

**SAN DIEGO COMMUNITY COLLEGE DISTRICT  
MIRAMAR COLLEGE  
ASSOCIATE DEGREE COURSE OUTLINE**

**SECTION I**

**SUBJECT AREA AND COURSE NUMBER:** Diesel Technology 240

**COURSE TITLE:** Equipment Chassis R&R

**Units: 3**  
Grade Only

**CATALOG COURSE DESCRIPTION:**

Students learn how to use specialized and general shop equipment and hand tools for removing and replacing components in general shop repairs of heavy equipment units. They also learn how to operate, install, and troubleshoot single and multiple disc clutches.

**REQUISITES:**

**Corequisite: Completion of or concurrent enrollment in:**  
DIES 100 with a grade of "C" or better, or equivalent

**FIELD TRIP REQUIREMENTS:** May be required

**TRANSFER APPLICABILITY:** Associate Degree Credit & transfer to CSU and/or private colleges and universities

**TOTAL LECTURE HOURS:** 32 - 36

**TOTAL LAB HOURS:** 48 - 54

**STUDENT LEARNING OBJECTIVES:**

Upon successful completion of the course the student will be able to:

1. Remove and replace components in general shop repairs of heavy equipment units
2. Prepare and explain, both orally and in writing, a plan to remove and replace major components in an organized manner
3. Identify the function of commonly used dynamic and static seals and demonstrate their proper use
4. Explain the selection and uses of common types of bearings used in components; select the proper methods for their installation and adjustment
5. Compare and select the appropriate lubes for common applications on heavy equipment
6. Identify the common methods and attach-points of major frame, cab, and body components of heavy equipment
7. Demonstrate, both orally and in writing, familiarity with nomenclature and design features of common heavy equipment, including frames, cab, and body elements
8. Demonstrate proper lifting and rigging procedures using wire rope, chain, and slings with appropriate types of cranes and jacks
9. Remove and replace major components of the frame, cab, or drive system of a heavy equipment vehicle
10. Safely remove and replace air, electrical, and hydraulic components from a heavy equipment vehicle
11. Explain the operation of heavy duty clutches of single and multiple disc types
12. Disassemble and perform failure analysis of a clutch assembly

13. Formulate a repair plan for a failed clutch unit
14. Reassemble, install, and adjust (post installation) a clutch assembly on a vehicle or power unit
15. Compare and contrast common methods of supporting vehicles and their components for safe and organized removal and replacement (R&R) procedures.

## **SECTION II**

### **1. COURSE OUTLINE AND SCOPE:**

#### **A. Outline Of Topics:**

The following topics are included in the framework of the course but are not intended as limits on content. The order of presentation and relative emphasis will vary with each instructor.

- I. Course overview
  - A. Course content
  - B. Grading system
  - C. Safe working procedures
  - D. Project organization
  - E. Handling components
  - F. Special tools and hardware
  - G. Bearings, lubes, and seals.
- II. Heavy equipment
  - A. Nomenclature and design
  - B. Frames
  - C. Cab and body
  - D. Attach-points and methods.
- III. Basic shop rigging and lifting
  - A. Blocking and supporting equipment
  - B. Wire rope, chain, and slings
  - C. Use of Mobil, Bridge, and other types of cranes.
- IV. Basic component R&R
  - A. Large components
    1. Major drive components
    2. Cab and frame.
  - B. Small component R&R
    1. Air
    2. Electrical
    3. Hydraulic.
  - C. Clutches
    1. Theory of operation
    2. Types: single and multiple disc
    3. Disassembly and failure analysis
    4. Rebuilding
    5. Adjustments: internal and external
    6. Problem diagnosis.

#### **B. Reading Assignments:**

Reading assignments are required and may include but, are not limited to, the following:

- I. 1. Chapters from course textbook(s)
- II. 2. Articles related to diesel repair in professional journals such as Service Tech, Diesel Progress, Commercial Carrier Journal (CCJ), Utility Fleet, Fleet Owner, and Transportation Equipment News
- III. 3. Reports, repair manuals, on-line resources, and laboratory guides associated with diesel technology.

#### **C. Appropriate Assignments that Demonstrate Critical Thinking:**

Critical thinking assignments are required and may include, but are not limited to, the following:

- I. 1. Analyzing methods learned in class and utilizing appropriate methods for completing laboratory

tasks

- II. 2. Evaluating and recording the condition of heavy equipment major units
- III. 3. Formulating repair plans for heavy equipment major units
- IV. 4. Calculating and solving mathematical problems.

**D. Appropriate Outside Assignments:**

Outside assignments may include, but are not limited to, the following:

- I. 1. Conducting research related to heavy equipment updates at Caterpillar websites
- II. 2. Completing all reading and writing assignments, including a shop notebook and final drive power flow report
- III. 3. Completing a field assignment report on a site visit to a local heavy equipment repair shop.

**E. Writing Assignments:**

Writing assignments are required and may include, but are not limited to, the following:

- I. 1. Preparing a shop notebook
- II. 2. Writing a task analysis report for the replacement of a final drive and steering clutch assembly
- III. 3. Responding to short essay questions about related topics such as removing and replacing heavy equipment major units and troubleshooting steering clutches.

**2. METHODS OF EVALUATION:**

A student's grade will be based on multiple measures of performance unless the course requires no grade. Multiple measures may include, but are not limited to, the following:

- I. Performing manipulative skills as needed to complete laboratory assignments satisfactorily
- Successfully applying theory to laboratory assignments
- Performing on written, oral, and/or practical examinations
- Performing on out-of-class assignments including diesel engine reports and projects
- Contributing to class discussion
- Maintaining attendance per current department policy.

**3. METHODS OF INSTRUCTION:**

Methods of instruction may include, but are not limited to, the following:

- \* Lecture
- \* Laboratory
- \* Lecture-Lab Combination
- \* Other (Specify)
- \* A. Demonstration
- \* B. Field trips and/or field assignments
- \* C. Computer-assisted instruction.

**4. REQUIRED TEXTS AND SUPPLIES:**

Textbooks may include, but are not limited to:

**TEXTBOOKS:**

1. Caterpillar, Inc.. SIS DVDA0006-29, Machines, 1st ed. Caterpillar, Inc., 2001,
2. Caterpillar, Inc.. Fundamentals of Machine Service, SENB1022-6, 3rd ed. Caterpillar, Inc., 1999,
3. Caterpillar, Inc.. SIS DVDA0007-02, Machines, 1st ed. Caterpillar, Inc., 2001,
4. Lewis, Jim.. DIES-M Daily Reports, 2nd ed. Miramar Reprographics, 1982,

**MANUALS:**

**PERIODICALS:**

**SOFTWARE:**

**SUPPLIES:**

1. Safety glasses
2. Hearing protection
3. Calculator
4. Appropriate clothing and footwear for shop work
5. Scantron answer sheets

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