

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



MASTER SYLLABUS

**COURSE NUMBER – COURSE NAME
HVAC203 – Commercial Refrigeration**

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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:**

Commercial applications of refrigeration appliances used in retail food, cold storage warehouses, along with commercial buildings used by humans will develop into topics needed to function as a trained technician. Retail food appliances include walking cooler/freezers used by supermarkets, convenience stores, restaurants, and food services kitchens. Cold Storage explores the equipment necessary to store meat, produce, and dairy products while ensuring perishable goods maintain quality. By their very nature, commercial buildings are an increasing application of refrigeration demand to ensure the cooling and human comfort. Exploring air handlers and heat pumps in the built environment is necessary for the modern technician.

- 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:

<u>Course Student Learning Outcome</u> <u>[SLO]</u>	<u>Program Student Learning Outcome</u> <u>[PSLO]</u>	<u>GER</u> <i>[If Applicable]</i>	<u>ISLO & SUBSETS</u>	
1. Explain components and functions in commercial and industrial refrigeration applications			3-Found Skills ISLO ISLO	Subsets Subsets Subsets Subsets
2. Explain the proper procedures used in replacing or repairing defective commercial components			3-Found Skills ISLO ISLO	Subsets Subsets Subsets Subsets
3. Explain procedures for evacuating and recharging a refrigeration system.			3-Found Skills ISLO ISLO	Subsets Subsets Subsets Subsets
4. Calculate heat loads for refrigeration			3-Found Skills ISLO ISLO	Subsets Subsets Subsets Subsets
5. Read and interpret pressure-enthalpy diagrams charts and scales			3-Found Skills ISLO ISLO	Subsets Subsets Subsets Subsets
			3-Found Skills ISLO ISLO	Subsets Subsets Subsets Subsets

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KEY	<u>Institutional Student Learning Outcomes [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

*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:

M. EQUIPMENT: None Needed:

N. GRADING METHOD: A-F

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

Exams, Quizzes, Homework

P. DETAILED COURSE OUTLINE:

1. 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