MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
HVAC203 – Commercial Refrigeration

Created by: Stan Skowronek

Updated by:

Canino School of Engineering Technology
Department: Mechanical & Energy Systems
Semester/Year: Spring 2019
A. **TITLE:** Commercial Refrigeration

B. **COURSE NUMBER:** HVAC203

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:**

   The fundamentals of refrigerating and air conditioning equipment are the emphasis of this course. Students study the basic refrigeration cycle and the function of each component; compressor, condenser, evaporator and metering device. Use of hand and power tools is stressed in laboratory work. Students cut, bend, solder, braze, flare, and swage cooper tubing. Flowing nitrogen is stressed during brazing operations.

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

   HVAC101, HVAC102

   **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>
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<tbody>
<tr>
<td>1. Explain components and functions in commercial and industrial refrigeration applications</td>
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<td>3-Found Skills ISLO ISLO</td>
<td>Subsets Subsets</td>
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<td>2. Explain the proper procedures used in replacing or repairing defective commercial components</td>
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<td>3-Found Skills ISLO ISLO</td>
<td>Subsets Subsets</td>
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<td>3. Explain procedures for evacuating and recharging a refrigeration system.</td>
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<td>3-Found Skills ISLO ISLO</td>
<td>Subsets Subsets</td>
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<td>4. Calculate heat loads for refrigeration</td>
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<td>3-Found Skills ISLO ISLO</td>
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<td>5. Read and interpret pressure-enthalpy diagrams charts and scales</td>
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<td>3-Found Skills ISLO ISLO</td>
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<td>Institutional Student Learning Outcomes [ISLO 1 – 5]</td>
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<td>ISLO #</td>
<td>ISLO &amp; Subsets</td>
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</table>
| 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  ☐ Civic Engagement
☐ Internship  ☐ Creative Works/Senior Project
☐ Clinical Placement  ☐ Research
☐ Practicum  ☐ Entrepreneurship
☐ Service Learning  (program, class, project)
☐ Community Service

K. TEXTS:
Auvil, Ronnie J., HVAC and Refrigeration Systems, ATP, 2015

L. REFERENCES:

M. EQUIPMENT: None ☒ Needed:

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Exams, Quizzes, Homework

P. DETAILED COURSE OUTLINE:

1. Refrigerants
   1.1. Refrigerant Identification
   1.2. Pressure-Temperature Curves
   1.3. Group One Through Three Refrigerants
   1.4. Expendable Refrigerants
   1.5. Refrigerant Cylinders
   1.6. Using Pressure-Temperature Curves
   1.7. Refrigerant Applications
   1.8. Refrigeration Oil
   1.9. Changing Refrigerants
   1.10. New Refrigerants
   1.11. Ozone Protection-EPA Guidelines
2. Control Systems
   2.1. Controllers
   2.2. Thermostats
   2.3. Relays
   2.4. Limits
   2.5. Control Circuits
   2.6. Split System Controls
2.7. Control Servicing -
3. Cooling Loads
3.1. Heat Transfer -
3.2. U and R Factors -
3.3. Design Temperature -
3.4. Infiltration and Ventilation -
3.5. Internal Heat Gain -
3.6. Total Cooling Loads -
3.7. Equipment Selection -
4. EPA Requirements
4.1. CFC’s and The Ozone Layer -
4.2. Replacement Refrigerants -
4.3. Refrigerant Recovery -
4.4. EPA 608 exam review -

Q. LABORATORY OUTLINE: None ☒ Yes ☐