SYLLABUS

DATE OF LAST REVIEW: 11/11/2014

CIP CODE: 46.0302

SEMESTER: Departmental Syllabus

COURSE TITLE: Residential Wiring I

COURSE NUMBER: ELET0150

CREDIT HOURS: 4

INSTRUCTOR: Departmental Syllabus

OFFICE LOCATION: Departmental Syllabus

OFFICE HOURS: Departmental Syllabus

TELEPHONE: Departmental Syllabus

EMAIL: Departmental Syllabus

KCKCC-issued email accounts are the official means for electronically communicating with our students.

PREREQUISITE (S): ELET0101 Electromechanical Systems or ELET0110

REQUIRED TEXT AND MATERIALS: Please check with the KCKCC bookstore, http://www.kckccbookstore.com for the required text for your particular class.

COURSE DESCRIPTION:

This is an introductory course on residential wiring methods that includes practical application and hands-on experience in implementing the code requirements. Upon successful completion of this course, the student should acquire the necessary skills to wire a residence to meet the minimum requirements as set forth in the current National Electrical Code for residential occupancies. The student will be required to provide ANSI Z87 safety glasses and may be expected to provide other basic hand tools and/or equipment.
METHOD OF INSTRUCTION:

A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE

I. General Information for Electrical Installations
   A. Identify branch circuit loads
   B. Explain specifications on branch circuits
   C. Identify symbols and notations for circuits
   D. Explain the American National Standards Institute
   E. Explain how the Code uses metric (SI) measurements
   F. Identify Underwriters Laboratories, Inc. (UL)
   G. Use safe work practices in the lab

II. Electrical Calculations for Residential Service
   A. Determine load based on square footage and utilization.
   B. Calculate the wire sizes for service entrance,
   C. Determine specifications for service per authority having jurisdiction.
   D. Install Ganged switch (device) boxes
   E. Size boxes for conduit wiring
   F. Describe special-purpose outlets
   G. Calculate the voltage drop on a branch circuit
   H. Select a box size when conductors are different sizes

III. Electrical Luminaries for the Residence
   A. Explain the basics of fluorescent lighting.
   B. Identify and install outdoor lighting.
   C. Identify and install recessed lighting.
   D. Determine the minimum number of lighting circuits in a dwelling
   E. Identify and install energy efficient luminaries
   F. Explain the different types of lamps and their colors

IV. Branch Service for Appliances
   A. Explain the need for current supply to appliances
   B. Calculate the voltage supply for major appliances
   C. Describe armored cable usage on appliances.
   D. Explain the wiring requirements for a counter-mounted cooking unit circuit
   E. Calculate the demand for a wall-mounted oven circuit
   F. Select the circuit requirements when more than one wall-mounted oven and counter-mounted cooking unit are supplied by one circuit
V. Residential Switches and Receptacles for Residential
   A. Explain and Install three-way switches
   B. Install single pole toggle switches
   C. Bonding a receptacle to a metal box
   D. Describe non-grounding and self-grounding receptacles
   E. Calculate the small appliance branch circuits for convenience receptacles in a kitchen
   F. Explain split-circuit receptacles and Multiwire circuits
   G. Explain the rules for receptacles and outlets in a kitchen

VI. Electrical Requirements for Grounding and Bonding
   A. Describe general grounding considerations in a kitchen
   B. Explain Code requirements for ground-fault circuit interrupters
   C. Install ground-fault circuit interrupter in a residential circuit
   D. Explain and install bonding
   E. Explain and install grounding on all receptacles
   F. Explain and install grounding on service entrance
   G. Explain how an isolated ground receptacle functions
   H. Explain and install grounding on metal boxes

VII. Electrical Protection from Short Circuits and Ground Faults
   A. Identify and install circuit breakers
   B. Identify and install grounding protection on circuits
   C. Explain the purpose of grounding electrical circuits
   D. Explain and identify the purpose of service entrance grounding
   E. Explain and identify the purpose of ground fault circuit interrupters
   F. Explain and identify the purpose of arc fault circuit interrupters
   G. Install ground fault and arc fault circuit interrupters

EXPECTED LEARNER OUTCOMES:

A. The student will be able to identify and install required branch circuits per NEC.
B. The student will be able to install and calculate residential services per NEC.
C. The student will be able to identify and install various types of luminaries.
D. The student will be able to describe branch circuit requirements for appliances per NEC.
E. The student will be able to identify and install various types of switches and receptacles per NEC.
F. The student will be able to identify the NEC requirements for grounding and bonding.
G. The student will be able to identify and install over current/short circuit and ground fault protection.
CORE COMPETENCIES:
Upon successful completion of this course:

