

Course Code: MFX 191**Course Title:** C-210 Mechanical Certification**Department:** Applied Sciences and Technologies**Effective Date:** Summer 2026**PCS Code:** 1.2 - Occupational/Technical Instruction**CIP Code:** 47.0303**Repeatability:** 0

Credit Hours

Catalog Notation: 1-2-2**Credit Hour Distribution:**

Lecture: 1

Lab: 2

Clinical: 0

Total: 2

General Course Information

Catalog Description

Study material and review as needed; access to the C-210 Certification test.

General Course Objectives

Obtain an industry standard certification.

Minimum Placement Levels

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

Prerequisites

Credit in MFX 170, MFX 171, MFX 172, and MFX 173

Recommended before enrolling (not required):

Credit in MFX 174 and MFX 175

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 Mechanical Drive Systems	1. Describe the function of a mechanical power transmission system and give an advantage. 2. Describe five methods of rotary mechanical power transmission and give an application of each. 3. Describe six rules of safe dress for working with power transmission equipment. 4. Describe eight mechanical transmission safety rules. 5. Describe the operation of the lockout/tagout system. 6. Perform a lockout/tagout. 7. Describe the function of a foundation and give three types. 8. Describe the function and construction of a bedplate. 9. Describe the function of a spirit level and give an application. 10. Describe the operation of a spirit level. 11. Use a level to determine orientation of a surface. 12. Describe how greases are specified.	1	2	0
Motor Mounting	1. Describe three types of motor mounts and give an application of each. 2. Describe how fasteners are used to attach a motor mount to a bedplate. 3. Describe how to select fastener size and type for a motor mount. 4. Select a fastener size and type for a motor mount. 5. Describe how to master and use a dial indicator. 6. Describe how to mount and level an electric motor. 7. Mount an electric motor and correct for a soft foot condition. 8. Level an electric motor. 9. Describe two methods of measuring motor shaft speed and give an application. 10. Use a digital tachometer to measure motor speed.	1	2	0
Key Fasteners	1. Describe the function and operation of a key fastener. 2. Describe the construction of six types of keys and give an application of each. 3. Describe how keys and keyseats are specified. 4. Select a key size for a given application. 5. Describe how to measure the actual size of a key and keyseat. 6. Describe six types of set screws. 7. Measure the actual size of a key and keyseat given a sample. 8. Cut and file key stock to fit a keyseat. 9. Describe how to assemble a hub to a shaft using a key fastener. 10. Assemble a hub to a shaft using a key fastener.	1	2	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Torque, Power, and Efficiency	1. Describe two methods of loading a mechanical drive system. 2. Use a Prony brake to measure shaft torque. 3. Describe how to calculate rotary mechanical power. 4. Calculate rotary mechanical power. 5. Describe how to calculate mechanical efficiency and explain its importance. 6. Calculate mechanical efficiency. 7. Describe two methods of measuring shaft torque and give an application of each. 8. Describe three methods of measuring electric motor current. 9. Measure electric motor current.	1	2	0
Power Transmission Systems	1. Describe the function of a shaft and give an application. 2. List four types of shaft materials and give an application of each. 3. Describe how shafts are specified. 4. Identify shaft size given a sample. 5. Describe the function of a bearing and give an application. 6. Define three types of bearing loads and give an example of each. 7. Describe how bearings are positioned to support a load. 8. Describe the operation of two categories of bearings and give an application of each. 9. Describe two methods of mounting a shaft bearing and give an application of each. 10. Install and adjust a pillow block anti-friction bearing and shaft. 11. Describe the function of a coupling and give an application. 12. Describe the function and application of four categories of mechanical couplings. 13. Describe the operation of a flexible jaw coupling. 14. Install a flexible jaw coupling. 15. Describe the purpose of shaft alignment and give two types of misalignment. 16. Describe a general procedure for shaft alignment and give four measurement methods. 17. Describe the operation of the straight edge and feeler gauge alignment method. 18. Align two shafts using a straight edge and feeler gauge.	1	2	0
