

COURSE OUTLINE

Revision: Doug Clapper-2008

DEPARTMENT:	Heavy Duty Diesel Technology
CURRICULUM:	Diesel and Heavy Duty Equipment Technology
COURSE TITLE:	Heating, Ventilation and Air Conditioning
COURSE NUMBER:	HDM 193
TYPE OF COURSE:	Vocational Preparatory
COURSE LENGTH:	120 Hours
CREDIT HOURS:	6
LECTURE HOURS:	10
LAB HOURS:	110
CLASS SIZE:	18 Maximum
PREREQUISITES:	HDM 101 (Introduction to Heavy Duty) or instructor's permission

COURSE DESCRIPTION:

In this unit, students will study the operation, system diagnosis and repair of heating, ventilation, and air conditioning systems related to trucks and equipment. Retrofit of R-12 systems to R-134a refrigerant will also be covered in this course. Safety practices and proper environmental procedures related to the recovery and dispensing of refrigerant is taught.

STUDENT LEARNING OUTCOMES ADDRESSED:

1. Computation – Apply math operations to determine the correct amount of refrigerant to installed in system.
2. Critical Thinking and Problem Solving – Think critically to systematically locate and repair heating, ventilation, and air conditioning system failures.
3. Critical Thinking and Problem Solving – Think critically to systematically locate and repair heating, ventilation, and air conditioning system failures.
4. Information Literacy – Access technical information and specifications to evaluate systems performance.

GENERAL COURSE OBJECTIVES:

At the end of the course the student will:

1. Demonstrate safety procedures and precautions necessary when handling refrigerants.
2. Understand the proper handling of C.F.C.'s and demonstrate competency in recovery and recycling practices.
3. Diagnose mechanical failures and make repairs to heating, ventilation, and air conditioning systems.
4. Diagnose and make repairs to electrical and electronic components, circuits and controls on heating, ventilation, and air conditioning systems.
5. Diagnose and perform preventive maintenance procedures on heating, ventilation and air conditioning systems.

TOPICAL OUTLINE:	APPROX. HOURS
I. Service tools and their use	5
II. Air conditioning/heating function	10
III. Overview of system operation	10
IV. Heater components and controls	10
V. Air conditioner components	10
VI. Heater/air conditioner controls	10
VII. Inspection and maintenance (W/O Gauges)	10
VIII. Troubleshooting and service procedures	10
IX. Refrigerants	6
X. Retrofitting	
a. Retrofit Survey	4
b. General Retrofit Procedure	4
c. Compressor	3
d. Condenser	3
e. Receiver-Drier	3
f. Expansion Valve	4
g. Evaporator	3
h. Hoses	4
i. Seals and "O" Rings	3
j. Service Ports	3
XI. Component repair or replacement	<u>8</u>
TOTAL	120

Program Outcomes

1. Identify function, read diagrams and manufacturer specifications, inspect, diagnose problems, replace/repair, and service all major components of heavy duty equipment and vehicles. (SLO 1.1 & 7.2)

2. Using IVISDS sheets, OSHA and WISHA standards, demonstrate safety procedures relating to equipment, personal safety, and safety of others. (SLO 6.4)
3. Demonstrate proficiency in using hand and electronic testing and repair equipment. (SLO 6.3)
4. Consistently apply standards and guidelines for safe work procedures. (SLO 6.4 & 6.5)
5. Work independently and in groups to service, complete repairs, test, and maintain heavy duty vehicles to meet industry standards. (SLO 3.1)
6. Use industry tools to measure service. (SLO 2.2)
7. Use technology to test and repair equipment. (SLO 5.1)
8. Identify and strategize own career plans within the field. (SLO 6.2)
9. Practice good customer service. (SLO 3.2)
10. Work with accuracy, dependability, proficiency and speed when servicing equipment. (SLO 6.1)
11. Explain the expectations of employers for employees within the diesel industry. (SLO 7.1)
12. Communicate and document service records. (SLO 1.2)
13. Demonstrate basic competency in use of computers to access repair/replacement data and to document service. (SLO 5.1 & 7.1)

Student Learning Outcomes (SLO)

STUDENT LEARNING OUTCOMES are the knowledge and abilities every student graduating with a certificate or degree from South Seattle Community College will have. Students will achieve these outcomes as well as the specific curriculum outcomes for their academic or technical area of study.

1. Communication

- 1.1 Read and listen actively to learn and communicate.
- 1.2 Speak and write effectively for personal, academic and career purposes.

2. Computation

- 2.1 Use arithmetic and other basic mathematical operations as required by program of study.
- 2.2 Apply quantitative skills for personal, academic, and career purposes.
- 2.3 Identify, interpret and utilize higher level mathematical and cognitive skills (for those students who choose to move beyond the minimum requirements are stated above).

3. Human Relations

- 3.1 Use social interactive skills to work in groups effectively.
- 3.2 Recognize the diversity of cultural influences and values.

4. Critical Thinking and Problem-Solving

- 4.1 Think critically in evaluating information, solving problems and making decisions.

5. Technology

- 5.1 Select and use appropriate technological tools for personal, academic and career tasks.

6. Personal Responsibility

- 6.1 Be motivated and able to continue learning and adapt to change.
- 6.2 Value one's own skills, abilities, ideas and art.
- 6.3 Manage personal health and safety.
- 6.4 Be aware of civic and environmental issues.

7. Information Literacy

- 7.1 Access and evaluate information from a variety of sources and contexts, including technology.
- 7.2 Use information to achieve personal, academic, and career goals, as well as to participate in a democratic society.

REVISED BY: Doug Clapper
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