MASTER SYLLABUS

COURSE NUMBER – COURSE NAME
HVAC104 – Hydronics Lab

Created by: Stan Skowronek
Updated by: Paul Todd

Canino School of Engineering Technology
Department: Mechanical & Energy Systems
Semester/Year: Fall 2023
A. **TITLE:** Hydronics Lab

B. **COURSE NUMBER:** HVAC104

C. **CREDIT HOURS:** 2 credit hour(s) per week for 15 weeks
   - [ ] One hour (50 minutes) of lecture per week
   - [x] Two to three hours of lab or clinical per week
   - [ ] Two hours of recitation per week
   - [ ] 40 hours of internship

D. **WRITING INTENSIVE COURSE:** Yes [ ] No [x]

E. **GER CATEGORY:** None [x] Yes: GER
   If course satisfies more than one: GER

F. **SEMESTER(S) OFFERED:** Fall [x] Spring [ ] Fall & Spring [ ]

G. **COURSE DESCRIPTION:**
   The fundamental construction methods for hydronic distribution systems will be covered in this course. Students will understand how to install and evaluate hydronic system performance in residential and commercial settings. Safe use of hand and power tools is stressed in laboratory work.

H. **PRE-REQUISITES:** None [x] Yes [ ] If yes, list below:
   HVAC103

   **CO-REQUISITES:** None [ ] Yes [x] If yes, list below:
   HVAC103
I. **STUDENT LEARNING OUTCOMES:** *(see key below)*

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

<table>
<thead>
<tr>
<th><strong>Course Student Learning Outcome [SLO]</strong></th>
<th><strong>Program Student Learning Outcome [PSLO]</strong></th>
<th><strong>GER [If Applicable]</strong></th>
<th><strong>ISLO &amp; SUBSETS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Select and operate basic service tools and equipment</td>
<td>N/A</td>
<td>3-Found Skills ISLO ISLO</td>
<td>QTR Subsets Subsets</td>
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<tr>
<td>2. Perform joining techniques to complete tubing and pipe connections</td>
<td>N/A</td>
<td>3-Found Skills ISLO ISLO</td>
<td>QTR Subsets Subsets</td>
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<td>3. Install basic electrical controls and power for hydronic systems</td>
<td>N/A</td>
<td>3-Found Skills ISLO ISLO</td>
<td>QTR None Subsets Subsets</td>
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<tr>
<td>4. Demonstrate the ability to measure, document, and communicate system performance</td>
<td>PSLO 2</td>
<td>1-Comm Skills 3-Found Skills ISLO</td>
<td>QTR Subsets Subsets Subsets</td>
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<td>5. Work with a diverse group, completing a common task</td>
<td>PSLO 4</td>
<td>4-Soc Respons ISLO ISLO</td>
<td>QTR Subsets Subsets Subsets</td>
</tr>
</tbody>
</table>

The key for the columns in the table is as follows:
- **GER** stands for General Education Requirements.
- **ISLO** stands for Institutional Student Learning Outcomes.
- **Subsets** indicate the subsets of the learning outcomes.
<table>
<thead>
<tr>
<th>ISLO</th>
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<th>Subsets Subsets Subsets Subsets</th>
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<td>ISLO #</td>
<td>Institutional Student Learning Outcomes [ISLO 1 – 5]</td>
<td>ISLO &amp; Subsets</td>
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<td>1</td>
<td>Communication Skills</td>
<td>Oral [O], Written [W]</td>
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<td>2</td>
<td>Critical Thinking</td>
<td>Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</td>
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<td>3</td>
<td>Foundational Skills</td>
<td>Information Management [IM], Quantitative Lit./Reasoning [QTR]</td>
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<td>4</td>
<td>Social Responsibility</td>
<td>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</td>
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<tr>
<td>5</td>
<td>Industry, Professional, Discipline Specific Knowledge and Skills</td>
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</table>

*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:**
Lab Manual

L. **REFERENCES:**
N/A

M. **EQUIPMENT:** None ☐ Needed: NN101 and NS139 and HVAC Tool list

N. **GRADING METHOD:** A-F

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**
Lab reports and participation

P. **DETAILED COURSE OUTLINE:**

Q. **LABORATORY OUTLINE:** None ☐ Yes ☑

1. Pipe, fitting, and valve identification
2. Methods of pipe installation, support, and insulating
3. Hydronic boiler installation methods
4. Heat emitter installation
5. Chimney and venting installation
6. Hydraulic separation and pressure measurement
7. Boiler electrical power installation
8. Hydronic system filling and purging
9. Measuring fuel consumption
10. Hydronic system evaluation