



## **COURSE SYLLABUS**

### **HART 1307- Refrigeration Principles**

**Catalog Description:** An introduction to the refrigeration cycle, basic thermodynamics, heat transfer, temperature/pressure relationship, safety, refrigeration containment, and refrigeration components.

Lecture Hrs = 2, Lab Hrs = 2

**Prerequisites:** None

**Semester Credit Hours:** 2

**Lecture Hours per Week:** 2

**Contact Hours per Semester:** 64

**State Approval Code:** 1505010000

**Course Subject/Catalog Number:** HART 1307

**Course Title:** Refrigeration Principles

**Course Rationale:** Provides the student with basic knowledge required to work in the field of air conditioning and refrigeration.

**Instructional Goals and Purposes:** The purpose of this course is to provide the student with basic skills useful in identifying the concepts of air conditioning & refrigeration and describe the terms and phrases associated with air conditioning & refrigeration. The student will perform installation, repair, brazing, evacuating, charging and troubleshooting procedures. Performance will be satisfactory when student can demonstrate competence in maintaining and troubleshooting air conditioning & refrigeration equipment includes identifying, understanding, and performing routine preventative maintenance and service; detecting more serious problems; generating workable solutions to correct deviations; and recognizing when to get additional help.

**Learning Objectives:** Upon completion of this course, the student will be able to accomplish the following competencies:

1. Know and follow all safety rules and regulations. (1Ai, 1Aii, 1Bv)
2. Identify system components and piping. (1Ai, 1Aii, 1Biv, 2Di)
3. Explain temperature/pressure relationships. (1Ai, 1Aii, 1Aiii, 1Bv, 2Ci, 2Ciii, 2Dii)
4. Connect service gauges to system, determine operating pressures.(1Biii, 2Ci, 2Ciii, 2Di, 2Dii, 2Ei)
5. Obtain operating temperatures and calculate superheat and subcool. (1Ai, 1Aii, 1Aiii, 2Ci, 2Ciii, 2Di, 2Dii, 2Ei)
6. Properly connect and braze copper tubing and fittings.( 1Biii, 2Ci, 2Ciii, 2Di, 2Dii, 2Ei)
7. Recover and reclaim refrigerants as required by EPA regulations. .( 1Biii, 2Ci, 2Ciii, 2Di, 2Dii, 2Ei)

8. Describe the EPA section 608 Clean Air Act, licensing & regulation. (1Ai, 1Aii, 1Ci, 1Cv)
9. Pumpdown, evacuate, repair & recharge a sealed system. ( 1Biii, 2Ci, 2Ciii, 2Di, 2Dii, 2Ei, 2Eii, 2Eiii )
10. Troubleshoot and repair basic thermostat & control wiring. ( 1Biii, 2Ci, 2Ciii, 2Di, 2Dii, 2Ei, 2Eii, 2Eiii)

**Methods of Instruction/Course Format/Delivery:** This course is taught either as weekly or twice weekly lecture/lab class..

**Course Grade:**

Note: The instructor may implement a different grading policy.

|                               |      |
|-------------------------------|------|
| Attendance and Participation: | 10 % |
| Weekly assignments:           | 30 % |
| Quizzes:                      | 30 % |
| Final Exam                    | 30%  |

Exams: Any test missed by the student will be counted as a 0 unless prior arrangements have been made with the instructor.

Assignments: Assignments are due as assigned and 10 points for each day the work is late.

**Texts, Materials, and Supplies:**

Title: *Modern Refrigeration and Air Conditioning*  
Author: Andrew D. Althouse, Carl H. Turnquist, Alfred F. Bracciano  
Publisher: Goodheart-Wilcox  
ISBN: 1590702808

**Note: See student counselor or instructor concerning the acquisition of the books for this course.**

## Secretary of Labor's Commission on Achieving Necessary Skills (SCANS)

### 1. BASIC SKILL COMPETENCIES

#### A. Basic Skills

- i. **Reading:** Locate, understand and interpret written information in prose and in documents such as manuals, graphs and schedules.
- ii. **Writing:** Communicate thoughts, ideas, information and messages in writing, and create documents such as letters, directions, manuals, reports, graphs, and flow charts.
- iii. **Arithmetic & Mathematical Operations:** Perform basic computations and approach practical problems by choosing appropriately from a variety of mathematical techniques.
- iv. **Listening:** Receive, attend to, interpret, and respond to verbal messages and other cues.
- v. **Speaking:** Organize ideas and communicate orally.

#### B. Thinking Skills

- i. **Creative Thinking:** Generate new ideas.
- ii. **Decision Making:** Specify goals and constraints generate alternatives, consider risks and evaluate and choose the best alternative.
- iii. **Problem Solving:** Recognize problems and devise and implement plan of action.
- iv. **Visualize ("Seeing Things in the Mind's Eye"):** Organize and process symbols, pictures, graphs, objects, and other information.
- v. **Reasoning:** Discover a rule or principle underlying the relationship between two or more objects and apply it when solving a problem.

#### C. Personal Qualities

- i. **Responsibility:** Exert a high level of effort and persevere toward goal attainment.
- ii. **Self-Esteem:** Believe in one's own self-worth and maintain a positive view of oneself.
- iii. **Sociability:** Demonstrate understanding, friendliness, adaptability, empathy, and politeness in group settings.
- iv. **Self-Management:** Assess oneself, set personal goals, monitor progress, and exhibit self-control.
- v. **Integrity & Honesty:** Choose ethical courses of action.

## 2. WORKPLACE COMPETENCIES

### A. Resources:

- i. **Time:** Select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
- ii. **Money:** Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
- iii. **Material & Facilities:** Acquire, store, allocate, and use materials or space efficiently.
- iv. **Human Resources:** Assess skills and distribute work accordingly, evaluate performance and provide feedback.

### B. Interpersonal Skills:

- i. **Participate as Member of a Team:** Contribute to group effort.
- ii. **Teach Others New Skills.**
- iii. **Serve Clients/ Customers:** Work to satisfy customers' expectations.
- iv. **Exercise Leadership:** Communicate ideas to justify position, persuade & convince others, responsibly challenge existing procedures & policies.
- v. **Negotiate:** Work toward agreements involving exchange of resources, resolve divergent interests.
- vi. **Work with Diversity:** Work well with men and women from diverse backgrounds.

### C. Information:

- i. **Acquire and Evaluate Information.**
- ii. **Organize and Maintain Information.**
- iii. **Interpret and Communicate Information.**
- iv. **Use computers to process information.**

### D. Systems:

- i. **Understand Systems:** Know how social, organizational and technological systems work and operate effectively with them.
- ii. **Monitor & Correct Performance:** Distinguish trends, predict impacts on system operations, and diagnose deviations in systems' performance.
- iii. **Improve or Design Systems:** Suggest modifications to existing systems and develop new or alternative systems to improve performance.

### E. Technology

- i. **Select Technology:** Choose procedures, tools or equipment including computers and related technologies.
- ii. **Apply Technologies to Task:** Understand overall intent and proper procedures for setup and operation of equipment.
- iii. **Maintain and Troubleshoot Equipment:** Prevent, identify, or solve problems with equipment, including computers and other technologies.