# Course Information Form (CIF)

**Course Code:** MFX 171

**Course Title:** Mechanical Drives II

**Department:** Applied Sciences and Technologies
**PCS Code:** 1.2 - Occupational/Technical Instruction
**CIP Code:** 47.0303
**Repeatability:** 0

**Effective Date:** Summer 2026

## Credit Hours

**Catalog Notation:** 0.5-1-1
**Credit Hour Distribution:**

| Lecture: 0.5 | Lab: 1 | Clinical: 0 | **Total: 1** |
|---|---|---|---|

## General Course Information

### Catalog Description

Introduction of mechanism concepts and their importance in industrial, commercial, and residential applications. Three common types of mechanisms and applications of each type.

### General Course Objectives

Introduces mechanism concepts and their importance in industrial, commercial, and residential applications.

### Minimum Placement Levels

| English | Reading | Math |
|---|---|---|
| Placement into ENG 098 | Placement into CCS 098 | Placement into MAT 059 |

### Prerequisites

Credit in MFX 170

### Methods of Evaluation

5 quizzes.

### Instructional Materials and Additional Supplies

Amatrol Course Code

## Course Content

### General Learning Outcomes (GLOs)

- Critical Thinking and Information Literacy: Students will demonstrate the ability to evaluate perspectives, evidence, and implications, and to locate, assess, and use information effectively.
- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

### Course Segments and Student Learning Outcomes

| Course Segment | Learning Outcomes | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|---|
| Introduction to Shafts | 1. Describe the function of a shaft and give an application.<br>2. Give examples of four types of shaft materials and give an application of each.<br>3. Generalize how shafts are specified.<br>4. Describe shaft size given a sample. | 0.25 | 0.5 | 0 |
| Introduction to Bearings | 1. Describe the function of a bearing and give an application.<br>2. Generalize three types of bearing loads and give an example of each.<br>3. Make sense of how bearings are positioned to support a load.<br>4. Make sense of the operation of two categories of bearings and give an application of each.<br>5. Explain the two methods of mounting a shaft bearing and give an application of each.<br>6. Demonstrate how to install and adjust a pillow block anti-friction bearing and shaft. | 0.25 | 0.5 | 0 |
| Introduction to Couplings | 1. Describe the function of a coupling and give an application.<br>2. Generalize the function and application of four categories of mechanical couplings.<br>3. Explain the operation of a flexible jaw coupling.<br>4. Show how to install a flexible jaw coupling. | 0.25 | 0.5 | 0 |
| Shaft Alignment | 1. Describe the purpose of shaft alignment and give two types of misalignment.<br>2. Generalize a procedure for shaft alignment and give four measurement methods.<br>3. Show the operation of the straight edge and feeler gauge alignment method.<br>4. Perform an alignment of two shafts using a straight edge and feeler gauge. | 0.25 | 0.5 | 0 |
| Belt Drive Concepts | 1. Describe the function of the three basic components of a belt drive.<br>2. Generalize pitch and explain its importance.<br>3. Interpret the pitch circle, pitch diameter, and pitch length of a belt drive and explain their importance.<br>4. Make sense of how to calculate the pulley ratio and explain its importance.<br>5. Show how to calculate pulley ratio.<br>6. Explain how to calculate the shaft speed and torque of a belt drive system.<br>7. Determine the shaft speed and torque of a belt drive system. | 0.25 | 0.5 | 0 |
| V-Belt Operation | 1. Generalize five types of belt drives and give an application of each.<br>2. Explain three types of V-belts and give an application of each.<br>3. Describe the operation of a fractional horsepower V-belt drive.<br>4. Generalize how to install and align a V-belt drive.<br>5. Demonstrate how to install and align a V-belt drive with a finished bore. | 0.25 | 0.5 | 0 |

