SOUTHEAST COMMUNITY COLLEGE
CONSTRUCTION, MANUFACTURING AND TECHNOLOGY DIVISION
Energy Generation Operations Technology Program
Revision Date: August 26, 2019

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 reliable grid.
- **C.** Explain electric power generation technologies using various fuel sources.
- **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.** Assess the future of energy.

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 organizations that prioritize safety.
2. Explain the different structures of energy companies.
3. Identify the role and function of generation, transmission and distribution organizations.
4. Explain the technologies that generate electricity (natural gas, coal, nuclear, wind, hydroelectric, solar, biomass and biogas, and geothermal).
5. Explain the electric power transmission process.
6. Explain the application of different electric power principles (including AC vs. DC).
7. Explain ownership/governance of the electric transmission system.
8. Explain the electric power distribution process.
9. Discuss the emerging technologies in electric power transmission and distribution, including grid expansion, cyber security, distribution automation and SmartGrid systems.
10. Explain the natural gas transmission and distribution process.

11. Explain metering, billing, and rate schedules.
12. Discuss energy generation career pathways.
13. Discuss the future of energy.

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. The Power of Energy
1. Our energy ecosystem
2. Fueling our energy future
3. The technologies that generate electricity
4. Our generation's energy trends

B. The Evolution of Energy
1. The past, present, and future of energy
2. Companies that power America
3. Keeping the grid reliable and safe
4. The future of energy companies

C. Our Interconnected Energy System
1. The power transmission system
2. The power distribution system
3. Natural gas transmission, distribution, and end use
4. The drive for grid modernization

D. Show Me the Money
1. Metering, billing and rate schedules
2. Distribution generation, electric vehicles, and load management
3. Energy careers and energy justice

E. Your Future in Energy: Bringing It All Together

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. A minimum grade of "B" or 80% is required to achieve the NUCP Certificate, in accordance with ACAD 08-006, Revision 1, dated October 2016.

C. 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.

D. Credit by Examination: Credit for the course CANNOT be earned through Credit by Examination.