MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
AREA 224 - RENEWABLE ENERGY ELECTRICAL CODE

Created by: Michael J. Newtown, P.E.

Updated by: Kibria Roman, Ph.D, P.E

Canino School of Engineering Technology !

Department: Mechanical & Energy Technology !

Semester/Year: Fall/2018 !
A. **TITLE:** Renewable Energy Electrical Code

B. **COURSE NUMBER:** AREA 224

C. **CREDIT HOURS:** (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

- # Credit Hours: 3
- # Lecture Hours: 3 per week
- # Lab Hours: per week
- Other: per week

Course Length: 15 Weeks

D. **WRITING INTENSIVE COURSE:** Yes ☐ No ☒

E. **GER CATEGORY:** None: ☒ Yes: GER !

*If course satisfies more than one: GER !

F. **SEMESTER(S) OFFERED:** Fall ☒ Spring ☒ Fall & Spring ☐

G. **COURSE DESCRIPTION:**

This course deals with the National Electrical Code (NEC) for renewable energy systems. The various aspects of the electrical code are studied to ensure proper system design and installations. Safety issues as related to the various sections of the code are emphasized.

H. **PRE-REQUISITES:** None ☐ Yes ☒ If yes, list below:

ELEC 261 Electricity or ELEC 171 & ELEC 172 Electrical Construction and Maintenance I & II

**CO-REQUISITES:** None ☒ Yes ☐ If yes, list below:
I. **STUDENT LEARNING OUTCOMES:** *(see key below)*

By the end of this course, the student will be able to:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>Program Student Learning Outcome [PSLO]</th>
<th>GER [If Applicable]</th>
<th>ISLO &amp; SUBSETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recall the section of the National Electrical Code as related to specific task conditions.</td>
<td>SO #1 An appropriate mastery of the knowledge, techniques, and skills, and modern tools of their disciplines utilizing renewable energy systems and design parameters</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>IA Subsets Subsets Subsets</td>
</tr>
<tr>
<td>Demonstrate the proper selection of NEC for compliance.</td>
<td>SO # 6 An ability to identify, analyze and solve technical problems.</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>CA Subsets Subsets Subsets</td>
</tr>
<tr>
<td>Produce sketches of components and systems that represent the NEC compliance.</td>
<td>SO # 6 An ability to identify, analyze and solve technical problems.</td>
<td>1-Comm Skills 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>W Subsets Subsets Subsets</td>
</tr>
<tr>
<td>Assemble circuits to NEC requirements.</td>
<td>SO # 4 An ability to apply creativity in the design of systems, components, or processes.</td>
<td>2-Crit Think 5-Ind, Prof, Disc, Know Skills ISLO</td>
<td>CA Subsets Subsets Subsets</td>
</tr>
<tr>
<td>Evaluate circuits to determine NEC violation.</td>
<td>SO # 6 An ability to identify, analyze and solve technical problems.</td>
<td>2-Crit Think ISLO ISLO</td>
<td>CA Subsets Subsets Subsets</td>
</tr>
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**KEY**

<table>
<thead>
<tr>
<th>ISLO #</th>
<th>Institutional Student Learning Outcomes [ISLO 1 – 5]</th>
<th>ISLO &amp; Subsets</th>
</tr>
</thead>
</table>
| 1      | Communication Skills  
Oral [O], Written [W] | ISLO & Subsets |
| 2      | Critical Thinking  
Critical Analysis [CA], Inquiry & Analysis [IA], Problem Solving [PS] | ISLO & Subsets |
| 3      | Foundational Skills  
Information Management [IM], Quantitative Lit./Reasoning [QTR] | ISLO & Subsets |
| 4      | Social Responsibility  
Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T] | ISLO & Subsets |
| 5      | Industry, Professional, Discipline Specific Knowledge and Skills | ISLO & Subsets |

*Include program objectives if applicable. Please consult with Program Coordinator!*
J. APPLIED LEARNING COMPONENT: Yes ☒ No ☐

If YES, select one or more of the following categories:

☒ Classroom/Lab ☐ Internship ☐ Clinical Placement ☐ Practicum ☐ Service Learning ☐ Community Service
☐ Civic Engagement ☐ Creative Works/Senior Project ☐ Research ☐ Entrepreneurship (program, class, project)

K. TEXTS:


L. REFERENCES:

National Electrical Code (current edition)
National Fire Protection Association, 2011

M. EQUIPMENT: None ☐ Needed: Technology enhanced classroom

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

• Exams
• Quizzes
• Papers
• Participation

P. DETAILED COURSE OUTLINE:

I. General NEC requirements
   a. Wire size
   b. Wiring integrity
   c. Arc flash hazards
   d. Electrical safety

II. Protection
   a. Service Entrance
   b. Overcurrent protection
   c. Grounding and bonding
   d. DC vs. AC circuits

III. Wiring Methods
a. Conductor for general wiring
b. Meter boxes
c. Pull boxes
d. Combiner boxes
e. Metal clad cable
f. Entrance cable
g. Rigid Conduit
h. Flexible metal conduit
i. PVC conduit
j. Liquid tight conduit

IV. Equipment for general use
   a. Cords and cables
   b. Switches
c. Panel and boards
d. Storage batteries

V. Renewable energy circuits
   a. Circuits requirements
   b. Disconnecting means

Q.  LABORATORY OUTLINE: None ☒ Yes ☐