MASTER SYLLABUS

ECMR 173 – Introduction to the National Electrical Code

CIP Code: 46.0399

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

Canino School of Engineering Technology
Civil and Construction Technology
Fall 2021
A. TITLE: Introduction to the National Electrical Code

B. COURSE NUMBER: ECMR 173

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

  # Credit Hours: 3
  # Lecture Hours _3__ per Week
  # Lab Hours _ Week
  Other ___ per Week

  Course Length (# of Weeks): 15 weeks

D. WRITING INTENSIVE COURSE: No

E. GER CATEGORY:

  Does the course satisfy more than one GER category? If so, which one? No

F. SEMESTER(S) OFFERED: (Fall, Spring, or Fall and Spring) Fall

G. COURSE DESCRIPTION:

  This course will cover the basics of understanding the National Electrical Code, with electrical drawing illustrations. Topics include circuit, overcurrent protection devices, box and wire sizing, with service entrance design. A final project will include a residential electrical design in accordance with the National Electric Code. Certificate/ AAS Elective Credit.

H. PRE-REQUISITES: None

  CO-REQUISITES: None

I. STUDENT LEARNING OUTCOMES:

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>PSLO</th>
<th>GER</th>
<th>ISLO</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Apply NEC references to installation practices</td>
<td></td>
<td>5. Industry, Professional, Discipline Specific Knowledge and Skills</td>
<td></td>
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<tr>
<td>b. Identify electrical symbols with architectural scale applications for electrical blueprint reading</td>
<td></td>
<td>Industry, Professional, Discipline Specific Knowledge and Skills</td>
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c. Apply calculated loads of a residential dwelling for sizing service entrances

d. Apply skills for residential house electrical system design as per NEC specifications with material list and pricing

e. Demonstrate navigation of the NEC references

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

J. APPLIED LEARNING COMPONENT: Yes___X____  No_______

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

- Classroom/Lab ___X___
- Internship ___
- Clinical Practicum ___
- Practicum ___
- Service Learning ___
- Community Service ___
- Civic Engagement ___
- Creative Works/Senior Project ___
- Research ___
- Entrepreneurship ___

(program, class, project)
K. TEXTS:  

L. REFERENCES: NFPA. *NFPA 70 National Electrical Code 2014*. Quincy, Ma: NFPA

M. EQUIPMENT: Architectural Scale

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:  
- Exams (Hourly/Final): 20%
- Quizzes: 30%
- Homework assignments: 40%
- Participation/Attendance: 10%
  (May be modified by instructor)

P. DETAILED COURSE OUTLINE:  
I. Introduction to NEC  
   A. History  
   B. Listing/Labeling for Product Standards  
   C. How to navigate the code book

II. Definitions  
   A. Code Terminology

III. Boxes and Enclosures  
   A. Box Fill Calculations  
   B. General Installation  
   C. Box/Luminaire Support

IV. Cables  
   A. General Installation  
   B. Conductor Identification  
   C. Grounded Conductors  
   D. Underground Installation

V. Raceways and Conductors  
   A. General Descriptions  
   B. Types and Uses

VI. General Provisions  
   A. Electrical Floor Plan (Blueprint)  
   B. Branch Circuits  
   C. Receptacles  
   D. AFCI Requirements  
   E. Other Considerations  
   F. Lighting and Switching  
   G. Outdoor Receptacles and Lighting
VII. Specific Provisions
   A. Small Appliance Circuit
   B. Hallway/Stairs
   C. Closets
   D. Bathrooms
   E. Basement and Garage
   F. Laundry area
   G. Attic/Crawl Space

VIII. Load Calculation
   A. Compile Critical Information
   B. Standard Calculation

IX. Services and Electrical Equipment
   A. Wiring Methods
   B. Outside Clearances
   C. Working Space
   D. Equipment and Panel Boards
   E. Grounding

Q. LABORATORY OUTLINE: None