

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

**SECTION I****SUBJECT AREA AND COURSE NUMBER:** Diesel Technology 210**COURSE TITLE:** Brakes, Final Drives and Steering Systems**Units: 3**  
Grade Only**CATALOG COURSE DESCRIPTION:**

Students learn the principles and practices in the operation and servicing of heavy equipment brakes, final drive systems, and steering systems.

**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. Describe basic machine safety procedures; demonstrate the ability operate machine controls
2. Describe the purpose and operation of direct drive axles; select and demonstrate proper repair procedures on them
3. Describe the purpose and operation of single reduction axles; select and demonstrate proper repair procedures on them
4. Describe the purpose and operation of double reduction planetary gears; select and demonstrate proper repair procedures on them
5. Describe the purpose and operation of machine braking systems; select and demonstrate proper repair procedures on them
6. Describe the purpose and operation of brake control systems; select and demonstrate proper adjustment and repair procedures on them
7. Describe the purpose and operation of steering clutches; select and demonstrate proper adjustment and repair procedures on them
8. Describe the purpose and operation of steering clutch control systems; select and demonstrate proper adjustment and repair procedures on them.

**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. Introduction to track-type machines
  - A. Machine controls
  - B. Machine safety.
- II. Direct drive-type axles
  - A. Purpose
  - B. Operation
  - C. Types
  - D. Repair.
- III. Single reduction planetary-type drive axles
  - A. Purpose
  - B. Operation
  - C. Types
  - D. Repair.
- IV. Double reduction planetary-type drive axles
  - A. Purpose
  - B. Operation
  - C. Types
  - D. Repair.
- V. Braking systems
  - A. Purpose
  - B. Operation
  - C. Types
  - D. Repair.
- VI. Brake control systems
  - A. Purpose
  - B. Operation
  - C. Types
  - D. Adjustments
  - E. Repair.
- VII. Steering clutches
  - A. Purpose
  - B. Operation
  - C. Types
  - D. Adjustments
  - E. Repair.
- VIII. Steering control systems
  - A. Purpose
  - B. Operation
  - C. Types
  - D. Repair.

**B. 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 serviceability of heavy equipment brakes, final drives, and steering system components
- III. 3. Formulating repair plans for heavy equipment brakes, final drives, and steering system components
- IV. 4. Calculating and solving mathematical problems.

**C. Appropriate Outside Assignments:**

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

- I. 1. Conducting research relating to equipment brakes, final drives, and steering updates at Caterpillar websites
- II. 2. Completing all reading and writing assignments, including a shop notebook and an equipment brake system safety report
- III. 3. Completing a field assignment report on a site visit to a local Caterpillar equipment repair shop.

**D. 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 power shift power flow report
- III. 3. Responding to short essay questions about related topics such as the operation and servicing of heavy equipment brakes, final drive systems, and steering systems.

**E. 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.

**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/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.. SIS DVDA0007-02, Machines, 1st ed. Caterpillar, Inc., 2001,
3. Deere & Company. Power Trains, 7th ed. John Deere Publishing, 2001, ISBN: 0866933245
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

**ORIGINATOR:** James Cargill

**CO-CONTRIBUTOR(S)**

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