

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

SECTION I**SUBJECT AREA AND COURSE NUMBER:** Diesel Technology 155**COURSE TITLE:** Air Brake Systems**Units: 3**
Grade Only**CATALOG COURSE DESCRIPTION:**

Students learn principles and practices of the operation and servicing of heavy duty transportation and equipment air brake systems. Topics include S-cam brakes, wedge brakes, disc brakes, air compressors, air reservoir systems, piping, control valves, switches, and actuators used in heavy duty transportation and equipment air systems.

REQUISITES:

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

Limitation on Enrollment:

This course is not open to students with previous credit for DIES 140 or 214

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. Explain safe handling of air system components and special tools
2. Properly use common terms and demonstrate familiarity with federal safety regulations as they relate to air brake systems
3. Demonstrate safe handling of wheel end components and proper adjustment of wheel bearings
4. Compare and contrast cam, wedge, and disc brake operation
5. Recognize the common classifications of brake friction materials
6. Identify common brake hardware
7. Identify the three major types of air compressors used in air brake systems
8. Describe the operation of air compressor unloaders and governors
9. Diagnose and formulate a repair plan for common air compressor system faults
10. Describe the air brake systems used on trucks and equipment
11. Identify common problems and describe the proper repair procedures in air system controls, piping, and valves.

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.
- II. Introduction to foundation brakes
 - A. Terms and regulations
 - B. Component safety
 - C. Wheels, tires, and wheel bearings
 - D. Brake hardware
 - E. Cam brakes
 - F. Wedge brakes
 - G. Disc brakes
 - H. Friction materials
 - I. Diagnosis and repair.
- III. Air compressor operation and controls
 - A. Bendix-Westinghouse compressors
 - B. Cummins engine air compressors
 - C. Midland air compressors
 - D. Air compressor unloaders and governors
 - E. Diagnosis and repair.
- IV. Truck and equipment air systems
 - A. Air reservoir system
 - B. Air system piping
 - C. Air system controls and valves
 - D. Diagnosis and repair.

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 air brake system components
- III. 3. Formulating repair plans for air brake system components
- IV. 4. Calculating and solving mathematical problems
- V. 5. Evaluating the serviceability of an anti-lock air brake system.

D. Appropriate Outside Assignments:

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

- I. 1. Conducting research
- II. 2. Completing all reading and writing assignments, including a shop notebook and composing a brake system component evaluation report
- III. 3. Completing field assignments/projects.

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 an air brake system inspection report
- III. 3. Responding to short essay questions about related topics such as the operation, assembly/disassembly, and/or repair of heavy air brake systems.

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 an air brake system serviceability report
- 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 Discussion
- * Computer Assisted Instruction
- * Laboratory
- * Discussion Seminar
- * Lecture-Lab Combination
- * Learning Modules
- * Audio-Visual
- * Collaborative Learning
- * Shadowing
- * Other (Specify)
- * Lecture
- * A. Demonstration
- * B. Field trips and/or field assignments.

4. REQUIRED TEXTS AND SUPPLIES:

Textbooks may include, but are not limited to:

TEXTBOOKS:

- 1. Brady, Robert N.. Heavy Duty Trucks: Power Trains and Suspension Systems, 1 ed. Prentice-Hall, 1998, ISBN: 0835952320
- 2. Lewis, Jim. DIES-M Daily Reports, 2 ed. Miramar Reprographics, 1976,
- 3. ROCKWELL. ANTI-LOCK BRAKING SYSTEM TRAINING PROGRAM, 1 ed. ROCKWELL WABCO,

MANUALS:

PERIODICALS:

SOFTWARE:

SUPPLIES:

1. Shop notebook (8 1/2 x 11" spiral bound)
2. Safety glasses
3. Calculator
4. Appropriate clothing and footwear for shop work
5. Scantron answer sheets

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