

**Course Code:** MFX 170

**Course Title:** Mechanical Drives I

**Department:** Applied Sciences and Technologies

**Effective Date:** Summer 2026

**PCS Code:** 1.2 - Occupational/Technical Instruction

**CIP Code:** 47.0303

**Repeatability:** 0

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## Credit Hours

**Catalog Notation:** 0.5-1-1

**Credit Hour Distribution:**

Lecture: 0.5

Lab: 1

Clinical: 0

**Total: 1**

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## 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. Introduction to levers: force measurement; first, second, and third-class levers. Linkages, cams, and turnbuckles including friction and inclined plane concepts. Emphasis on pulley systems and gear drives including fixed pulleys, movable pulleys, and combination pulleys.

### General Course Objectives

Students will be introduced to 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

None

### 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
Mechanisms Concepts	<ol style="list-style-type: none"> <li>1. Describe the function of a mechanism.</li> <li>2. Describe three common types of mechanisms and give an application of each.</li> <li>3. Describe mechanism safety rules.</li> </ol>	0.5	0	0
Force Measurement	<ol style="list-style-type: none"> <li>1. Define force and give its units of measurement.</li> <li>2. Define weight and give its units of measurement.</li> <li>3. Predict mass and give its units of measurement.</li> <li>4. Summarize how to calculate the weight of an object given its mass.</li> <li>5. Calculate the weight of an object given its mass.</li> <li>6. Explain Hooke's Law and its use.</li> <li>7. Make sense of the function and operation of a spring scale and give an application.</li> <li>8. Calculate the compression rate of a spring using Hooke's Law.</li> <li>9. Use a spring scale to measure the weight of an object.</li> <li>10. Implement using a spring scale to measure the force on an object.</li> </ol>	0.5	1	0
First-Class Levers	<ol style="list-style-type: none"> <li>1. Explain a lever and explain its importance.</li> <li>2. Summarize three types of levers and give an application of each.</li> <li>3. Paraphrase the construction and operation of a first-class lever.</li> <li>4. Determine torque and give its units of measurement.</li> <li>5. Summarize how to calculate torque given an application.</li> <li>6. Calculate torque given an application.</li> <li>7. Give examples of rotational movement of a lever.</li> <li>8. Generalize the Law of Moments.</li> <li>9. Explain how to calculate the moment caused by a force.</li> <li>10. Interpret the calculation of moment caused by a force.</li> <li>11. Describe the concept of mechanical advantage.</li> <li>12. Generalize how to calculate the mechanical advantage of a first-class lever.</li> <li>13. Calculate the mechanical advantage of a first-class lever.</li> <li>14. Deduce the mechanical advantage of a first-class lever.</li> </ol>	0.5	0.5	0
Second and Third-Class Levers	<ol style="list-style-type: none"> <li>1. Describe a second-class lever and give an application.</li> <li>2. Describe the construction and operation of a second-class lever.</li> <li>3. Describe how to calculate the mechanical advantage of a second-class lever.</li> <li>4. Calculate the mechanical advantage of a second-class lever.</li> <li>5. Make sense of the mechanical advantage of a second-class lever.</li> <li>6. Explain a third-class lever and give an application.</li> <li>7. Generalize the construction and operation of a third-class lever.</li> <li>8. Describe how to calculate the mechanical advantage of a third-class lever.</li> <li>9. Calculate the mechanical advantage of a third-class lever.</li> <li>10. Break down the mechanical advantage of a third-class lever.</li> </ol>	0.25	0.5	0

