Correlation of

***Modern Refrigeration and Air Conditioning,* by Althouse, Turnquist, Bracciano**
(Goodheart-Willcox Publisher ©2021)
to

AHRI Curriculum Guide: IX. Load Calculations

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

IX.A. Refrigeration Loads	
Knowledge	**Textbook Chapter(s)**
1. Define "U" value: (Btu/hrAft^{2}A°F).	Chapters 37, 50
2. Define "K" value: (Btu/hrAft^{2}A°F).	Chapters 37, 50
3. Define "C" value: (Btu/hrAft^{2}A°F).	Chapters 37, 50
4. Define "R" value: (Btu/hrAft^2°F/Btu).	Chapters 37, 50
5. Interpret heat transfer tables ("U", "K," "C," "R").	Chapters 37, 50
6. Explain the heat load sources:	
a. conduction	Chapters 4, 37, 46, 50
b. infiltration (sensible and latent)	Chapters 27, 37, 45, 46, 50
c. product	Chapters 37, 46, 50
d. miscellaneous loads (people, motors, equipment, sensible and latent)	Chapters 37, 46, 50
e. radiation	Chapters 4, 37, 46, 50

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IX. Load Calculations—page 2

IX.A. Refrigeration Loads (continued)	
Knowledge	**Textbook Chapter(s)**
7. Explain the purpose of vapor barriers.	Chapters 37, 46, 50
8. Interpret tables of specific heat values, latent heat, and heat or respiration.	Chapters 37, 46, 50
Task	**Textbook Chapter(s)**
1. Calculate total heating transfer value of any surface (R) – (U).	Chapters 37, 46, 50, 51
IX.B. Psychrometrics	
Knowledge	**Textbook Chapter(s)**
1. Identify the following on a psychrometric chart:	
a. dry bulb line (DB)	Chapters 27, 35
b. wet bulb line (WB)	Chapters 27, 35
c. relative humidity (RH)	Chapters 27, 35
d. dew point (DB)	Chapters 27, 35
e. enthalpy (h)	Chapters 4, 6, 9, 27, 35, 50
f. specific humidity (grains of moisture) or (lbw/lbda)	Chapters 27, 35
g. apparatus dew point	Chapters 9, 22, 27, 35, 51
2. Explain:	
a. specific humidity	Chapters 27, 35
b. apparatus dew point	Chapters 22, 35, 51
c. contact factor	Chapters 22, 51
d. relative humidity	Chapters 27, 29, 31, 35, 51
e. dry bulb	Chapters 27, 35
f. wet bulb	Chapters 27, 35
g. dew point	Chapters 27, 35
h. enthalpy	Chapters 4, 6, 9, 27, 35, 50
i. specific volume	Chapters 5, 27
Tasks	**Textbook Chapter(s)**
1. Calculate:	
a. refrigeration sensible heat ratio	Chapter 27
b. latent heat ratio	Chapters 4, 9, 29, 44, 50
c. contact factor	Chapters 21, 51
d. latent heat	Chapters 4, 6, 9, 29, 37, 44, 50

IX.B. Psychrometrics (continued)	
Tasks	**Textbook Chapter(s)**
e. sensible heat	Chapters 4, 6, 9, 29, 37, 44, 50
f. total heat	Chapters 4, 6, 9, 29, 37, 44, 50
g. water removal	Chapters 4, 6, 9, 29, 35, 37, 44, 50, 51
h. mixed air condition	Chapters 27, 28, 29, 30, 35, 37, 50
2. On a psychrometric chart, plot the following:	
a. sensible heating	Chapters 27, 35
b. sensible cooling	Chapters 27, 33, 35
c. heating and humidifying	Chapters 27, 35
d. heating and dehumidifying	Chapters 27, 35
e. cooling and humidifying	Chapters 27, 33, 35
f. cooling and dehumidifying	Chapters 27, 33, 35
g. humidifying	Chapters 27, 35
h. dehumidifying	Chapters 27, 33, 35
i. cooling cycle	Chapters 27, 35
j. mixed air process	Chapters 27, 32, 33, 35
k. cooling and reheat	Chapters 27, 35
IX.C. Heating Loads	
Knowledge	**Textbook Chapter(s)**
1. Interpret structure design data.	Chapters 27, 37, 46
2. Interpret building prints—size of rooms, etc.	Chapters 27, 37, 46
Tasks	**Textbook Chapter(s)**
1. Determine total resistance to heat flow (“R”) (“U”)	Chapters 37, 46, 50, 51
2. Calculate conduction loss:	
a. walls	Chapter 46
b. roofs	Chapter 46
c. floors	Chapter 46
d. windows	Chapter 46
e. basement (walls, floor)	Chapter 46
f. unconditioned space	Chapter 46
3. Calculate infiltration:	
a. doors	Chapter 46
b. windows	Chapter 46

IX.C. Heating Loads (continued)	
Tasks	**Textbook Chapter(s)**
4. Calculate ventilation load.	Chapters 29, 46
5. Calculate duct loss.	Chapters 27, 28, 29, 37, 46
6. Calculate effects of bath and kitchen exhaust.	Chapters 27, 28, 29, 37, 46
7. Calculate effects of power roof ventilators.	Chapters 27, 28, 29, 37, 46
8. Calculate total heating load.	Chapters 27, 28, 29, 37, 46
IX.D. Cooling Loads	
Knowledge	**Textbook Chapter(s)**
1. Interpret structure design data.	Chapter 46
Tasks	**Textbook Chapter(s)**
1. Calculate “U” values for building material.	Chapters 46, 48
2. Calculate cooling load temperature difference (CLTD).	Chapters 37, 46, 48
3. Make corrections for CLTD.	Chapters 37, 46, 48
4. Calculate conduction loads:	
a. walls	Chapters 37, 46, 48
b. roofs	Chapters 37, 46, 48
c. windows	Chapters 37, 46, 48
d. doors	Chapters 37, 46, 48
e. unconditioned space	Chapters 37, 46, 48
f. floors	Chapters 37, 46, 48
5. Calculate lighting load.	Chapters 37, 46, 48
6. Calculate equipment load.	Chapters 37, 46, 48
7. Calculate infiltration and ventilation load.	
a. heat load	Chapters 27, 28, 29, 37, 46
b. moisture loads	Chapters 27, 28, 29, 35, 37, 46
8. Calculate duct gain.	Chapter 29
9. Calculate refrigeration sensible heat ratio.	Chapters 37, 46, 50
10. Calculate storage factor.	Chapters 37, 46, 50
11. Calculate effects of bath and kitchen exhaust.	Chapters 27, 28, 29, 37, 46, 50
12. Calculate effects of power roof ventilators.	Chapters 27, 28, 29, 37, 46, 50
13. Calculate total cooling load:	
a. sensible loads	Chapters 27, 28, 29, 37, 46, 50
b. latent loads	Chapters 27, 28, 29, 37, 46, 50