

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



**SAULT
COLLEGE**

COURSE OUTLINE

COURSE TITLE: Drive Trains

CODE NO. : TCT716 **APP Level:** TWO

PROGRAM: Truck and Coach Technician – Level 2
Apprenticeship

AUTHOR: John Avery

DATE: October 2015 **PREVIOUS OUTLINE DATED:** August 2011

APPROVED: *“Corey Meunier”*
CHAIR

TOTAL CREDITS: 5

PREREQUISITE(S): Commercial Vehicle Common

HOURS/WEEK: 25 over 8 Week Period

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School of Technology & Skilled Trades

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I. COURSE DESCRIPTION:

The Level Two Drive Trains course deals with the power-train systems and components starting from the Engine Flywheel to the Drive wheels of the vehicles. Students will be taught about Heavy Duty pull type clutch assemblies, Drive line arrangements, Multiple Countershaft Standard Transmissions, Electronically Automated Standard Transmissions, Double Reduction and Inter-Axle Differential Assemblies. Students will be taught the power-flow associated with the Transfer of power from the engine through each of these individual system components and the relationship to gearing and gear ratios to produce the multiple speeds and torque output required for Commercial Vehicle Industry applications. The students will also be taught the proper service and maintenance procedures as well as the repair and over-haul procedures. Proper diagnosis and testing procedures will be demonstrated and taught to the students to enable them to learn these skills.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. Explain the power-Flow of the Two Plate Pull Type Clutch Assembly.
2. Perform proper clutch Adjustment Procedures for a Pull Type Clutch Manual Adjust Clutch Assembly, and ensure proper adjustment action of the Self Adjust Clutch Assemblies.
3. Describe the purpose and advantages of Twin Countershaft and Triple Countershaft Transmissions.
4. Describe the Power-Flow of the Multiple-Range Twin Countershaft Transmissions from gear selector lever to the auxiliary range output section.
5. Describe the operation and Air flow of the Air Shift components of the Transmission for Low range, High range, Deep Reduction or Split shift systems.
6. Properly Disassemble and Re-assemble a Twin Countershaft transmission Front and Rear section using the proper tools, service manual, and according to Manufacturers specifications.
7. Perform Drive Shaft working angle measurements between the Transmission and the Rear Axle assembly.

8. Describe the purpose, construction and operation of a double reduction and Inter-Axle differential assembly.
9. Explain the power through a double reduction differential assembly in both high range and low range.
10. Explain the power flow through the inter axle differential during the locked out and locked in conditions.
11. Disassemble and Assemble a double reduction differential assembly using the proper tools and manual to set pinion bearing pre-load, pinion gear depth, and backlash to obtain the correct gear tooth pattern according to manufacturers' specifications.

III. TOPICS:

1. Heavy Duty Pull Type Clutches
2. Clutch R & R and Adjustment
3. Multiple Counter Shaft Transmissions
4. Transmission Air Shift range selector Systems
5. Transmission Service and Repair procedures
6. Double Reduction Rear Axle Assemblies
7. Differential Service and Repair procedures
8. Inter Axle differential assemblies

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Hand-outs provided by instructor as well as text books requested by department as per booklist.

Text Book: Heavy Duty Truck Systems
Edition: 4th ed., 12959#
Author: Bennett
Publisher: Thomson Nelson Learning Canada

Pens, Pencils, Calculator and 3 Ring Binder

V. EVALUATION PROCESS/GRADING SYSTEM:

Students will be tested on the material covered per apprenticeship curriculum by multiple choice questions, assignments, and practical tests. The weigh factor for each area of testing will be as follows:

Theory Tests	50 %
Practical Tests	30 %
Assignments	20 %

This evaluation can change depending on the emphasis placed on each of the above testing procedures.

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
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.	

If a faculty member determines that a student is at risk of not being successful in their academic pursuits and has exhausted all strategies available to faculty, student contact information may be confidentially provided to Student Services in an effort to offer even more assistance with options for success. Any student wishing to restrict the sharing of such information should make their wishes known to the coordinator or faculty member.

VI. SPECIAL NOTES:**Attendance:**

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

Failure to show up for a Test either theory or practical will result in an "F" grade unless prior arrangements have been made with the Instructor.

Re-writes of theory tests are only allowed at the Instructors discretion and any Student that re-writes a test will be given a maximum of 60%.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located in D2L and on the portal form part of this course outline.

VIII. USE OF CELL PHONES IN THE CLASSROOMS:

Cell phones will not be allowed to be turned on in the classroom during regular teaching periods and students breaking this rule will be asked to leave the classroom.