Basic Refrigeration Systems

TEAC - 1140 401

Course Student Learning Outcomes

- Describe the fundamental refrigeration cycle including heat, states of substances, heat transfer, and pressure/temperature relationships.
- Identify common refrigerants and understand their differences and develop an understanding of proper refrigerant handling techniques and the application of EPA Section 608 rules.
- Identify and describe the function of the major refrigerant system components including compressor types and operational characteristics.
- Identify and describe the function of common refrigeration accessories and controls.
- Demonstrate the proper use of refrigerant manifold gauges to evaluate, service, and diagnose refrigerant systems including refrigerant recovery, system evacuation, and refrigerant charging procedures.

Course Prerequisites

TEAC-1120

Engagement Plan

Example language:

- I will respond to email within 24 hours Monday through Thursday. The best way to contact me is via the Canvas Inbox, as I will prioritize this email over other modes of communication.

Keys for Success (how to succeed in the course)

This course is structured to allow students to work at their own pace. However, this course must be completed by the end of the semester the course was registered in. While substantial preparation work can be performed outside of the classroom and lab, most of the lab assignments are hands-on and require that students be in attendance for these assignments as well as for most quizzes and all exams. Students are expected to manage their schedules and complete all current (registered) coursework by the end of the current semester. Any course not completed by the end of the semester will receive a failing grade and the student will need to repeat the course before proceeding to other courses in the program.

Classroom and lab hours are Monday through Thursday 8:00AM—2:00PM and 6:00PM—10:00PM. However, if instructors have not had, or do not have, any students in the lab at 8:00PM, at their discretion, they may close the lab for the evening. Therefore, if you will be later than 7:30PM, please communicate with the instructor for that evening. The classroom and lab are located in room TAB-109 of the Technical Arts Building (TAB) on the Taylorsville campus, 1902 Community Blvd.

Required Text or Materials

Title: Heating and Cooling Essentials
ISBN: 978-1-63776-460-2

Title: Modern Refrigeration and Air Conditioning
ISBN: 979-8-89737-599-8

For more information on textbook accessibility, contact Accessibility & Disability Services at ads@slcc.edu.

Additional Materials

You are required to purchase a personal pair of safety glasses. General safety rated plastic glasses or prescription safety glasses are acceptable. You will also need a scientific calculator. You will also need the following hand tools and meters for the labs:

- Safety glasses or prescription glasses with safety lenses.
- Gloves, cut resistant ANSI A4, similar/equal to these found on Amazon.

- Earbuds or headphones that can plug into a laptop computer.
- USB drive to store and transfer your work
- HVACR Clamp Multi-Meter UEI DL479 or similar available at some supply houses or Amazon.
- 6 in 1 screwdriver (#1 and #2 Phillips screwdrivers, 1/4” and 3/16” slotted screwdrivers, 1/4" and 5/16” nut-drivers).
- Small 1/8” flat-blade screwdriver (control screwdriver) used for installing thermostats and other control devices.
- Hex wrench set, SAE (not metric), long-arm (not folding)
- Adjustable open-end wrench, 6”.
- Adjustable open-end wrench, 8”.
- Two pocket thermometers, UEI PDT650 or similar.
- Magnet (approx. 2”X3/4”X1/2”) or The Old Switcheroo (Google to find source).
- Refrigeration service wrench, Yellow Jacket model 60613 or similar.
- Measuring tape, at least 16’.
- Electrical tape, 1 roll.
- Tubing cutter, Ridgid model 150 or similar.
- Deburring tool, Yellow Jacket model 60163 or similar.
- Jumper wires with alligator clips.
- Electrical tape.
- Tubing cutter, Ridgid model 150 or similar.
- Deburring tool, Yellow Jacket model 60163 or similar.

Brief Description of Assignments/Exams

See Assignment Schedule

Assignment Schedule

Due Date	Assignment Name	Assignment Type	Points
	Basic Refrigeration Systems Final Written Exam	Quiz	100
	Check Your Knowledge: H&C Chapter 10 Temperature and Pressure	Quiz	25
	Check Your Knowledge: H&C Chapter 11 Basic Refrigeration Cycle	Quiz	45
	Check Your Knowledge: H&C Chapter 12 Other System Components	Quiz	34
	Check Your Knowledge: H&C Chapter 13 Refrigerants	Quiz	22
	Check Your Knowledge: H&C Chapter 14 Zeotropic Blends	Quiz	25
	Check Your Knowledge: H&C Chapter 15 Refrigerant Recovery and Recycling	Quiz	25

