SYLLABUS

DATE OF LAST REVIEW: 02/2013

CIP CODE: 46.0201

SEMESTER: Departmental Syllabus

COURSE TITLE: Electrical (Level 1)

COURSE NUMBER: CONS0115

CREDIT HOURS: 3

INSTRUCTOR: Departmental Syllabus

OFFICE LOCATION: Departmental Syllabus

OFFICE HOURS: Departmental Syllabus

TELEPHONE: Departmental Syllabus

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

PREREQUISITES: KBOR approved Core Curriculum. OSHA 10. Math Level 3 Recommended

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

COURSE DESCRIPTION: This is the basic electrical course. It is in alignment with NCCER (selected modules) and the Kansas Board of Regents. The course topics include: Environmental sustainability, Fasteners and Anchors, Electrical Theory One, Electrical Theory Two, Electrical Test Equipment, Introduction to the National Electrical Code®, Boxes, and Fittings, Conductors, and Wiring: Residential.

METHOD OF INSTRUCTION: A variety of instructional methods may be used depending on content area. They may include but are not limited to lecture, multimedia, cooperative/collaborative learning, demonstrations, labs, on-the-job, internships, performance
tests, and other learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE:

I. MODULE 26101-08 – ORIENTATION TO THE ELECTRICAL TRADE
   A. Apprenticeship/training.
   B. Career paths.
   C. Sectors of the electrical industry.
   D. Tasks typically performed.
   E. Responsibilities and aptitudes.

II. MODULE 26102-08 – ELECTRICAL SAFETY
    A. Safe working practices.
    B. OSHA safety.
    C. Electrical hazards.
    D. Safety issues.
    E. Task plan and a hazard assessment.

III. MODULE 26103-08 – INTRODUCTION TO ELECTRICAL CIRCUITS
     A. Voltage.
     B. Conductors and insulators.
     C. Units of measurement.
     D. Meters used to measure voltage, current, and resistance.
     E. Series and parallel circuits.

IV. MODULE 26104-08 – ELECTRICAL THEORY
    A. Combination circuits.
    B. Kirchhoff’s voltage law.
    C. Kirchhoff’s current law.
    D. Ohm’s law.

V. MODULE 26105-08 – INTRODUCTION TO THE NATIONAL ELECTRICAL CODE®
   A. The NEC®.
   B. Layout of the NEC®.
   C. Navigate the NEC®.
   E. Testing laboratories.

VI. MODULE 26106-08 – DEVICE BOXES
A. Nonmetallic and metallic boxes.
B. Boxes under 100 cubic inches.
C. Box type and size.
D. Mounting a box.

VII. MODULE 26111-08 – RESIDENTIAL ELECTRICAL SERVICES
A. National Electrical Code®.
B. Grounding requirements.
C. Service-entrance equipment.
D. Wiring methods.
E. Branch circuit loads.
F. Equipment grounding conductors.
G. Ground fault circuit interrupters.
H. Outlet boxes.
I. Space heating and HVAC equipment.
J. Swimming pools, spas, and hot tubs.
K. Wiring device selection and.
L. Lighting fixtures.

VIII. MODULE 26112-08 – RESIDENTIAL ELECTRICAL SERVICES
A. Operation of:
   1. Voltmeter
   2. Ohmmeter
   3. Clamp-on ammeter
   4. Multimeter
   5. Megohmmeter
   6. Motor and phase rotation testers
B. Category ratings.
C. Hazards of test equipment.

IX. ENVIRONMENTAL SUSTAINABILITY
A. Environmentally safe waste disposal.
B. Life cycle analysis.
C. Recycled material.
D. Low VOC emissions.
E. New “green” materials.
F. New “green” methods and practices.
G. “Low impact” designs.
EXPECTED LEARNER OUTCOMES:

A. Module 26101-08. The student will be able to identify and describe careers in the electrical trade, the industry, and typical tasks.
B. Module 26102-08. The student will be able to identify and describe electrical safety, OSHA, and identify hazards.
C. Module 26103-08. The student will be able to identify and describe voltage, use of meters and circuits.
D. Module 26104-08. The student will be able to identify and describe types of electrical circuits.
E. Module 26105-08. The student will be able to identify and describe the NEC and testing labs.
F. Module 26106-08. The student will be able to identify and describe metallic and non-metallic device boxes.
G. Module 26111-08. The student will be able to identify and describe the residential electrical code, services boxes, wiring and HVAC.
H. Module 26112-08. The student will be able to identify and describe – residential electrical services.
I. The student will identify and describe sound environmental practices for the electrical trade, including waste disposal, life cycle analysis, green practices and low impact

COURSE COMPETENCIES:

Module 26101-08. The student will be able to identify and describe careers in the electrical trade, the industry, and typical tasks.

