

# COURSE SYLLABUS

DEMR 1323 (3:1:6)

Heating, Ventilation and Air Conditioning (HVAC) Troubleshooting and Repair
---

Diesel Service Technology

Industrial

Technical Education Division

Levelland

SOUTH PLAINS COLLEGE

Fall 2019

Campus Listed as Appropriate to Class:  
Levelland

## COURSE SYLLABUS

COURSE TITLE: HVAC Troubleshooting and Repair

INSTRUCTOR: Terry Chrestman

OFFICE LOCATION

AND PHONE/E-MAIL: Office #104, Phone 806-716-2756, tchrestman@southplainscollege.edu

OFFICE HOURS: Published on 12th class day

SOUTH PLAINS COLLEGE IMPROVES EACH STUDENT'S LIFE

\*\*\*\*\*

### 1. GENERAL COURSE INFORMATION:

- i. Course Description: This course is an introduction to heating, ventilation and air conditioning theory, testing and repair. Emphasis is on refrigerant reclamation, safety procedures, specialized tools, and repairs.
- ii. Course Learning Outcomes: The student will analyze heating, ventilation, and air conditioning systems; utilize special tools; and repair or replace components. iii. Course Competencies: This course uses established Associated Equipment Dealers (AED) and Automotive Service Excellence (ASE) competencies. Upon completion of this course the student must demonstrate the ability to:
  - A. Properly utilize shop equipment pertaining to the servicing of heating and cooling systems as found on modern diesel equipment.
  - B. Accurately follow industry service guidelines.
  - C. Properly diagnose and correct air conditioning system malfunctions and system control complaints.
  - D. Locate pertinent service information using computer based manuals.
- iv. Academic Integrity: (see current college catalog for policy)
- v. SCANS and Foundation Skills: C1 through C20 and F1 through F17. A description of these SCANS skills is incorporated in this syllabus for reference.
- vi. Verification of Workplace Competencies: All graduating students in the diesel service technology program will have a comprehensive, exit review exam administered in order to comply with the state requirement for a "capstone learning experience".

### 2. SPECIFIC COURSE/INSTRUCTOR REQUIREMENTS:

- i. Textbook and Other Materials Medium / Heavy Commercial Vehicle Systems, Jones & Bartlett / CDX Automotive, ISBN 978-1-284-04116-3; Tools per DST Tool list
- ii. Attendance Policy: (also see current college catalog). Additionally, training here is not only for operation of systems, components and repair

- techniques, but to prepare you for the working world. The potential employer looks at such traits as punctuality, responsibility and regularity. Therefore, regular and punctual attendance is required here just as would be by an employer. Your first absence in class is to be considered a warning. **Upon obtaining the 3<sup>th</sup> absence, you will be dropped from the course.** Three tardies are considered equal to and count as 1 absence. Arriving after the first hour counts as an absence.
- iii. Assignment Policy: Assignments will be given from time to time at the instructor's discretion. All assigned work will be due at the beginning of the class for which the assignment is given, and on the day, time and manner specified at the time the assignment is given. Late work is penalized.
3. Grading Policy/Procedure and/or methods of evaluation: Exams will be given periodically throughout the semester at the instructor's discretion. Lab assignments will be given and completed at the assigned date. At the end of the semester, a comprehensive final exam will be given. These are three categories taken into consideration when computing the final semester grades.
- i. Classroom grades: These grades will constitute 20% of the final semester grade. This will include tests, quizzes, and assignments.
- A. 7% from quizzes and assignments
  - B. 13% from major tests
  - C. Tutoring – Students who do not pass their first exam will be required to attend three hours of tutoring each week until they pass their next exam. This is a course requirement and will be reflected in the course grade.
- ii. Lab grades: These grades will constitute 60% of the final semester grade.
- A. Lab Grades will be based on:
    - 1. Completion of Lab Assignments
    - 2. Completion of Work Orders
    - 3. Lab Tests
- iii. Damaging lab projects will result in a deducted grade for projects as follows:
- 1. Damaged, but repaired correctly 5%
  - 2. Damaged, required part replacement 10%
  - 3. Damaged, not repairable 20%
  - 4. Damaged, abandoned 100%
- B. NOTE: When you apply for a signature on a project, you will be randomly, verbally, quizzed on your knowledge of the project, procedures, etc. Inability to answer questions will result in an incomplete until you comply with the research assigned at that moment.
- iv. Final exam: At the end of the semester, a final exam will be given and the grade earned will count as 20% of the final semester grade. A. Final test will be comprehensive.
4. GRADE LEVELS: There are four levels of attainable grades in the diesel technology program. The levels are A - (90 and above); B - (80-89); C - (70-79); F - (69 and below). This grading policy follows industry standards used in certification testing.
5. TUTORING: Students who do not pass their first exam will be required to attend three hours of tutoring each week until they pass their next exam. This is a course requirement and will be reflected in the course grade.

