COURSE OUTLINE: MPF123 - ELECTRICAL II

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Course Code: Title	MPF123: ELECTRICAL II
Program Number: Name	4041: AUTOMOTIVE REPAIR 4044: MOT POWER ADV REPAIR
Department:	MOTIVE POWER
Academic Year:	2024-2025
Course Description:	In this course you will gain an understanding of automotive and heavy duty electrical circuits, wiring diagrams, electro-magnetism and the use of applied test equipment. Construction and operating principals of starters and alternators will be discussed. You will perform basic starting and charging system testing. Electronic ignition system operation and design will be studied including manufactures maintenance and inspection procedures. Students will be required to follow proper safety procedures when performing the above tasks according to both Sault College Motive Power Department Standards and Vehicle Manufacturers safety regulations and specifications.
Total Credits:	3
Hours/Week:	5
Total Hours:	40
Prerequisites:	MPF100, MPF103
Corequisites:	There are no co-requisites for this course.
This course is a pre-requisite for:	MPT201
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4041 - AUTOMOTIVE REPAIR** VLO 1 Identify basic motive power system problems by using critical thinking skills and strategies and by applying fundamental knowledge of motor vehicle operation, components, and their interrelationships. VLO 3 Identify, inspect, and test basic electrical, electronic, and emission components and systems in compliance with manufacturers recommendations. VLO 6 Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices. VLO 7 Use a variety of test equipment to assess basic electronic circuits, vehicle systems, and subsystems. VLO 9 Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards. VLO 10 Use information technology and computer skills to access data concerning repair procedures and manufacturer's updates.

	4044 - MOT POWER ADV REPAIR 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.
Essential Employability Skills (EES) addressed in this course:	EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
Course Evaluation:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
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.
Books and Required Resources:	Heavy Duty Truck Systems by Sean Bennet Publisher: Cengage Learning Canada Edition: 7th ISBN: 9781305686229 Automotive Technology a Systems Approach by Erjavec, Restole Publisher: Cengage Learning Canada Edition: 4th Canadian ISBN: 9780176501679

Course Outcomes and Learning Objectives:

Course Outcome 1	Learning Objectives for Course Outcome 1
Outline the fundamentals of wiring diagrams	• Prepare a valley forge style diagram for a relay controlled circuit • Follow the path of current flow in a circuit using a wiring schematic • Relate troubleshooting procedures for opens, shorts and high resistance faults to a wiring schematic
Course Outcome 2	**Learning Objectives for Course Outcome 2**
Connect and operate diagnostic test equipment	• Use a test lamp to diagnose an open in a circuit • Use a DVOM to diagnose an open in a circuit • Locate unwanted resistance in a circuit using voltage drop testing • Measure resistance in a circuit using a DVOM • Measure parasitic drain • Measure current flow using an inductive ammeter • Remove and replace electrical components
Course Outcome 3	**Learning Objectives for Course Outcome 3**
Describe the principals of operation and construction of starting and charging systems.	• Describe the construction and operation of an alternator • Describe the construction and operation of a starter motor • Explain the motor principle • Describe electromagnetic induction
Course Outcome 4	**Learning Objectives for Course Outcome 4**
Test starting and charging system operation.	• Perform charging system tests following manufactures recommended procedures • Perform starting system tests following manufactures recommended procedures
Course Outcome 5	**Learning Objectives for Course Outcome 5**
Explain the construction, operation and maintenance of ignition systems.	• Identify ignition system components • Describe the fundamental operation of a spark ignition system • Perform visual inspection of ignition system components • Perform a spark test • Measure secondary voltage using a KV meter

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight

	Assignments	10%
	Employability Skills	10%
	Shop	45%
	Tests	35%
Date:	November 12, 2024	
Addendum:	Please refer to the course outline addendum on the Learning Management System for further information.	