

**STATE UNIVERSITY OF NEW YORK !
COLLEGE OF TECHNOLOGY !
CANTON, NEW YORK !**



MASTER SYLLABUS

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

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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:

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

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

*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:

- | | |
|---------------------------------------------------|--------------------------------------------------------|
| <input checked="" type="checkbox"/> Classroom/Lab | <input type="checkbox"/> Civic Engagement |
| <input type="checkbox"/> Internship | <input type="checkbox"/> Creative Works/Senior Project |
| <input type="checkbox"/> Clinical Placement | <input type="checkbox"/> Research |
| <input type="checkbox"/> Practicum | <input type="checkbox"/> Entrepreneurship |
| <input type="checkbox"/> Service Learning | (program, class, project) |
| <input type="checkbox"/> Community Service | |

K. **TEXTS:**

Holt, Mike., Understanding NEC Requirements for Solar Photovoltaic Systems, Mike Holt Enterprises, Inc., 2011

L. **REFERENCES:**

National Electrical Code (current edition)
Earley, Mark W. and Sargent, Jeffrey S., 2011 National Electrical Code® Handbook
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