

Course Outline of Record

1. Course Code: ESYS-001
2.
 - a. Long Course Title: Energy Generation & Distribution Industry
 - b. Short Course Title: INTRO POWER
3.
 - a. Catalog Course Description:

An overview of our current power generation infrastructure, methods of power generation and potential employment opportunities will be examined in this course. These areas will be supported by the fundamentals of the power industry including; safety practices, power industry economics and the future of the power industry. An introduction to electrical and construction calculation will be applied to electricity. Hand tools, power tools, construction drawings, material handling and basic rigging will form the basis of knowledge for entering into the power industry.
 - b. Class Schedule Course Description:

This course is an introduction to the power generation infrastructure, methods of power generation and a general overview of employment opportunities within the power generation industry.
 - c. Semester Cycle (if applicable): Every Semester
 - d. Name of Approved Program(s):
 - AIR CONDITIONING AND REFRIGERATION Certificate of Achievement
 - AIR CONDITIONING AND REFRIGERATION AS Degree for Employment Preparation
 - ENERGY SYSTEMS TECHNOLOGY Certificate of Achievement
4. Total Units: 3.00 Total Semester Hrs: 54.00
 Lecture Units: 3 Semester Lecture Hrs: 54.00
 Lab Units: 0 Semester Lab Hrs: 0
 Class Size Maximum: 30 Allow Audit: Yes
 Repeatability No Repeats Allowed
 Justification 0
5. Prerequisite or Corequisite Courses or Advisories:

Course with requisite(s) and/or advisory is required to complete Content Review Matrix (CCForm1-A)

 Advisory: RDG 061 and
 Advisory: ESYS 004 or
 Advisory: MATH 060
6. Textbooks, Required Reading or Software: (List in APA or MLA format.)
 - a. National Center for Construction Education and Research (2015). Core Curriculum: Introductory Craft Skills (5th edition /e). Pearson Education Incorporated. ISBN: 9780134244006
 College Level: Yes
 Flesch-Kincaid reading level: 11.2
 - b. National Center for Construction Education and Research. Introduction to the Power Industry. Pearson Education Incorporated , 09-01-2010.
7. Entrance Skills: *Before entering the course students must be able:*
Advisory skills:

a. Use the concept of ratio to determine the solution to a proportion problem.

- MATH 060 - Use the concept of ratio to determine the solution to a proportion problem.
- ESYS 004 - Use the concept of ratio to determine the solution to a proportion problem.

b. _____

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Compute using the four basic operations of addition, subtraction, multiplication, and division on the rational numbers.

- MATH 060 - Compute using the four basic operations of addition, subtraction, multiplication, and division on the rational numbers in both fraction and decimal form.
- ESYS 004 - Compute using the four basic operations of addition, subtraction, multiplication, and division on the rational numbers.

c.

Compute the value of expressions containing natural number exponents.

- ESYS 004 - Compute the value of expressions containing natural number exponents.
- MATH 060 - Use the properties of natural number exponents to simplify algebraic expressions.

d.

Use various reading strategies to prepare, read and comprehend expository text

- RDG 061 - Use SQ3R &/or SOAR along with outlining, note-taking, mapping summarizing and other strategies to prepare, read, & comprehend expository text.

e.

Read a variety of texts fluently

- RDG 061 - Read a variety of texts fluently.

f.

Write organized summaries & reactions that capture main idea and supporting details

- RDG 061 - Write organized summaries & reactions that capture main idea and supporting details.

g.

Understand multiple word meanings, uses & synonyms

- RDG 061 - Understand multiple word meanings, uses & synonyms

8. Course Content and Scope:

Lecture:

Introduction to power industry

1. Electric power generation
2. Power transmission and distribution
3. Types of Energy
4. Power Generation Technologies
5. Fossil fuels
6. Nuclear Power
7. Hydro-power
8. Geothermal Energy
9. Wind Energy
10. Solar Energy
11. Environmental Controls

