# **Basic Electricity for HVAC (HART 1401)**



Credit: 4 semester credit hours (2 hours lecture, 6 hours lab)

# Prerequisite/Co-requisite: N/A

# **Course Description**

Principles of electricity as required by HVAC, including proper use of test equipment, electrical circuits, and component theory and operation.

# **Required Textbook and Materials**

- 1. Electricity for Refrigeration, Heating and Air Conditioning by Russell E. Smith, 8<sup>th</sup> edition.
  - a. ISBN number is 10: 1-111-03874-0
- 2. Modern Refrigeration and Air Conditioning by Althouse, Turnquist, and Bracciano, 18<sup>th</sup> edition
  - a. ISBN number is 1590702808

# **Course Objectives**

Upon completion of this course, the student will be able to

- 1. Demonstrate knowledge of basic principles of electricity, electrical current, circuitry, and air conditioning devices. (SCANS C5.2, C6.4, C7.3, C9.3, C10.1, C14.5, C20.3, F1.3, F2.6, F4.3, F7.5, F9.4, F11.2, F12.3)
- 2. Apply Ohm's law to electrical calculations. (SCANS C5.2, C6.4, C7.3, C9.3, C10.1, C14.5, C20.3, F1.3, F2.6, F4.3, F7.5, F9.4, F11.2, F12.3)
- 3. Perform electrical continuity, voltage, and current test with appropriate meters. (SCANS C5.2, C6.4, C7.3, C9.3, C10.1, C14.5, C20.3, F1.3, F2.6, F4.3, F7.5, F9.4, F11.2, F12.3)
- 4. Demonstrate electrical safety. (SCANS C5.2, C6.4, C7.3, C9.3, C10.1, C14.5, C20.3, F1.3, F2.6, F4.3, F7.5, F9.4, F11.2, F12.3)

# SCANS Skills and Competencies

Beginning in the late 1980's, the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) conducted extensive research and interviews with business owners, union leaders, supervisors, and laborers in a wide variety of work settings to determine what knowledge workers needed in order to perform well on a job. In 1991 the Commission announced its findings in *What Work Requires in Schools*. In its research, the Commission determined that "workplace know-how" consists of two elements: foundation skills and workplace competencies.

#### HART 1401

Course Syllabi

### **Course Outline**

- A. Electrical Safety:
  - 1. Working a live circuit
  - 2. Operation of a volt ohm meter
  - 3. Safety equipment required
  - 4. Lock out tag out
- B. Ohms Law
  - 1. Computing volts
  - 2. Computing ohms
  - 3. Computing watts
  - 4. Formula for S.E.E.R
  - 5. Effect of SEER on electrical cost
- C. Series Circuits
  - 1. Uses for series circuits
  - 2. Examples of series circuits
- D. Parallel Circuits
  - 1. Uses for parallel circuits
  - 2. Examples of parallel circuits
- E. Series Parallel Circuits
  - 1. Uses for parallel circuits
  - 2. Examples of parallel circuits

### **Grade Scale**

A=90-100 B=80-89 C=70-79 D=60-69 F=0-59

### **Course Evaluation**

- 1. 4--Objective Test33%
- 2. Comprehensive Final 33%
- 3. Homework/Lab work 33%

### **Course Requirements**

- 1. Homework assignments
- 2. Hands on lab activities
- 3. Complete comprehensive final

### **Course Policies**

- 1. There will be *no* horseplay tolerated.
- 2. No open foot shoes, sandals, or flip-flops: closed foot shoes *only*.

- 3. No smoking, eating, or sleeping will be tolerated during class.
- 4. If an assignment is late, there will be 5 points deducted per day.
- 5. No hanging jewelry or rings in lab.

#### **Disabilities Statement**

The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator, Rebecca Cole, at (409)880-1737 or visit her office located in the Cecil Beeson Building, room 120.

| Week    | Торіс                                    | Reference  |  |
|---------|--|------------|--|
| 1& 2    | Electrical safety                        | Chapter 1  |  |
| 3       | Basic electricity                        | Chapter 2  |  |
| 4       | Electric circuits                        | Chapter 3  |  |
| 5 &6    | Electrical symbols                       | Chapter 5  |  |
| 7 & 8   | Reading electric diagrams                | Chapter 6  |  |
| 9       | A/C Power and D/C Power                  | Chapter 7  |  |
| 10 &11  | Installation of HVAC systems             | Chapter 8  |  |
| 12      | Basic electric motors                    | Chapter 9  |  |
| 13      | Hands on electric meter evaluation       | Chapter 10 |  |
| 14 & 15 | General electric meter use, amp meter    |            |  |
|         | Volt meter, and ohm meter                |            |  |
| 16      | General overview and comprehensive final |            |  |

#### **Course Schedule**

### **Contact Information**

| Instructor:          | Mr. Henry Gaus    |
|----------------------|-------------------|
| Office:              | TA2 Room 100      |
| Telephone:           | (409)839-2068     |
| E-mail               | gaush@lit.edu     |
| <b>Office Hours:</b> | 11:00a.m12:30p.m. |