ESYST 123 - Residential Wiring

Approval Date:  Effective Term:

Department: ELECTRONIC SYSTEMS TECHNOLOGY
Division: Career Technical Education
Units: 4.00
Grading Option: Letter Grade
Transferability: CSU Transferable
Course is: AA/AS Degree
Repeatability:
Contact Hours per Term:
  Lecture/Discussion: 3.00
  Lab: 3.00
Associate Degree GE Applicability: No
Recommended Class Size: 35

Discipline/Minimum Qualifications:
Electricity, Electronics

Catalog Description:
Introduces circuit wiring and methods for residential construction according to the National Electrical Code, including circuit planning for kitchens, bathrooms, general living areas and special purpose circuits.

Schedule Description:
Introduces circuit wiring and methods for residential construction according to the National Electrical Code.

Student Learning Outcome:
Lecture:

  1. Design common residential circuits in accordance with the National Electrical Code and California State Electrical Code.

Lab:

  1. Implement common residential circuits in accordance with the National Electrical Code and California State Electrical Code.
1. Determine the requirements for service entrance equipment according to the NEC.
2. Identify the breaker boxes and fittings required for a residential plan according to the NEC.
3. Determine the overcurrent protection devices required for a residential plan according to the NEC.
4. Determine the grounding devices required for a residential plan according to the NEC.
5. Describe and explain the wiring method requirements for a HVAC system according to the NEC.
6. Compare and contrast the wiring method requirements for a fire alarm system to the wiring method requirements for a security system according to the NEC.
7. Describe and explain the wiring method requirements for a swimming pool system according to the NEC.
8. Develop electrical circuits for the kitchen utilizing a set of construction blueprints according to the NEC.
9. Design electrical circuits for the bathroom utilizing a set of construction blueprints according to the NEC.

Lab:

1. Install the breaker boxes and fittings for a residential plan according to the NEC.
2. Cable the grounding system for a residential plan according to the NEC.
3. Install overcurrent protection according to the NEC.
4. Install electrical circuits for the bathroom according to the NEC.

Course Content Outline:

Lecture:

1. Wiring Methods
   1. NEC requirements
   2. Cable assemblies
   3. Boxes
   4. Fittings
   5. Service entrance equipment
   6. Cables
   7. Conductors
   8. Overcurrent protection
   9. Panel boards
   10. Bonding
   11. Grounding
   12. Watt-hour meters
2. General Wiring Installation
   1. Air conditioning systems
   2. Heating systems
   3. Thermostats
   4. Furnace controls
   5. Class 1 & class 2 wiring systems
   6. Signal wiring
3. Additional Wiring Applications
1. Remote control wiring
2. TV and phone outlets
3. Swimming pools/spas
4. Motors
5. Pumps
6. Security systems
7. Fire alarm systems
8. Smart control systems
9. Signal transmission fundamentals
10. Safety codes

4. Circuit Planning
   1. General living area
   2. Bathrooms
   3. Exterior
   4. Kitchen
   5. Washrooms
   6. Special purpose

Lab:

1. Breaker boxes
2. Grounding
3. Overcurrent
4. Fire alarm systems
5. Security systems

Methods of Instruction:
Lab, Lecture:

Methods of Evaluation:
Exams/Tests/Quizzes
Problem Solving
Skill Demonstrations

Exams

Typical Assignments:

Reading:
Text readings Technical specifications for electrical circuits Schematics for electrical circuits

Writing, Problem Solving or Performance:
Install breaker boxes according to plans. Design an electrical circuit for a bathroom.
Other:

Required Materials Examples:
Book 1
Author: Harvey N. Holzman  
Publication Date: 2008  
Edition: 8th
Title: Modern Residential Wiring  
Publisher: Goodheart-Wilcox

Course Preparation:
Prerequisite(s):
ESYST 104
CONST 103
CONST 124

Co-Requisite(s):
None

Recommended:
None

Document Content Review

Target Course Skills
Condition on Enrollment
Established
Faculty
Lee Hilliard Samuel Bolanos

Basic Content Review
Lecture: Define the terms analog and digital and distinguish between digital and analog signals. Explain the basic process of how a computer works showing data and address flows in the basic computer components. Compare and contrast discrete logic, embedded controller, and CPLD/FPGA digital function implementation. Explain the operational differences of a binary up counter, down counter, BCD counter, and frequency divider. Differentiate storage register operation from shift register operation. Translate between truth table and Boolean expression. Compare and contrast parallel and serial binary data transmission methods. Lab: Measure propagation delay and rise/fall time of a logic gate/circuit and flip flop. Program a basic microcontroller using a higher level language. Validate basic logic circuits using TTL or CMOS ICs with truth tables, oscilloscope waveforms, or other means. Write the Boolean expression from a logic diagram and draw the logic diagram from a Boolean expression. Convert between the hexadecimal, decimal, and binary number systems.
Condition on Enrollment
Established
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Basic Content Review
Lecture: 1. Explain multi-view and isometric drawings and sketches. 2. Explain the types and uses of plans,
views, and drawings in residential and commercial construction. 3. Read symbols, dimensions, materials, and scales. Laboratory: 1. Analyze various structural, architectural, mechanical, plumbing, electrical drawings and details. 2. Properly use various scales and trade mathematics to extract construction data from a variety of drawings, plans, and specifications.

Condition on Enrollment

Established

Faculty

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Basic Content Review

Evaluate the use of appropriate electrical codes for various types of construction drawings. Assess a construction job site project to assure electrical codes are adhered to in the building process. Describe the organization of the Electrical Code.