SYLLABUS

DATE OF LAST REVIEW: 08/17/2014

CIP CODE: 46.0302

SEMESTER: Departmental Syllabus

COURSE TITLE: National Electric Code I

COURSE NUMBER: ELET0110

CREDIT HOURS: 4

INSTRUCTOR: Department Syllabus

OFFICE LOCATION: Department Syllabus

OFFICE HOURS: Department Syllabus

TELEPHONE: Department Syllabus

EMAIL: Departmental Syllabus

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

PREREQUISITES: None

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 the use and interpretation of the current National Electrical Code. Students should develop a working knowledge of the code that will permit them to apply it to everyday applications. Upon successful completion of this course, the student should be able to use the code to design service entrances, feeders and branch circuits and discern between wiring methods used in difference occupancies. 4 hrs. lecture /wk.

METHOD OF INSTRUCTION: A variety of instructional methods may be used depending on content area. These may include but are not limited to lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, and panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.
COURSE OUTLINE:
I. General terms of the National Electrical Code
   A. Explain the history of NEC.
   B. Differentiate code changes from previous codes.
   C. Explain terms and layout of NEC.
   D. Use the NEC to find information.
   E. Explain what professionals use the NEC.
   F. Define the purpose of the NEC.
   G. Distinguish different interpretations of the NEC.
   H. Explain code arrangement and enforcement.
   I. Distinguish between mandatory and explanatory material.
   J. Describe safety and wiring planning.

II. Chapter 1 General
   A. Interpret definitions of the NEC using Article 100.
   B. Summarize the NEC requirements for electrical installations.
   C. Explain the approval of equipment by the authority having jurisdiction.
      1. Describe the identification, installation and use of equipment.
      2. Explain nominal voltages and conductor methods.
      3. Distinguish different conductor insulation and wiring methods.
      4. Explain interrupting rating.
      5. Explain deteriorating agents and mechanical execution of work.
      6. Describe the mounting of cooling equipment.
      7. Explain electrical conductor termination.
      8. Define access and working space.

III. Chapter 2 Wiring and Protection
   A. Generalize the use of Article 200 for identification of grounded conductors.
      1. Explain the connection to grounded system.
      2. Describe the use of the grounded conductor.
      3. Explain the use of white or gray conductors.
      4. Describe terminal identification and polarity.
   B. Article 210, Branch Circuits
      1. Explain scope and definitions.
      2. Describe branch circuit classification.
      3. Explain multi-wire branch circuits.
      4. Explain color code for branch circuits.
      5. Explain voltage limitations and use of receptacles.
      6. Describe GFCI receptacle protection.
      7. Explain conductor ampacity and overcurrent protection.
      8. Calculate outlet device rating and maximum branch circuit Loads.
      9. Calculate permissible loads and multi-outlet branch circuit
   10. Calculate lighting outlet requirements.

C. Article 215, Feeder Conductors
1. Describe the scope and minimum rating and size of feeders.
2. Calculate overcurrent protection.
3. Describe feeder conductor grounding means.
4. Identify feeder high leg.
5. Explain ground-fault protection of equipment.

D. Article 220, Branch Circuit, Feeder and Service Demands
1. Explain the scope and definitions of section 220.
2. Explain voltages and computations of loads.
3. Calculate branch circuit requirements.
4. Calculate general lighting demands.
5. Describe commercial receptacle demand factors.
6. Describe motors and fixed electric space heating requirements.
7. Complete a dwelling unit small appliance and laundry load.
8. Calculate a dwelling unit appliance demand.
9. Calculate a dwelling unit electric clothes dryer demand.
10. Calculate a dwelling unit electric range demand.
11. Explain a commercial unit electric range demand.
12. Explain a non-coincident load.
13. Size a feeder neutral load.
14. Verify an optional calculation for a dwelling unit.

