

Course Outline of Record

1. Course Code: ACT-031
2.
  - a. Long Course Title: Electrical Fundamentals
  - b. Short Course Title: ELECTRICAL FUND
3.
  - a. Catalog Course Description:
 

This course is an introduction to residential wiring and grounding, and covers the installation of panels, switches, receptacles, lighting, and other outlets. In addition, load calculations are used to size the electrical service for dwellings. Safety procedures are emphasized as students have the opportunity to apply Service Learning by way of a practical lab or an actual project site with close supervision of trade professionals.
  - b. Class Schedule Course Description:
 

This course is an introduction to residential wiring and grounding, and covers the installation of panels, switches, receptacles, lighting, and other outlets.
  - c. Semester Cycle (if applicable): Fall
  - d. Name of Approved Program(s):
    - CONSTRUCTION MANAGEMENT Certificate of Achievement
4. Total Units: 3.00      Total Semester Hrs: 126.00  
 Lecture Units: 1      Semester Lecture Hrs: 18.00  
 Lab Units: 2      Semester Lab Hrs: 108.00  
 Class Size Maximum: 20      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)*

 Prerequisite: CM 020 or  
 Prerequisite: ACT 020
6. Textbooks, Required Reading or Software: *(List in APA or MLA format.)*
  - a. National Center for Construction Education and Research (2016). Construction Technology-Trainee Guide (4th/e). Gainesville, FL Pearson . ISBN: 0134130391  
 College Level: Yes  
 Flesch-Kincaid reading level: 12
7. Entrance Skills: *Before entering the course students must be able:*
  - a. Discuss common safety hazards on construction sites.
    - ACT 020 - Discuss common safety hazards on construction sites.
  - b. Explain the purpose of Occupational Safety and Health Administration (OSHA) and their regulations for the construction industry.
    - CM 020 - Explain the purpose of Occupational Safety and Health Administration (OSHA) and their regulations for the construction industry.
  - c. Identify various hand tools used in the construction industry.
    - ACT 020 - Identify various hand tools used in the construction industry.
  - d. Identify various power tools used in the construction industry.
    - CM 020 - Identify various power tools used in the construction industry
  - e. Understand the impact of construction to the environment.
    - ACT 020 - Understand the impact of construction to the environment.
  - f. Demonstrate fluency reading a tape measure.
    - CM 020 - Demonstrate fluency reading a tape measure.

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g. Demonstrate the ability to interpret information and instructions presented in both written and verbal form.

- CM 020 - Demonstrate the ability to interpret information and instructions presented in both written and verbal form

h. Demonstrate effective relationship skills with teammates and supervisors, the ability to work on a team, and appropriate leadership skills.

- ACT 020 - Demonstrate effective relationship skills with teammates and supervisors, the ability to work on a team, and appropriate leadership skills.

i. Demonstrate critical thinking skills and the ability to solve problems using those skills.

- CM 020 - Demonstrate critical thinking skills and the ability to solve problems using those skills

j. Understand workplace issues such as sexual harassment, stress, and substance abuse.

- ACT 020 - Understand workplace issues such as sexual harassment, stress, and substance abuse.

## 8. Course Content and Scope:

### Lecture:

- Overview of the electrical trade
- Electrical shock
- Reducing the risk of hazardous situations
- OSHA
- NFPA 70E
- Ladders and scaffolds
- Basic tools safety
- Confined space entry procedures
- Basic first aid
- Solvents and toxic vapors
- Asbestos
- Batteries
- PCBs and vapor lamps
- Fall protection
- Sizing the electrical service
- Sizing residential neutral conductors
- Sizing the load center
- Grounding
- Installing the service entrance
- Electrical panel location
- Wiring methods
- Equipment grounding system
- Branch circuit layout for power
- Branch circuit layout for lighting
- Outlet boxes
- Wiring devices
- Lighting control
- Electrical wiring
- Residential swimming pools, spas, and hot tubs

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

- Calculate electric service requirements for a dwelling
- Install grounding requirements for a residential electric service
- Aid in the installation of the main service panel
- Pull wiring to power outlets and light switches
- Connect wiring for power outlets and lighting switches
- Connect homerun wiring to the main service panel
- Install electrical face plates
- Install electrical light fixtures

## 9. Course Student Learning Outcomes:

1.

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Outline the purpose of OSHA and the safety procedures in the workplace. (Cognitive)

2.

Explain the role of the National Electrical Code in residential wiring. (Cognitive)

3.

Design the electric service requirements in a dwelling. (Psychomotor)

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

- a. Explain the safe working practices in the construction environment.
- b. Explain the purpose of OSHA and how it promotes safety on the job site.
- c. Identify electrical hazards and how to avoid or minimize them in the workplace.
- d. Explain safety issues concerning lockout / tagout procedures, confined space entry, respiratory protection, and fall protection systems.
- e. Explain the development of a task plan and a hazard assessment for a given task and select the appropriate PPE and work methods to safely perform the task.
- f. Explain the role of the National Electrical Code in residential wiring.
- g. Describe how to determine electric service requirements for dwellings.
- h. Explain the grounding requirements of a residential electric service.
- i. Explain how to calculate and select service-entrance equipment.
- j. Describe the proper wiring methods for various types of residences.
- k. Explain the proper computation for branch circuit loads and explain their installation requirements.
- l. Explain the types and purposes of equipment grounding conductors.
- m. Explain the purpose of ground fault circuit interrupters.
- n. Discuss outlet boxes and select the proper type for different wiring methods.
- o. Describe the installation rules for electrical systems around swimming pools pas, and hot tubs.
- p. Explain how wiring devices are selected and installed.
- q. Describe the installation and control of lighting fixtures.

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

- a. Demonstration, Repetition/Practice
- b. Discussion
- c. Lecture
- d. Participation

Other Methods:

Office and site visits

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

In Class Hours: 126.00

Outside Class Hours: 36.00

a. In-class Assignments

1. Individual projects
2. Small group projects

b. Out-of-class Assignments

1. Review questions
2. Vocabulary terms
3. Short response papers

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

- Written homework

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- Group activity participation/observation
- Student participation/contribution
- Other  
Quizzes In-class exercises Participation during office and site visits

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

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.

IO - Personal and Professional Development

Develop realistic goals.

Demonstrate an understanding of ethical issues to make sound judgments and decisions.

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:

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18. Materials Fees:  Required Material?

**Material or Item**

**Cost Per Unit**

**Total Cost**

19. Provide Reasons for the Substantial Modifications or New Course:

Periodic Course Review

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]: CCC000513184  
b. T.O.P. Code [CB03]: 95700.00 - Civil and Construction Ma  
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]: 2 = Stand-alone

Name of Approved Program (*if program-applicable*): CONSTRUCTION MANAGEMENT

*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

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Third Year: 20

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 Donbert M. Bitanga Origination Date 04/22/18