Introduction to chemicals filters

1. Electrostatic Precipitators
2. Scrubbers
3. Selective Catalytic Reduction

Electrical Transmission and Distribution

1. Transmission subsystems
2. Substations and switchyards
3. Distribution system
4. Careers in the Power Industry

Importance of Safety

1. Safety culture

2. Personal Protective Equipment (PPE)
3. Electrical Hazards
4. Elevated work and Fall Protection
5. Government agencies involved with safety
6. Occupational Safety and Health Administration (OSHA)
7. Department of Transportation
8. Nuclear Regulatory Commission
9. Policies and procedures
10. Foreign Material Exclusion
11. Hazard recognition, Evaluation and Control
12. Hazard Communication Standard
13. Other Job-Site Hazards

Future of the power industry

1. Environmental considerations
2. Power Industry Economics
3. Future Technology

Introduction to Construction Math

1. Whole Numbers
2. Working with Length Measurements
3. What Are Fractions
4. Decimals
5. Practical application
6. Conversion Process
7. Introduction to Construction Geometry

Hand tool identification and safety & maintenance

1. Hammers
2. Ripping Bars and Nail Pullers
3. Chisels and Punches
4. Screwdrivers
5. Pliers and Wire Cutters
6. Wrenches
7. Sockets and Ratchets
8. Torque Wrenches

Rules and Other Measuring Tools

10. Levels
11. Squares
12. Plumb Bob
13. Chalk Lines
14. Utility Knives
15. Handsaw
16. Files and Rasps
17. Clamps
18. Chain Falls and Come-Alongs
19. Shovels
20. Pick

Introduction to Power Tools

1. Drills
2. Saws
3. Grinders and Sanders
4. Miscellaneous Power Tools

Introduction to Construction Drawings

1. The Drawing Set
2. Six Types of Construction Drawings
3. Scale
4. Lines of Construction
5. Abbreviations, Symbols and Deynotes
6. Using Gridlines to Identify Plan Locations
7. Dimensions

Introduction to Basic Rigging

1. Slings

2. Hitches
3. Rigging Hardware
4. Sling stress
5. Hoists
6. Rigging operations and practices
7. Load control

Introduction to Basic Employability Skills

1. The Construction Business
2. Critical Thinking Skills
3. Computer Skills
4. Relationship Skills
5. Communication Skills
6. Workplace issues

Introduction to Materials Handling

1. Materials-Handling Basics
2. Materials-Handling Safety
3. Materials-handling Equipment

Lab: (if the "Lab Hours" is greater than zero this is required)

9. Course Student Learning Outcomes:

1.
Describe the three fundamental areas of the power industry; Generation station, Transmission substation and Distribution network.
2.
Describe the 5 predominant methods of power generation; Steam, Photovoltaic, Wind, Combustion Engine and Hydro-power generation.
3.
Apply basic math as it pertains to basic electricity.
4.
Recognize ohms law, series and parallel circuits, also combination circuits.
5.
Explain basic electromagnetic theory which will include magnetism, field strength, and motor action.
6.
Explain basic operation of motors and generators.

10. Course Objectives: *Upon completion of this course, students will be able to:*

- a. Define energy and name its sources.
- b. Identify the different methods of converting energy into electricity.
- c. Explain how electricity is transmitted and distributed.
- d. Describe the environmental impacts of producing and distributing electricity and methods used to minimize negative effects.
- e. Explain the idea of a safety culture and its importance in the construction crafts.
- f. Recognize hazard recognition and risk assessment techniques.
- g. Explain fall protection, ladder, stair, and scaffold procedures and requirements.
- h. Define safe work procedures to use around electrical hazards.
- i. Demonstrate the use and care of appropriate personal protective equipment (PPE)
- j. Add, subtract, multiply and divide whole numbers, decimals and fractions with and without a calculator.
- k. Recognize and use metric units of length, weight, volume and temperature.

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- l. Recognize and identify some of the basic hand tools and their proper uses in the construction trade.
- m. Identify power tools and safe practices commonly used in the construction trades.
- n. Identify and analyze various principles as they apply to electrical theory? i.e., conductors, electrical potential, current impedance, and simple circuits.
- o. Recognize and employ essential electrical symbols and schematic diagrams.

