

Diesel

- DIES 107 Engine Principles I 3 credits**
This course is designed to familiarize the students with the fundamental physical principles and relationships which apply to reciprocating internal combustion engines. Topics include the operational theory of internal combustion engines, combustion and heat, fuel consumption and power, scavenging, and supercharging. The hands-on servicing of complete engines involves disassembly, precision measuring, and reassembly of an engine in the laboratory. Two lecture and two laboratory hours per week.
- DIES 108 Electrical Systems 3 credits**
The student develops understanding of electrical knowledge as a foundation for future level advancement. The course gives the student the background and working knowledge of electrical theory required to test and service the electrical system of a diesel-powered piece of equipment. Repair and troubleshooting procedures consisting of removal, disassembly, inspection, repair, and reassembly of electrical components are designed to prepare students for entry into the job market equipped with both the knowledge and skills needed for satisfactory performance on the job. Safety in all areas is constantly stressed as well as the development of correct work habits, attitudes, and interest for each student. Two lecture and two laboratory hours per week.
- DIES 122 Fuel Systems 3 credits**
This course is designed to give the student the background and working knowledge of modern diesel fuel injection systems and their components, which are a necessary part of the diesel internal combustion engine. Topics include the operation of instruments, computer diagnostic and calibration programs and special tools required to test current production fuel systems on modern diesel engines. Two lecture and two laboratory hours per week.
Prerequisite: DIES 124 Truck Components II.
- DIES 123 Truck Components I 3 credits**
This course introduces the student to a number of specialized areas that a diesel technician will encounter. Through classroom lecture and lab application, the student learns maintenance and repair procedures for heavy-duty truck components. Specialized areas of study include braking, steering, suspension, and basic drivelines. The lab provides practical experience in troubleshooting and maintenance of these components. Two lecture and two laboratory hours per week.
- DIES 124 Truck Components II 3 credits**
This course introduces a number of specialized areas that a diesel technician will encounter. The students build on the knowledge which they received in DIES 123 Truck Components I. The more complex components discussed include ABS brakes, on-board computer systems, hydraulics, and transportation refrigeration. The lab provides practical experience in troubleshooting and maintenance of these components. Two lecture and two laboratory hours per week.
Prerequisite: DIES 123 Truck Components I.
- DIES 133 Governing and Computer Control Systems 3 credits**
This course is a study in the theory and operating characteristics of various types of governing and computer control systems as applied to the diesel engine. The study of the governing system includes functions of the system and detailed analysis of the mechanical, pneumatic, hydraulic, and electrical governors. The second major focus of this course is on the computer control system and its role in engine governing, emission control, and diagnostics. Through lab application, this course gives students the necessary skills used in solving problems in governing and computer control systems. Two lecture and two laboratory hours per week.
Prerequisite: DIES 222 Electronic Engine Diagnostics.
- DIES 134 Multi-Cylinder Overhaul 4 credits**
This course develops the student's understanding of various diesel engines by working with one manufacturer at a time, enabling the student to gain a clear understanding of a diesel engine's construction, operation, maintenance, and repair. Also covered are the troubleshooting and engineering designs that are integrated in the diesel engines of various manufacturers. The course provides a sound procedure in understanding the importance of the serial number of the engine, so the technician can obtain the information needed to correct any deficiency with a diesel engine. Two lecture and four laboratory hours per week.
Prerequisite: DIES 222 Electronic Engine Diagnostics.
- DIES 141 Fundamentals of Standby Power Generation 4 credits**
This course covers the fundamental operating principles of stationary and portable electric power generation equipment. Generator construction, operating principles, troubleshooting and proper installation procedures are covered in detail. Students work with current production automatic transfer switches and GENSETS from 2.8kW to 25kW developing an understanding of generator operation and proper testing procedures. Three lecture and two laboratory hours per week.
Prerequisite: DIES 123 Truck Components I.
- DIES 222 Electronic Engine Diagnostics 3 credits**
This course covers the introduction and uses of computer-based diagnostic applications. Students learn basic Windows and then learn engine-specific diagnostic applications that are used in the calibration and repair of today's electronic diesel engines. Students learn to open and create new job orders using engine software applications. Students learn how to diagnose engine faults

using diagnostic programs and follow appropriate troubleshooting procedures. Electronic engine control module calibrations and customer-controlled parameters are covered in depth. The primary focus in this class is on the Cummins Insite and the Caterpillar ET diagnostic programs, although others are discussed. Two lecture and two laboratory hours per week.

Prerequisite: DIES 124 Truck Components II.

DIES 223 Natural Gas Engines 3 credits

This course covers the characteristics of compressed natural gas (CNG) and propane and how they are used as alternative power sources in internal combustion engines. Students learn the characteristics of alternative fuels, evaluate the storage and handling components of the alternative fuel system, and the safety procedures involved in working with these fuels. Students learn the theory behind the operation of gaseous fuel engines and are able to identify, service, and troubleshoot components unique to these engines. Primary focus is centered on the Cummins ISL-G and L10 G engines, although other manufacturers are discussed. Two lecture and two laboratory hours per week.

Prerequisite: DIES 123 Truck Components I.

DIES 226 Hydraulics 3 credits

This course provides the student with an in-depth study of open and closed hydraulic systems. Topics covered include a study of hydraulic fluids, graphic symbols and schematic Interpretation. An applied systems approach is used to discuss pumps, control valves, actuators, and other components. Two lecture and two laboratory hours per week.

Prerequisite: DIES 123 Truck Components I.

DIES 227 Advanced Hydraulic Systems 3 credits

This course is designed to build off of the fundamentals learned in the hydraulic systems class, which provides the student with an in-depth study of the various types of hydraulic pump controls, flow and horsepower regulation. Topics covered include; open and closed center hydraulic systems, pressure compensation, load-sensing pressure-compensation, flow sharing/ downstream compensation, positive and negative flow controls, flow summation and hydrostatic drives. Two lecture hours and two laboratory hours each week.

Prerequisites: DIES 226 Hydraulic Systems.

DIES 230 Power Train Systems I 3 credits

This course provides the student with an in-depth study of heavy equipment power trains and supporting systems. Topics include heavy equipment operation and safety, belt and chain drive systems, manual transmissions, planetary and gearing theory, differentials, final drive units, hydraulic steering, and braking systems. An applied approach is used in comprehension of system functions and diagnostics. Two lecture and two laboratory hours per week.

DIES 231 Power Train Systems II 3 credits

This course is the continuation of Power Train Systems 1, which provides the student with an in-depth study of heavy equipment power trains and supporting systems. Topics covered include: the operating platform and HVAC, powershift and automatic transmission theory, hydrodynamic drives, undercarriages, track and wheeled steering systems and hybrid electric drives. An applied approach is used in comprehension of system functions and diagnostics. Two lecture hours and two laboratories. hours each week.

Prerequisites: DIES 230 Power Train Systems 1.

DIES 401 Diesel Internship 3 credits

This course offers students an opportunity for structured, paid, or unpaid work experience, which allows students to apply the theory of classroom experience to practical applications in their technical fields of concentration. In addition, a biweekly seminar gives students the opportunity to discuss their job and their employers' evaluations of their work performance in their weekly academic assignments.

Prerequisite: open to students enrolled in the Diesel Technology program; or departmental approval.