

**COURSE OUTLINE**

Revision: Doug Clapper – 2008

DEPARTMENT:	Heavy Duty Diesel Technology
CURRICULUM:	Diesel and Heavy Duty Equipment Technology
COURSE TITLE:	Hydraulics and Pneumatics
COURSE NUMBER:	HDM 107
TYPE OF COURSE:	Vocational Preparatory
COURSE LENGTH:	144 Hours
CREDIT HOURS:	9
LECTURE HOURS:	44
LAB HOURS:	100
CLASS SIZE:	18 Maximum
PREREQUISITES:	HDM-101 (Introduction to Heavy Duty) or instructors permission

**COURSE DESCRIPTION:**

In this unit, the students will study the theory, basic operation principles, design, function, testing, and repair of selected types of hydraulic and air pumps, motors, hoses and accessories used on mobile equipment, as well as the application and repair of pressure, flow, and directional control valves and actuators.

**STUDENT LEARNING OUTCOMES ADDRESSED:**

1. Communication - Read and listen actively to better communicate.
2. Computation - Use basic mathematical skills as they apply to mobile hydraulic components.
3. Technology - Select and use appropriate technological tools to repair and service mobile hydraulic systems.

## GENERAL COURSE OBJECTIVES:

At the end of the course the student will be able to:

1. Demonstrate safe work practices.
2. Diagnose Hydraulic and Pneumatic system failures
3. Define and explain the applicable hydraulic principles to mobile equipment.
4. Correctly compute pump and motor flow requirements and outputs.
5. Disassemble various types of pumps, motors and accessories and determine their condition.
6. Inspect and repair control valves.
7. Inspect and repair actuators.
8. Read circuit drawing.

TOPICAL OUTLINE:	APPROX. HOURS
I Safety rules for Hydraulics	5
II Hydraulic Pumps and maintenance	15
III Hydraulic valves	12
IV Hydraulic cylinders and maintenance	12
V Hydraulic motors and maintenance	12
VI Hydraulic accumulators and maintenance	12
VII Hydraulic filters and maintenance	12
VIII Reservoirs, oil coolers, hoses, pipes, tubes and couplers	12
IX Hydraulic seals	12
X Hydraulic fluids	12
XI General maintenance	12
XII Diagnosis and testing of Hydraulic systems	<u>16</u>
TOTAL	144

## 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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