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

I. CATALOG DESCRIPTION

Course Number: AGST2361
Course Title: Engines and Emission Systems
Prerequisite(s): AGST1111, AGST1116

Catalog Description: Theory, operation, maintenance, overhaul, diagnosis and repair of four stroke cycle engines. Safe and proper operation of engine test equipment. Theory, operation, diagnosis and repair of diesel engine emission and aftertreatment systems.

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

II. COURSE OBJECTIVES: *Course will:*

A. Cover safety procedures related to the Hazard Communication and Globally Harmonized Systems as well as specific program rules for tool and equipment use.
B. Cover theory and operation of 4 stroke engines.
C. Cover troubleshooting and diagnostic testing of engines and engine systems.
D. Teach proper identification of engine component types and nomenclature.
E. Cover operation, diagnosis and repair of cylinder heads.
F. Teach operation, diagnosis and repair of cylinder blocks and rotating assemblies.
G. Teach operation, diagnosis and repair of modern cooling systems.
H. Teach operation, diagnosis and repair of lubrication systems.
I. Cover precision measurement of and reconditioning of components to factory specifications.
J. Demonstrate proper removal and reinstallation procedures for various components and assemblies.
K. Cover operation, diagnosis and repair of emissions treatment systems.
L. Cover function, composition and sources of various engine lubricants and fluids.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES

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

1. Demonstrate the correct procedure to read and comprehend technical information found in textbooks, manuals, and operational instructions.
2. 2. Describe the operation of a 2 and 4 stroke engine.
3. Troubleshoot and diagnose problems within various engine systems.
4. Identify the various components of a modern diesel engine using proper nomenclature.
5. Be able to remove, repair and reinstall components of the various engine systems.
6. Identify the different types of diesel fuel systems and the components of those systems.
7. Demonstrate the proper technique to precisely measure engine components.
8. Describe the function and proper handling of various engine lubricants and fluids.
9. Abide by 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 LEARNING 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. Four stroke cycle engine principles
C. Engine performance measurements
D. Static timing
E. Cooling systems
F. Engine block and cylinder design, construction, inspection and repair
G. Cylinder head design, construction, inspection and repair
H. Rotating assembly design, construction, inspection and repair
I. Lubrication system design, construction, inspection and repair
J. Lube oil refinement and application uses
K. Engine bearing theory, design and inspection
L. Diesel fuel injector removal, installation, and testing procedures
M. Theory, operation, and testing of emissions controls

V. INSTRUCTIONAL MATERIALS

The course information document lists the current text(s), tools/equipment, and/or supplies required for this class. This list is also available from the campus bookstore.

VI. METHODS OF PRESENTATION/INSTRUCTION

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

1. Lecture
2. 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. Assignments
4. Lab grades
5. Class conduct

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

VIII. SPECIFIC COURSE REQUIREMENTS

A. Students must:

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

B. Program shop safety rules must be followed. Please see course information document for any additional safety rules established by the instructor.

C. 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.

D. 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.