

New Course Form

MET 120 Industrial Mechanics I 5

Originator: Kenny Keith **Status:** Approved **Date Created:** 01/30/2013

Department: MET: Mechatronics **Submitted:** 02/05/2013 **Completed:** 02/27/2013

To ACETS:

Course Prefix: MET

Course Number: 120

Course Title: Industrial Mechanics I

Cross-listing: No

**Cross-listing
information:**

**Semester for
Implementation:** Fall

**Year of
Implementation:** 2013

Course Type: Required Transfer Vocational

Credit Hours: 5

Transfer Course: BAS-articulation discussions are underway

Course Catalog Description: This course covers the principles and applications of the most commonly found mechanical drive and fluid power components in an Industrial Power Plant and Manufacturing environment.

Rationale: This course provides basic mechanical principles, skills and competencies that would be required of an entry-level maintenance mechanic in a power plant and moderately complex manufacturing environment in discrete or hybrid industries such as electronics, automotive, food, pharmaceuticals, consumer products, packaging, metals, mining, power plant production, or materials.

**Total Lecture
Contact Hours** 4.
per Week:

**Total Lab
Contact Hours** 3
per Week:

**Total Contact
Hours:** 105

Load Factor: 6.1

Requisites: Yes

Prerequisites: Satisfactory Placement Scores in Reading, Writing and Math

Co-requisites:

Mode of Instructional Delivery: (1) Traditional classroom instruction (5) Laboratory

If "other" mode of instruction, specify:

Library Resources: N/A

Assessment of Student Learning - Methods: (1) Written Examinations (5) Demonstration of Skills

IF "other" assessment, specify:

Recommend Course Enrollment: 15

Credit by Examination: No

Literacy/ Critical Inquiry Component: N/A

Ethnic/ Gender Awareness: N/A

Sustainability: No

Sustainability (explanation):

COURSE 1. Mechanical power transmission devices

TOPICS: 2. Pneumatics, and hydraulics through an intermediate level along with related construction and troubleshooting techniques.
3. Preventive Maintenance Procedures

**COURSE
OUTCOMES:**

1. Apply basic safety rules for working with mechanical, pneumatic and hydraulic equipment
2. Calculate speed, torque, power, pitch, ratio, mechanical efficiency, and motor current in both English and S.I. units for a variety of drive types and configurations
Measure speed, torque, power, pitch, ratio, mechanical efficiency, and motor current in both English and S.I. units for a variety of drive types and configurations
3. Describe the function and application of shafts, bearings, keys, and couplings
4. Install and align electric motors using shafts, bearings, keys, and couplings
5. Describe the construction and operation of bushings; sheaves; idlers; conventional, multiple, wedge, notched, and variable speed belt systems

6. Demonstrate how to select, install, align and tension bushings; sheaves; idlers; conventional, multiple, wedge, notched, and variable speed belt systems
7. Describe preventive and reactive maintenance steps and troubleshooting procedures for v-belt drive systems
8. Perform preventive and reactive maintenance steps and troubleshooting procedures for v-belt drive systems
8. Describe the construction and operation of sprockets; master links; single roller, multiple strand and silent chain drives
9. Demonstrate how to remove, install, align, adjust sag and lubricate these chain drive systems
10. Describe maintenance and troubleshooting operations on chain drive systems
11. Perform maintenance and troubleshooting operations on chain drive systems
12. State Pascal's and Boyle's laws
13. Apply Pascal's and Boyle's laws to calculate and measure force, flow, pressure and speed in pneumatic circuits
Identify schematic symbols of pneumatic relief valves, pressure regulators, filters, fittings, cylinders, directional control valves, motors, mufflers, needle valves, rotameters, check valves, and flow control valves
Describe functions, applications of pneumatic relief valves, pressure regulators, filters, fittings, cylinders, directional control valves, motors, mufflers, needle valves, rotameters, check valves, and flow control valves
14. Draw a pneumatic schematic diagram using these components; connect, adjust and operate the circuit
15. Describe methods and components used to perform the maintenance procedures to properly condition and lubricate air used for industrial pneumatic systems
16. Perform the maintenance procedures to properly condition and lubricate air used for industrial pneumatic systems.
17. State Pascal's Law and $\Delta -P$
18. Apply Pascal's Law and $\Delta -P$ to calculate and measure pressure and force in hydraulic circuits
19. Identify schematic symbols of pneumatic relief valves, pressure regulators, filters, fittings, cylinders, directional control valves, motors, mufflers, needle valves, rotameters, check valves, and flow control valves
20. Describe the functions, applications of pneumatic relief valves, pressure regulators, filters, fittings, cylinders, directional control valves, motors, mufflers, needle valves, rotameters, check valves, and flow control valves
pressure reducing valves
21. Draw a hydraulic schematic diagram using these components, connect, adjust and operate the circuit
22. Describe the functions and operation of hydraulic speed, flow and pressure control and cylinder synchronization and regeneration
23. Demonstrate the operation of hydraulic speed, flow and pressure control and cylinder synchronization and regeneration
24. Describe the operation and function of a pressure-compensated hydraulic pump and its components.
25. Describe troubleshooting techniques for hydraulic components, pumps, and systems including systems operated by programmable logic controls (PLCs)
26. Apply troubleshooting techniques for hydraulic components, pumps, and

systems including systems operated by programmable logic controls (PLCs)

27. Describe the features, construction and functions of various types of fluid power hoses, metallic and non-metallic tubing and piping

28. Construct and assemble fluid components using techniques such as cutting, crimping, flaring, soldering, threading, and bending

29. Describe how to determine needs from schematics and drawings, how to specify components, how to size components and calculate pressure drops, how to make and install attachments, how to use expansion joints and insulation and how to maintain fluid power conductors

Proposer: Kenny Keith