

Course Outline of Record

1. Course Code: ESYS-011E
2.
 - a. Long Course Title: Introduction to Energy Storage
 - b. Short Course Title: ENERGY STORAGE
3.
 - a. Catalog Course Description:

This course provides a broad overview of electric energy storage technologies, benefits, economics, California policies and a discussion of energy storage in microgrid systems. This course addresses students considering a career in the advanced energy industry or want to know how energy storage fits into energy and solar industry. Students will be prepared to work as site planning technicians or solar sales advisors.
 - b. Class Schedule Course Description:

This course provides a broad overview of electric energy storage technologies, benefits, economics, California policies and a discussion of energy storage in microgrid systems.
 - c. Semester Cycle (if applicable): N/A
 - d. Name of Approved Program(s):
 - NEW CERTIFICATE IN PROGRESS Certificate of Completion
4. Total Units: 1.00 Total Semester Hrs: 18.00
 Lecture Units: 1 Semester Lecture Hrs: 18.00
 Lab Units: 0 Semester Lab Hrs: 0
 Class Size Maximum: 30 Allow Audit: No
 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: ESYS 311C
6. Textbooks, Required Reading or Software: (List in APA or MLA format.) N/A
7. Entrance Skills: *Before entering the course students must be able:*
 - a.
Describe efficiency of solar modules.
 - ESYS 311C - Describe efficiency of solar modules. satisfy SLO 1.
 - b.
Identify system components (inverter, charge controller, combiner, batteries, etc.)
 - ESYS 311C - Identify system components (inverter, charge controller, combiner, batteries, etc.)
 - c.
Explain DC system output versus AC production
 - ESYS 311C - Explain DC system output versus AC production.
8. Course Content and Scope:

Lecture:

1. Explain solar efficiency and the factors affecting solar performance * SLO(1)
2. Explain methods for proper electrical grounding.*SLO(2)
3. Participate in the discussion to identify differences between inverter and micro inverters SLO (3)

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

9. Course Student Learning Outcomes:

1.
Demonstrate knowledge of the current energy storage policy and technologies.
2.
Compare and contrast competing batteries manufacture's performance, benefits, and incentives during procurement of equipment.
3.
Apply battery terminology to communicate effectively with the end user.

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

- a. Explain the Self Generation Incentive Program, state policy and eligibility requirements for qualifying energy storage projects. Satisfy SLO (1)
- b. Identify and explain the types of electric energy storage technologies, performance & operation SLO(2)
- c. Recognize energy storage markets and applications where it make financial sense to use them. SLO (2)

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

- a. Activity
- b. Collaborative/Team
- c. Demonstration, Repetition/Practice
- d. Discussion
- e. Participation
- f. Technology-based instruction

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

In Class Hours: 18.00

Outside Class Hours: 36.00

a. In-class Assignments

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| <ol style="list-style-type: none">1. Group discussion on overview of energy policy. SLO (1)2. Examen energy storage capability and performer efficiency calculations. SLO (2)3. Class discussion over design errors and how to avoid Pitt falls. SLO (3) |
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b. Out-of-class Assignments

Read assigned text.

13. Methods of Evaluating Student Progress: *The student will demonstrate proficiency by:*

- True/false/multiple choice examinations
- Student preparation
- 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.

Apply critical thinking skills to execute daily duties in their area of employment.

Display the skills and aptitude necessary to pass certification exams in their field.

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IO - Scientific Inquiry

Recognize the utility of the scientific method and its application to real life situations and natural phenomena.

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:

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:

This course provides a broad overview of electric energy storage technologies, benefits, economics, California policies and a discussion of energy storage in microgrid systems. This course addresses students considering a career in the advanced energy industry or want to know how energy storage fits into energy and solar industry. Students will be prepared to work as site planning technicians or solar sales advisors.

This course is developed to meet the goals of the California Energy Efficiency Strategic Plan (CEESP) which mandates that 100 percent of all new homes in California will be Zero Net Energy starting in 2020 and 50 percent of commercial buildings by 2030. Solar technology is the leading technology used to offset electrical demand from the power grid. California has acknowledged the shortage of qualified and available work force to meet these new mandates. This course is designed to develop the highly trained technical workforce necessary to meet the goals of the California Energy Efficiency Strategic Plan (CEESP).

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]: *N/A*
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]: Clearly 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]: Y = Not Applicable
m. Program Status [CB24]: 1 = Program Applicable

Name of Approved Program (*if program-applicable*): NEW CERTIFICATE IN PROGRESS

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: 40

24. Resources - Faculty - Discipline and Other Qualifications:

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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 Ramiro Galicia Origination Date 09/17/16