New Course Form

IMO 208 Introduction to Energy Generation and Distribution 6

Originator: Kenny Keith **Status:** Approved **Date Created:** 11/12/2014

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

Completed: 12/11/2014 **To ACETS:**

Course Prefix: IMO

Course Number: 208

Course Title: Introduction to Energy Generation and Distribution

Cross-listing: No

Cross-listing information:

Semester for Implementation: Fall

Year of Implementation: 2015

Course Type: Required Vocational

Credit Hours: 6

Transfer Course:

Course Catalog Description: Introduction to various types of energy and their conversion to useable energy such as electrical power. Includes how to generated electrical is transmitted and distributed to the point of use.

Rationale: IMO Advisory Committee recommended a course that covers a broader area of the Power & Energy Industry. This recommendation was approved on October 2, 2014.
Incorporates National Career Readiness aptitude testing for Talent, Applied Mathematics, Locating Information, and Reading for Information.
Uses the Energy Industry Fundamentals (EIF) developed by Center for Workforce Development and Industry Partners

Total Lecture Contact Hours per Week: 6

Total Lab Contact Hours per Week: 3

Total Clinical Contact Hours per Week: 0

Total Contact Hours: 135

Load Factor: 8.1

Requisites: Yes

Prerequisites:

Co-requisites: HDE 103 workforce Skills

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

If "other" mode of instruction, specify:

Library Resources: N/A

Assessment of Student Learning - Methods: (1) Written Examinations (3) Oral Presentations (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): N/A

COURSE TOPICS:
1. Overview of the Energy Industry
2. Operator Responsibilities
3. Industrial Math
4. Electric Power Generation and Power Transmission
5. Natural Gas Transmission and Distribution
6. Plant Sciences
7. Lubrication
8. Process Sampling
9. Careers in the Energy Industry
10. Energy Trends and Topics

COURSE OUTCOMES:
1. Demonstrate specified competencies of the Base Curriculum topic: Basic Skills with hands-on assignment and tests scores totaling a minimum of 80%.
   a. Overview of the Energy Industry
   EIF Module 1

Discuss the history of the United States energy industry/infrastructure.
Discuss environmental laws and regulations that impact the energy industry (local, state,
and federal) and explain importance of proper documentation to ensure compliance.
Explain the role of regulatory bodies in the energy industry (Federal Energy Regulatory
Commission and others) and understand what ?obligation to serve? means.

b. Operator Responsibilities:
OTORI-Operator Responsibilities: Introduction
AOOPP - Plant Production
AOOCO Safety and Communication
BBSDS- Safety Data Sheets
EIF Module 2
Understand the roles of federal, state, and local agencies in workplace safety and health.
Understand the importance of compliance with standards, regulations, and established
procedures to ensure a safe and healthful work environment.
Know basic regulatory requirements that promote safe and effective operations for the
protection of people, data, property, and institutions.
Know basic procedural guidelines that promote safe and effective operations for the
protection of people, data, property, and institutions.
Understand the roles and responsibilities of employers, employees, and the general public
in creating and maintaining workplace, personal, and community safety cultures.

b. Operator Responsibilities:
AOOTC Introduction and Trends
AOOIM Maintenance and Emergencies

2. Explain the utilization of the Base Curriculum topic: Industrial Math applying specified competencies of hands-on assignment and tests scores totaling a minimum of 80%.
a. Industrial Math:
AOIFC Formulas, Graphs, and Trends

b. National Career Readiness ACT assessment testing
Locating Information
Reading for Information
Math
3. Compare the basic Physics Principles of the Base Curriculum topic: Plant Science 1 demonstrating specified competencies with hands-on assignment and tests scores totaling a minimum of 80%.

a. Electric Power Generation

EIF Module 3
Explain how oil was created and list its advantages and disadvantages.
Explain how coal was created and list its advantages and disadvantages.
Explain how natural gas was created and list its advantages and disadvantages.
Explain how water is used in hydroelectric power generation and list its advantages and
disadvantages.
Explain how uranium is created and lists its advantages and disadvantages.

Explain how solar energy is used to produce electricity in photovoltaic systems and what its advantages and disadvantages are.
Explain how solar energy is used to produce electric energy using steam and what its
advantages and disadvantages are.
Explain how wind energy is used to produce electric energy and what its advantages and
disadvantages are.
Explain how geothermal energy is used to produce electric energy and what its advantages and disadvantages are.
Explain how biomass energy is used to produce electric energy and what its advantages
and disadvantages are.
Explain how ocean wave energy is used to produce electric energy and what itsadvantages and disadvantages are.

b. Plant Science: 1
AOPSL Solids and Liquids
AOPGF Gases and Flowing Liquids
AOPBP Basic Principles
AOPLM Forces and Machines
AOPBE Basic Electrical Principles
AOPBC Basic Electrical Circuits

4. Compare the basic Physics Principles of the Base Curriculum topic: Plant Science 2 demonstrating specified competencies with hands-on assignment and tests scores totaling a minimum of 80%.
a. Plant Science 2
AOPHE Heat
AOPHT Heat Transfer
AOPFS Fluid Systems
AOPPD Process Dynamics and Measurement

5. Display a fundamental knowledge of the Base Curriculum topic: Minor Maintenance performing specified competencies of hands-on assignment and tests scores totaling a minimum of 80%.
a. Equipment Lubrication:
GMBLU Basic Lubrication
AOELB Lubricants and Bearings

6. Electric Power Transmission
EIF Module 4
Explain the electric power transmission process.
Discuss the application of different electric power transmission principles (including AC vs. DC).
Name electric power transmission equipment and systems.

7. Electric Power Distribution
EIF Module 5
Explain the electric power distribution process.
Discuss the need for electric distribution systems and how they are designed to operate.
Name electric-power-distribution system equipment and what the various components do.
Explain the general ownership and governance structures of the electric distribution
system.
Discuss the emerging technologies in electric power distribution including distribution
automation and Smart Grid systems.

8. Natural Gas Transmission and Distribution
EIF Module 5
Explain the natural gas transmission and distribution process.
Name the components of the natural gas distribution system and how the equipment is
designed to operate.
Discuss emerging technologies in natural gas distribution.

9. Complete specified competencies of the Base Curriculum topic: Process Sampling with hands-on assignment and tests scores totaling a minimum of 80%.
a. Process Sampling:
AOPOS Obtaining Samples
AOPTS Testing Samples

10. Careers in the Energy Industry
EIF Module 6
Discuss different careers in the energy industry and personal interests and aptitudes relating to those careers.
11. Energy Trends and Topics
EIF Module 7
Discuss regulations, energy efficiency, conversation, alternative energies Smart Grid, time-of Use and other emerging technologies.

Proposer: Kenny Keith