E. Article 225, Outside Branch Circuits and Feeders
1. Explain the scope and definitions of section 225.
2. Calculate the loads of an outside branch circuit.
3. Describe conductor covering and minimum size conductors.
4. Explain the use of lighting equipment installed outdoors.
5. Interpret the requirements for more than one building or other structure.
6. Explain the wiring requirements on buildings.
7. Identify the point of attachment and clearances from a building.
8. Describe mechanical protection.
9. Explain rain tight raceways and arranged to drain.
10. Describe underground circuits and use of trees for support.

F. Article 230, Service Installations
1. Explain the scope and definitions of section 230.
2. Explain the rules for sizing a service.
3. Explain the number of services allowed on a building.
4. Identify the rules for single building or structure not to be supplied through another building.
5. Identify conductors considered outside a building.
6. Explain service conductors separate from other conductors.
7. Describe raceway seals and clearance from building openings.
8. Calculate overhead conductors size and rating.
9. Identify clearance requirements and points of attachment.
10. Identify the use of service masts as supports for the point of attachment.
11. Describe underground service size and rating.

G. Overcurrent Protection
1. Explain the scope of Article 240
2. Locate the section on standard ampere ratings.
3. Describe supplementary overcurrent protection.
4. Explain ground fault protection of equipment.
5. Describe the rules for underground conductors.
6. Differentiate between damp and wet location.
7. List the rules for Edison base fuses.
8. List the rules for type S fuses.
9. Describe the use of a circuit breaker.
10. Define series rated equipment.

H. Grounding and Bonding
1. Explain the purpose of grounding.
2. Differentiate between grounding and bonding.
3. Define the term objectionable currents.
4. Explain the rules for service system grounding.
5. Define separately derived system.
6. Explain the term made and other electrodes.
7. List the rules for supplemental grounding electrodes.
8. Define maximum resistance to ground.
9. List the requirements for grounding and bonding on the line side of the service.
10. List the requirements for grounding and bonding on the load side of the service.
11. Define hazardous locations.
12. Describe equipment bonding jumpers.
13. List the rules for bonding of piping and building steel.
14. Define a lightning protection system.
15. Describe grounding of ranges and clothes dryers.
16. Explain the rules for bonding receptacles and boxes.

IV. Chapter 3 Wiring Methods and Materials
A. Article 300, Wiring Methods
1. Define voltage and temperature limitations.
2. Describe the rules for underground installations.
3. List the rules for securing and supporting.
4. Describe the danger of multi-wire branch circuits.
5. Explain length of free conductors.
6. Calculate the number and size of conductors allowed in a raceway.
7. Explain Induced currents in metal parts.

B. Article 527, Temporary Wiring
1. Explain time constraints.
2. List the rules for ground-fault protection of personnel.

C. Article 310, Conductors for General Wiring
1. Differentiate between stranded and solid conductors.
2. Define the rules for conductors in parallel.
3. Explain insulation temperature limitation.
4. Calculate conductor ampacity using temperature and bundling adjustment factors.

D. Surface Raceways
1. Define flat conductor cable (FCC).
2. List the uses and limitations of FCC.
3. Describe the branch circuit ratings of FCC.
4. Define electrical nonmetallic tubing (ENT).
5. Describe the uses and limitations of type AC cable, MC cable, NM cable, SE and USE cable, UF cable.
6. List the installation requirements for intermediate metal conduit and rigid metal conduit, rigid nonmetallic conduit.
7. Describe the use of flexible metal conduit, liquid-tight flexible metal conduit and liquid-tight nonmetallic flexible conduit.
8. Describe the use of a multi-outlet assembly.

E. Outlet, Device, Pull and Junction Boxes.
   1. Differentiate between nonmetallic and metal boxes.
   2. Define classified location for box installation.
   3. Calculate the number of conductors allowed in a box.
   4. Size a junction box.
   5. Calculate the size of a pull box when making an angle pull and a straight pull.
   6. Explain auxiliary gutters.

F. Switchboards and Panel-boards
   1. Define working clearance.
   2. Distinguish between a lighting panelboard and appliance branch circuit panelboard.
   3. Describe overcurrent protection of a panelboard.
   4. Explain grounding of panelboards.

