair problems in 12 and 24 volt charging circuits.
7	Identify, isolate and repair problems in lighting and accessory circuits.
8	Use electrical schematics and diagrams to troubleshoot electrical systems.

Course Outcomes:

	Course Outcomes
1	Demonstrate the ability to use and understand electrical diagnostic tools including multimeter, oscilloscope and computer based diagnostic software to troubleshoot problems in agriculture power equipment.
2	Use electrical schematics to troubleshoot an electrical problem in a tractor.
3	Understand the major electrical systems found in agriculture power equipment.

Assignments:

Assignment Type:	Details
Reading	Students will read service procedures to rebuild a starter motor.
Writing	Students will write service reports to be used by a service manager.
Lab	Students will measure electrical frequency using an oscilloscope.
Homework	Students will complete an online dealer training course.

Textbooks or other support materials

Resource Type:	Details
Books	Fundamentals of Mobile Heavy Equipment First Edition, Owen C Duffy ISBN 9781284112917 Copyright 2019
Web/Other	Original Equipment Manufacturer product databases.

Equity Review:

Yes

Transferable to CSU

Yes - Proposed

Transferable to CSU Justification

Transfer Policy Justification 2a and 2b

2a. This course deals with a great deal of electrical theory and ohms law. Students will need to spend time outside of class familiarizing themselves with Ohm's Law and how it applies in the electrical system of agriculture equipment. Students will need to apply Ohm's law to troubleshoot and diagnose agriculture equipment. This skill demonstrates and understanding of how the system works, how Ohm's Law works and the student will determine what is not functioning correctly and perform appropriate repairs.

2b. This course takes students well above the entry level of a technician. Many times employers have to send employees to training specifically in electrical and electronics. The skills learned in this course would be very valuable to students as they would come into the jobsite with advanced training. The theories and skills that are learned and practiced in this course allow students to take laws and theories and apply them to a real life situation. The students are not only learning the theoretical piece but then have to take the theoretical piece and apply it for real world results as expected by an employer.

This course will also be proposed for UC transfer.

No

Other Degree Attributes

Degree Applicable
Not a Basic Skills Course

Banner Title:

Power Equipment Electronics