

COURSE TITLE (Heating, Ventilation, and Air Conditioning (HVAC) Troubleshooting and Repair (DEMR 1323 3A1)

**CREDIT**

3 Semester Credit Hours (2 hours lecture, 4 hours lab)

**MODE OF INSTRUCTION**

Face to Face

**PREREQUISITE/CO-REQUISITE:**

None

**COURSE DESCRIPTION**

Introduction to basic heating, ventilation and air conditioning theory, testing, and repair, Emphasis on refrigerant reclamation, safety procedures, specialized tools and repairs. Student must pass ASE Certification test upon completion of this course.

**COURSE OBJECTIVES**

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

1. Identify and use Heating and Air Conditioning Service specialty test equipment and basic mechanics hand tools.
2. Use human protection equipment.
3. Correctly use and dispose of environmentally sensitive and hazardous materials.

**INSTRUCTOR CONTACT INFORMATION**

Instructor: Landon Kohring

Email: lmkohring@lit.edu

Office Phone:

Office Location:

Office Hours: Monday / Wednesday 1:30 – 2:30 pm during semester

**REQUIRED TEXTBOOK AND MATERIALS**

1. **Auto Heating and Air Conditioning**  
Chris Johanson. Goodheart - Willcox Company, Inc.  
ISBN 978-1-64564-174-2; 5<sup>th</sup> edition
2. **Auto Heating and Air Conditioning Workbook**  
Chris Johanson. Goodheart - Willcox Company, Inc.

Approved: PMIII / 1-08-2024



ISBN 978-1-64564-175-9; 5<sup>th</sup> edition

3. Notebook and 8.5" x 11" notebook paper
4. Blue and Black ink pens
5. Safety glasses and suitable work clothes

### ATTENDANCE POLICY

1. Missing more than 20% of classes will result in an automatic "F" for the course.
2. Absences are counted for unexcused, excused and coming to class late.
3. Missing more than 20% of a class period will count as an absence.
4. Being tardy 3 times equals 1 absence.

### DROP POLICY

If you wish to drop a course, you are responsible for initiating and completing the drop process. If you stop coming to class and fail to drop the course, you will earn an "F" in the course.

### COURSE CALENDAR

Week	TOPIC	READINGS	ASSIGNMENTS
1	Lecture: Course introduction and policies	Syllabus / Handouts Lecture	Review Handouts and Class Quizzes
2	Lecture: Introduction to Automotive Heating, Air Conditioning, and Ventilation 1. A/C Components 2. HVAC Operation	Chapter 1 Auto heating and Air Conditioning	Complete assigned Review, ASE and Workbook Questions. Class Quizzes
3/4	Lecture: Shop Safety and Environmental Protection Personal Safety Equipment Environmental	Chapter 2	Complete assigned Review, ASE and Workbook Questions. Class Quizzes
5/6	Lecture: HVAC Tools, Equipment, and Service Information Lab: Preparing to Service a Vehicle Perform Safety Environmental Inspections	Chapter 3	Complete assigned Review, ASE and Workbook Questions. Class Quizzes Take 609 certification Online from ASE

7/8	Lecture: HVAC Electrical and Electronic Fundamentals Lab: Identify & Interpret Vehicle Numbers	Chapter 4	Complete assigned Review, ASE and Workbook Questions. Class Quizzes
9/10	Lecture: Principles of Refrigeration Lab: Find & use Service Information	Chapters 5	Complete assigned Review, ASE and Workbook Questions. Class Quizzes
11/12	Lecture: Refrigerants, Oils & Related Chemicals Lab: Use a Scan Tool to Retrieve Diagnostic Trouble Codes	Chapter 6	Complete assigned Review, ASE and Workbook Questions. Class Quizzes
13	Lecture: Hoses, Lines, Fittings & Seals Lab: Diagnosing Heating, Air Conditioning Systems	Chapter 7	Complete assigned Review, ASE and Workbook Questions. Class Quizzes
14/15/16	Final Project Servicing an Air Conditioning System ASE certification exam	Lecture/Review Prepare for final exam	Review semester materials Instructor assigned Project

### COURSE EVALUATION

Final grades will be calculated according to the following criteria:

Daily work, Quizzes and Homework assignment	45%
Major Chapter Test and Certification completion	30%
Performance grade, classroom decorum or Attendance	5 %
Final Exam (All material covered during semester)	<u>20%</u>
<b>Total</b>	<b>100%</b>

### GRADE SCALE

- 90-100 A
- 80-89.9 B

- 70-79.9 C
- 60-69.9 D
- 0-59.9 F

### **TECHNICAL REQUIREMENTS**

The latest technical requirements, including hardware, compatible browsers, operating systems, etc. can be online at <https://lit.edu/online-learning/online-learning-minimum-computer-requirements>. A functional broadband internet connection, such as DSL, cable, or WiFi is necessary to maximize the use of online technology and resources.