<b>Course Segment</b>	<b>Learning Outcomes</b>	<b>Lecture Hours</b>	<b>Lab Hours</b>	<b>Clinical Hours</b>
Friction	<ol style="list-style-type: none"> <li>1. Define friction and explain its importance.</li> <li>2. Describe an example of high and low amounts of friction.</li> <li>3. Explain the two types of friction.</li> <li>4. Explain the coefficient of friction and give its units of measurement.</li> <li>5. Generalize how to calculate the coefficient of friction.</li> <li>6. Calculate the coefficient of friction given application data.</li> <li>7. Formulate the force required to overcome friction in different applications.</li> <li>8. Deduce how wheels are used to reduce friction.</li> </ol>	0.5	1	0
Inclined Planes	<ol style="list-style-type: none"> <li>1. Define an inclined plane and explain its importance.</li> <li>2. Explain how to calculate the mechanical advantage of an inclined plane.</li> <li>3. Calculate the mechanical advantage of an inclined plane.</li> <li>4. Point out the mechanical advantage of an inclined plane.</li> </ol>	0.25	0.5	0
Linkages	<ol style="list-style-type: none"> <li>1. Define a linkage and explain its importance.</li> <li>2. List three types of bar linkages and give applications of each.</li> <li>3. Give examples of the construction and operation of a slider crank linkage.</li> <li>4. Demonstrate how to connect and operate a slider crank linkage.</li> <li>5. Describe the construction and operation of a double rocker linkage.</li> <li>6. Discuss, connect, and operate a double rocker linkage.</li> <li>7. Give examples of the construction and operation of a crank rocker linkage.</li> <li>8. Recognize, connect, and operate a crank rocker linkage.</li> </ol>	0.25	0.5	0
Cams	<ol style="list-style-type: none"> <li>1. Define a cam and a cam follower and give an application.</li> <li>2. Summarize how to connect and operate a cam and cam follower.</li> <li>3. Discriminate the four properties of cams.</li> <li>4. Formulate the velocity and dwell of a cam.</li> </ol>	0.25	0.5	0
Turnbuckles	<ol style="list-style-type: none"> <li>1. Define a turnbuckle and give an application.</li> <li>2. Describe the construction of a turnbuckle.</li> <li>3. Explain how to connect and operate a turnbuckle.</li> </ol>	0.25	0.5	0
Fixed Pulleys	<ol style="list-style-type: none"> <li>1. Define a pulley and give an application.</li> <li>2. Give examples of the function and operation of a fixed pulley.</li> <li>3. Compute the mechanical advantage of a fixed pulley.</li> </ol>	0.25	0.5	0
Movable Pulleys and Pulley Combinations	<ol style="list-style-type: none"> <li>1. Describe the function and operation of a movable pulley.</li> <li>2. Interpret how to calculate the mechanical advantage of a movable pulley.</li> <li>3. Compute the mechanical advantage of a movable pulley.</li> <li>4. Give examples of the function and operation of a pulley combination.</li> <li>5. Provide examples of how to calculate the mechanical advantage of a pulley combination.</li> <li>6. Calculate the mechanical advantage of a pulley combination.</li> <li>7. Differentiate the mechanical advantage of a pulley combination.</li> </ol>	0.5	1	0
Gear Drives	<ol style="list-style-type: none"> <li>1. Define a gear drive and give an application.</li> <li>2. Explain the functions of the main components of a gear drive system.</li> <li>3. Give examples of how to connect and operate a gear drive system.</li> <li>4. Explain how to calculate the mechanical advantage of a gear drive.</li> <li>5. Calculate the mechanical advantage of a gear drive.</li> <li>6. Formulate the mechanical advantage of a gear drive.</li> </ol>	0.25	0.5	0
Mechanical Power Transmission Safety	<ol style="list-style-type: none"> <li>1. Describe the function of a mechanical power transmission system and give an advantage.</li> <li>2. Describe five methods of rotary mechanical power transmission and give an application of each.</li> <li>3. Explain the six rules of safe dress for working with power transmission equipment.</li> <li>4. Point out the eight mechanical transmission safety rules.</li> <li>5. Recognize the operation of the lockout/tagout system.</li> <li>6. Facilitate a lockout/tagout.</li> </ol>	0.25	1	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Machine Installation	<ol style="list-style-type: none"> <li>1. Describe the function of a foundation and give three types.</li> <li>2. Generalize the function and construction of a bedplate.</li> <li>3. Interpret the function of a spirit level and give an application.</li> <li>4. Give examples of the operations of a spirit level.</li> <li>5. Demonstrate how to use a level to determine orientation of a surface.</li> </ol>	0.5	1	0
Motor Mounting	<ol style="list-style-type: none"> <li>1. Describe three types of motor mounts and give an application of each.</li> <li>2. Give examples of how fasteners are used to attach a motor mount to a bedplate.</li> <li>3. Determine how to select fastener size and type for a motor mount.</li> <li>4. Demonstrate how to select a fastener size and type for a motor mount.</li> <li>5. Summarize how to mount and level an electric motor.</li> <li>6. Demonstrate how to mount an electric motor and correct for a soft foot condition.</li> <li>7. Perform leveling of an electric motor.</li> </ol>	0.25	1	0
Shaft Speed Measurement	<ol style="list-style-type: none"> <li>1. Describe two methods of measuring motor shaft speed and give an application.</li> <li>2. Demonstrate how to use a digital tachometer to measure motor speed.</li> </ol>	0.5	1	0
Keyseat Fasteners	<ol style="list-style-type: none"> <li>1. Describe the function and operation of a key fastener.</li> <li>2. Summarize the construction of six types of keys and give an application of each.</li> <li>3. Explain how keys and keyseats are specified.</li> <li>4. Explain how select a key size for a given application.</li> </ol>	0.25	1	0
Key Assembly	<ol style="list-style-type: none"> <li>1. Describe how to measure the actual size of a key and keyseat.</li> <li>2. Give examples of six types of set screws.</li> <li>3. Demonstrate how to measure the actual size of a key and keyseat given a sample.</li> <li>4. Demonstrate how to cut and file key stock to fit a keyseat.</li> <li>5. Provide steps on how to assemble a hub to a shaft using a key fastener.</li> <li>6. Demonstrate how to assemble a hub to a shaft using a key fastener.</li> </ol>	0.5	1	0
Torque and Power Measurement	<ol style="list-style-type: none"> <li>1. Describe two methods of loading a mechanical drive system.</li> <li>2. Demonstrate how to use a Prony brake to measure shaft torque.</li> <li>3. Generalize how to calculate rotary mechanical power.</li> <li>4. Perform a calculation for rotary mechanical power.</li> </ol>	0.5	1	0
Mechanical Efficiency	<ol style="list-style-type: none"> <li>1. Describe how to calculate mechanical efficiency and explain its importance.</li> <li>2. Calculate mechanical efficiency.</li> <li>3. Make sense of the two methods of measuring shaft torque and give an application of each.</li> <li>4. Generalize three methods of measuring electric motor current.</li> <li>5. Demonstrate how to measure electric motor current.</li> </ol>	0.5	1	0

**Total Contact Hours**

Lecture Hours	Lab Hours	Clinical Hours
7.5	15	0