



# COURSE OUTLINE

## MPT201

Prepared: Jamie Schmidt    Approved:

|   |   |
|---|---|
| <b>Course Code: Title</b>   | MPT201: ELECTRICITY/ELECTRONICS   |
| <b>Program Number: Name</b>   | 4044: MOT POWER ADV REPAIR  |
| <b>Department:</b>  | MOTIVE POWER  |
| <b>Semester/Term:</b>   | 17F   |
| <b>Course Description:</b>  | In this course, you will be introduced to electronic components relating to the motive power industry. The student will diagnose and repair electrical and electronic systems. Use a variety of troubleshooting techniques and test equipment to access electronic circuits and vehicle subsystems such as distributor less ignition systems, restraint systems, charging systems, starting systems and accessories.  |
| <b>Total Credits:</b>   | 3   |
| <b>Hours/Week:</b>  | 5   |
| <b>Total Hours:</b>   | 40  |
| <b>Prerequisites:</b>   | MPF103, MPF123  |
| <b>This course is a pre-requisite for:</b>  | MPT233  |
| <b>Vocational Learning Outcomes (VLO's):</b><br><br>Please refer to program web page for a complete listing of program outcomes where applicable. | <p>#1. Analyse, diagnose, and solve various motive power system problems by using problem-solving and critical thinking skills and strategies and by applying fundamental knowledge of motor vehicle operation, components, and their interrelationships.</p> <p>#4. Diagnose and repair electrical, electronic, personal safety, and emission components and systems in compliance with manufacturer's recommendations.</p> <p>#8. Select and use a variety of troubleshooting techniques and test equipment to assess electronic circuits, vehicle systems, and subsystems.</p> <p>#11. Use information technology and computer skills to support work in a motive power environment.</p> |
| <b>Essential Employability Skills (EES):</b>  | <p>#4. Apply a systematic approach to solve problems.</p> <p>#5. Use a variety of thinking skills to anticipate and solve problems.</p> <p>#6. Locate, select, organize, and document information using appropriate technology and information systems.</p> <p>#7. Analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>#11. Take responsibility for ones own actions, decisions, and consequences.</p>  |



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| <b>Course Evaluation:</b>                                     | Passing Grade: 50%, D  |                 |                   |             |     |                      |     |      |     |       |     |
|---|--|-----------------|-------------------|-------------|-----|----------------------|-----|------|-----|-------|-----|
| <b>Other Course Evaluation &amp; Assessment Requirements:</b> | <p>The following semester grades will be assigned to students:</p> <p>Grade<br/>Definition Grade Point Equivalent<br/>A+ 90 100% 4.00<br/>A 80 89%<br/>B 70 - 79% 3.00<br/>C 60 - 69% 2.00<br/>D 50 59% 1.00<br/>F (Fail) 49% and below 0.00</p> <p>CR (Credit) Credit for diploma requirements has been awarded.<br/>S Satisfactory achievement in field /clinical placement or non-graded subject area.<br/>U Unsatisfactory achievement in field/clinical placement or non-graded subject area.<br/>X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.<br/>NR Grade not reported to Registrar's office.<br/>W Student has withdrawn from the course without academic penalty.</p> |                 |                   |             |     |                      |     |      |     |       |     |
| <b>Evaluation Process and Grading System:</b>                 | <table border="1"> <thead> <tr> <th>Evaluation Type</th> <th>Evaluation Weight</th> </tr> </thead> <tbody> <tr> <td>Assignments</td> <td>10%</td> </tr> <tr> <td>Employability Skills</td> <td>10%</td> </tr> <tr> <td>Shop</td> <td>45%</td> </tr> <tr> <td>Tests</td> <td>35%</td> </tr> </tbody> </table>   | Evaluation Type | Evaluation Weight | Assignments | 10% | Employability Skills | 10% | Shop | 45% | Tests | 35% |
| Evaluation Type   | Evaluation Weight  |                 |                   |             |     |                      |     |      |     |       |     |
| Assignments   | 10%  |                 |                   |             |     |                      |     |      |     |       |     |
| Employability Skills  | 10%  |                 |                   |             |     |                      |     |      |     |       |     |
| Shop  | 45%  |                 |                   |             |     |                      |     |      |     |       |     |
| Tests   | 35%  |                 |                   |             |     |                      |     |      |     |       |     |
| <b>Books and Required Resources:</b>                          | <p>Heavy Duty Truck Systems by Sean Bennet<br/>Edition: 6<br/>ISBN: 9781305686229</p> <p>Automotive Technology a Systems Approach by Erjavec, Restole<br/>ISBN: 9780176501679</p>  |                 |                   |             |     |                      |     |      |     |       |     |
| <b>Course Outcomes and Learning Objectives:</b>               | <p><b>Course Outcome 1.</b></p> <p>Describe the construction, operation, composition, types, style and applications of electronic</p>  |                 |                   |             |     |                      |     |      |     |       |     |



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and circuit devices.

### **Learning Objectives 1.**

Describe the construction, operation and applications of:

#### Diodes

- forward and reverse bias
- current control

#### Transistors

- forward and reverse bias
- PNP and NPN
- switching
- amplification

#### Capacitors

- ceramic and electrolytic

#### Sensors

##### Voltage generating

- pulse generators
- piezoelectric
- galvanic
- Hall effect
- optical
- thermistors

##### Variable resistor

- rheostat
- potentiometers
- piezo resistive

##### Circuit Devices

- solenoids
- relays

### **Course Outcome 2.**

Perform inspection, testing and diagnostic procedures for electronic and circuit devices



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following manufacturers' recommendations.

### Learning Objectives 2.

#### Diodes

- test the operation of a diode with a DVOM

#### Transistors

- verify the operation of a switching diode in a power train control module

#### Capacitors

- measure capacitance

#### Sensors

- measure voltage output and resistance of magnetic pulse generators
- measure voltage output of piezoelectric sensors
- measure voltage output of galvanic sensors
- perform resistance tests on potentiometers and thermistors

#### Circuit Devices

- perform electrical diagnosis on solenoids and relays

### Course Outcome 3.

Perform inspection testing and diagnostic procedures using manufactures wiring schematics

### Learning Objectives 3.

- diagnose faults, i.e., shorts, opens, grounds, high resistance
- perform circuit analysis following manufacturers' troubleshooting charts
- interpret various types of manufacturers' wiring diagrams

### Course Outcome 4.

Describe the construction, operation, types, styles and application of computer-controlled starting systems, charging systems and electronic regulators.

### Learning Objectives 4.



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- computer-controlled starting and charging system
- alternator field
- ambient temperature sensing
- battery voltage sensing
- battery temperature sensing
- zener diode and voltage control transistors
- field current switching
- Ignition switch input
- Starter control relay
- BCM controlled starter inputs and outputs

### Course Outcome 5.

Perform inspection, testing and diagnostic procedures on starting and computer-controlled charging systems following manufacturers' recommendations.

### Learning Objectives 5.

- outline the recommended testing sequence to determine the overall condition of the charging and starting systems
  - perform visual charging and starting system tests
  - identify and isolate faulty charging and starting system components by utilizing the recommended troubleshooting procedures and test equipment

**Date:**

Friday, September 1, 2017

Please refer to the course outline addendum on the Learning Management System for further information.