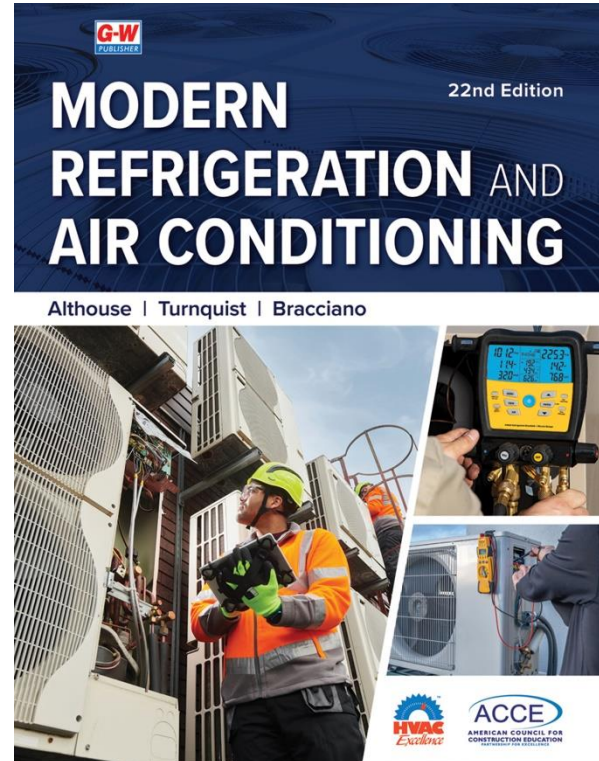


*Correlation of*  
**Modern Refrigeration and Air Conditioning, Althouse, Turnquist, Bracciano**  
**(Goodheart-Willcox Publisher ©2025)**  
to  
**AHRI Curriculum Guide VI. Electricity**

Goodheart-Willcox is pleased to partner with the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) and the American Council for Construction Education (ACCE) by correlating *Modern Refrigeration and Air Conditioning* to the AHRI Curriculum Guide. The following chart correlates *Modern Refrigeration and Air Conditioning* to a section of the Curriculum Guide developed by AHRI used for ACCE (formerly PAHRA) accreditation.

The chart lists the Curriculum Guide’s knowledge and task competency objectives in the left column and the corresponding chapter numbers from *Modern Refrigeration and Air Conditioning* in the right column.

For more information on the American Council for Construction Education (ACCE) and related accreditation, please visit:  
[www.acce-hq.org](http://www.acce-hq.org)



<b>VI.A. Basic Electricity</b>	
<b>Knowledge</b>	<b>Textbook Chapter(s)</b>
1. Define <i>watts, ohms, volts, and amps.</i>	Chapter 13
2. Define and compare <i>single- and three-phase voltage and current.</i>	Chapter 14
3. Identify types of electrical loads (i.e., capacitive, inductive, and resistive).	Chapters 13, 14
4. Analyze applications of magnetism in electricity.	Chapters 13, 14, 15, 16, 17, 19
5. Apply magnetic principles to electrical therapy.	Chapters 13, 14, 16, 17
6. Compare conducting and insulating materials.	Chapter 13
7. Identify principles of solid-state switching devices.	Chapters 15, 17

**Correlation of Modern Refrigeration and Air Conditioning to AHRI Curriculum Guide:**

**VI. Electricity—page 2**

<b>VI.A. Basic Electricity (continued)</b>	
<b>Tasks</b>	<b>Textbook Chapter(s)</b>
1. Demonstrate proper use of ammeter, ohmmeter, voltmeter, and wattmeter.	Chapters 14, 18, 48, 49
2. Use Ohm’s Law to solve circuit problems and calculate circuit loads.	Chapters 13, 14, 18
3. Use appropriate meters to check basic electrical components.	Chapters 14, 18
4. Determine the electrical characteristics of both series and parallel circuits.	Chapters 13, 18
5. Demonstrate algebra/math skills.	Chapters 13, 14
6. Determine the equivalent resistance in a parallel and series circuit.	Chapter 13
7. Determine the equivalent capacitance in a parallel and series circuit.	Chapters 13, 19
8. Construct and analyze:	
a. series circuit	Chapter 13
b. parallel circuit	Chapter 13
c. series-parallel circuit	Chapter 13
<b>VI.B. Electrical Generation and Distribution</b>	
<b>Knowledge</b>	<b>Textbook Chapter(s)</b>
1. Explain basic generator principle.	Chapter 14
2. Explain how electricity is produced and distributed.	Chapter 14
3. Define <i>wye (Y)</i> and <i>Delta (Δ)</i> distribution systems.	Chapter 14
<b>Tasks</b>	<b>Textbook Chapter(s)</b>
1. Draw and identify power transformer types.	Chapter 14
2. Use electrical meters appropriately to test and identify voltages in both single- and three-phase systems.	Chapters 14, 18
3. Size/test fuses/breakers and safely replace them.	Chapters 14, 17, 18
4. Use National Electrical Code (NEC) tables (i.e., NEC 310-16) to check wire size and conduit size for connected equipment.	Chapters 14, 17, 35
5. Determine correct wire size and voltage drops for electrical circuits.	Chapters 14, 18
6. Determine whether existing load centers are adequate to supply desired load additions.	Chapters 14, 19

