

# DIESEL MECHANICS (DEM)

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## DEM 111 Shop Skills & Safety Fundament (1)

The focus of this course is the ability to safely work with shop equipment commonly found in a diesel servicing and repair facility. Emphasis is using, maintain and servicing shop equipment such as hoists, lifts, safety stands, cranes, presses and grinders. The location and usage of personal protective equipment (PPE) and of common hand tools is included.

## DEM 113 Electrical/Electronic Systems (5)

Systems studies the principles of electricity through operations and testing procedures and provides an introduction to electronics. Diagnostics and repair of starting and charging electrical systems are covered, in addition to practical applications of the principles of electricity. Electronic management programs are referenced and studied.

## DEM 116 Workplace Skills (1)

Overview and practice of general workplace skills including personal effectiveness, time management, teamwork, and critical thinking in the workplace. The course incorporates skill development in the following three units: overview of diesel technology, workplace communication and customer service, and job application.

## DEM 123 Hydraulics (5)

Principles of basic hydraulics, introduction to hydraulics systems: open center, closed center, and pressure and flow compensating type systems.

## DEM 134 Scanner Diagnostics (1)

Scanner Diagnostics focuses on the hands-on application of aftermarket diagnostic equipment and tools such as the Snap-on Pro-link and Modis as well as OEM systems utilized by Cummins, CASE and others.

## DEM 138 Suspension and Steering (3)

Suspension and Steering addresses the theory, operations and troubleshooting of various steering and suspension system components.

## DEM 142 Welding for Diesel (3)

Introduction to basic concepts of general welding; hands-on lab activities to apply knowledge and develop skills in the following areas: shop safety, cutting (oxy/acetylene) SMAW (Shielded Metal Arc Welding).

## DEM 143 Brakes (3)

Brakes will cover the theory and operations of hydraulic and air brake systems, teaching troubleshooting, disassembly, inspection and adjustments of hydraulic and air brake systems, including ABS.

## DEM 144 Brakes for Construction (2)

Brakes will cover the theory and operations of hydraulic and air brake systems, teaching troubleshooting, disassembly, inspection and adjustments of hydraulic and air brake systems, including ABS. Common braking system utilized on construction equipment are highlighted.

## DEM 148 Advncd Electr/Electrnc Systms (5)

Construction machine electrical schematic reading, troubleshooting, diagnosis, and repair of monitoring systems, instrumentation, and other specialized electronic and computer-controlled equipment on CASE Construction machinery and heavy equipment. Students will determine proper use of wiring schematics to troubleshoot electrical systems on light through heavy vehicles.

## DEM 150 EST Diagnostics (1)

The CASE EST (Electronics Scan Tool) Diagnostics course on the hands-on application of CASE and aftermarket diagnostic equipment and tools such as the Snap-on Pro-link and Modis as well as OEM systems utilized by Cummins, CASE and others.

## DEM 204 Advanced Machine Electrical (4)

Knowledge and skills learned in DEM113 are the foundation for the study of CASE Construction equipment electrical systems such as monitoring systems, instrumentation, lighting and other specialized electronic and computer-controlled systems. Troubleshooting, diagnosis, and repair of these systems is performed utilizing electrical testers, meters, and scan tools such as the CASE EST (Electronic Service Tool). The use of wiring schematics and repair manuals in the diagnosis process is emphasized. Prerequisite: DEM113 Electrical Electronics Systems

## DEM 221 Drive Trains (3)

The Drive Trains 1 course will include classroom and/or shop exercises in: characteristics and principles of power trains units. Specific topics include introduction to diesel drive trains, drive shafts, power take-offs, and standard transmissions. Also the procedures in disassembly, wear analysis, and failure analysis. Instruction will be included in these types of transmissions and differentials: Mack, Rockwell Eaton and Dana Spicer. Students will be expected to observe and comply with all safety rules and regulations.