11. Methods of Instruction: (*Integration: Elements should validate parallel course outline elements*)

- a. Collaborative/Team
- b. Discussion
- c. Distance Education
- d. Lecture
- e. Participation

12. Assignments: (*List samples of specific activities/assignments students are expected to complete both in and outside of class.*)

In Class Hours: 54.00

Outside Class Hours: 108.00

a. In-class Assignments

- | |
|---|
| <ul style="list-style-type: none">1. Students will take lecture notes.2. Class Discussion.3. Group Interaction and presentations.4. Evaluate the Industry after viewing videos and reading industry reports. |
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b. Out-of-class Assignments

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| <ul style="list-style-type: none">1. Read assigned text.2. Complete assigned worksheets3. Evaluate home energy bills.4. Prepare for in-class discussions on specific energy topics. |
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13. Methods of Evaluating Student Progress: *The student will demonstrate proficiency by:*

- Presentations/student demonstration observations
Presentations given by the students will be measured by content, delivery, timeliness.
- Group activity participation/observation
- True/false/multiple choice examinations
Weekly quizzes composed of true/false/multiple choice questions will be evaluated based upon accuracy.
- Mid-term and final evaluations
Mid-term and final exams scores will be evaluated based upon accuracy.
- Student participation/contribution
- Organizational/timelines assessment

14. Methods of Evaluating: Additional Assessment Information:

15. Need/Purpose/Rationale -- *All courses must meet one or more CCC missions.*

PO - Career and Technical Education

Fulfill the requirements for an entry- level position in their field.

IO - Global Citizenship - Scientific & Technological Literacy

Utilize quantitative expression in a variety of contexts. These would include units of measurement, visual representations, and scales and distributions.

Synthesize, interpret, and infer, utilizing information, data, and experience to solve problems, innovate, and explore solutions.

Produce oral and written information in various modes and media, using technology such as computers, the Internet, and library databases.

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16. Comparable Transfer Course

University System	Campus	Course Number	Course Title	Catalog Year
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17. Special Materials and/or Equipment Required of Students:

NA

18. Materials Fees: Required Material?

Material or Item	Cost Per Unit	Total Cost
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19. Provide Reasons for the Substantial Modifications or New Course:

Change requisite and entrance skills to Reading 061

20. a. Cross-Listed Course (*Enter Course Code*): *N/A*
b. Replacement Course (*Enter original Course Code*): *N/A*

21. Grading Method (*choose one*): Letter Grade Only

22. MIS Course Data Elements

- a. Course Control Number [CB00]: CCC000546103
b. T.O.P. Code [CB03]: 94610.00 - Energy Systems Technology
c. Credit Status [CB04]: D - Credit - Degree Applicable
d. Course Transfer Status [CB05]: C = Non-Transferable
e. Basic Skills Status [CB08]: 2N = Not basic skills course
f. Vocational Status [CB09]: Possibly Occupational
g. Course Classification [CB11]: Y - Credit Course
h. Special Class Status [CB13]: N - Not Special
i. Course CAN Code [CB14]: *N/A*
j. Course Prior to College Level [CB21]: Y = Not Applicable
k. Course Noncredit Category [CB22]: Y - Not Applicable
l. Funding Agency Category [CB23]: A = Fully Economic Development funds
m. Program Status [CB24]: 1 = Program Applicable

Name of Approved Program (*if program-applicable*): AIR CONDITIONING AND REFRIGERATION,AIR
CONDITIONING AND REFRIGERATION,ENERGY SYSTEMS TECHNOLOGY

Attach listings of Degree and/or Certificate Programs showing this course as a required or a restricted elective.)

23. Enrollment - Estimate Enrollment

First Year: 20

Third Year: 36

24. Resources - Faculty - Discipline and Other Qualifications:

- a. Sufficient Faculty Resources: Yes
b. If No, list number of FTE needed to offer this course: *N/A*

25. Additional Equipment and/or Supplies Needed and Source of Funding.

N/A

26. Additional Construction or Modification of Existing Classroom Space Needed. (*Explain:*)

N/A

27. FOR NEW OR SUBSTANTIALLY MODIFIED COURSES

Library and/or Learning Resources Present in the Collection are Sufficient to Meet the Need of the Students Enrolled in the Course: Yes

28. Originator Gary Bergstrom Origination Date 11/10/17

