

DIESEL & HEAVY EQUIPMENT TECHNICIAN



PROGRAM OUTCOMES

Employers will expect you, as a Diesel & Heavy Equipment Technician graduate, to be able to:

- Practice safe working procedures
- Diagnose, service and repair diesel powered equipment
- Comply with federal, state and local regulations
- Proficiently operate tools and equipment common to the industry
- Diagnose, service and repair electrical systems
- Apply theoretical concepts to mechanical, electrical and hydraulic repair

CAREER OPTIONS

Agricultural Machinery Technician
Auto Technician
Chassis Repair Technician
Construction and Heavy
Equipment Technician
Diesel or Heavy Equipment Technician
Engine Repair Technician
Fleet Maintenance Technician
Heavy Equipment Parts Salesperson
Industrial Equipment Technician

Program Code 32-412-1

Expected Program Costs: \$10,400

Median Annual Salary: \$32,000

OVERVIEW

The Diesel & Heavy Equipment Technician program helps you develop the skills you need to be successful in the on- and off-road service industry. Learn to locate and repair mechanical and electrical problems in trucks, buses, construction equipment, farm equipment and industrial machinery.

Training emphasis is in diesel engine rebuilding, fuel injection systems, chassis and suspension systems, brakes and electrical systems. You will learn to perform preventive maintenance and troubleshooting procedures, to rebuild components and to respond to field service calls.

The Diesel & Heavy Equipment Technician program is offered at the Wisconsin Rapids campus.

POTENTIAL FOR ADVANCEMENT

Diesel Equipment Superintendent
Equipment Sales and Repair
Field Service Representative
Sales Representative
Shop Supervisor
Specialist-Electrical and Hydraulic
Specialist-Engines, Transmissions-
Differentials, Brakes-Alignment
Truck/Auto Dealer
Truck Fleet Supervisor

Potential advancement generally requires further education.

ADMISSIONS PROCEDURES

To apply to the Diesel & Heavy Equipment Technician program, please submit the following documents to the MSTC Admissions Office:

1. Complete an MSTC application form and return it with the \$30 non-refundable application fee.
2. Complete the Accuplacer or ACT test. Minimum scores required:
 - Reading-Accuplacer score of 55
 - Sentence Skills-Accuplacer score of 60
 - Math-Accuplacer score of 34
 - ACT equivalents for above scores are acceptable.

If a student does not meet the required test scores, they may retest or complete an identified structured course(s) in the Academic Support Center.

- Written Communication, courses in mathematics and some science courses have placement requirements. Please refer to the course description section in the back of the catalog, listed under General Education, for course specific information.
3. Submit an official copy of all academic transcripts, including high school, college or university and HSED/GED.

**Mid-State Technical College
Admissions
500 32nd Street North
Wisconsin Rapids, WI 54494**

Protective Clothing

Students are required to wear coveralls while working in the Diesel shop. Coveralls will be provided and there will be a \$30 fee per semester to cover the cost of weekly laundering. Students are required to wear work boots or leather shoes with an oil-resistant sole while working in the shop.

PROGRAM COURSE DESCRIPTIONS

**10462114 // 3 credits
Metals & Machining**

A two-part class which introduces the basics of metal science and machine shop practice. Metallurgical concepts of steel and iron production, properties of metals, testing of metals, carbon and its role, heat-treating, steel designations, and cast iron and non-ferrous metals are introduced. Students will participate in lab exercises examining the properties of metal, an introduction to machine shop practices of safety, measurement, and machining through the use of hand tools, drilling machines, saws and engine lathes. Students will be introduced to those concepts by both classroom presentation and hands-on shop experiences.

**10462116 // 3 credits
Metal Fabrication**

An introduction to structural steel and plate fabrication, sheet metal fabrication and basic electric arc and oxyacetylene welding. Fabrication techniques, metal selection, layout, cutting, bending, drilling, threading, and joining will be presented. Information will be presented to the student followed by lab activities to provide a hands-on experience. The emphasis will be placed on developing an understanding of the tools, techniques, safe work habits, and the application of metal fabrication skills.

