



COURSE OUTLINE: MPT0231 - AUTO DRIVE TRAINS

Prepared: Stephen Kent

Approved: Martha Irwin, Chair, Community Services and Interdisciplinary Studies

Course Code: Title	MPT0231: AUTOMOTIVE DRIVE TRAINS
Program Number: Name	1120: COMMUNITY INTEGRATN
Department:	C.I.C.E.
Semesters/Terms:	21W, 22W
Course Description:	<p>In this course, students in the CICE Program, with the assistance of a Learning Specialist, 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.</p> <p>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.</p>
Total Credits:	3
Hours/Week:	6
Total Hours:	48
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Essential Employability Skills (EES) addressed in this course:	<p>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.</p> <p>EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication.</p> <p>EES 3 Execute mathematical operations accurately.</p> <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 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.</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> <p>EES 11 Take responsibility for ones own actions, decisions, and consequences.</p>

In response to public health requirements pertaining to the COVID19 pandemic, course delivery and assessment traditionally delivered in-class, may occur remotely either in whole or in part in the 2021-2022 academic year.



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Course Evaluation:	<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>				
Other Course Evaluation & Assessment Requirements:	<p>The final grade for this course will be based on the results of classroom, assignments and shop evaluations weighed as indicated:</p> <p>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</p> <p>Employability Skills 10% of final grade is comprised of attendance, class participation, show ability to follow direction and being a team player.</p> <p>(Student will be given notice of test and assignment dates in advance)</p> <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>				
Books and Required Resources:	<p>Automotive Technology: A Systems Approach by Erjavec Publisher: Thomson Nelson Learning Canada Edition: 4th Canadian Edition</p>				
Course Outcomes and Learning Objectives:	<p>Upon successful completion of this course, the CICE student, with the assistance of a Learning Specialist will acquire varying levels of skill development relevant to the following learning outcomes:</p> <table border="1" data-bbox="500 1211 1448 1458"> <thead> <tr> <th data-bbox="500 1211 802 1251">Course Outcome 1</th> <th data-bbox="802 1211 1448 1251">Learning Objectives for Course Outcome 1</th> </tr> </thead> <tbody> <tr> <td data-bbox="500 1251 802 1458">1. Describe the functions, construction, types, styles and application of front wheel drive axle assemblies.</td> <td data-bbox="802 1251 1448 1458"> 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 </td> </tr> </tbody> </table>	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
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	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
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%

CICE Modifications:

Preparation and Participation

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1. A Learning Specialist will attend class with the student(s) to assist with inclusion in the class and to take notes.
2. Students will receive support in and outside of the classroom (i.e. tutoring, assistance with homework and assignments, preparation for exams, tests and quizzes.)
3. Study notes will be geared to test content and style which will match with modified learning outcomes.
4. Although the Learning Specialist may not attend all classes with the student(s), support will always be available. When the Learning Specialist does attend classes he/she will remain as inconspicuous as possible.

A. Further modifications may be required as needed as the semester progresses based on individual student(s) abilities and must be discussed with and agreed upon by the instructor.

B. Tests may be modified in the following ways:

1. Tests, which require essay answers, may be modified to short answers.
2. Short answer questions may be changed to multiple choice or the question may be simplified so the answer will reflect a basic understanding.
3. Tests, which use fill in the blank format, may be modified to include a few choices for each question, or a list of choices for all questions. This will allow the student to match or use visual clues.
4. Tests in the T/F or multiple choice format may be modified by rewording or clarifying statements into layman's or simplified terms. Multiple choice questions may have a reduced number of choices.

C. Tests will be written in CICE office with assistance from a Learning Specialist.

The Learning Specialist may:

1. Read the test question to the student.
2. Paraphrase the test question without revealing any key words or definitions.
3. Transcribe the student's verbal answer.
4. Test length may be reduced and time allowed to complete test may be increased.

D. Assignments may be modified in the following ways:

1. Assignments may be modified by reducing the amount of information required while maintaining general concepts.
2. Some assignments may be eliminated depending on the number of assignments required in the particular course.

The Learning Specialist may:

1. Use a question/answer format instead of essay/research format
2. Propose a reduction in the number of references required for an assignment
3. Assist with groups to ensure that student comprehends his/her role within the group
4. Require an extension on due dates due to the fact that some students may require additional time to process information
5. Formally summarize articles and assigned readings to isolate main points for the student
6. Use questioning techniques and paraphrasing to assist in student comprehension of an assignment

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E. Evaluation:

Is reflective of modified learning outcomes.

NOTE: Due to the possibility of documented medical issues, CICE students may require alternate methods of evaluation to be able to acquire and demonstrate the modified learning outcomes

Date:

December 14, 2021

Addendum:

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

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