Correlation of

***Modern Refrigeration and Air Conditioning,* by Althouse, Turnquist, Bracciano**
(Goodheart-Willcox Publisher ©2021)
to
AHRI Curriculum Guide: XI. Air-Conditioning Systems

The following chart correlates the *Modern Refrigeration and Air Conditioning* textbook (©2021) to a section of the Curriculum Guide developed by Air-Conditioning, Heating, and Refrigeration Institute (AHRI) and used for PAHRA accreditation.

The chart lists the Curriculum Guide's knowledge and task competency objectives and the corresponding chapter numbers from *Modern Refrigeration and Air Conditioning*.

For more information on the Partnership for Air-Conditioning, Heating, Refrigeration Accreditation (PAHRA) and related accreditation, please visit: www.pahrahvacr.org

XI.A. Unitary Cooling	
Knowledge	**Textbook Chapter(s)**
1. Describe the sequence of the basic refrigeration cycle and operation of the various types of air-conditioning systems.	Chapters 6, 31, 32, 33, 34, 35
Task	**Textbook Chapter(s)**
1. Use and read various tools and instrumentation needed for checking, testing, and operating air-conditioning systems.	Chapters 7, 10, 11, 13, 16, 18, 28, 32, 33
XI.B. Central Station Systems	
Knowledge	**Textbook Chapter(s)**
1. Explain the basic function of the following components of central station systems:	
a. air distribution systems	Chapters 29, 32, 33
b. expansion tanks	Chapter 39
c. heat recovery systems	Chapter 22, 44, 46

XI.B. Central Station Systems (continued)	
Knowledge	**Textbook Chapter(s)**
d. water chiller	Chapters 33, 34
e. water cooling tower	Chapters 33, 34, 54
2. Explain the operation of a central station system.	Chapters 6, 31, 32, 34, 44
3. Understand the requirements for system control:	
a. electronic DDC	Chapters 16, 45
b. pneumatic	Chapters 33, 45
c. building systems	Chapters 16, 23, 33, 45
Task	**Textbook Chapter(s)**
1. Draw a piping diagram of a chilled water system:	
a. Two-way control valves	Chapters 23, 34, 54
b. Three-way control valves	Chapters 23, 33, 34, 54
XI.C. Service and Problem Analysis	
Knowledge	**Textbook Chapter(s)**
1. Explain the causes of electrical problems.	Chapters 16, 17, 18, 25, 31, 32, 33, 53, 54, 55
2. Explain the causes of mechanical problems.	Chapters 16, 18, 25, 31, 32, 33, 53, 54, 55
3. Explain the causes of hydronic problems.	Chapters 16, 18, 39
Task	**Textbook Chapter(s)**
1. Analyze air-conditioning systems and appropriately diagnose the electrical and/or mechanical and/or hydronic problems.	Chapters 16, 17, 18, 25, 31, 32, 33, 39, 53, 54, 55
XI.D. Absorption Refrigeration	
Knowledge	**Textbook Chapter(s)**
1. Explain the basic function of the components of the absorption system.	Chapter 34
2. Describe the sequence of operation of the absorption system.	Chapter 34
3. Understand which components of an absorption system can be field-serviced.	Chapters 34, 41
Task	**Textbook Chapter(s)**
1. Check all “external” components of system for proper operation.	Chapters 34, 41

XI.E. Desiccant Cooling and Dehumidification	
Knowledge	**Textbook Chapter(s)**
1. List the applications of dehumidification.	Chapter 35
2. Describe the methods of desiccant dehumidification.	Chapters 27, 35
3. Describe the benefits of using desiccant dehumidification versus cooling coil dehumidification.	Chapter 35
4. Explain how a desiccant wheel works.	Chapters 29, 30, 32, 35, 46
5. Understand and describe how the four primary variables influence the performance of a desiccant dehumidifier:	
a. air flow	Chapters 27, 28, 29, 30, 32, 33, 35, 38
b. entering humidity level	Chapters 27, 28, 29, 30, 32, 33, 35, 38
c. entering dry bulb temperature	Chapters 27, 28, 29, 30, 32, 33, 35, 38
d. regeneration temperature	Chapters 27, 28, 29, 30, 32, 33, 35, 38
6. Understand basic troubleshooting methods for desiccant systems:	
a. air flow readings	Chapters 27, 28, 29, 30, 32, 33, 35, 38
b. temperature verification	Chapters 27, 28, 29, 30, 32, 33, 35, 38
c. humidity level readings	Chapters 27, 28, 29, 30, 32, 33, 35, 38
d. mass balance calculations	Chapters 27, 28, 29, 30, 32, 33, 35, 38
7. Describe the operation and maintenance of desiccant cooling and dehumidification systems. (Desiccant cycle and physical components)	Chapters 27, 28, 29, 30, 32, 33, 35, 38
8. List the various types of desiccant cooling and dehumidification systems in use today.	Chapters 27, 28, 29, 30, 32, 33, 35, 38
9. Describe how desiccant dehumidifiers are integrated into conventional refrigeration and air-conditioning systems and identify the function of each component in an integrated system.	Chapters 27, 28, 29, 30, 32, 33, 35, 38
Tasks	**Textbook Chapter(s)**
1. Read and use the various tools/instruments needed for checking, testing, and operating a desiccant dehumidifier:	
a. airflow measurement	Chapters 27, 28, 29, 30, 32, 33, 35, 38
b. humidity measurements (wet/dry bulb, dewpoint, relative humidity)	Chapters 27, 28, 29, 30, 32, 33, 35, 38
c. moisture balance calculation	Chapters 27, 28, 29, 30, 32, 33, 35, 38
2. Analyze a desiccant system and determine:	
a. if meeting manufacturers' specifications	Chapters 27, 28, 29, 30, 32, 33, 35, 38
b. potential for improving moisture removal rate	Chapters 27, 28, 29, 30, 32, 33, 35, 38