Introduction to V-Belt Drives	1. Describe the function of the three basic components of a belt drive. 2. Define pitch and explain its importance. 3. Define the pitch circle, pitch diameter, and pitch length of a belt drive and explain their importance. 4. Describe how to calculate the pulley ratio and explain its importance. 5. Calculate pulley ratio. 6. Describe how to calculate the shaft speed and torque of a belt drive system. 7. Calculate the shaft speed and torque of a belt drive system.	1	2	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
V-Belt Operation	1. List five types of belt drives and give an application of each. 2. List three types of V-belts and give an application of each. 3. Describe the operation of a fractional horsepower V-belt drive. 4. Describe how to install and align a V-belt drive. 5. Install and align a V-belt drive with a finished bore. 6. Describe how to determine belt tension for an application. 7. Determine the belt deflection force for a given application. 8. Describe three methods of adjusting belt tension. 9. Adjust belt tension using an adjustable mounting base. 10. Describe three methods of measuring belt tension and give an application of each. 11. Use a belt tension tester to measure belt tension.	1	2	0
Introduction to Chain Drives	1. Describe the function of the three basic components of a chain drive. 2. Describe how to calculate sprocket ratio and explain its importance. 3. Calculate sprocket ratio. 4. Describe how to calculate shaft speed and torque of a chain drive system. 5. Calculate shaft speed and torque of a chain drive system.	1	2	0
Chain Drive Operation	1. List four types of chains and give an application of each. 2. List four types of roller chain drives and give an application of each. 3. Describe the operation of a single-strand roller chain drive. 4. Describe how to install, align, and remove a roller chain drive system with adjustable centers. 5. Install and align a roller chain drive system with adjustable centers.	1	2	0
Chain Tensioning and Installation	1. Describe how to determine allowable chain sag for a given application. 2. Determine allowable chain sag for a given application. 3. Describe two methods used to adjust chain sag. 4. Describe how to measure chain sag. 5. Use a rule and a straight edge to measure chain sag. 6. Adjust chain sag to a specified amount using adjustable centers. 7. Describe the function and operation of a master link. 8. Describe two methods of installing a lightweight chain that uses a master link. 9. Install and remove a chain with a master link using sprocket teeth. 10. Describe the operation of a chain puller. 11. Install and remove a chain with a master link using a chain puller.	1	2	0
Introduction to Spur Gear Drives	1. Describe the function of the three components of a gear drive system. 2. Define the gear pitch, pitch circle, and pitch diameter and explain their importance. 3. Describe how to calculate the gear ratio of a gear drive. 4. Calculate gear ratio. 5. Describe how to calculate the shaft speed and torque of a gear drive system. 6. Calculate the shaft speed and torque of a gear drive system. 7. Describe the functions of four types of gear drives and give an application of each. 8. List four types of parallel shaft gears and give an application of each.	1	2	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Spur Gear Drive Operation	1. Describe eleven features of a gear. 2. Identify the twelve dimensions of a gear and explain the importance of each. 3. Identify the ten dimensions and features of a gear drive and explain the importance of each. 4. Describe the operation of a spur gear drive.	1	2	0
Spur Gear Drive Installation	1. Describe how to install and align a spur gear drive system. 2. Install and align a spur gear drive system. 3. Describe the function of backlash. 4. Describe how to determine the allowable backlash in a gear drive. 5. Determine the allowable backlash in a gear drive. 6. Describe two methods of measuring spur gear backlash. 7. Measure gear backlash. 8. Adjust gear backlash to a specified amount.	1	2	0
Multiple Shaft Drives	1. Describe how to calculate the speed and torque output in a multiple shaft gear drive. 2. Calculate the shaft speed and torque of a multiple shaft gear drive system. 3. Describe the function of a compound gear drive system and give an application. 4. Describe how to calculate the torque and speed output of a compound gear drive system. 5. Calculate the torque and speed output of a compound gear drive system. 6. Describe how to determine the direction of rotation of a gear drive. 7. Determine the direction of rotation of a gear given its position in a gear drive. 8. Describe how to install and align a multiple shaft drive system. 9. Install and align a multiple shaft drive system. 10. Describe the function of a solid coupling and list two types. 11. Describe the operation of a sleeve coupling and give an application. 12. Describe the alignment procedure of a sleeve coupling. 13. Install and align a sleeve coupling and shaft.	2	4	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
15	30	0