A. **TITLE:** HVAC Systems Design

B. **COURSE NUMBER:** ACHP105

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 HVAC system and its component parts is studied in detail. Components are sized and selected to meet application requirements and then system equilibrium is determined.

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

   **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>ACHP105.1 Commercial Refrigeration Equipment Calculate load for a walk in cooler</td>
<td>1. Gain the skills to begin a career in refrigeration and air conditioning service.</td>
<td>N/A</td>
<td>5-Ind, Prof, Disc, Know Skills ISLO ISLO SUBSETS</td>
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<td>ACHP105.2 Air Conditioning Load Calculate load and select equipment for an air conditioning system</td>
<td>2. Learn how to install and service refrigeration and air conditioning equipment for residential and commercial buildings.</td>
<td>N/A</td>
<td>5-Ind, Prof, Disc, Know Skills ISLO ISLO SUBSETS</td>
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<tr>
<td>ACHP105.3 Commercial Ductwork Calculate ductwork requirements for a commercial building</td>
<td>1. Gain the skills to begin a career in refrigeration and air conditioning service.</td>
<td>N/A</td>
<td>5-Ind, Prof, Disc, Know Skills ISLO ISLO SUBSETS</td>
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<tr>
<td>ACHP105.4 Residential HVAC Prepare design proposal for a residential HVAC system</td>
<td>3. Students will learn to communicate properly in the language of equipment installation &amp; service</td>
<td>N/A</td>
<td>1-Comm Skills ISLO ISLO SUBSETS</td>
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<td>ACHP105.5 Industry Standards Apply manufacturer engineering guides to pick out equipment. Navigate supplier catalogs to source components</td>
<td>1. Gain the skills to begin a career in refrigeration and air conditioning service 2. Students will learn to communicate properly in the language of equipment installation &amp; service.</td>
<td>N/A</td>
<td>1-Comm Skills ISLO ISLO Subsets</td>
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| 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:**


L. **REFERENCES:**

N/A

M. **EQUIPMENT:** None ☒ Needed:

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

O. **SUGGESTED MEASUREMENT CRITERIA/METHODS:**

Design projects

P. **DETAILED COURSE OUTLINE:**

1. Refrigeration
   1.1. Cooler load calculations
   1.2. Cabinet Design
   1.3. Equipment design
   1.4. Equipment selection
2. Residential HVAC
   2.1. Heat Load
   2.2. Cooling Load
   2.3. Ventilation
   2.4. Equipment selection
   2.5. Design proposal
3. Commercial Ductwork
   3.1. Ductwork calculations
   3.2. Design
   3.3. Specification
   3.4. Ductwork Sketching
4. Equipment Sourcing
   4.1. Refrigeration
4.2. Heating
4.3. Residential cooling

Q. LABORATORY OUTLINE: None ☒ Yes ☐