Western Technical College

32412406 Diesel Electricity Fundamentals

Course Outcome Summary

Course Information

Description	This course is a practical study introducing the student to basic fundamentals of electricity including test equipment, batteries, starting systems, charging systems, and lighting systems.
Career Cluster	Transportation, Distribution and Logistics
Instructional Level	Technical Diploma Courses
Total Credits	3
Total Hours	108

Textbooks

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

Student Workbook Part #H-WB111A Vehicle Electrical-Electronics Troubleshooting Training/Programming Starter Kit. 9th Edition. Fischelli, Vince. Publisher: Veejer Enterprises. **ISBN-13:** 978-1-934161-22-7. Required.

Student Workbook Part #H-WB113 Troubleshooting DC Motor Circuit Module. 9th Edition. Fischelli, Vince. Publisher: Veejer Enterprises. **ISBN-13:** 978-1-934161-07-4. 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.

Uniform: Four black/grey shirts with embroidered name. **Vendor:** Campus Shop. Required.

Success Abilities

1. Cultivate Passion: Enhance Personal Connections
2. Cultivate Passion: Expand a Growth-Mindset
3. Cultivate Passion: Increase Self-Awareness
4. Live Responsibly: Develop Resilience
5. Live Responsibly: Embrace Sustainability
6. Live Responsibly: Foster Accountability
7. Refine Professionalism: Act Ethically
8. Refine Professionalism: Improve Critical Thinking
9. Refine Professionalism: Participate Collaboratively
10. Refine Professionalism: Practice Effective Communication

High Impact Practices

1. Learning Community: these courses are designed to enhance your learning experience in which a cohort of peers complete two or more courses that are linked through projects, themes, or program emphasis.

Program Outcomes

1. Diagnose, repair and service electrical/electronic systems

Course Competencies

1. Explore general electrical systems.

Assessment Strategies

1.1. Skill Demonstration
1.2. Written Objective Test

Criteria

You will know you are successful when:

1.1. you complete task sheets with average score of three.
1.2. you wear personal protective equipment.
1.3. you follow all safety, set up, and clean up procedures.
1.4. you select the correct tools. equipment, instruments, materials, and supplies.
1.5. you perform the critical steps in the right order.
1.6. you are able to verbalize sound reasoning for decisions made throughout the process.
1.7. you score a 75% or higher on written exams.

Learning Objectives

1.a. Compare different types of electric motors.
1.b. Examine circuit control devices.
1.c. Examine solid state components.
1.d. Examine circuit protection devices.

2. Investigate electronic circuits.

Assessment Strategies

2.1. Written objective test
2.2. Skill demonstration

Criteria

You will know you are successful when

2.1. you complete task sheets with average score of three.
2.2. you wear personal protective equipment.
2.3. you follow all safety, set up, and clean up procedures.
2.4. you select the correct tools. equipment, instruments, materials, and supplies.
2.5. you perform the critical steps in the right order.
2.6. you are able to verbalize sound reasoning for decisions made throughout the process.
2.7. you score a 75% or higher on written exams.

Learning Objectives

2.a. Read and interpret electrical/electronic circuits using wiring diagrams.
2.b. Check continuity in electrical/electronic circuits using appropriate test equipment.
2.c. Check applied voltages, circuit voltages, and voltage drops in electrical/electronic circuits using appropriate test equipment.
2.d. Check current flow in electrical/electronic circuits and components using appropriate test equipment.
2.e. Check resistance in electrical/electronic circuits and components using appropriate test equipment.
2.f. Locate shorts, grounds, and opens in electrical/electronic circuits.

3. Perform battery inspection, testing, repair or maintenance.

Assessment Strategies

3.1. Written objective test
3.2. Skill demonstration

Criteria

You will know you are successful when

3.1. you complete task sheets with average score of three.
3.2. you wear personal protective equipment.
3.3. you follow all safety, set up, and clean up procedures.
3.4. you select the correct tools, equipment, instruments, materials, and supplies.
3.5. you perform critical steps in the right order from start to finish.
3.6. you are able to verbalize sound reasoning for the decisions made throughout the process.
3.7. you score a 75% or higher on written exams.

Learning Objectives

3.a. Identify battery type, perform appropriate battery load test, determine needed action.
3.b. Determine battery state of charge using an open circuit voltage test.
3.c. Inspect, clean, and service battery; replace as needed.
3.d. Inspect and clean battery boxes, mounts, and hold downs; repair or replace as needed.
3.e. Charge battery using appropriate method for battery type.
3.f. Inspect, test, and clean battery cables and connectors; repair or replace as needed.
3.g. Jump start a vehicle using jumper cables and a booster battery or appropriate auxiliary power supply using proper safety procedures.
3.h. Identify and test low voltage disconnect (LVD) systems; determine needed repair.
3.i. Perform battery test (load and/or capacitance).

4. Explore starting systems.

Assessment Strategies

4.1. Written objective test
4.2. Skill demonstration

Criteria

You will know you are successful when

4.1. you complete task sheets with average score of three.
4.2. you wear personal protective equipment.

4.3. you follow all safety, set up, and clean up procedures.
4.4. you select the correct tools, equipment, instruments, materials, and supplies.
4.5. you perform the critical steps in the right order.
4.6. you are able to verbalize sound reasoning for decisions made throughout the process.
4.7. you score a 75% or higher on written exams.

Learning Objectives

4.a. Perform starter circuit cranking voltage and voltage drop tests; determine needed action.
4.b. Inspect and test components (key switch, push button and/or magnetic switch) and wires and harnesses in the starter control circuit; replace as needed.
4.c. Inspect and test starter relays and solenoids/switches; replace as needed.
4.d. Remove and replace starter; inspect flywheel ring gear or flex plate.

5. Perform charging system diagnosis and repair.

Assessment Strategies

5.1. Written objective test
5.2. Skill demonstration

Criteria

You will know you are successful when

5.1. you complete task sheets with average score of three.
5.2. you wear personal protective equipment.
5.3. you follow all safety, set up, and clean up procedures.
5.4. you select the correct tools, equipment, instruments, materials, and supplies.
5.5. you perform the critical steps in the right order.
5.6. you are able to verbalize sound reasoning for decisions made throughout the process.
5.7. you score a 75% or higher on written exams.

Learning Objectives

5.a. Test instrument panel, mounted volt meters and/or indicator lamps; determine needed action.
5.b. Identify causes of a no charge, low charge, or overcharge problems; determine needed action.
5.c. Inspect and replace alternator drive belts, pulleys, fans, tensioners, and mounting brackets; adjust drive belts and check alignment.
5.d. Perform charging system voltage and amperage output tests and AC ripple test; determine needed action.

5.e. Perform charging circuit voltage drop tests; determine needed action.
5.f. Remove and replace alternator.
5.g. Inspect, repair, or replace cables, wires, and connectors in the charging circuit.

6. Inspect lighting system.

Assessment Strategies

6.1. Written objective test
6.2. Skill demonstration

Criteria

You will know you are successful when

6.1. you complete task sheets with average score of three.
6.2. you wear personal protective equipment.
6.3. you follow all safety, set up, and clean up procedures.
6.4. you select the correct tools. equipment, instruments, materials, and supplies.
6.5. you perform the critical steps in the right order.
6.6. you are able to verbalize sound reasoning for decisions made throughout the process.
6.7. you score a 75% or higher on written exams.

Learning Objectives

6.a. Test, aim, and replace headlights.
6.b. Inspect and test tractor-to-trailer multi-wire connector(s); repair or replace as needed.