6. Special Requirements: Appropriate safety equipment to be worn and or used as necessary. This includes steel toe safety boots and safety glasses which are to be correctly worn at all times in lab spaces.

## 7. COURSE OUTLINE

### A. Introduction

1. Heat and cold
2. Temperature and pressure
3. Evaporation and condensation

### B. Air conditioning systems

1. Components and Their Functions
2. Operation
3. Refrigerants

### C. Heating / Ventilation

### D. Service equipment

### E. Gauges

### F. Reclaim / recycle units

### G. Vacuum pumps

### H. Leak detectors I. Diagnostics

### J.

## 8. HAZARDOUS MATERIALS:

- i. Students will come in contact with chemicals and other materials, which are classified as HAZARDOUS MATERIAL by EPA and/or TCEQ. Examples of these materials include used engine oil, hydraulic fluid, antifreeze, batteries, various light bulbs and other items. Material Safety Data Sheets (MSDS) are located in the areas affected. Appropriate safety equipment is provided and is expected to be used.

## 9. ACCOMMODATIONS :

- i. Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Disability Services Office. For more information, call or visit the Disability Services Office at Levelland (Student Health & Wellness Office) 806-716-2577, Reese Center (Building 8) 806-716-4675, or Plainview Center (Main Office) 806-716-4302 or 806-296-9611. (Also see current college catalog).

## 10. DIVERSITY STATEMENT

- i. In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about ourselves. By promoting diversity and intellectual

exchange, we will not only mirror society as it is, but also model society as it should and can be.

#### 11. DISABILITIES STATEMENT

- i. Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Disability Services Office. For more information, call or visit the Disability Services Office at Levelland (Student Health & Wellness Office) 806-716-2577, Reese Center (Building 8) & Lubbock Center 806-716-4675, or Plainview Center (Main Office) 806-716-4302 or 806-296-9611.

#### 12. NON-DISCRIMINATION STATEMENT

- i. South Plains College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Vice President for Student Affairs, South Plains College, 1401 College Avenue, Box 5, Levelland, TX 79336. Phone number 806-716-2360.

#### 13. CAMPUS CARRY

- i. Campus Concealed Carry - Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in South Plains College buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and South Plains College policy, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to the SPC policy at: ([http://www.southplainscollege.edu/human\\_resources/policy\\_procedure/hhc.php](http://www.southplainscollege.edu/human_resources/policy_procedure/hhc.php)) Pursuant to PC 46.035, the open carrying of handguns is prohibited on all South Plains College campuses. Report violations to the College Police Department at 806-716- 2396 or 9-1- 1 ii. Please refer to Senate Bill 11 and South Plains College's campus carry policy if you choose to exercise your rights to carry on campus. Please keep in mind when choosing to carry the nature of the work in the lab and secure your weapon in a manner that will prevent it from interfering with your work.

#### **GENERAL RULES**

1. Always follow safety rules. They are for your protection.
2. Personal Protection Equipment: Safety glasses will be properly worn at all times. Acceptable lens colors: clear, yellow colored lenses. Mirrored or dark lenses will be permitted for outside work only. Sunglasses will not be allowed indoors or outdoors.

All safety glasses must be “ANSI Z-87-1” or better certified. Safety toe footwear are required and will be worn at all times. Non-compliance will result in dismissal for the day with an absence.

3. Service bay doors will be either fully raised or lowered.

4. No tobacco products are allowed in campus buildings, and smoking must not be done within 25 feet of the building, per campus policy. This policy includes vaping.

5. No shorts to be worn in the lab areas. Clothing should well-fitting and appropriate for work. Clothing with obscene, profane or otherwise inappropriate language or images not be allowed.

6. No parking is allowed inside the south fenced in area.

7. The DST program adheres to the South Plains College zero tolerance policy for controlled substances. Should an instructor suspect a student is under the influence of drugs or alcohol while on campus, they will remove the student from class and/or lab and the appropriate disciplinary measures will be enforced.

