



## COURSE OUTLINE: MPT201 - ELECTRIC/ELECTRONICS

Prepared: Jamie Schmidt

Approved: Bob Chapman - Dean

<b>Course Code: Title</b>	MPT201: ELECTRICITY/ELECTRONICS
<b>Program Number: Name</b>	4044: MOT POWER ADV REPAIR
<b>Department:</b>	MOTIVE POWER
<b>Academic Year:</b>	2025-2026
<b>Course Description:</b>	In this course, you will be introduced to electronic components used in the motive power industry. The student will diagnose and repair electrical and electronic systems. You will use a variety of troubleshooting techniques and test equipment to troubleshoot module input and output circuits. Computerized starting, charging and ignition systems will be studied with the use of electrical schematics and manufactures service information.
<b>Total Credits:</b>	3
<b>Hours/Week:</b>	5
<b>Total Hours:</b>	40
<b>Prerequisites:</b>	MPF103, MPF123
<b>Corequisites:</b>	There are no co-requisites for this course.
<b>This course is a pre-requisite for:</b>	MPT233
<b>Vocational Learning Outcomes (VLO's) addressed in this course:</b>	<b>4044 - MOT POWER ADV REPAIR</b>
Please refer to program web page for a complete listing of program outcomes where applicable.	VLO 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.
	VLO 4 Diagnose and repair electrical, electronic, personal safety, and emission components and systems in compliance with manufacturer's recommendations.
	VLO 7 Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices.
	VLO 8 Select and use a variety of troubleshooting techniques and test equipment to assess electronic circuits, vehicle systems, and subsystems.
	VLO 10 Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards.
	VLO 11 Use information technology and computer skills to support work in a motive power environment.
	VLO 16 Complete all assigned work in compliance with occupational, health, safety, and environmental law; established policies and procedures; codes and regulations; and in accordance with ethical principles.
<b>Essential Employability</b>	EES 3 Execute mathematical operations accurately.



