

COURSE OUTLINE
Industrial Technology 203
CAQI/QM/QS Refrigeration Module

I. Catalog Statement

Industrial Technology 203 examines the practical fundamentals and theory behind basic air conditioning and heat pump systems. Topics include the physical properties of air conditioning and refrigerants, basic system components and accessories, basic zone systems, air filtration, humidification and ventilation. The use of field instruments for measuring refrigerant pressures and temperatures, velocity and volume, and system airflow adjustments is covered.

Total Lecture Units: 1.0

Total Course Units: 1.0

Lecture Hours: 16.0

Total Faculty Contact Hours: 16.0

Recommended Preparation: ENGL 120 or ESL 151.

II. Course Entry Expectations

Prior to enrolling in the course, the student should be able to:

1. summarize, analyze, and synthesize information, express and apply standards for judgment, compare and contrast, and evaluate evidence in order to form and state reasoned opinions;
2. demonstrate a command of grammar, diction, syntax, and mechanics sufficient for college level work: control of standard English at the sentence level, with few major errors in grammar and punctuation.

III. Course Exit Standards

Upon successful completion of the required coursework, the student will be able to:

1. identify basic refrigeration components;
2. understand the service and maintenance of air conditioning and heat pump systems.

IV. Course Content

Total Faculty Contact Hours = 16

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| A. Refrigeration Principles | 4 hours |
| 1. Review of thermodynamics and basic gas/liquid physics | |
| 2. Superheat and sub-cooling cycle | |
| 3. Basic refrigeration cycle and components | |
| 4. Compressors, condensing coils, metering devices, and evaporator coils | |
| 5. Refrigerant properties and flow | |

6. Basic heat pump refrigeration components
7. Reversing valve, suction line accumulator, and defrost control
8. Effective use of pressure/temperature charts
9. Oil in the refrigeration circuit

B. Refrigeration Installations 4 hours

1. 2014 Title 24 requirements for construction and air duct thermal installation
2. Packaged systems compared to split refrigeration systems
3. Packaged system components and their impact
4. Split system equipment
5. Condensing unit and evaporator coil placement
6. Refrigeration system filter/driers
7. Correct nitrogen purging
8. Refrigeration system evacuation and refrigerant charging procedures

C. Maintenance 4 hours

1. 2014 CAQM refrigeration system maintenance guidelines
2. Create a planned preventative maintenance program
3. The effect of contamination and/or charge compromise
4. HVAC equipment and air distribution data required to meet minimum performance standards

D. Servicing 4 hours

1. Condensing/evaporating fan coil assemblies
2. Determine if a system is properly charged and performing as designed
3. Use of generic charging charts
4. Refrigerant management procedures
5. Vacuum levels

V. **Methods of Instruction**

The following instructional methodologies may be used in the course:

1. lecture;
2. demonstrations;
3. multi-media.

VI. **Out of Class Assignments**

The following out of class assignments may be used in the course:

1. essay (e.g. create a preventative maintenance plan);
2. essay (e.g. describe the basic refrigeration components for a successful system).

VII. **Methods of Evaluation**

The following methods of evaluation may be used in the course:

1. quizzes;

2. final examination.

VIII. Textbook

Institute of Heating and Air Conditioning Industries, Inc. *IHACI – Refrigeration Module*.

Glendale: Institute of Heating and Air Conditioning Industries, 2014. Print.

12th Grade Textbook Reading Level.

IX. Student Learning Outcomes

Upon successful completion of the required coursework, the student will be able to:

1. explain refrigeration components and their thermodynamic properties;
2. explain the procedures to service and maintain air conditioning and heat pump systems.