Due Date	Assignment Name	Assignment Type	Points
	Check Your Knowledge: H&C Chapter 16 System Evacuation, Leak Detection, and Recharging	Quiz	54
	Check Your Knowledge: H&C Chapter 9 Basic Thermodynamic Principles	Quiz	30
	Check Your Knowledge: Hazard Communication Safety Quiz-	Quiz	20
	Check Your Knowledge: Working with Refrigerants Quiz-	Quiz	10
	H&C Lab Activities 12-3, 12-4, 12-5, 12-6, and 12-7	Assignment	25
	H&C Lab Activity 10-1 Temperature and Pressure	Assignment	5
	H&C Lab Activity 10-2 Pressure-Temperature Relationships	Assignment	5
	H&C Lab Activity 11-1 Refrigeration Cycle	Assignment	5

Due Date	Assignment Name	Assignment Type	Points
	H&C Lab Activity 11-2 Identification	Assignment	5
	H&C Lab Activity 11-3 Temperature Difference	Assignment	5
	H&C Lab Activity 11-4 Compressor Operation	Assignment	5
	H&C Lab Activity 11-6 Removing the Compressor Head and Valve Plate	Assignment	5
	H&C Lab Activity 12-1 Refrigeration System Components	Assignment	5
	H&C Lab Activity 12-2 Recalibrating a Gauge Manifold Set	Assignment	5
	H&C Lab Activity 13-1 Obtaining Refrigerant Information	Assignment	5
	H&C Lab Activity 13-2 Alternative Refrigerant Information	Assignment	5
	H&C Lab Activity 13-3 Finding Saturation, Superheat, and Subcooling	Assignment	5
	H&C Lab Activity 15-1 Definitions	Assignment	5

Due Date	Assignment Name	Assignment Type	Points
	H&C Lab Activity 16-6 Low-Side Temperatures and Pressures	Assignment	5
	H&C Lab Activity 16-7 High-Side Temperature and Pressures	Assignment	5
	H&C Lab Activity 9-1 Forced Convection	Assignment	5
	H&C Lab Activity 9-2 Computing Btu Requirements	Assignment	5
	H&C Lab Activity 9-3 Identifying Latent Heats and Lab Activity 9-4 Calculating Refrigeration Effect	Assignment	5
	H&C Lab Activity 9-5 Subcooling and Superheat	Assignment	5
	Introduce Yourself	Discussion	0
	Introduce Yourself	Discussion	0
	Pressurized Gases and Cylinders Quiz-	Quiz	10
	Refrigerant Recovery, Leak Detection, Evacuation, and Charging Lab.	Assignment	25

Grading Scale

Each assignment, quiz, and exam have an assigned point value. The course grade is determined by summing all of the assignments, quizzes, and exams and dividing the sum by the total possible points. A letter grade of A , B, or E (failing) will be assigned according to the percentage of points earned and the following table:

GRADE	RANGE
A	90-100%
B	80-89%
E	Less than 80%

How to Navigate to Canvas

Institutional Policies

As members of our academic community, we would like to invite you to review the Institutional Syllabus which covers important policies and procedures. This document contains important links for students on the code of student rights and responsibilities, academic integrity, and grading policies, Title IX and other important acknowledgements. By familiarizing yourself with this information, you can help us create a safe and respectful environment for everyone.

For more information, navigate to the Institutional Policies tab on the Institutional Syllabus page.

Learning Support and Tutoring Services

We are pleased to offer a range of tutoring and learning support services to help you achieve your academic goals. Whether you need assistance with a specific subject or want to improve your study skills, you have many options for tutoring or other support.

To learn more about the services we offer and how to access them, visit the Institutional Syllabus page under the Tutoring and Learning Support tab. We encourage you to take

advantage of these resources to help you succeed in your studies. If you have any questions or would like to schedule a tutoring session, please don't hesitate to reach out to us. We are here to support you in any way we can.

Advising and Counseling Support Services

At our institution, we are committed to supporting your academic and personal growth. That's why we offer a range of advising and counseling services to help you navigate the challenges of college life. To learn more about the resources available to you and how to access them, visit the Institutional Syllabus page under the Advising and Counseling Support Services tab. Our advising team and the support centers across campus are here to support you in achieving your goals and overcoming any obstacles you may face.

Student Academic Calendar

As students you should be aware of all important dates in the semester, such as the day that courses begin and end, as well as the drop date and the last day to withdraw. To learn more about those dates, navigate to the Student Academic Calendar below:

SLCC Student Academic Calendar