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

MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
HVAC201 – HVAC Electric Motors & Controls

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

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Canino School of Engineering Technology

Department: Mechanical & Energy Systems

Semester/Year: Fall 2019

A. **TITLE**: HVAC Electric Motors & Controls

B. **COURSE NUMBER:** HVAC201

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

 # Credit Hours: 2
 # Lecture Hours: 2 **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 introduces students to AC and DC circuits, interpretation of electrical schematics, troubleshooting using test equipment, motors types and uses, and installation of electrical equipment in compliance with local, state, and national codes. The sequence of controls in HVAC are explored in details allowing students to correct electrical faults or diagnose hardware problems.

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

HVAC105

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:

Course Student Learning Outcome [SLO]	***Program Student Learning Outcome [PSLO]***	***GER*** *[If Applicable]*	***ISLO & SUBSETS***	
1. Determine the voltage, amperage, resistance, and impedance of electrical circuits used in HVAC			3-Found Skills ISLO ISLO	Subsets Subsets Subsets Subsets
2. Explain and perform the proper procedures used in troubleshooting electrical faults in HVAC equipment.			3-Found Skills ISLO ISLO	Subsets Subsets Subsets Subsets
3. Demonstrate prior troubleshooting of electrical controls of HVAC appliances.			3-Found Skills ISLO ISLO	Subsets Subsets Subsets Subsets
4. Demonstrate proper installation of HVAC electrical controls and wiring.			3-Found Skills ISLO ISLO	Subsets Subsets Subsets Subsets
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KEY	**Institutional Student Learning Outcomes [ISLO 1 – 5]**
ISLO #	**ISLO & Subsets**
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]*
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:

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

K. TEXTS:

Auvil, Ronnie J., HVAC and Refrigeration Systems, ATP, 2015

L. REFERENCES:

Cooper, William B., Raymond E. Lee, Raymond A. Quinlan, Martin W. Sirowatka, Warm Air Heating for Climate Control, 5th Edition, Prentice Hall, 2003

M. EQUIPMENT: None ☐ **Needed:** Technical enhanced classroom

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Exams, Quizzes, Homework

P. DETAILED COURSE OUTLINE:

1. 1. Ohms Law
1.1. Resistors
1.2. Amperage
1.3. Voltage
2. Series circuits
2.1. Voltage summation
2.2. Amperage measurement
3. Parallel circuits
3.1. Voltage summation
3.2. Amperage measurement
4. AC Circuits
4.1. Impedance
4.2. Measurement
4.3. Amperage
4.4. Voltage
5. Single Phase power
6. Three phase power
6.1. Delta

6.2. Wye
7. Capacitors
7.1. Run
7.2. Start
8. Motor types
8.1. ECM
8.2. Stator Winding
9. Sequence of operations
10. Proper troubleshooting techniques
11. Electrical wiring
11.1. Wire size and type
11.2. Amperage capacities
11.3. Termination
11.4. Box fastening methods
12. Electrical Code

Q. <u>LABORATORY OUTLINE</u>: None ☒ Yes ☐