- The student will be able to identify and install required branch circuits per NEC.
- The student will be able to explain and identify conductor size and type per branch circuit.
- The student will be able to demonstrate wiring methods and wire connections.
- The student will be able to determine using the NEC minimum number of small appliances and lights required.
- The student will be able to identify and install various types of switches and receptacles per NEC.
- The student will be able to install multi-wire branch circuits.
- The student will be able to install and calculate residential services per NEC.
- The student will be able to calculate the service-entrance equipment requirements for a dwelling.
- The student will be able to determine using the National Electric Code the minimum number of small appliances and lights are required.
- The student will be able to explain the drip line needed for service entrance.
- The student will be able to explain the correct wire size for service entrance.
- The student will be able to explain the strain relief attachment for the service mast.
- The student will be able to calculate the size of service-entrance cable for residential homes.
- The student will be able to demonstrate conductor size and types.
- The student will be able to demonstrate wiring methods and wire connections.
- The student will be able to determine voltage drop and neutral sizing for services.
- The student will be able to explain the purpose of ground fault circuit interrupters.
- The student will be able to explain the purpose of arc fault circuit interrupters.
- The student will be able to identify and install various types of luminaries.
- The student will be able to describe the characteristics of various lights.
- The student will be able to identify and explain different types of lights.
- The student will be able to explain the advantages and disadvantages of incandescent lights.
- The student will be able to explain the advantages and disadvantages of High-intensity discharge lights (i.e., metal halide lights, low and high pressure sodium and mercury vapor).
- The student will be able to identify and install fluorescent lights.
- The student will be able to identify and install different types of ballast or fluorescent lights.
- The student will be able to install track lighting, recessed lighting, surface-mounted lighting and suspended lighting.
- The student will be able to explain the Kelvin temperature and the color of light produced.
- The student will be able to identify different types of fluorescent light fixtures.
The student will be able to describe branch circuit requirements for appliances per NEC.

26. The student will be able to explain how ground-fault circuit interrupters work.
27. The student will be able to explain causes of transient voltage occurs in a circuit.
28. The student will be able to explain how surge suppressors eliminate high voltage or current.
29. The student will be able to explain importance of isolated ground receptacles.
30. The student will be able to explain receptacle bonding.
31. The student will be able to explain the minimum appliance circuits per NEC.
32. The student will be able to explain installations rules for appliances in the home per NEC.
33. The student will be able to explain dedicated circuits for appliances per NEC.

The student will be able to identify and install various types of switches and receptacles per NEC.

34. The student will be able to explain switch controls of lighting circuits.
35. The student will be able to install single pole switches, three-way switches and four-way switches.
36. The student will be able to identify and install 15 amp and 20 amp receptacles.
37. The student will be able to identify and install 30 amp receptacles for electric dryers.
38. The student will be able to identify and install 40 or 50 amp receptacles for electric range.
39. The student will be able to identify and install safety switches per NEC.
40. The student will be able to identify and install ground-fault circuit interrupter receptacles.
41. The student will be able to identify and install arc-fault circuit interrupter receptacles.
42. The student will be able to describe isolated ground receptacles.

The student will be able to identify NEC requirements for grounding and bonding.

43. The student will be able to identify grounding equipment.
44. The student will be able to explain the purpose of grounding metal appliances.
45. The student will be able to explain the importance of grounding and bonding.
46. The student will be able to identify bonding versus grounding.
47. The student will be able to the proper distance and depth for grounding rods.
48. The student will be able to identify the importance of grounding all receptacles.
49. The student will be able to explain grounding and bonding in article 200 thru 250 in the NEC.

The student will be able to identify and install over current/short circuit and ground fault protection.

50. The student will be able to explain the purpose of ground fault circuit interrupters.
51. The student will be able to identify where ground-fault circuit interrupters must be installed.
52. The student will be able to identify and install over current protection for circuits.
53. The student will be able to identify why a short circuit occurred.
54. The student will be able to explain the causes of a short circuit or ground fault.
ASSESSMENT OF LEARNER OUTCOMES:
Student progress is evaluated by means that include, but are not limited to, exams, written assignments, and class participation.

SPECIAL NOTES:
This syllabus is subject to change at the discretion of the instructor. Material included is intended to provide an outline of the course and rules that the instructor will adhere to in evaluating the student's progress. However, this syllabus is not intended to be a legal contract. Questions regarding the syllabus are welcome anytime.

Kansas City Kansas Community College is committed to an appreciation of diversity with respect for the differences among the diverse groups comprising our students, faculty, and staff that is free of bigotry and discrimination. Kansas City Kansas Community College is committed to providing a multicultural education and environment that reflects and respects diversity and that seeks to increase understanding.

Kansas City Kansas Community College offers equal educational opportunity to all students as well as serving as an equal opportunity employer for all personnel. Various laws, including Title IX of the Educational Amendments of 1972, require the college’s policy on non-discrimination be administered without regard to race, color, age, sex, religion, national origin, physical handicap, or veteran status and that such policy be made known.

Kansas City Kansas Community College complies with the Americans with Disabilities Act. If you need accommodations due to a documented disability, please contact the Director of the Academic Resource Center, in Rm. 3354 or call at: 288-7670.