SOUTHEAST COMMUNITY COLLEGE
TRANSPORTATION OCCUPATIONS
DIESEL-AG EQUIPMENT SERVICE TECH
COURSE SYLLABUS
November 17, 2022

I. CATALOG DESCRIPTION

Course Number: AGST 2331
Course Title: Advanced Electrical/HVAC Systems
Prerequisite(s): AGST1111, AGST1116

Catalog Description: Review of electrical and electronic fundamentals. The design, operation, diagnosis and repair principles of electronics and module control systems including vehicle networking. The use of electrical schematics as well as various diagnostic tools is covered.
The design, operation, diagnosis and repair of the heating, ventilation and air conditioning systems used in modern ag equipment. The use of diagnostic and service tools is covered as well as proper safety procedures. Students will receive Section 609 certification.

Credit Hour: 6.0
Class Hours: 45
Lab Hours: 135
Total Contact Hours: 180

II. COURSE OBJECTIVES: *Course will cover*:

- **A.** Safety procedures related to the Hazard Communication and Globally Harmonized Systems as well as specific program rules for tool and equipment use.
- **B.** Electrical and electronic circuit design and function pertaining to modern vehicle control systems.
- **C.** Operation and testing procedures of on-board diagnostic systems.
- **D.** The use of schematic wiring diagrams.
- **E.** The use of diagnostic equipment.
- **F.** HVAC system design and operation.
- **G.** Environmental rules associated with HVAC systems.
- **H.** Section 609 certification.
- **I.** Proper reclaiming, evacuation and charging.
- **J.** Proper refrigerant/sealant identifier use.
- **K.** Proper leak testing and proper repairs.
- **L.** Proper HVAC diagnostic procedures.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

A. STUDENT LEARNING OUTCOMES: *The student will be able to:*

1. Perform safety procedures related to the Hazard Communication and Globally Harmonized Systems, as well as, specific program rules for tool and equipment use
2. Comprehend electrical principles and Ohm's Law
3. Use the Digital Multi-Meter (DMM) to perform testing of components and circuits

4. Identify, locate and test module control systems found on modern ag equipment
5. Find, read and analyze wiring schematics and perform wiring and connector repair
6. Diagnose electrical failures using OE dealer tools and DMM
7. Describe the concern, cause and correction of customer production work
8. Demonstrate the correct procedure to diagnose, reclaim, evacuate, repair, recharge and test the air conditioning and heating systems
9. Demonstrate safety procedures related to the Hazard Communication and Globally Harmonized Systems as well as specific program rules for tool and equipment use

B. GENERAL EDUCATION LEARING OUTCOMES:

GELO #3: Critical Thinking & Problem Solving

Outcomes:

1. Collect, identify, interpret and analyze data.
2. Synthesize information to arrive at reasoned solutions to problems.
3. Evaluate ideas presented in writing, medial, speech, or artistic presentations.
4. Evaluate the validity of arguments, alternatives, data, outcomes, and/or impacts of actions.
5. Acquire and integrate knowledge and construct relationships across disciplines.

IV. CONTENT/TOPICAL OUTLINE

A. Safety
B. Use of electrical schematics for troubleshooting
C. Application of electrical and electronic concepts in diagnosis and repair
D. Microprocessor/vehicle network systems
E. Heating system components and operation
F. Air conditioning theory
G. A/C system component identification and location
H. System operation
I. Recovery/recycling & recharging
J. Leak testing and repair
K. Diagnostics of HVAC systems
L. Section 609 Certification

V. INSTRUCTIONAL MATERIALS

Required Text(s): See Course Identification Document for current textbook.
Tools: See current required tool list.

VI. METHODS OF PRESENTATION / INSTRUCTION

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

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

9. Assigned lab projects
10. Field trips

VII. METHODS OF EVALUATION

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

1. Quizzes
2. Tests
3. Lab grades
4. Class conduct

Letter grades will be based on the SCC Standard Grade Scale Policy. **Note:** See course information document for specific details on how the course grades will be calculated.

VIII. SPECIFIC COURSE REQUIREMENTS

A. Student must:

1. Complete all tests, projects, assignments, and notebook (if required).
2. Earn a final grade of 70% (2.0) or higher in all classes to progress through the program.

B. Attendance:

1. Attendance is required for successful completion of this course.
2. This is an Engaged Learning course and students are expected to complete pre-class preparation assignments/homework and attend sessions for class, lab, including assignments missed due to absence.
3. Each instructor will inform students by means of a syllabus and Course Information Document of attendance requirements at the first-class meeting.
4. It is expected that students will be on time and present for all scheduled class / lab times unless PRIOR arrangements have been made with the instructor.
5. Missed class or lab sessions, regardless of cause, reduces the opportunity for learning and may affect student achievement of course learning outcomes and the student's grades.
6. Students are responsible for all content missed, regardless of the reason for the absence.
7. Students must, whenever possible, notify the instructor if unable to attend any class/lab session.
8. Emergency absences will be considered on an individual basis to determine if learning activities can reasonably be rescheduled during the current session.

C. Participation:

1. For every hour of classroom learning students are expected to perform two hours of related studies as homework or hands-on / simulated/on-line activities outside the classroom.
2. Students are expected to be responsible for meeting scheduled class/lab/ homework & assigned due dates unless prior arrangements have been made with the instructor 24 hours before the due date.
3. Students are expected to complete all exams, quizzes, lab activities and assignments / homework at the scheduled times unless PRIOR arrangements have been made with the instructor before the due date and time.
4. When reasonably possible, and only when prior arrangements have been made, students may ask the instructor to have a test or exam rescheduled prior to 24 hours before the activities scheduled date and time.

5. Unscheduled Quizzes may be given at any time and may not be repeated or taken at a later time, unless approved by the instructor.
6. Exceptions due to emergency absences will be considered on an individual basis.

D. Program shop safety rules will be followed. Please see the course outline for any additional safety rules established by the instructor.