

New Course Form

MET 100 Introduction to Mechatronics 4

Originator: Kenny Keith **Status:** In Process **Date Created:** 10/31/2014

Department: IMO Industrial Maintenance and Operations **Submitted:** 11/12/2014

Completed: **To ACETS:**

Course Prefix: MET

Course Number: 100

Course Title: Introduction to Mechatronics

Cross-listing: No

**Cross-listing
information:**

**Semester for
Implementation:** Fall

**Year of
Implementation:** 2015

Course Type: Required Vocational

Credit Hours: 4

Transfer Course: Ongoing discussion.

Course Catalog Description: Introduction to mechatronic production systems as well as basic manufacturing concepts. Introduces the energy industry and covers basic skills and knowledge that any technical employee needs to be successful in a variety of manufacturing and other industrial settings.

Rationale: Currently MET 110 covers some of these concepts, but not sufficiently. The course content needs to be modified to include an introduction to the energy industry. The overall course content will be changed to a degree sufficient to warrant the creation of a new course.

Total Lecture

**Contact Hours 3
per Week:**

Total Lab

**Contact Hours 3
per Week:**

Total Clinical

**Contact Hours 0
per Week:**

**Total Contact
Hours: 96**

Load Factor: 5.1

Requisites: Yes

Prerequisites:

Co-requisites: HDE 103 Workforce Skills

Mode of

Instructional Delivery: (1) Traditional classroom instruction (3) Hybrid: internet with live lab

Delivery:

If "other" mode of instruction, specify:

Library

Resources: DVD's that the library already has (at PDC).

Assessment of Student Learning - Methods:

(1) Written Examinations (3) Oral Presentations (4) Portfolio (5) Demonstration of Skills

IF "other" assessment, specify:

Recommend

Course 10

Enrollment:

Credit by

Examination: No

Literacy/ Critical

Inquiry N/A

Component:

Ethnic/ Gender

Awareness: N/A

Sustainability: Yes

Sustainability (explanation): Alternative energies and energy efficiency are discussed while we cover general energy topics.

COURSE 1. Introductions and explanation of what Mechatronics is.

TOPICS: 2. Safety (NCCER Core Chapter 1)

3. Measurement Tools

4. Mechanical Fabrication

5. Energy Industry Fundamentals

A. History and Organization of the Industry

B. Energy Industry Safety

C. Electric Power Generation

D. Electric Power Transmission

E. Electric Power Distribution

F. Career Exploration

G. Hot Topics In the Energy Industry;

Energy Efficiency & Conservation,

Alternative Energy

Emerging Technologies

Smart-Grid and Time-of-Use Technologies

Energy Regulation

6. Construction/Industrial Math
7. Intro. to Hand Tools & Power Tools
8. Intro. to Construction & Industrial Drawings
9. Intro. to Manufacturing Basics
10. Career Readiness-prep for and completion of National Career Readiness Certification test.

- COURSE OUTCOMES:**
1. Define Mechatronics and identify common mechatronic systems.
 2. Demonstrate ability to work in a safe manner.
 - a. Explain safety culture and it's importance.
 - b. Identify causes of accidents and the cost of accidents.
 - c. Explain what OSHA is and what it does.
 - d. Demonstrate correct use and knowledge of Personal Protective Equipment.
 - e. Recognize hazards and assess risks.
 - f. Explain fall protection, ladder, stair, and scaffold procedures.
 - g. Identify various types of hazards and demonstrate proper work procedures to minimize those hazards.
 3. Demonstrate ability to specify and assemble different types of assemblies.
 - a. Describe and apply different categories of assembly and types of fasteners.
 - b. Identify and use correctly various hand & power tools.
 - c. Demonstrate how to identify and properly assemble a pneumatic system.
 4. Define and demonstrate different types of measurements and tools.
 - a. Describe different measurement systems and conversion between them.
 - b. Demonstrate proper application and use of various measurement tools.
 - c. Explain and properly apply basic principles of Statistical Process Control.
 - d. Describe various types of dimensions and tolerance types.
 5. Demonstrate Familiarity with the Energy Industry
 - a. Discuss history of U.S. energy industry/infrastructure, environmental laws and regulatory bodies.
 - b. Explain different types, structures and roles of energy companies, businesses and organizations.
 - c. Describe electric metering and billing.
 - d. Explain flow of energy from generation through distribution to the customer.
 - e. Explain conventional electrical power generation systems and identify electric power generation equipment and systems.
 - f. Explain formation and/or application of various energy sources used to generate electric power and their advantages and disadvantages.

- g. Explain how various alternative energy sources are used to produce electric energy and what their advantages and disadvantages are.
- h. Explain electric power transmission and various principles involved and name equipment and systems used.
- i. Explain the ownership and governance of the electric transmission system and discuss emerging technologies related system.
- j. Explain the electric power distribution process, why electric distribution systems are needed, how they operate and the name and purpose of the equipment used for power distribution.
- h. Explain the U.S. transmission and distribution system, the components of the system and how the equipment operates.
- l. Discuss emerging technologies related to natural gas distribution.
- m. Discuss different careers in the energy industry and personal interests and aptitudes relating to those careers.
- n. Discuss regulation, energy efficiency, conservation, alternative energies Smart-Grid, Time-of-Use and other emerging technologies.

6. Perform basic math and measurement functions

- a. Add, subtract, multiply, and divide whole numbers, fractions, and decimals without a calculator.
- b. Use basic measurement tools such as tape measures and rulers to make measurements.
- c. Convert between fractions, decimals and percentages.
- d. Recognize different units of measurement and convert back and forth between them.
- d. Recognize basic geometric shapes commonly used in industry and use geometry to measure them.

7. Identify, safely use and properly maintain power tools commonly used in industry.

8. Interpret and create industrial and other types of engineering drawings.

- a. Identify basic industrial and construction drawing parts and symbols.
- b. Relate information on drawings to actual locations and/or features.
- c. Identify different types of industrial drawings.
- d. Interpret and use drawing dimensions.

9. Discuss basic manufacturing concepts.

- a. Describe various manufacturing processes.
- b. Discuss basic principles of lean manufacturing and other manufacturing economics.
- c. Explain batch vs. continuous production systems.

10. Prepare for and complete National Career Readiness Certification test.

Proposer: Kenny Keith