V. Chapter 4 Equipment for General Use
A. Flexible cords and Fixture wire
   1. Describe types of flexible cords.
   2. Define fixture wire.
   3. Identify allowable ampacities of fixture wire.
   4. List the rules for overcurrent protection.

B. Light Fixtures, Lamps and Receptacles
   1. Describe specified fixture locations.
   2. Explain fixture supports.
   3. Describe a receptacle installation.
   4. Explain the protection of recessed fixtures.
   5. Describe electric discharge lighting.

C. Appliances
   1. Identify the branch circuit requirements for an appliance.
   2. Describe over current protection.
   3. Explain disconnecting means.
   4. Describe the rules for baseboard heaters.

D. Article 450, Transformers
   1. List the rules for over current protection on a transformer.
   2. Explain ventilation requirements.
   3. Size the conductors for the primary side of a transformer.
4. Size the conductors for the secondary side of a transformer.

EXPECTED LEARNER OUTCOMES:

A. The student will be able to explain the purpose and history of NEC and layout.
B. The student will be able to interpret and apply general requirements of the NEC.
C. The student will be able to interpret and apply wiring and protection requirements.
D. The student will be able to interpret and apply wiring methods and material.
E. The student will be able to install equipment for general use.

CORE COMPETENCIES:

Upon successful completion of this course:

The student will be able to explain the purpose and history of NEC and layout.
1. The student will be able to explain why and when the NEC was developed.
2. The student will be able to explain how the NEC has a distinct layout format.
3. The student will be able to explain the purpose of the NFPA.
4. The student will be able to explain the protection of people and property.
5. The student will be able to explain mandatory and informational in the NEC.
6. The student will be able to explain code arrangement and enforcement of the NEC.
7. The student will be able to explain safety and wiring planning of the NEC.

The student will be able to interpret and apply general requirements of the NEC.
8. The student will be able to explain nominal voltages and conductor methods.
9. The student will be able to explain approval of equipment by authority having jurisdiction.
10. The student will be able to describe identification, installation and use of equipment.
11. The student will be able to explain what professionals use NEC.
12. The student will be able to explain code arrangement and enforcement.

The student will be able to interpret and apply wiring and protection requirements.
13. The student will be able to explain the connection to grounded system.
14. The student will be able to explain and describe branch circuits wiring.
15. The student will be able to explain color code for branch circuit wiring.
16. The student will be able to calculate branch circuit requirements.
17. The student will be able to interpret and calculate lighting outlet requirements.
18. The student will be able to interpret and calculate voltages for various loads.
19. The student will be able to interpret and explain the sizes for underground service.
20. The student will be able to explain the rules for system grounding.
21. The student will be able to interpret and apply wiring for grounding and bonding.

The student will be able to interpret and apply wiring and protection requirements.
22. The student will be able to explain voltage and temperature limitations.
23. The student will be able to interpret and apply wiring methods to secure and support.
24. The student will be able to describe the rules for underground installations.
25. The student will be able to calculate the number and size of conductors in a raceway.
26. The student will be able to explain the rules for ground fault protection wiring.
27. The student will be able to describe the use of flexible metal conduit for wiring.
28. The student will be able to interpret and apply wiring rules for parallel circuits.
29. The student will be able to explain the over current protection on panel boards.

The student will be able to interpret and apply wiring methods and materials.

30. The student will be able to describe the minimum number of circuits are allowed in various locations in a home or business.
31. The student will be able to list the number of branch circuits for the average home.
32. The student will be able to explain voltage limitations and use for receptacles.
33. The student will be able to interpret and apply the use of flat conductor cable.
34. The student will be able to interpret and apply the use of electrical metallic tubing.
35. The student will be able to interpret and apply the calculation for conductors in a raceway.
36. The student will be able to interpret and apply over current and grounding of a panel board.

The student will be able to install equipment for general use.

37. The student will be able to install flexible cords and fixture wires.
38. The student will be able to install light fixtures lamps and receptacles.
39. The student will be able to install branch circuits for appliances.
40. The student will be able to install transformers and over current protection.

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.