



Western Technical College

32412412 Diesel Advanced Electricity

Course Outcome Summary

Course Information

Description	This course is a practical study in the procedures associated with the diagnosis and troubleshooting of electronically controlled systems using manufacturer software and other diagnostic equipment.
Career Cluster	Transportation, Distribution and Logistics
Instructional Level	Technical Diploma Courses
Total Credits	3
Total Hours	108

Textbooks

Fundamentals of Medium/Heavy Duty Commercial Engines. 2nd Edition. Copyright 2020. Duffy, Owen C. and Gus Wright. Publisher: Jones & Bartlett Publishers. **ISBN-13**: 978-1-284-15093-3. Required.

Troubleshooting CAN Bus Circuits Module H200 Student Workbook H-WB200. Fischelli, Vince. Publisher: Veejer Enterprises. **ISBN-13**: 978-1-934161-23-4. Required.

Learner Supplies

Safety glasses with side eye protection that meet Z87 OSHA guidelines. **Vendor**: To be discussed in class. Required.

Six inch ankle high, quality leather work shoes - \$75.00-100.00. **Vendor**: To be discussed in class. Required.

Course Competencies

1. Interpret fault codes from vehicle control modules.

Assessment Strategies

- 1.1. Written product
- 1.2. Skill demonstration
- 1.3. Written Objective tests

Criteria

You will know you are successful when:

- 1.1. you perform critical steps in the right order from start to finish
- 1.2. you are able to verbalize sound reasoning for the decisions made throughout the process
- 1.3. you attend class regularly and on time you meet criteria for successful completion of written products; lab sheets, presentations, case studies, etc.
- 1.4. you pass written exams at level indicated by the instructor
- 1.5. you meet criteria for successful completion of written products; lab sheets, presentations, case studies, etc...

Learning Objectives

- 1.a. Demonstrate interface with vehicle control modules.
- 1.b. Navigate OEM software to find fault codes.
- 1.c. Explain logged and active fault codes.
- 1.d. Determine recommended action based on fault codes.
- 1.e. Demonstrate recommended repairs.
- 1.f. Use appropriate electronic service tool(s) and procedures to diagnose automated mechanical transmission problems; check and record diagnostic codes, clear codes, and interpret digital multimeter (DMM) readings; determine needed action.

2. Program customer specified parameters.

Assessment Strategies

- 2.1. Written product
- 2.2. Skill demonstration
- 2.3. Written Objective tests

Criteria

You will know you are successful when:

- 2.1. you perform critical steps in the right order from start to finish
- 2.2. you are able to verbalize sound reasoning for the decisions made throughout the process
- 2.3. you attend class regularly and on time
- 2.4. you meet criteria for successful completion of written products; lab sheets, presentations, case studies, etc.
- 2.5. you attend class regularly
- 2.6. you arrive for class on time
- 2.7. you pass written exams at level indicated by the instructor
- 2.8. you meet criteria for successful completion of written products; lab sheets, presentations, case studies, etc...

Learning Objectives

- 2.a. Identify programmable and protected parameters.
- 2.b. Navigate OEM software to view programmable options.
- 2.c. Explain features/ operation implications of each programmable option.
- 2.d. Adjust programmable parameters to meet customer request.
- 2.e. Verify operation of new parameters.

3. Evaluate vehicle performance using OEM software.

Assessment Strategies

- 3.1. Written product
- 3.2. Skill demonstration
- 3.3. Written Objective tests

Criteria

You will know you are successful when:

- 3.1. you wear personal protective equipment
- 3.2. you follow safety procedures
- 3.3. you select the correct tools, equipment, instruments, materials and supplies
- 3.4. you perform critical steps in the right order from start to finish
- 3.5. you are able to verbalize sound reasoning for the decisions made throughout the process

- 3.6. you attend class regularly and on time
- 3.7. you meet criteria for successful completion of written products; lab sheets, presentations, case studies, etc.

Learning Objectives

- 3.a. Interface with vehicle control modules to gather pertinent information.
- 3.b. Navigate OEM software to locate performance tests.
- 3.c. Perform applicable tests to determine vehicle performance.
- 3.d. Interpret results of performance testing.
- 3.e. Determine recommended action.
- 3.f. Demonstrate recommended repair/ replacement.
- 3.g. Inspect and test operation of automated mechanical transmission and manual electronic shift controls, shift, range and splitter solenoids, shift motors, indicators, speed and range sensors, electronic/transmission control units (ECU/TCU), neutral/in gear and reverse switches, and wiring harnesses; determine needed action.
- 3.h. Inspect and test operation of automated mechanical transmission electronic shift selectors, air and electrical switches, displays and indicators, wiring harnesses, and air lines; determine needed action
- 3.i. Use appropriate electronic service tool(s) and procedures to diagnose automatic transmission problems; check and record diagnostic codes, clear codes, and interpret digital multimeter (DMM) readings; determine needed action.
- 3.j. Inspect and test engine cooling/condenser fan motors, relays, modules, switches, sensors, wiring, and protection devices; determine needed action.

4. Interpret information from CAN-BUS to determine system malfunctions.

Assessment Strategies

- 4.1. Written product
- 4.2. Skill demonstration
- 4.3. Written Objective tests

Criteria

You will know you are successful when:

- 4.1. you perform critical steps in the right order from start to finish
- 4.2. you are able to verbalize sound reasoning for the decisions made throughout the process
- 4.3. you attend class regularly and on time
- 4.4. you meet criteria for successful completion of written products; lab sheets, presentations, case studies, etc.
- 4.5. you attend class regularly
- 4.6. you arrive for class on time
- 4.7. you pass written exams at level indicated by the instructor
- 4.8. you meet criteria for successful completion of written products; lab sheets, presentations, case studies, etc...

Learning Objectives

- 4.a. Explain CAN-BUS function and applicability.
- 4.b. Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.
- 4.c. Interface with vehicle's on-board computer; perform diagnostic procedure, verify instrument cluster operations using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.
- 4.d. Identify causes of data bus-driven gauge malfunctions; determine needed action.
- 4.e. Interface with vehicle's on-board computer; perform diagnostic procedures using recommended electronic service tool(s) (including PC based software and/or data scan tools); determine needed action.
- 4.f. Identify causes of data bus communication problems; determine needed action.

5. Identify sensors/processors and location on electronically controlled components

Assessment Strategies

- 5.1. Written product

- 5.2. Skill demonstration
- 5.3. Written Objective tests

Criteria

You will know you are successful when:

- 5.1. you perform critical steps in the right order from start to finish
- 5.2. you are able to verbalize sound reasoning for the decisions made throughout the process
- 5.3. you attend class regularly and on time you meet criteria for successful completion of written products; lab sheets, presentations, case studies, etc.
- 5.4. you pass written exams at level indicated by the instructor
- 5.5. you meet criteria for successful completion of written products; lab sheets, presentations, case studies, etc...

Learning Objectives

- 5.a. Identify sensors on engine
- 5.b. Identify sensors on the exhaust system
- 5.c. Identify different sensors on truck chassis
- 5.d. Identify different types of sensor by what they measure
- 5.e. Identify the processors on the vehicle