

Course Outline of Record

1. Course Code: ESYS-033
2. a. Long Course Title: Residential House Electrical Wiring
 b. Short Course Title: ELECTRICAL WIRING
3. a. Catalog Course Description:
 This course will focus on safely wiring a single-family dwelling as per the National Electrical Code using laboratory mock-up walls: Lighting and appliance branch circuits, special purpose outlets, service-entrance calculations, and grounding; project estimating and pricing.
 b. Class Schedule Course Description:
 This course will focus on safely wiring a single-family dwelling as per the National Electrical Code using laboratory mock-up walls: Lighting and appliance branch circuits, special purpose outlets, service-entrance calculations, and grounding; project estimating and pricing.
 c. Semester Cycle (if applicable): *N/A*
 d. Name of Approved Program(s):
 • NEW CERTIFICATE IN PROGRESS Certificate of Completion
4. Total Units: 3.00 Total Semester Hrs: 90.00
 Lecture Units: 2 Semester Lecture Hrs: 36.00
 Lab Units: 1 Semester Lab Hrs: 54.00
 Class Size Maximum: 24 Allow Audit: No
 Repeatability 0x
 Justification 0
5. Prerequisite or Corequisite Courses or Advisories:
Course with requisite(s) and/or advisory is required to complete Content Review Matrix (CCForm I-A)
 Advisory: ESYS 002
 Advisory: ESYS 004
6. Textbooks, Required Reading or Software: (List in APA or MLA format.)
 a. Mullin, Ray C. (2014). *Electrical Wiring Residential* (18 th/e). Thomson, Delmar Learning. ISBN: 9781285170954
 College Level: Yes
 Flesch-Kincaid reading level: 11.0
7. Entrance Skills: *Before entering the course students must be able:*
Advisory skills:

a.

Develop a plan and a hazard assessment for a given task and select the appropriate PPE and work methods to safely perform the task.

- ESYS 002 - Develop a plan and a hazard assessment for a given task and select the appropriate PPE and work methods to safely perform the task.

b.

Define voltage and identify the ways in which it can be produced.

- ESYS 002 - Define voltage and identify the ways in which it can be produced.

c.

Explain the difference between conductors and insulators.

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- ESYS 002 - Explain the difference between conductors and insulators.

d.

Define the units of measurement that are used to measure the properties of electricity.

- ESYS 002 - Define the units of measurement that are used to measure the properties of electricity.

e.

Identify the meters used to measure voltage, current, and resistance.

- ESYS 002 - Identify the meters used to measure voltage, current, and resistance.

f.

Demonstrate proficiency in basic number facts (addition, subtraction, multiplication, division).

- ESYS 004 - Demonstrate proficiency in basic number facts (addition, subtraction, multiplication, division).

g.

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

- ESYS 004 - Compute using the four basic operations of addition, subtraction, multiplication, and division on the rational numbers.

h.

Compute the value of expressions containing natural number exponents.

- ESYS 004 - Compute the value of expressions containing natural number exponents.

i.

Apply the order of operations to simplify expressions involving several operations.

- ESYS 004 - Apply the order of operations to simplify expressions involving several operations.

j.

Explain the purpose of OSHA and how it promotes safety on the job.

- ESYS 002 - Explain the purpose of OSHA and how it promotes safety on the job.

8. Course Content and Scope:

Lecture:

1. Electrical safety, first aid, and the National Electrical Code.
2. Ohm's Law, power generation, and distribution.
3. Residential branch circuits including 3-way switches, lights, and wall outlets.
4. Conductor sizes and types, voltage drops, and loads.
5. Electrical service entrance equipment, sizes, types, and grounding.
6. Special electrical outlets and circuits.
7. Over-current protection, fuses, and circuit breakers.
8. Electrical troubleshooting and meters.
9. Material and labor estimating, costs, markup, and sales proposals.

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

HANDS ON LABS TO DEVELOPE TECHNICAL SKILL IN BUILDING.

1. Branch-circuit wiring in wood frame walls including switches, wall receptacles, and light fixtures.
2. Electrical service entrance equipment.
3. Grounding system.
4. Conduit bending, metal boxes, and fitting installation.
5. Electrical troubleshooting.

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9. Course Student Learning Outcomes:

1.
Demonstrate safe installation practices on typical house wiring branch circuits.
2.
Calculate electrical loads and size wires accordingly.
3.
Apply the National Electric Code to residential electrical construction.

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

- a. Demonstrate safe installation practices on typical house wiring branch circuits.
- b. Calculate electrical loads and size wires accordingly.
- c. Apply Ohm's Law to determine circuit voltage, amperage, and resistance.
- d. Calculate electrical installation costs using standard electrical estimating skills.

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

- a. Collaborative/Team
- b. Demonstration, Repetition/Practice
- c. Discussion
- d. Laboratory
- e. Lecture
- f. Participation
- g. 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: 90.00

Outside Class Hours: 72.00

a. In-class Assignments

- | |
|---|
| <ol style="list-style-type: none">1. Reading from textbooks2. Research of specialty items3. Problem solving4. Participate in collaboration5. Team group projects6. Participate in open forums discussion on Californian lighting code. |
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b. Out-of-class Assignments

- | |
|---|
| <ol style="list-style-type: none">1. Reading from textbooks2. Research of specialty items3. Problem solving |
|---|

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

- Laboratory projects
- Group activity participation/observation
- True/false/multiple choice examinations
- Mid-term and final evaluations
- Student participation/contribution
- Student preparation

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.

Apply critical thinking skills to research, evaluate, analyze, and synthesize information.

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

Exhibit effective written, oral communication and interpersonal skills.

IO - Scientific Inquiry

Analyze quantitative and qualitative information to make decisions, judgments, and pose questions.

IO - Critical Thinking and Communication

Apply principles of logic to problem solve and reason with a fair and open mind.

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.

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:

Core course for the Certificate in Lighting and Controls Technology. This Certificate is part of the Zero Net Energy stackable certificates.

- 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

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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:

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 03/12/17