### **DISABILITIES STATEMENT**

The Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. LIT provides reasonable accommodations as defined in the Rehabilitation Act of 1973, Section 504 and the Americans with Disabilities Act of 1990, to students with a diagnosed disability. The Special Populations Office is located in the Eagles' Nest Room 129 and helps foster a supportive and inclusive educational environment by maintaining partnerships with faculty and staff, as well as promoting awareness among all members of the Lamar Institute of Technology community. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409)-951-5708 or email [specialpopulations@lit.edu](mailto:specialpopulations@lit.edu). You may also visit the online resource at [Special Populations - Lamar Institute of Technology \(lit.edu\)](#).

### **STUDENT CODE OF CONDUCT STATEMENT**

It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the *LIT Catalog and Student Handbook*. The *LIT Catalog and Student Handbook* may be accessed at [www.lit.edu](http://www.lit.edu). Please note that the online version of the *LIT Catalog and Student Handbook* supersedes all other versions of the same document.

### **STARFISH**

LIT utilizes an early alert system called Starfish. Throughout the semester, you may receive emails from Starfish regarding your course grades, attendance, or academic performance. Faculty members record student attendance, raise flags and kudos to express concern or give praise, and you can make an appointment with faculty and staff all through the Starfish home page. You can also login to Blackboard or MyLIT and click on the Starfish link to view academic alerts and detailed information. It is the responsibility of the student to pay attention to these emails and information in Starfish and consider taking the recommended actions. Starfish is used to help you be a successful student at LIT.

### **ADDITIONAL COURSE POLICIES/INFORMATION**

1. **No Cell Phone or Electronic Devices** allowed in class, unless it is known to the instructor, for a special reasoning.

***All cell phones must be turned off and put away. Text messaging during class time will not be tolerated. Text messaging during an exam will be considered academic dishonesty. The exam will be considered over and the student will receive a zero for the exam.***

2. **No smoking or use of any tobacco products allowed**
3. Do not bring any **food or drinks** in class
4. No visitor allowed in class including children
5. **Do not disturb lecture for any reason. If you must leave class or come in late, do so without disturbing class.**
6. **DRESS CODE:**  
**Proper work attire only, NO Open shoes, Short pants, low riding, or sleeveless shirts, will be allowed in any program classrooms.**
7. **No grades will be dropped**, No homework or assignments can be made up or accepted after instructor has taken up for grading.
8. **Homework** must be done **in proper outline form, neat and legible**, prepared on **loose leaf (8.5" X 11") note book paper**, written only on **one** side.
9. Assignment must be turn in at the beginning of class
10. Any student caught cheating will be dropped from class and given an F for the semester grade.
11. Students are required to be present for all examinations and lectures. Student must sign up and self-fund for 609 certification and Pass the 609 certification.
12. Learning activities will be subjectively graded by the instructor. Students assigned to a group must be present at all times when the project is being worked on.

**NOTE:**

**Students who violate any of these policies will be asked to leave class and given an absent for the class period. Students who are continuing disturbing classes will be suspended from class for the remainder of the semester and given an grade of F.**

*Students may vary in their competency levels on these abilities. You can expect to acquire these abilities only if you honor all course policies, attend classes regularly, complete all assigned work in good faith and on time, and meet all other course expectations of you as a student.*

## **Course Outline**

- A. Shop Orientation
  1. Lab policies
  2. Tool room duties
  3. Housekeeping assignment
- B. Shop Safety
  1. General shop safety regulation

2. Personal Safety
- C. Proper handling of hazardous and environmentally sensitive material
  1. Classification
  2. MSDS
  3. Disposal of waste material
  4. Recovery of refrigerant
- D. Tools and Shop Equipment
  1. Identify
  2. Use of tools properly
- E. Air Conditioning Service specialty test equipment
  1. Thermometers
  2. Gauge Manifolds
  3. Vacuum Gauges
  4. ECM Scan Equipment
- F. Types of Pullers
  1. Arm pullers
  2. Hub
  3. Jacking Screw
  4. Orifice extractors
- G. Spring coupler release tools and shop equipment
  1. Presses
  2. Recovery / Recycle
  3. Vacuum pump
  4. Vises
  5. Cleaning Equipment
- H. Tubing and Fittings
  1. Aluminum
  2. Rubber
- I. Unit
  1. Testing and Charging
  2. Connections and Circuits
- J. General unit information
  1. Use of manuals
  2. Checking specification
  3. General description
  4. Model description
  5. Unit serial, model, and optional plate numbers
  6. General procedure for disassembly
  7. Parts inspection
  8. Use of tools for disassembly
  9. Safety Precautions