

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



CICE COURSE OUTLINE

COURSE TITLE: Power Transmission

CODE NO. : MCH141 **SEMESTER:** Winter
MODIFIED CODE: MCH0141

PROGRAM: Mechanical Programs

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MODIFIED BY: Kim Jefferies, Learning Specialist CICE Program

DATE: Jan 2017 **PREVIOUS OUTLINE DATED:** 2016

APPROVED:	“Martha Irwin”	Jan 2017
	<hr/> CHAIR	<hr/> DATE

TOTAL CREDITS: Three

PREREQUISITE(S):

HOURS/WEEK: Three

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I. COURSE DESCRIPTION:

A trades course designed to provide CICE students with basic knowledge of power transmission systems such as belt drives, chains, gears, shafts and couplings.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the CICE student, with the assistance of a learning specialist, will demonstrate the basic ability to:

1. *Explain and calculate Belt Drive Systems theory and practices, with the use of assistive tools.*

Potential Elements of the Performance:

- Calculate Area of Contact
- Classify materials of belts and pulleys
- Calculate belt tension
- Calculate sheave and pulley speed and ratio's
- Explain the difference between Slip and Creep in belt drives

2. *Identify Flat belt construction and their applications.*

Potential Elements of the Performance:

- Identify flat belt materials
- Understand flat belt construction
- Describe the various Flat belt joining systems
- Classify flat belt applications

3. *Identify V- belt construction and their applications.*

Potential Elements of the Performance:

- Explain the advantages of using V-belts
- Understand V-belt construction
- Explain V-belt sizes, and codes
- Classify V- belt applications

4. *Explore Belt Drive systems, assemblies and their applications.*

Potential Elements of the Performance:

- Explain the difference between Pulleys and Sheaves
- Identify the components used in a drive system
- Assess drives and Pulleys for Flat belts
- Assess drives and Sheaves for V-belts
- Demonstrate the proper tension and alignment of pulleys and sheaves

5. *Classify the various types of chain and sprockets used in Chain*

Drives.**Potential Elements of the Performance:**

- Identify various links and construction
- Explain Chain sizes, and codes
- Describe components used in pin and roller Chain
- Identify various Sprocket styles and their applications

6. *Explore Chain Drive systems, assemblies and their applications.***Potential Elements of the Performance:**

- Identify the components used in a chain drive system
- Calculate sprocket ratio's and shaft speeds, with the use of assistive tools
- Select the correct size and style of chain to be used
- Demonstrate the proper tension and alignment of shafts and sprockets

7. *Establish recognized Chain Drive maintenance procedures.***Potential Elements of the Performance:**

- Select the correct Lubrication method for that chain
- Explain the need for Routine Maintenance inspections
- Demonstrate Basic Troubleshooting techniques
- Analyze chain drive failures.

8. *Explore various types of materials, Gear types, and shaft arrangements used in Gear Drives.***Potential Elements of the Performance:**

- Explain Gear tooth terminology
- Classify Gear Materials and their applications
- Identify the various Gear types and their applications
- Identify the different Shaft arrangements and the corresponding gear type.
- Calculate gear ratio's and shaft speeds for any given gear drive, with the use of assistive tools

9. *Differentiate between Overdrive, Reduction, Worm and Planetary gear units***Potential Elements of the Performance:**

- Describe Overdrive Units and their applications
- Describe Reduction Units and their applications
- Describe Worm Gear reduction Units and their applications
- Describe Planetary Gears and their applications

10. Establish Installation and maintenance procedures for gear drives assemblies.

Potential Elements of the Performance:

- Describe various installation and mounting styles
- Explain the various Lubrication systems
- Demonstrate motor to gearbox alignment
- Demonstrate gearbox to drive alignment
- Explain Basic Troubleshooting techniques

11. Classify the difference between various Couplings and Clutches

Potential Elements of the Performance:

- Describe the different alignment options
- Explain the operating parameters and styles of Rigid couplings
- Explain the operating parameters and styles of Flexible couplings
- Explain the main function of both couplings and brakes

III. TOPICS:

1. BELT DRIVE THEORY
2. FLAT BELTS
3. V-BELTS
4. BELT DRIVE ASSEMBLIES
5. CHAIN DRIVE THEORY
6. CHAIN DRIVE ASSEMBLIES
7. CHAIN DRIVE MAINTENANCE
8. GEAR DRIVE DESIGN
9. OVERDRIVE AND REDUCTION UNITS
10. INSTALLATION / MAINTENANCE / TROUBLESHOOTING OF REDUCTION UNITS
11. COUPLINGS AND CLUTCHES

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

**Millwright Manual/ Industrial Trades Pocket Manual/Safety Eye glasses and foot wear
Keyed safety lock.**

V. EVALUATION PROCESS/GRADING SYSTEM:

Attendance 10% (12/15) **See special notes**
 Assignments 30%
 Tests 60%

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 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.	

VI. SPECIAL NOTES:

Attendance:

A student who attends less than 80% (12) classes will receive a zero (0) for attendance. A student who attends less than 66% (10) classes will FAIL the class.

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 been closed, the learning process has begun. Late arrivers will not be granted admission to the room.

VII. COURSE OUTLINE ADDENDUM:

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

Addendum:

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 professor.

CICE Modifications:**Preparation and Participation**

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. 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.

B. 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.

C. 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

D. Evaluation:

Is reflective of modified learning outcomes.