COURSE OUTLINE: MPT231 - AUTO DRIVE TRAINS

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Course Code: Title	MPT231: AUTOMOTIVE DRIVE TRAINS
Program Number: Name	4044: MOT POWER ADV REPAIR
Department:	MOTIVE POWER
Semesters/Terms:	19W
Course Description:	In this course, you will be introduced to manual transaxles and front wheel drive axle assemblies. You will observe the disassembly and reassembly of a manual transaxle and CV shaft service. Automatic transmissions will be introduced focusing on pump types, valves, torque converters, driving and holding devices and planetary gear sets both simple and compound. You will participate in the disassembly and tracing of power flows through an automatic transmission and perform pressure tests. You will also be introduced to four wheel drive and all wheel drive systems focusing on construction and operation. 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:	6
Total Hours:	48
Prerequisites:	MPF103, MPF127
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4044 - MOT POWER ADV REPAIR** 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 5 Diagnose and repair drive train 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 9 Apply knowledge of hydraulics and pneumatics to the testing and analysis of motive power 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.

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	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 1	Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
	EES 2	Respond to written, spoken, or visual messages in a manner that ensures effective communication.
	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 8	Show respect for the diverse opinions, values, belief systems, and contributions of others.
	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 final grade for this course will be based on the results of classroom, assignments and shop evaluations weighed as indicated: Classroom 35% of the final grade is comprised of term tests Assignments 10% of the final grade is comprised of technical reports Shop 45% of the final grade is comprised of attendance, punctuality, preparedness, student ability, work organization and general attitude Employability Skills 10% of final grade is comprised of attendance, class participation, show ability to follow direction and being a team player. (Student will be given notice of test and assignment dates in advance) 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.	

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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 Bennett
Publisher: Thomson Nelson Learning Canada Edition: 6th ed

Automotive Technology: A Systems Approach by Erjavec
Publisher: Thomson Nelson Learning Canada Edition: 3rd Canadian Edition

Course Outcomes and Learning Objectives:

Course Outcome 1	**Learning Objectives for Course Outcome 1**
1. Describe the functions, construction, types, styles and application of front wheel drive axle assemblies.	Describe the following: 1.1 front wheel drive axles 1.2 half shafts 1.3 constant velocity 1.4 bearings 1.5 constant velocity (CV) boots 1.6 vibration damper 1.7 front wheel drive axles 1.8 torque steer 1.9 inner and outer constant velocity joints 1.10 vibration damper operation
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2. Describe the construction and operation of manual transaxles.	2.1 Compare and contrast front wheel drive vs. rear wheel drive. 2.2 Trace power flows through a transaxle. 2.3 Explain operation of the synchronizer hub assembly. 2.4 Outline shift mechanisms. 2.5 Observe the disassembly and inspect a transaxle and perform assigned operations to determine gear ratio and final drive ratio.
Course Outcome 3	**Learning Objectives for Course Outcome 3**
3. Explain front wheel drive axle construction and operation.	3.1 State the difference between a plunge and a fixed CV joint. 3.2 Remove and install axle assemblies from vehicles. 3.3 Perform assigned operations to remove CV boots and joints from the half shafts. 3.4 Explain the diagnostic sequence used to determine CV joint failure.
Course Outcome 4	**Learning Objectives for Course Outcome 4**
4. Explain the construction and operating principles of automatic transmissions.	4.1 Describe clutch pack and band operation. 4.2 List three types of pumps. 4.3 Outline control devices. 4.4 Describe a compound planetary gear set. 4.5 Explain torque converter operation.
Course Outcome 5	**Learning Objectives for Course Outcome 5**

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5. Describe special tools required for servicing and repairing automatic transmission equipped vehicles.	5.1 Identify tools used for transmission repair. 5.2 Explain how clutch packs are disassembled.
Course Outcome 6	**Learning Objectives for Course Outcome 6**
6. Describe the construction, types, styles and application of transfer case assemblies.	6.1 Outline shifting 6.2 Describe ranges 6.3 Explain internal operation of manual and automatic four wheel drive transfer cases.

Evaluation Process and Grading System:

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

Date: September 2, 2020

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