| Course Segment | Learning Outcomes | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|---|
| Belt Tensioning | 1. Describe how to determine belt tension for an application.<br>2. Determine the belt deflection force for a given application.<br>3. Differentiate the three methods of adjusting belt tension.<br>4. Perform adjustment of belt tension using an adjustable mounting base. | 0.25 | 0.5 | 0 |
| Belt Tension Measurement | 1. Describe three methods of measuring belt tension and give an application of each.<br>2. Demonstrate how to use a belt tension tester to measure belt tension. | 0.25 | 0.5 | 0 |
| Chain Drive Concepts | 1. Describe the function of the three basic components of a chain drive.<br>2. Explain how to calculate sprocket ratio and explain its importance.<br>3. Predict sprocket ratio.<br>4. Deduce how to calculate shaft speed and torque of a chain drive system.<br>5. Demonstrate how to calculate shaft speed and torque of a chain drive system. | 0.25 | 0.5 | 0 |
| Chain Drive Operation | 1. Generalize four types of chains and give an application of each.<br>2. Make sense of the four types of roller chain drives and give an application of each.<br>3. Demonstrate the operation of a single-strand roller chain drive.<br>4. Demonstrate how to install, align, and remove a roller chain drive system with adjustable centers.<br>5. Design, install, and align a roller chain drive system with adjustable centers. | 0.25 | 0.5 | 0 |
| Chain Tensioning | 1. Describe how to determine allowable chain sag for a given application.<br>2. Explain allowable chain sag for a given application.<br>3. Make sense of the two methods used to adjust chain sag. | 0.25 | 0.5 | 0 |
| Chain Tension Measurement | 1. Describe how to measure chain sag.<br>2. Demonstrate how to use a rule and a straight edge to measure chain sag.<br>3. Demonstrate how to adjust chain sag to a specified amount using adjustable centers. | 0.25 | 0.5 | 0 |
| Fixed Center Chain Installation | 1. Describe the function and operation of a master link.<br>2. Generalize the two methods of installing a lightweight chain that uses a master link.<br>3. Demonstrate how to install and remove a chain with a master link using sprocket teeth.<br>4. Explain the operation of a chain puller.<br>5. Demonstrate how to install and remove a chain with a master link using a chain puller. | 0.5 | 1 | 0 |
| Gear Drive Concepts | 1. Describe the function of the three components of a gear drive system.<br>2. Generalize gear pitch, pitch circle, and pitch diameter and explain their importance.<br>3. Paraphrase how to calculate the gear ratio of a gear drive.<br>4. Formulate a gear ratio. | 0.5 | 1 | 0 |
| Gear Drive Designs | 1. Describe how to calculate the shaft speed and torque of a gear drive system.<br>2. Calculate the shaft speed and torque of a gear drive system.<br>3. Explain the functions of four types of gear drives and give an application of each.<br>4. Make sense of the four types of parallel shaft gears and give an application of each. | 0.5 | 1 | 0 |

| Course Segment | Learning Outcomes | Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|---|---|
| Spur Gear Operation | 1. Describe eleven features of a gear.<br>2. Generalize the twelve dimensions of a gear and explain the importance of each.<br>3. Make sense of the ten dimensions and features of a gear drive and explain the importance of each.<br>4. Summarize the operation of a spur gear drive. | 0.5 | 1 | 0 |
| Spur Gear Installation | 1. Describe how to install and align a spur gear drive system.<br>2. Design, install, and align a spur gear drive system.<br>3. Generalize the function of backlash.<br>4. Make sense of how to determine the allowable backlash in a gear drive.<br>5. Summarize the allowable backlash in a gear drive. | 0.5 | 1 | 0 |
| Spur Gear Analysis | 1. Compare two methods of measuring spur gear backlash.<br>2. Evaluate the measurement of gear backlash.<br>3. Modify a gear backlash to a specified amount. | 0.5 | 1 | 0 |
| Multiple Shaft Gear Analysis | 1. Describe how to calculate the speed and torque output in a multiple shaft gear drive.<br>2. Calculate the shaft speed and torque of a multiple shaft gear drive system.<br>3. Generalize the function of a compound gear drive system and give an application.<br>4. Generalize how to calculate the torque and speed output of a compound gear drive system.<br>5. Perform the calculation of torque and speed output of a compound gear drive system. | 0.5 | 1 | 0 |
| Multiple Shaft Drive Installation | 1. Describe how to determine the direction of rotation of a gear drive.<br>2. Determine the direction of rotation of a gear given its position in a gear drive.<br>3. Generalize how to install and align a multiple shaft drive system.<br>4. Explain how to install and align a multiple shaft drive system. | 0.5 | 1 | 0 |
| Sleeve Couplings | 1. Describe the function of a solid coupling and list two types.<br>2. Deduce the operation of a sleeve coupling and give an application.<br>3. Participate in the alignment procedure of a sleeve coupling.<br>4. Participate in the installation and alignment of a sleeve coupling and shaft. | 0.5 | 1 | 0 |

**Total Contact Hours**

| Lecture Hours | Lab Hours | Clinical Hours |
|---|---|---|
| 7.5 | 15 | 0 |