

**SOUTHEAST COMMUNITY COLLEGE**  
**CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION**  
**Energy Generation Operations Technology Program**  
**Revision Date: August 26, 2019**  
[Syllabus Statements](#)

**I. CATALOG DESCRIPTION**

Course Number: ENER1100  
Course Title: Energy Industry Fundamentals  
Prerequisite(s): None  
Catalog Description: The course content focuses on understanding various types of energy and their conversion to useable energy such as electrical power. How generated electrical power is transmitted and distributed to the point of use. Natural gas transmission and distribution systems are described. Compliance with safety procedures is introduced. Careers in energy industry and entry points are covered. Energy system reliability and governance are explained.

Credit Hours: 3  
Class Hours: 45  
Lab Hours: 0  
Total Contact Hours: 45

**II. COURSE OBJECTIVES:** *Course will*

- A. Demonstrate knowledge of the basic and emerging principles and concepts that impact the energy industry.
- B. Show students how to apply compliance with procedures necessary to ensure a safe and healthy work environment.
- C. Explain electric power generation.
- D. Provide an understanding of electric power transmission technologies.
- E. Explain electric power and natural gas distribution.
- F. Identify and describe careers and entry requirements in the energy industry.
- G. Evaluate and analyze energy industry 'hot topics'.

**III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:**

- A. Student Learning Outcomes: *Student will be able to*
  - 1. Explain the role of the regulatory bodies in the energy industry (Federal Energy Regulatory Commission and others) and understand what "obligation to serve" means.
  - 2. Identify and practice safe work practices as used in the utility industries.
  - 3. Explain the different structures of energy companies.
  - 4. Identify the role and function of generation, transmission and distribution organizations.
  - 5. Explain the conventional electric power generation systems and process (coal, gas, hydroelectric, and nuclear).
  - 6. Explain the electric power transmission process.
  - 7. Explain the application of different electric power principles (including AC vs. DC).
  - 8. Explain ownership/governance of the electric transmission system.
  - 9. Explain the electric power distribution process.

- 10. Discuss the emerging technologies in electric power transmission and distribution, including distribution automation and SmartGrid systems.
- 11. Explain the natural gas transmission and distribution process.
- B. General Education Learning Outcomes (GELOs)
  - 1. GELO #4: Global Awareness and Citizenship  
Outcome 2: Explain the connections between historical and recent events and current global situations related to political systems, economic systems, social systems, and/or environmental issues.

#### IV. CONTENT/TOPICAL OUTLINE

- A. History and organization of the energy industry.
  - 1. History of the U.S. energy and infrastructure.
  - 2. The energy industry: Structure and organization
  - 3. Energy flow: generation, transmission and distribution
- B. Safety
  - 1. Regulatory/Procedural/Security
  - 2. Preparing for hazards in the workplace
  - 3. Hazards and response
- C. Electric Power Generation
  - 1. Conventional electric power generation systems
  - 2. Overview of generation fuel sources
  - 3. Overview of emerging and alternative generation technologies
- D. Electric Power Transmission
  - 1. Introduction to electric power transmission
  - 2. Transmission governance, stability and emerging technologies
- E. Electric Power Distribution
  - 1. Introduction to electric power distribution
  - 2. Distribution governance, stability and emerging technologies
  - 3. Natural gas distribution
- F. Energy Industry Careers
  - 1. Energy careers and entry requirements
  - 2. General wage/salary, benefits and other advantages of careers in the energy industry
- G. Evaluate and analyze energy “hot topics”
  - 1. Energy efficiency and conservation
  - 2. Alternative energy resources (wind, solar, geothermal)
  - 3. Emerging technologies in the energy industry
  - 4. Key energy regulatory topics

#### V. INSTRUCTIONAL MATERIALS

- A. Required Text(s): Howlett, II, H.C., *The Industrial Operators Handbook*, EIF online materials will be provided with the course.
- B. Other Resources: Internet, classroom activities
- C. Outside Reading/Research required: Internet Research assignments
- D. Supplies: 3 ring binder with blank paper for notes and USB Flash Drive

#### VI. METHODS OF PRESENTATION/INSTRUCTION

- A. Methods of presentation typically include a combination of the following:
  - 1. Face to face or online, to be determined by the instructor.

## **VII. METHODS OF EVALUATION**

- A.** Methods of evaluation, although determined by the individual instructor, traditionally includes a combination of the following:
  - 1.** Class participation
  - 2.** Regular assignments
  - 3.** Written exams and/or quizzes
  - 4.** Performance and observational assessments

## **VIII. SPECIFIC COURSE REQUIREMENTS**

- A.** A minimum grade of “C” or a minimum of 70% is required to receive credit for this class.
- B.** Cheating within the Manufacturing Division:  
Any violation of academic integrity on assignments, quizzes, or tests will result in a grade of 0 on that assignment, quiz, or test. A second violation in any course after the initial infraction will result in a grade of F for that course. Any additional violations while in the program will result in a suspension from the program. For additional information, refer to the *Academic Integrity* pamphlet available from Student Services.
- C.** Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination.