

COURSE OUTLINE
Industrial Technology 204
CAQI/QM/QS System Performance Module

I. Catalog Statement

Industrial Technology 204 examines the knowledge required to establish heating/ventilating air conditioning (HVAC) system performance. The process starts with the fundamentals and theory behind residential and light commercial HVAC performance. This course will also introduce the concept and ramifications of the HVAC being a subsystem in the building envelope and addresses the direct and indirect problems that will affect system performance.

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. apply basic thermodynamic principles;
2. apply heating and cooling systems performance measures;
3. obtain the measurements of a system that will allow you to determine a system's capacity and efficiency.

IV. Course Content

Total Faculty Contact Hours = 16

A. Thermodynamic Theory	4 hours
1. Specific heat, sensible heat, and latent heat	
2. The physical states of water	
3. How heat moves	
4. Converting R-values to U-values	
B. System Performance	4 hours
1. The sub-system of a building	
2. Thermal boundary and envelope	
3. Barriers: thermal, air, and radiant	
4. Air movement: infiltration, exfiltration, and ventilation	
5. Wind effect, stack effect, and fan effect	
6. HVAC system air leakage	
7. Duct leakage	
8. Depressurization, room to room	
C. Heating System	4 hours
1. Properties of air	
2. Airflow and airflow tools	
3. Fan performance data	
4. Static pressure and air flow	
5. Temperature stratification test	
6. Room-to-room temperature variation results	
D. Cooling System	4 hours
1. Uses of the psychrometric chart	
2. Three mass fluid flows	
3. Different airflow measurement methods	
4. Field measurements	
5. Calculating system capacity and efficiency	
6. Calculating equipment and delivered efficiency	

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. describe importance of energy efficiency and comfort);
2. essay (e.g. evaluate system performance using assigned values).

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 – System Performance*.

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. describe system performance of heating and cooling systems;
2. obtain the measurements of a system that will allow you to determine a system's capacity and efficiency.