## DEM 224 Advanced Hydraulic Systems (3)

Knowledge and skills learned in DEM123 are the foundation for the study of the hydraulic and hydrostatic systems used on CASE construction equipment. Diagnosing and testing to solve system problems; interpretation of fluid hydraulic schematic and diagrams; and electronic and computer-controlled systems are all covered. Prerequisite DEM123 Hydraulics

## DEM 231 Diesel Engines I (5)

Diesel Engines I introduces the theory of operation and the use of the engine's mechanical components; disassembling, inspecting, measuring, reassembling and performing maintenance procedures on diesel engines.

## DEM 241 Advanced Diesel Engines (5)

Advanced Diesel Engines course will include classroom and/or shop exercises: basic principles of the various engine systems, the disassembly and inspection, reconditioning of component parts to include various fuel systems. In addition, engine diagnosis and maintenance will be discussed and performed in various engine systems. Students will be expected to observe and comply with all safety rules.

## DEM 244 Heavy Equipment Operation (2)

Operation and operator-level service and inspection of typical heavy construction equipment such as bulldozers, backhoes, loaders, track hoes, uni-loaders, and off road trucks. Pre-operation inspections, setup, and operational field testing of new and used construction equipment.

## DEM 248 Drive Trains II (3)

Drive Trains II builds on the knowledge, skills and abilities obtained in DEM221. Systems utilized in light, medium and heavy truck drive trains including: automatic transmissions, drive axles, procedures in disassembly/assembly, wear analysis, and failure analysis in drive trains, pressure and flow testing of drive train systems, timing of drive train systems, and theory and operation of final drives and shuttles are included. Prerequisite: DEM221 Drive Trains

## DEM 250 Engine Performance (2)

Engine Performance covers the engine control and emission control systems such as fuel injection, air induction, exhaust, exhaust gas treatments\filters utilized on light, medium and heavy diesel trucks. Students are introduced to diagnostic equipment and tools such as the Snap-on Pro-link and Modis as well as OEM systems utilized by Cummins, CASE and others.

**DEM 252 Power Trains for Construction (3)**

Drive trains and components of construction equipment, clutch systems, transaxles, differentials, axles; emphasis on disassembly, reassembly and component identification; pressure and flow testing of powertrains used in construction equipment; calibrations of transmissions, theory and operations of final drives and shuttles. Emphasis: Understanding of operation of mechanical, power shift, power shuttle, S type power shift, and hydrostatic transmissions to include tracking and adjustments.

**DEM 265 Diesel Internship I (3)**

Students will apply for and secure an internship or other work-based learning experience in the diesel industry. The student will work under the guidance of an assigned industry mentor at their internship location. Instructor may specify areas of specific need based on students needs and previous performance within the diesel department. Prerequisites: Instructor approval.

**DEM 268 Aux Power Units/Refrigeration (2)**

The function and purpose of Auxiliary Power Units (APUs) that power system when the primary engine is not in use, such as refrigeration units on tractor-trailers, are covered. This course includes basic air conditioning service, diagnostic, and repair on applications used in the diesel field and Section 509 Refrigeration certification by the Mobile Air Condition Society (MACS).

**DEM 274 Diesel Preventative Maintenanc (3)**

This course is designed to prepare students for entry-level jobs as a preventative maintenance diesel mechanic. Preventative maintenance diesel mechanics perform inspections and maintenance on diesel vehicles and equipment doing minor repairs and keeping maintenance records. The course series covers all the basic systems of a vehicle or equipment with an emphasis on preventative maintenance procedures and shop safety.

**DEM 275 Diesel Internship II (3)**

Students will apply for and secure an internship or other work-based learning experience in the diesel industry. The student will work under the guidance of an assigned industry mentor at their internship location. Instructor may specify areas of specific need based on students needs and previous performance within the diesel department. Diesel Internship II is a continuation of Diesel Internship I for those students wishing to continue the internship. Prerequisites: Instructor permission and DEM 265 Diesel Internship I.