Course Title:
Mechanical Fundamentals for Process Controls

Catalog Description:
This course covers the basic functions of equipment such as drive components, pumps, compressors, valves and basic electrical equipment. It explores various methods and the importance of equipment lubrication. Additional topics covered in this course include material handling equipment and procedures. Mechanical Fundamentals explains how equipment is used in systems such as piping systems, heat exchangers, cooling towers, refrigeration, furnace and boiler systems. Startup, shutdown, operation and troubleshooting procedures of various mechanical systems will be explained.

FULFILLS MN TRANSFER CURRICULUM AREA(S) (Leave blank if not applicable)
Goal 1: Communication: _____ by meeting the following competencies:

Goal 2: Critical Thinking: _____ by meeting the following competencies:

Goal 3: Natural Sciences: _____ by meeting the following competencies:

Goal 4: Mathematics/Logical Reasoning: _____ by meeting the following competencies:

Goal 5: History and the Social and Behavioral Sciences: _____ by meeting the following competencies:

Goal 6: The Humanities and Fine Arts: _____ by meeting the following competencies:

Goal 7: Human Diversity: _____ by meeting the following competencies:

Goal 8: Global Perspective: _____ by meeting the following competencies:

Goal 9: Ethical and Civic Responsibility: _____ by meeting the following competencies:

Goal 10: People and the Environment: _____ by meeting the following competencies:

Prerequisites or Necessary Entry Skills/Knowledge:
N/A
### Topics to be Covered (General)

- Process Drawings and Industry Standards
- Piping, Gaskets, Tubing, Hoses and Fittings
- Valves
- Pumps, Compressors, and Turbines
- Motors and Engines
- Power Transmission and Lubrication
- Heating and Cooling Equipment
- Boilers
- Vessels and Reactors
- Filters and Dryers
- Miscellaneous Equipment

### Student Learning Outcomes

- Demonstrate knowledge of process control and instrumentation.
- Explain the concepts of troubleshooting and maintenance for process control.
- Describe the functions of valves and pneumatic actuators.
- Identify the various types of pumps, compressors, and turbines.
- Describe the basic operations of cooling towers and condensers.
- Identify and describe common pipe fittings and pipe line control.
- Identify the drivers and auxiliary equipment for pumps.
- Explain the basic operations of heat exchangers.
- State the basic requirements of steam production and combustion.

### Is this course part of a transfer pathway:

- Yes ☐
- No ☒

*If yes, please list the competencies below*

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