**Correlation of Modern Refrigeration and Air Conditioning to AHRI Curriculum Guide:**

**VI. Electricity—page 3**

<b>VI.C. Electrical Components</b>	
<b>Knowledge</b>	<b>Textbook Chapter(s)</b>
1. Define <i>magnetic theory</i> .	Chapters 13, 14, 16
2. Define and explain the use or function of:	
a. aquastats	Chapter 38
b. capacitors	Chapter 13
c. contactor/starters	Chapters 17, 19, 48, 49
d. crankcase heaters	Chapter 43
e. current relays	Chapter 17
f. damper actuators	Chapters 17, 20, 21, 24, 25, 26, 30, 31, 38
g. defrost timers	Chapters 20, 36, 41, 44, 45
h. fan/limit controls	Chapters 26, 33, 34, 35
i. oil pressure safety	Chapter 43
j. overloads	Chapters 19, 23, 43, 48
k. positive temperature co-efficient (PTC)	Chapters 15, 17, 18
l. potentiometers	—
m. pressure controls	Chapters 14, 39, 40, 45, 52
n. relays	Chapters 15, 17, 18, 33, 34, 35, 47, 48, 49
o. rheostats	—
p. sail switches	Chapters 33, 35
q. sequencers	Chapter 35
r. solenoids	Chapters 12, 15, 17, 44, 33, 34, 49
s. solid-state time delays	Chapters 15, 16, 19, 33, 34, 36, 48
t. thermostats	Chapters 17, 20, 21, 22, 23, 25, 26, 33, 34, 35, 36, 37, 38, 48
u. water valves	Chapters 24, 25, 38, 48, 49
v. zone valves	Chapter 38
<b>Tasks</b>	<b>Textbook Chapter(s)</b>
1. Demonstrate proper use of test equipment for testing the above items.	Chapters 17, 18, 20, 21, 31, 33, 48, 49, 50

**Correlation of Modern Refrigeration and Air Conditioning to AHRI Curriculum Guide:**

**VI. Electricity—page 4**

<b>VI.D. Electric Motors</b>	
<b>Knowledge</b>	<b>Textbook Chapter(s)</b>
1. Explain electric motor theory (i.e., magnetism, electromotive force, etc.)	Chapters 13, 14, 16
2. Explain operation and application of:	
a. capacitor start induction run motor (csir)	Chapter 16
b. capacitor start capacitor run motor (cscr)	Chapter 16
c. electronically controlled motor (ecm)	Chapter 16
d. modulating motor (economizers)	Chapters 16, 19, 23, 25, 26
e. multi-speed motor	Chapter 16
f. permanent split capacitor motor (psc)	Chapter 16
g. shaded pole	Chapter 16
h. split-phase motor (rsir)	Chapter 16
i. three-phase motor	Chapter 16
j. variable-speed motor	Chapters 16, 22, 23, 25
3. Describe starting components associated with single-phase and three-phase motors.	Chapters 16, 17, 48, 49
4. Explain the significance of power factor.	Chapters 14, 18, 49
<b>Tasks</b>	<b>Textbook Chapter(s)</b>
1. Demonstrate proper use of testing equipment for motors.	Chapters 4, 16, 19
2. Determine physical conditions of motor bearings and rotors.	Chapters 16, 19
3. Build a basic motor-using a piece of wood, copper wire, and a coat hanger.	—
4. Draw and explain the starting and nm circuit for a single-phase CSIR compressor using a current type starting relay.	Chapters 16, 17, 19, 21
5. Draw and explain the starting and 11m circuit for a single-phase CSCR compressor using a potential (metage) starting relay.	Chapters 16, 17, 19, 21
6. Draw and explain the circuit for a PSC compressor.	Chapters 16, 17, 19, 21

<b>VI.E. Electrical Circuits and Controls</b>	
<b>Knowledge</b>	<b>Textbook Chapter(s)</b>
1. Interpret detailed instructions for wiring circuits.	Chapters 17, 19, 22, 25, 34, 35, 48, 49
<b>Tasks</b>	<b>Textbook Chapter(s)</b>
1. Draw electrical circuits that conform to standard industry logic and symbols using appropriate loads and controls.	Chapters 13, 17, 18, 22, 25, 35, 48, 49
2. Wire actual electrical circuits from wiring diagrams.	Chapters 13, 18, 19, 22, 25, 35, 48, 49
3. Demonstrate use and understanding of basic electrical meters in actual wiring and testing of circuits.	Chapters 13, 17, 18, 19, 22, 25, 35, 48, 49
4. Identify and draw all electrical symbols used by the HVACR industry in diagrams.	Chapters 13, 17, 18, 19, 22, 25, 35, 48, 49
5. Size an electric motor circuit, single and multiple, including overcurrent protection in accordance with National Electrical Code (NEC).	Chapters 13, 14, 16, 17, 18, 21, 23, 35, 43, 47, 50