**10605108 // 2 credits
Intro to Electronics**

This course presents a survey of electricity and electronics which includes lab activities and is designed for persons wishing to learn some of the basics of electricity and electronics. It is an excellent refresher course to get back into electronics or improve a skills list. The course is intended for persons where electronics has become a part of their regular occupation and a need exists to identify various electronic components and perform basic tests using test equipment such as multimeters and oscilloscopes. The course covers concepts and applications of DC and AC electricity, semiconductor components, and digital devices using basic math skills.

**32404330 // 2 credits
Applied Fluid Power**

Covers basic principles and application of pumps, compressors, motors, valves, seals, packing, and conductors. Students learn the advantage of hydraulic and pneumatic systems, as well as the physical properties of liquids and air. The intent is to identify various parts of a circuit and to illustrate standard liquid power components through laboratory experiments.
Prerequisite: Admission to Automotive Technician 324042, Diesel & Heavy Equipment Technician 324121 or Machine Tool Technician 324201

**32404375 // 2 credits
Service Practices in Transportation Industry**

This course introduces the student to common tools, terminology and service practices in the transportation service field. Safety, environmental concerns and basic customer relations will also be covered. Service shop management practices and the use of automated work order, parts ordering and time management concepts are included.
Prerequisite: Admission to Automotive Technician 324042 or Diesel & Heavy Equipment Technician 324121 Programs

**32412303 // 3 credits
Heating / AC-Diesel**

This course introduces students to the theory and operation of the heating and air conditioning systems found in the transportation, farm, and heavy equipment industries. Students will learn how to inspect, diagnose, and repair heat and air conditioning systems found in their field. Students will have the opportunity to acquire their state of Wisconsin HVAC certification through a written test and hands on evaluation. This class offers experience in installation, operation, and repair of auxiliary power units found on today's modern trucks. Not only will students learn about heating and air conditioning for operator comfort, they will also have the opportunity to learn how to inspect, service, and repair refrigerated units found on today's semi trailers and shipping containers.
Prerequisite: Admission to Diesel & Heavy Equipment Technician Program 324121

| CURRICULUM | | |
|---|--|---------------------|
| Term | | (17 credits) |
| 10605108 | Intro to Electronics | 2 |
| 10804107 | College Mathematics | 3 |
| 32404375 | Service Practices in Transportation Industry | 2 |
| 32412308 | Braking Systems | 5 |
| 32412309 | Suspension & Steering Systems | 5 |
| Term | | (15 credits) |
| 10462114 | Metals & Machining | 3 |
| 32412305 | Preventive Maintenance-Diesel | 1 |
| 32412311 | Advanced Electricity-Diesel | 5 |
| 32412313 | Electrical Systems | 5 |
| 32412320 | Hybrid Systems-Diesel | 1 |
| Term | | (17 credits) |
| 10462116 | Metal Fabrication | 3 |
| 31809351 | Applied Human Relations | 2 |
| 32404330 | Applied Fluid Power | 2 |
| 32412310 | Engine Performance-Diesel | 5 |
| 32412327 | Fuel Systems & Emissions | 5 |
| Term | | (17 credits) |
| 31801351 | Occupational Communication | 2 |
| 32412303 | Heating/AC-Diesel | 3 |
| 32412312 | Drive Trains | 5 |
| 32412324 | Engine Repair | 5 |
| 32806351 | Applied Science | 2 |
| Total Credits 66 | | |
| Please Note: | | |
| <ul style="list-style-type: none"> The Diesel & Heavy Equipment Technician program has an August start date. We advise you to meet with an academic advisor or counselor to successfully plan your academic schedule. This curriculum sequence is only for student planning. Actual student schedules will vary depending on course availability. Degree completion time may vary based on student scheduling and course availability. For General Education course descriptions (800 level), see section marked under Course Descriptions. | | |

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32412305 // 1 credit

Preventive Maintenance-Diesel

This course will provide an introduction to vehicle preventive maintenance and inspection. The focus will be on maintaining and inspecting the engine system, cab and hood, electrical and electronics, and frame and chassis components. Students will learn how to properly service vehicle systems and perform a visual inspection of all vehicle components. Students will also learn how to properly document all maintenance and inspection findings.