8. All electronic devices will be used only for course related work. Inappropriate use of electronic devices, including cell phones, can result in your dismissal for the day with an absence.

9. You are required to have your tools to be able to participate in class. Talk to your instructor if this is a problem.

10. Do not store South Plains College tools, equipment or project parts in your toolbox. If you do put SPC property in your box we can and will use any means necessary to open your box if you are not present. While your box is present in our facility, it is subject to search at any time at instructor’s discretion. We are not responsible for any damage or losses that may occur due to this policy. You are welcome to register a spare key with your instructor for the semester to avoid such situations.

11. In accordance with Texas Commission on Environment Quality (TCEQ), there are to be no open or unlabeled containers in the lab or classroom areas. Only small quantities may be held in open containers, which must be labeled and currently in use.

12. All SPC property, including equipment keys and tools, must be put away at class clean up. You are responsible for putting away all your personal tools, sorting equipment neatly and disposing of all trash daily.

## **SCANS COMPETENCIES**

- C-1 **TIME**--Selects goal--relevant activities, ranks them, allocates time, and prepares and follows schedules. C-2 **MONEY**--Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives C-3 **MATERIALS & FACILITIES**--Acquires, stores, allocates, and uses materials or space efficiently. C-4 **HUMAN RESOURCES**--Assesses skills and distributes work accordingly, evaluates performances and provides feedback. **INFORMATION--Acquires and Uses Information** C-5 Acquires and evaluates information. C-6 Organizes and maintains information. C-7 Interprets and communicates information. C-8 Uses computers to Process information.

## **INTERPERSONAL--Works With Others**

- C-9 Participates as members of a team and contributes to group effort. C-10 Teaches others new skills. C-11 Serves clients/customers--works to satisfy customer's expectations. C-12 Exercises leadership--communicates ideas to justify position, persuades and convinces others, responsibly challenges existing procedures and policies. C-13 Negotiates--Works toward agreements involving exchanges of resources resolves divergent interests. C-14 Works with Diversity--Works well with men and women from diverse backgrounds.

## **SYSTEMS--Understands Complex Interrelationships**

- C-15 Understands Systems--Knows how social, organizational, and technological systems work and operates effectively with them C-16 Monitors and Correct Performance-Distinguishes trends, predicts impacts on system operations, diagnoses systems' performance and corrects malfunctions. C-17 Improves or Designs Systems-Suggests modifications to existing systems and develops new or alternative systems to improve performance.

## **TECHNOLOGY--Works with a variety of technologies**

- C-18 Selects Technology--Chooses procedures, tools, or equipment including computers and related technologies. C-19 Applies Technology to Task-Understands overall intent and proper procedures for setup and operation of equipment. C-20 Maintains and Troubleshoots Equipment-Prevents, identifies, or solves problems with equipment, including computers and other technologies.

## **FOUNDATION SKILLS**

### **BASIC SKILLS--Reads, writes, performs arithmetic and mathematical operations, listens and speaks**

- F-1 Reading--locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules. F-2 Writing--Communicates thoughts, ideas, information and messages in writing, and creates documents such as letters, directions, manuals, reports, graphs, and flow charts. F-3 Arithmetic--Performs basic computations; uses basic numerical concepts such as whole numbers, etc. F-4 Mathematics--Approaches practical problems by choosing appropriately from a variety of mathematical techniques. F-5 Listening--Receives, attends to, interprets, and responds to verbal messages and other cues. F-6 Speaking--Organizes ideas and communicates orally. **THINKING SKILLS--Thinks creatively, makes decisions, solves problems, visualizes, and knows how to learn and reason** F-7 Creative Thinking--Generates new ideas.

- F-8 Decision-Making--Specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative. F-9 Problem Solving--Recognizes problems and devises and implements plan of action. F-10 Seeing Things in the Mind's Eye--Organizes and processes symbols, pictures, graphs, objects, and other information. F-11 Knowing How to Learn--Uses efficient learning techniques to acquire and apply new knowledge and skills. F-12 Reasoning--Discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

### **PERSONAL QUALITIES--Displays responsibility, self-esteem, sociability, self-management, integrity and honesty** F-13 Responsibility--Exerts a high level of effort and preservers towards goal attainment.

- F-14 Self-Esteem--Believes in own self-worth and maintains a positive view of self. F-15 Sociability--Demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings. F-16 Self-Management--Assesses self accurately, sets personal goals, monitors progress, and exhibits self-control. F-17 Integrity/Honesty--Chooses ethical courses of action.