<b>Skills (EES) addressed in this course:</b>	<p>EES 4 Apply a systematic approach to solve problems.</p> <p>EES 5 Use a variety of thinking skills to anticipate and solve problems.</p> <p>EES 6 Locate, select, organize, and document information using appropriate technology and information systems.</p> <p>EES 7 Analyze, evaluate, and apply relevant information from a variety of sources.</p> <p>EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.</p> <p>EES 10 Manage the use of time and other resources to complete projects.</p>				
<b>Course Evaluation:</b>	<p>Passing Grade: 50%, D</p> <p>A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.</p>				
<b>Other Course Evaluation &amp; Assessment Requirements:</b>	<p>The following semester grades will be assigned to students:</p> <p>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</p> <p>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.</p>				
<b>Books and Required Resources:</b>	<p>Automotive Technology a Systems Approach by Erjavec, Restole  Publisher: Cengage Edition: 4th Canadian  ISBN: 9780176501679</p>				
<b>Course Outcomes and Learning Objectives:</b>	<table border="1"> <thead> <tr> <th data-bbox="488 1112 802 1159">Course Outcome 1</th> <th data-bbox="802 1112 1433 1159">Learning Objectives for Course Outcome 1</th> </tr> </thead> <tbody> <tr> <td data-bbox="488 1159 802 1458">Describe the construction, operation, composition, types, style and applications of electronic and circuit devices.</td> <td data-bbox="802 1159 1433 1458"> Describe the construction, operation and applications of: <ul style="list-style-type: none"> <li>Diodes <ul style="list-style-type: none"> <li>• forward and reverse bias</li> <li>• current control</li> </ul> </li> <li>Transistors <ul style="list-style-type: none"> <li>• forward and reverse bias</li> <li>• PNP and NPN</li> <li>• switching</li> <li>• amplification</li> </ul> </li> <li>Capacitors <ul style="list-style-type: none"> <li>• ceramic and electrolytic</li> </ul> </li> </ul> </td> </tr> </tbody> </table>	Course Outcome 1	Learning Objectives for Course Outcome 1	Describe the construction, operation, composition, types, style and applications of electronic and circuit devices.	Describe the construction, operation and applications of: <ul style="list-style-type: none"> <li>Diodes <ul style="list-style-type: none"> <li>• forward and reverse bias</li> <li>• current control</li> </ul> </li> <li>Transistors <ul style="list-style-type: none"> <li>• forward and reverse bias</li> <li>• PNP and NPN</li> <li>• switching</li> <li>• amplification</li> </ul> </li> <li>Capacitors <ul style="list-style-type: none"> <li>• ceramic and electrolytic</li> </ul> </li> </ul>
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	<p>Sensors</p> <ul style="list-style-type: none"> <li>• voltage generating</li> <li>• pulse generators</li> <li>• piezoelectric</li> <li>• galvanic</li> <li>• hall effect</li> <li>• optical</li> <li>• thermistors</li> </ul> <p>Variable resistor</p> <ul style="list-style-type: none"> <li>• rheostat</li> <li>• potentiometers</li> <li>• piezo resistive</li> </ul> <p>Circuit Devices</p> <ul style="list-style-type: none"> <li>• solenoids</li> <li>• relays</li> </ul>
<b>Course Outcome 2</b>	<b>Learning Objectives for Course Outcome 2</b>
Perform inspection, testing and diagnostic procedures for electronic and circuit devices following manufacturer's recommendations.	<p>Diodes</p> <ul style="list-style-type: none"> <li>• test the operation of a diode with a DVOM</li> </ul> <p>Transistors</p> <ul style="list-style-type: none"> <li>• verify the operation of a transistor in a power train control module</li> </ul> <p>Capacitors</p> <ul style="list-style-type: none"> <li>• measure capacitance</li> </ul> <p>Sensors</p> <ul style="list-style-type: none"> <li>• measure voltage output and resistance of magnetic pulse generators</li> <li>• measure voltage output of piezoelectric sensors</li> <li>• measure voltage output of galvanic sensors</li> <li>• perform resistance tests on potentiometers and thermistors</li> </ul> <p>Circuit Devices</p> <ul style="list-style-type: none"> <li>• perform electrical diagnosis on solenoids and relays</li> </ul>
<b>Course Outcome 3</b>	<b>Learning Objectives for Course Outcome 3</b>
Perform inspection testing and diagnostic procedures using manufacturer's wiring schematics.	<ul style="list-style-type: none"> <li>• Diagnose faults, i.e., shorts, opens, grounds, high resistance</li> <li>• Perform circuit analysis following manufacturer's troubleshooting charts</li> <li>• Interpret various types of manufacturer's wiring diagrams</li> </ul>
<b>Course Outcome 4</b>	<b>Learning Objectives for Course Outcome 4</b>
Describe the construction, operation, types, styles and application of computer-controlled starting systems, charging systems and electronic regulators.	<ul style="list-style-type: none"> <li>• Computer-controlled starting and charging system</li> <li>• Alternator field</li> <li>• Ambient temperature sensing</li> <li>• Battery voltage sensing</li> <li>• Battery temperature sensing</li> <li>• Zener diode and voltage control transistors</li> <li>• Field current switching</li> <li>• Ignition switch input</li> <li>• Starter control relay</li> <li>• BCM controlled starter inputs and outputs</li> </ul>
<b>Course Outcome 5</b>	<b>Learning Objectives for Course Outcome 5</b>

	Perform inspection, testing and diagnostic procedures on starting and computer-controlled charging systems following manufacturer's recommendations.	<ul style="list-style-type: none"> <li>• Outline the recommended testing sequence to determine the overall condition of the charging and starting systems</li> <li>• Perform visual charging and starting system tests</li> <li>• Identify and isolate faulty charging and starting system components by utilizing the recommended troubleshooting procedures and test equipment</li> </ul>										
<b>Evaluation Process and Grading System:</b>	<table border="1"> <thead> <tr> <th data-bbox="505 340 708 378">Evaluation Type</th> <th data-bbox="711 340 914 378">Evaluation Weight</th> </tr> </thead> <tbody> <tr> <td data-bbox="505 381 708 420">Assignments</td> <td data-bbox="711 381 914 420">30%</td> </tr> <tr> <td data-bbox="505 423 708 461">Employability Skills</td> <td data-bbox="711 423 914 461">10%</td> </tr> <tr> <td data-bbox="505 465 708 503">Shop</td> <td data-bbox="711 465 914 503">40%</td> </tr> <tr> <td data-bbox="505 506 708 545">Tests</td> <td data-bbox="711 506 914 545">20%</td> </tr> </tbody> </table>		Evaluation Type	Evaluation Weight	Assignments	30%	Employability Skills	10%	Shop	40%	Tests	20%
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<b>Date:</b>	August 18, 2025											
<b>Addendum:</b>	Please refer to the course outline addendum on the Learning Management System for further information.											