1. The student will be able to identify and describe the apprenticeship/training process for electricians.
2. The student will be able to identify Describe various career paths/opportunities one might follow in the electrical trade.
3. The student will be able to identify Define the various sectors of the electrical industry.
4. The student will be able to identify State the tasks typically performed by an electrician.
5. The student will be able to identify Explain the responsibilities and aptitudes of an electrician.

Module 26102-08. The student will be able to identify and describe electrical safety, OSHA, and identify hazards.
6. The student will be able to identify Recognize safe working practices in the construction environment.
7. The student will be able to identify Explain the purpose of OSHA and how it promotes safety on the job.
8. The student will be able to identify electrical hazards and how to avoid or minimize them in the workplace.
9. The student will be able to identify Explain safety issues concerning lockout/tagout procedures, confined space entry, respiratory protection, and fall protection systems.
10. The student will be able to identify Develop a task plan and a hazard assessment for a given task and select the appropriate PPE and work methods to safely perform the task.

Module 26103-08. The student will be able to identify and describe voltage, use of meters and circuits.

11. The student will be able to identify Define voltage and identify the ways in which it can be produced.
12. The student will be able to identify Explain the difference between conductors and insulators.
13. The student will be able to identify Define the units of measurement that are used to measure the properties of electricity.
14. The student will be able to identify the meters used to measure voltage, current, and resistance.
15. The student will be able to identify Explain the basic characteristics of series and parallel circuits.

Module 26104-08. The student will be able to identify and describe types of electrical circuits.

16. The student will be able to identify Explain the basic characteristics of combination circuits.
17. The student will be able to identify Calculate, using Kirchhoff’s voltage law, the voltage drop in series, parallel, and series-parallel circuits. Calculate, using Kirchhoff’s current law, the total current in parallel and series-parallel circuits.
18. The student will be able to identify Using Ohm’s law, find the unknown parameters in series, parallel, and series-parallel circuits.

Module 26105-08. The student will be able to identify and describe the NEC and testing labs.

19. The student will be able to identify Explain the purpose and history of the NEC®.
20. The student will be able to identify Describe the layout of the NEC®.
21. The student will be able to identify Demonstrate how to navigate the NEC®.
22. The student will be able to identify Describe the purpose of the National Electrical Manufacturers Association and the NFPA.
23. The student will be able to identify Explain the role of nationally recognized testing
Module 26106-08. The student will be able to identify and describe metallic and non-metallic device boxes.

24. The student will be able to identify Describe the different types of nonmetallic and metallic boxes.
25. The student will be able to identify Calculate the NEC® fill requirements for boxes under 100 cubic inches.
26. The student will be able to identify the appropriate box type and size for a given application.
27. The student will be able to identify Select and demonstrate the appropriate method for mounting a given box.

Module 26111-08. The student will be able to identify and describe the residential electrical code, services boxes, wiring and HVAC.

28. The student will be able to identify, explain the role of the National Electrical Code® in residential wiring and describe how to determine electric service requirements for dwellings.
29. The student will be able to identify and explain the grounding requirements of a residential electric service.
30. The student will be able to identify and calculate and select service-entrance equipment.
31. The student will be able to identify and select the proper wiring methods for various types of residences.
32. The student will be able to identify and compute branch circuit loads and explain their installation requirements.
33. The student will be able to identify and explain the types and purposes of equipment grounding conductors.
34. The student will be able to identify and explain the purpose of ground fault circuit interrupters and tell where they must be installed.
35. The student will be able to identify and size outlet boxes and select the proper type for different wiring methods.
36. The student will be able to identify and describe rules for installing electric space heating and HVAC equipment.
37. The student will be able to identify and describe the installation rules for electrical systems around swimming pools, spas, and hot tubs.
38. The student will be able to identify and explain how wiring devices are selected and installed.
39. The student will be able to identify and describe the installation and control of lighting fixtures.

Module 26112-08. The student will be able to identify and describe residential...
The student will be able to identify and explain the operation of and describe the following pieces of test equipment:

- Voltmeter
- Ohmmeter
- Clamp-on ammeter
- Multimeter
- Megohmmeter
- Motor and phase rotation testers

41. The student will be able to identify and select the appropriate meter for a given work environment based on category ratings.

42. The student will be able to identify the safety hazards associated with various types of test equipment.

The student will identify and describe sound environmental practices for electricians, including waste disposal, life cycle analysis, green practices and low impact.

43. The student will be able to describe waste disposal methods for this industry according to EPA and industry guidelines.

44. The student will be able to describe the process of life cycle analysis in this industry based on industry guidelines.

45. The student will be able to identify recycled materials by label and industry practice.

46. The student will be able to define “low emission” and give two examples.

47. The student will be able to identify new “green” materials now being introduced or currently used in this industry.

48. The student will be able to describe new “green” practices and methods being instituted or currently employed within this industry.

49. The student will be able to identify and explain the term “low Impact” as it relates to the environment.

ASSESSMENT OF LEARNER OUTCOMES:
Student progress is evaluated by means that include, but not limited to, exams, written assignments, performance tests, 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 any time.

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 (913) 288-7670.