

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



MASTER SYLLABUS

HVAC 107 – Sustainable System Design

CIP Code: 47.0201

Created by: Jay Simmons

Updated by:

**School: Canino School of Engineering Technology
Department: Mechanical & Energy Systems
Implementation Semester/Year: Spring 2027**

A. TITLE: HVAC Sustainable Systems Design

B. COURSE NUMBER: HVAC 107

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

# Credit Hours per Week	3
# Lecture Hours per Week	2
# Lab Hours per Week	2
Other per Week	

D. WRITING INTENSIVE COURSE:

Yes	
No	x

E. GER CATEGORY:

Does course satisfy a GER category(ies)? If so, please select all that apply.

[1-2] Communication	
[3] Diversity: Equity, Inclusion & Social Justice	
[4] Mathematics & Quantitative Reasoning	
[5] Natural Science & Scientific Reasoning	
[6] Humanities	
[7] Social Sciences	
[8] Arts	
[9] US History & Civic Engagement	
[10] World History & Global Awareness	
[11] World Languages	

F. SEMESTER(S) OFFERED:

Fall	
Spring	X
Fall and Spring	

G. COURSE DESCRIPTION:

Explanation of building science leading to analysis of energy loads and indoor air quality. The building science portion of this course will lead to discovery of how buildings are put together, how insulation works, and ensuring good air quality. Leading to a heating and cooling load analysis used equipment sizing.

H. PRE-REQUISITES: NONE
CO-REQUISITES: NONE

I. STUDENT LEARNING OUTCOMES:

Course Student Learning Outcome [SLO]	Program Student Learning Outcome [PSLO]	GER	ISLO & Subsets
a. Industry Standards Apply manufacturer engineering guides to pick out equipment. Navigate supplier catalogs to source components	1. Gain the skills to begin a career in heating and air conditioning service 3. Students will learn to communicate properly in the language of equipment installation & service		5-Ind, Prof, Disc, Know Skills ISLO
b. Air Conditioning and Heating Load Calculate load and select equipment for an air conditioning or heating system	2. Learn how to install and design heating and air conditioning equipment for residential and commercial buildings.		5-Ind, Prof, Disc, Know Skills
c. Commercial Ductwork Calculate ductwork requirements for a commercial building	1. Gain the skills to begin a career in heating and air conditioning service		5-Ind, Prof, Disc, Know Skills
d. Residential HVAC Prepare design proposal for a residential HVAC system	3. Students will learn to communicate properly in the language of equipment installation & service		1-Comm Skills
e.			

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

J. APPLIED LEARNING COMPONENT:

Yes	X
No	

If yes, select [X] one or more of the following categories:

Classroom / Lab	X	Community Service	
Internship		Civic Engagement	
Clinical Practicum		Creative Works/Senior Project	
Practicum		Research	
Service Learning		Entrepreneurship [program, class, project]	

K. TEXTS:

Modern Refrigeration and Air Conditioning 22e, Althouse, Turnquist, Branciano

L. REFERENCES: N/A

M. EQUIPMENT: NONE

N. GRADING METHOD: A - F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Design projects, homework, quiz, Exam

P. DETAILED COURSE OUTLINE:

1. **Building Science**
 - 1.1. **Framing and Roof construction**
 - 1.2. **Foundations**
 - 1.3. **Thermal Boundaries**
 - 1.4. **Pressure Boundaries**
 - 1.5. **Moisture mitigation**
2. **HVAC Loads**
 - 2.1. **Heat Load**
 - 2.2. **Cooling Load**
3. **Indoor Air Quality**
 - 3.1 **Filtration**
 - 3.1. **Equipment selection**
 - 3.2. **Design proposal**
 - 3.3. **Duct sealing**
 - 3.4. **Define air quality**
 - 3.5. **Define indoor ventilation rates**

Q. LABORATORY OUTLINE:

- 1. Exercise on building construction**
 - 1.1 Calculations of areas and volumes**
- 2. Foaming penetrations and air leaks**
- 3. Insulation boxes**
- 4. Stack Effect**
- 5. Combustion analysis**
- 6. Blower door**
- 7. Duct testing**
- 8. Heating calculations using ACCA manual J**
- 9. Cooling load calculations using ACCA manual J**