32412308 // 5 credits

Braking Systems

Fundamentals of vehicle braking systems including drum and disc on hydraulic and air systems are studied. Power and anti-skid systems are included with emphasis on troubleshooting and component replacement and reconditioning.

Prerequisite: Admission to Diesel & Heavy Equipment Technician Program 324121

32412309 // 5 credits

Suspension & Steering Systems

Highlighted in this course will be an analysis of construction and working principles of chassis components. Included will be frames, suspension systems, steering gears and linkages, wheels and tires, and wheel alignment. Special attention will be given to products used in servicing chassis components.

Prerequisite: Admission to Diesel & Heavy Equipment Technician Program 324121

32412310 // 5 credits

Engine Performance-Diesel

This course will provide an introduction to ignition systems, fuel systems, air induction systems, exhaust systems, emission control systems, and engine electrical systems. Course emphasis will include the proper diagnosis and repair of system components as related to the truck, construction, and heavy equipment industry. A review of engine operation and related servicing will also be provided.

Prerequisite: Admission to Diesel & Heavy Equipment Technician Program 324121

32412311 // 5 credits

Advanced Electricity-Diesel

This course will provide advanced training in the theory, operating principles, diagnosis and repair of vehicle electronic/electrical systems. Emphasis will include vehicle ignition, starting, charging, and lighting system problem diagnosis and repair as related to the truck, construction, and heavy equipment industries.

Prerequisite: Admission to Diesel & Heavy Equipment Technician Program 324121

32412312 // 5 credits

Drive Trains

The course will provide training in the proper diagnosis and repair of clutches, manual transmissions, drive shafts and universal joints, and drive axles. Coverage of track-type vehicle service will also be included. Diagnostic and service procedures will apply to the truck, construction, and heavy equipment industries.

Prerequisite: Admission to Diesel & Heavy Equipment Technician Program 324121

32412313 // 5 credits

Electrical Systems

This is the study of construction, function, and principles of operation of starting motors, charging systems and controls. Basic electronics including capacitance, inductance, series and parallel circuits, magnetism and Ohm's Law, wiring schematics, soldering techniques, and use of diagnostic equipment are covered. Vehicle control and accessory systems will be studied.

Prerequisite: Admission to Diesel & Heavy Equipment Technician Program 324121

32412320 // 1 credit

Hybrid Systems-Diesel

This course covers basic vehicle propulsion systems within hybrid electric vehicle (HEV) context with a focus on application, integration, testing, and development of battery systems. Course topics include the following: Vehicle and powertrain systems requirements, regulations, design, energy storage, model based design, and control. HEV high voltage sub-systems are reviewed including electrical drive systems, electric machines, batteries, and their safety aspects.

32412324 // 5 credits

Engine Repair

This course will provide a general overview of engine types and operating characteristics. Course emphasis will include the diagnosis and repair of cylinder heads, valve train components, and engine blocks and related components. Engine support systems such as the lubrication systems, cooling system, ignition system, fuel and exhaust systems will also be covered.

Prerequisite: Admission to Diesel & Heavy Equipment Technician Program 324121

32412327 // 5 credits

Fuel Systems & Emissions

This course will provide a detailed coverage of the principles of operation, the components and diagnostic procedures for modern diesel engines. Emission control systems will be included. Course emphasis will include fuel injection and pump timing procedures.

Prerequisite: Admission to Diesel & Heavy Equipment Technician Program 324121