Prepared: Stephen Kent Approved: Corey Meunier

Course Code: Title	MPF127: MOTIVE POWER DRIVE TRAIN SYSTEMS
Program Number: Name	4041: AUTOMOTIVE REPAIR
Department:	MOTIVE POWER
Semester/Term:	17F
Course Description:	COURSE DESCRIPTION: In this course the student will be able to describe the construction, basic operating principles, servicing and testing techniques of the following gear train systems, clutch assemblies, manual transmission, differentials, rear wheel drive, drive shafts and PTO shafts and rear wheel drive axle, wheel hub assemblies. The student will also demonstrate their ability to disassemble, test and inspect manual transmissions, differentials, wheel hubs and drivelines including backlash, preload, gear patterns, driveline angle measurement and phasing.
Total Credits:	4
Hours/Week:	8
Total Hours:	64
Prerequisites:	MPF103
This course is a pre-requisite for:	MPT231, MPT234
Vocational Learning Outcomes (VLO's): **Please refer to program web page for a complete listing of program outcomes where applicable.**	**4041 - AUTOMOTIVE REPAIR** #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. #4. Identify, inspect, and test basic drive train components and systems in compliance with manufacturers recommendations. #6. Disassemble and assemble components to required specifications by applying workshop skills and knowledge of basic shop practices. #7. Use a variety of test equipment to assess basic electronic circuits, vehicle systems, and subsystems. #8. Apply basic knowledge of hydraulics and pneumatics to the testing and inspection of basic motive power systems and subsystems. #9. Communicate information effectively, credibly, and accurately by producing supporting documentation to appropriate standards.

	#11. Prepare logs, records, and documentation to appropriate standards. #12. Apply business practices and communication skills to improve customer service.
Essential Employability Skills (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. #2. Respond to written, spoken, or visual messages in a manner that ensures effective communication. #3. Execute mathematical operations accurately. #4. Apply a systematic approach to solve problems. #5. Use a variety of thinking skills to anticipate and solve problems. #6. Locate, select, organize, and document information using appropriate technology and information systems. #7. Analyze, evaluate, and apply relevant information from a variety of sources. #8. Show respect for the diverse opinions, values, belief systems, and contributions of others. #9. Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. #10. Manage the use of time and other resources to complete projects. #11. Take responsibility for ones own actions, decisions, and consequences.
Course Evaluation:	Passing Grade: 50%, D
Other Course Evaluation & Assessment Requirements:	V. EVALUATION PROCESS/GRADING SYSTEM: 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 a number 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) NOTE: All assignments will be in typed format. NO hand written assignments will be accepted. 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%
Theory Tests	35%

Books and Required Resources:

Heavy Duty Truck Systems by Bennett
Publisher: Cengage Learning 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.

Explain the construction, operating principles, testing and service techniques required to repair single and double disc clutch assemblies.

Learning Objectives 1.

Potential Elements of the Performance:
- Compare & contrast static and sliding friction.
- State the effects of centrifugal force.
- Describe the construction of single and double disc push and pull type clutch assemblies.
- Test and inspect push and pull type clutch assemblies with prescribed service tools and equipment.
- Perform clutch adjustments following manufactures maintenance procedures.

Course Outcome 2.

Demonstrate a thorough understanding of the construction, operation, testing and servicing of rear wheel drive single countershaft manual transmissions.

Learning Objectives 2.

Potential Elements of the Performance:
- Describe the basic operating principles of various manual shift gear boxes.
- Discuss the common customer complaints related to various power train component failures.
- Dismantle and trace power flows in manual shift transmissions.
- Inspect gears and synchronizers for wear and proper operation.
- Describe manufacturers` system maintenance procedures of manual transmission lubricating fluids.

Course Outcome 3.

Describe the function, composition and construction of single reduction differentials and drive shafts.

Learning Objectives 3.

Potential Elements of the Performance:
- Identify the differential and drive axle assemblies employed within the motive power field.
- Describe the function and interrelationship of the components of differentials and drive axle assemblies.
- Measure driveline angle and phasing using prescribed tools and equipment.
- Compare and contrast gears used in motive power drivelines (e.g.) bevel gear, spur gear, helical and hypoid.

Course Outcome 4.

Explain the fundamentals, construction, composition and types of wheel hub assemblies.

Learning Objectives 4.

Potential Elements of the Performance:
- Explain sliding and rolling friction.
- Outline load carrying bearings.
- Describe the importance of proper fluid types and specified levels.
- Identify bearing types, tapered roller and ball bearing.
- Describe seals and seal types used.

Course Outcome 5.

Perform removal, installation and inspection of wheel hub assemblies.

Learning Objectives 5.

Potential Elements of the Performance:
- Remove and install a wheel hub assembly following manufacturer`s recommendations.
- Inspect bearing match, endplay, bearing fit and hub & spindle condition.
- Adjust bearing preload / endplay following *TMC and OEM procedures.

*Technical and maintenance council (TMC)

Date:	Monday, December 18, 2017
	Please refer to the course outline addendum on the Learning Management System for further information.