DET 189 Course Outline as of Fall 2018

CATALOG INFORMATION

Dept and Nbr: DET 189 Title: HEAVY DUTY ELECTRICAL Full Title: Heavy Duty Equipment Electrical Systems Last Reviewed: 1/22/2018

| Units | | Course Hours per Week | | Nbr of Weeks | Course Hours Total | |
|---------|------|-----------------------|------|--------------|---------------------------|-------|
| Maximum | 3.00 | Lecture Scheduled | 2.25 | 17.5 | Lecture Scheduled | 39.38 |
| Minimum | 3.00 | Lab Scheduled | 2.25 | 8 | Lab Scheduled | 39.38 |
| | | Contact DHR | 0 | | Contact DHR | 0 |
| | | Contact Total | 4.50 | | Contact Total | 78.75 |
| | | Non-contact DHR | 0 | | Non-contact DHR | 0 |

Total Out of Class Hours: 78.75

Total Student Learning Hours: 157.50

| Title 5 Category: | AA Degree Applicable |
|-------------------|---|
| Grading: | Grade Only |
| Repeatability: | 00 - Two Repeats if Grade was D, F, NC, or NP |
| Also Listed As: | |
| Formerly: | DET 89 |

Catalog Description:

Principles of operation of electrical and electronic components and systems used in medium/heavy duty trucks, public transportation, construction and agricultural equipment. Introduction to electronic control systems.

Prerequisites/Corequisites:

Recommended Preparation: Eligibility for ENGL 100 or ESL 100 and Course Completion of DET 179

Limits on Enrollment:

Schedule of Classes Information:

Description: Principles of operation of electrical and electronic components and systems used in medium/heavy duty trucks, public transportation, construction and agricultural equipment. Introduction to electronic control systems. (Grade Only) Prerequisites/Corequisites: Recommended: Eligibility for ENGL 100 or ESL 100 and Course Completion of DET 179 Limits on Enrollment:

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

| AS Degree: CSU GE: | Area Transfer Area | | Effective: Effective: | Inactive: Inactive: |
|-----------------------|-----------------------|-----------|--------------------------|------------------------|
| IGETC: | Transfer Area | | Effective: | Inactive: |
| CSU Transfer | : E | ffective: | Inactive: | |
| UC Transfer: | E | ffective: | Inactive: | |

CID:

Certificate/Major Applicable:

Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:

At the conclusion of this course, the student should be able to:

- 1. Diagnose and repair starting, charging and chassis electrical systems.
- 2. Use computer based daignostic scan tools with on on-board diagnostic systems.
- 3. Inteprete service manuals and schematics for electrical systems.

Objectives:

At the conclusion of this course, the student should be able to:

- 1. Explain the fundamentals of alternating current (AC), direct current (DC), series and parallel circuits.
- 2. Read and interpret schematic diagrams.
- 3. Evaluate electrical circuits from schematic diagrams.
- 4. Properly use diagnostic tools related to the analysis and repair of electrical systems.
- 5. Identify, locate, and analyze electronic components and microprocessors.
- 6. Test, diagnose, and repair electrical and electronic circuits and components.
- 7. Discuss and apply personal, shop, and environmental safety procedures.

Topics and Scope:

- I. Review
 - A. Laws and theory
 - B. Diagnostic tools
 - C. Direct current
 - D. Alternating current
- II. Symbols and Diagrams
 - A. Electrical symbols
 - B. Use of schematic diagrams
- III. Series and Parallel Circuits
 - A. Series circuits
 - B. Parallel circuits

C. Series-parallel circuit

IV. Testing and Repair of Components

A. Battery testing

B. Starters

- C. Alternators/generators
- D. Lighting circuits
- E. Switches and relays
- F. Harnesses and ECM's

V. Electronic Components and Microprocessors

- A. Sensors/switches
- B. Electronic control modules
- C. Actuators
- D. Diagnosis with scanner
- VI. On-Board Networks and Diagnostics
- VII. Testing, Diagnosis, and Repair
 - A. Using test equipment
 - B. Diagnostic procedures and manuals
 - C. Repair of electronic circuitry
- VIII. Safety
 - A. Personal
 - B. Shop
 - C. Environmental

All topics are covered in both the lecture and lab parts of the course.

Assignment:

Lecture-Related Assignments:

- 1. Reading 25 50 pages a week
- 2. Ten to fifteen tests to include final exams

Lab-Related Assignments:

- 1. Evaluate batteries and starting systems, complete task sheets
- 2. Test and analyze charging systems, complete task sheets
- 3. Inspect and test starters and alternators
- 4. Test electronic control systems with computer diagnostic tools
- 5. Complete NATEF (National Automotive Technicians Education Foundation) recommended task sheets
- 6. Daily work logs (work assigned, work completed)

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Daily work logs

Writing 0 - 25% **Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Task sheets

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Starter and alternator inspections, test electronic controls

Exams: All forms of formal testing, other than skill performance exams.

Tests to include final

Other: Includes any assessment tools that do not logically fit into the above categories.

None

Representative Textbooks and Materials:

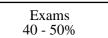
Fundamentals of Mobile Heavy Equipment. Wright, Gus and Duffy, Owen and Heard, Scott. Jones and Bartlett. 2019

Fundamentals of Medium/Heavy Duty Commercial Vehicle Systems. Duffy, Owen and Wright, Gus. Jones and Bartlett. 2016

Instructor prepared materials

Problem solving 10 - 25%

Skill Demonstrations 10 - 25%



Other Category 0 - 0%