

I. COURSE DESCRIPTION:

Upon successful completion, the apprentice is able to understand the principles of operation, diagnose and repair pull type clutches and flywheel assemblies; understand the principles of operation, diagnose and repair Multiple Countershaft Manual Transmission and Auxiliary Sections; understand the principles of operation, diagnose and repair Multiple Speed and Double Reduction Drive Axle Assemblies; understand the principles of operation, diagnose and repair Power Divided Tandem Drive Assemblies; understand the principles of operation, diagnose and repair Electronically Automated Standard Transmissions; understand the principles of operation, diagnose and repair Transfer Case, Drop Box and Power Take-Off Assemblies.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

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

1. *Pull Type Clutches and Flywheel Assemblies***Potential Elements of the Performance:**

- Define the purpose and fundamentals of pull type clutches and flywheel assemblies.
- Describe the functions, construction, composition, types, styles and application of pull type clutches and flywheel assemblies.
- Explain the principle(s) of operation of pull type clutches and flywheel assemblies.
- Perform inspection, testing and diagnostic procedures on pull type clutches and flywheel assemblies.
- Recommend reconditioning and repairs.

2. *Multiple Countershaft Manual Transmissions & Auxiliary Section***Potential Elements of the Performance:**

- Define the purpose and fundamentals of multiple countershaft manual transmission and auxiliary sections.
- Describe the functions, construction, composition, types, styles and application of multiple countershaft manual transmission and auxiliary sections.
- Explain the principle(s) of operation of multiple countershaft transmission and auxiliary sections.
- Recommend reconditioning or repairs.

3. Multiple Speed & Reduction Drive Axle AssembliesPotential Elements of the Performance:

- Define the purpose and fundamentals of multiple speed and double reduction drive axle assemblies.
- Describe the functions, construction, composition, types, styles and application of multiple speed and double reduction drive axle assemblies.
- Explain the principle(s) of operation of multiple speed and double reduction drive axle assemblies.
- Perform disassembly, inspection, testing, diagnostic and reassembly procedures on multiple speed and double reduction drive axle assemblies.
- Recommend reconditioning or repairs.

4. Power Divided Tandem Drive AssembliesPotential Elements of the Performance:

- Define the purpose and fundamentals of power divided tandem drive assemblies.
- Describe the functions, construction, composition, types, styles and application of power divided tandem drive assemblies.
- Explain the principle(s) of operation of power divided tandem drive assemblies.
- Perform inspection, testing and diagnostic procedures on power divided tandem drive assemblies.
- Recommend reconditioning or repairs.

5. Electronically Automated Standard TransmissionsPotential Elements of the Performance:

- Define the purpose and fundamentals of electronically controlled standard transmissions.
- Describe the functions, construction, composition, types, styles and application of electronically controlled standard transmissions.
- Explain the principle(s) of operation of electronically controlled standard transmissions.
- Perform inspection, testing and diagnostic procedures on electronically controlled standard transmissions.
- Recommend reconditioning or repairs.

6. Transfer Case, Drop Box and Power Take-Off AssembliesPotential Elements of the Performance:

- Define the purpose and fundamentals of transfer case, drop box and power take-off assemblies.

- Describe the functions, construction, composition, types, styles and application of transfer case, drop box and power take-off assemblies.
- Explain the principles of operation of transfer case, drop box and power take-off assemblies.
- Perform inspection, testing and diagnostic procedures on transfer case, drop box and power take-off assemblies.
- Recommend reconditioning or repairs.

III. TOPICS:

1. Pull Type Clutches and Flywheel Assemblies.
2. Multiple Countershaft Transmissions & Auxiliary Sections.
3. Multiple Speed and Double Reduction Drive Axle Assemblies.
4. Power Divided Tandem Drive Assemblies.
5. Electronically Automated Standard Transmissions.
6. Transfer Case, Drop Box and Power Take-Off Assemblies.

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

Prescribed text books outlined at the beginning of the course.

Must have Sault College/CSA safety glasses and steel toe work boots for lab activities as well as coveralls or shop coat.

V. EVALUATION PROCESS/GRADING SYSTEM:

- **70% of theory testing.**
- **10% shop assignments.**
- **20% Final Exam.**

The following semester grades will be assigned to students:

Grade	Definition	<i>Grade Point Equivalent</i>
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	

U	placement or non-graded subject area. 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.

VI. SPECIAL NOTES:

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

Substitute course information is available in the Registrar's office.

Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade “C”, (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations, in addition to announcements, news, academic calendar of events, class cancellations, your learning management system (LMS), and much more. Go to <https://my.saultcollege.ca>.

Electronic Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

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.

It is the departmental policy that once the classroom door has enclosed, the learning process has begun. Late arrivers will not be granted admission to the room.

Eye, Face and Foot Personal Protection Equipment (PPE)

Students are required to wear appropriate Personal Protection Equipment (PPE) in designated areas at all times. The designated areas for eye and foot protection in the Motive Power areas are: C1073 (Automotive), C1000, C1010, and C1040 (Truck/Coach and Heavy Equipment) and C1120 (Marine and Small Engines). Appropriate PPE must also be worn when facing hazards outside of these designated areas.

Eye Protection:

All protective eye wear shall meet the requirements of:

C.S.A. - Z94.3 or A.N.S.I. - Z87.1 +.

Approved safety glasses (lens and frames) shall have side protection such as wrap around design or fixed side shields.

The minimum acceptable eye protection is a spectacle (class 1A on chart Z94.3). Dark tinted spectacles will not be accepted for general indoor use. Additional eye and face protection is required for specific hazards. Chart Z94.3 outlines the appropriate PPE for specific hazards.

Foot Protection:

- 1. Boot height- minimum 5 ½" uppers, measured from the top of the sole.**
- 2. CSA Green Patch rating.**

Safety boots must be properly laced and not be worn or damaged as to impair their effectiveness.