



# COURSE OUTLINE

## MPT201

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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>  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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### Course Evaluation:

Passing Grade: 50%, D

### Other Course Evaluation & Assessment Requirements:

The following semester grades will be assigned to students:

Grade

Definition Grade Point Equivalent

A+ 90 100% 4.00

A 80 89%

B 70 - 79% 3.00

C 60 - 69% 2.00

D 50 59% 1.00

F (Fail) 49% and below 0.00

CR (Credit) Credit for diploma requirements has been awarded.

S Satisfactory achievement in field /clinical placement or non-graded subject area.

U Unsatisfactory achievement in field/clinical placement or non-graded subject area.

X A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.

NR Grade not reported to Registrar's office.

W Student has withdrawn from the course without academic penalty.

### Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Assignments	10%
Employability Skills	10%
Shop	45%
Tests	35%

### Books and Required Resources:

Heavy Duty Truck Systems by Sean Bennet

Edition: 6

ISBN: 9781305686229

Automotive Technology a Systems Approach by Erjavec, Restole

ISBN: 9780176501679

### Course Outcomes and Learning Objectives:

## Course Outcome 1.

Describe the construction, operation, composition, types, style and applications of electronic



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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.