



# DIESEL & HEAVY EQUIPMENT TECHNICIAN

## Technical Diploma Program Code: 32-412-1 Total Credits: 58

Graduates of Mid-State's Diesel & Heavy Equipment Technician program have the knowledge and skills to confidently locate and repair mechanical and electrical problems in trucks, buses, construction equipment, farm equipment, and industrial machinery. Through hands-on classroom learning and training on state-of-the-art equipment, you will learn to perform preventive maintenance and troubleshooting procedures, rebuild components, and respond to field service calls. You'll also participate in field trips, tours, and equipment demonstrations, and you'll get real-world experience by maintaining Mid-State's vehicle fleet and operating onsite equipment.

**Estimated tuition and fees:** [mstc.edu/programcosts](http://mstc.edu/programcosts)

### ACADEMIC ADVISOR

To schedule an appointment with an academic advisor, call 715.422.5300. Academic advisors will travel to other campuses as necessary to accommodate student needs. For more information about advising, visit [mstc.edu/advising](http://mstc.edu/advising).

### NEW STUDENT CHECKLIST

Complete the following steps to prepare for your New Student Advising appointment with your academic advisor:

- ☐ Submit a Mid-State application at [mstc.edu/apply](http://mstc.edu/apply).
- ☐ Send official transcripts to:  
Mid-State Technical College  
Student Services  
1001 Centerpoint Drive  
Stevens Point, WI 54481
- ☐ Complete the Free Application for Federal Student Aid (FAFSA) at [fafsa.gov](http://fafsa.gov). Mid-State's Financial Aid team is available to assist with your FAFSA application and to answer your financial aid questions. Contact Financial Aid or schedule an appointment at [mstc.edu/financial-aid](http://mstc.edu/financial-aid).
- ☐ Set up student MyCampus account at [mstc.edu/mycampus-assistance](http://mstc.edu/mycampus-assistance).
- ☐ Schedule a New Student Advising appointment at [mstc.edu/advising](http://mstc.edu/advising).



[mstc.edu](http://mstc.edu) • 888.575.6782 • TTY: 711



**ADAMS CAMPUS**  
401 North Main  
Adams, WI 53910

**MARSHFIELD CAMPUS**  
2600 West 5th Street  
Marshfield, WI 54449

**STEVENS POINT  
DOWNTOWN CAMPUS**  
1001 Centerpoint Drive  
Stevens Point, WI 54481

**WISCONSIN RAPIDS CAMPUS**  
500 32nd Street North  
Wisconsin Rapids, WI 54494

# CAREER PATHWAY • BEGIN AT ANY POINT



## CREDIT FOR PRIOR LEARNING AND EXPERIENCE

### CREDIT FOR PRIOR LEARNING AND EXPERIENCE

- Certifications and Licenses
- High School Credit
- Military Experience
- National/Standardized Exams
- Transfer Credit
- Work and Life Experience

Learn about Credit for Prior Learning at [mstc.edu/cpl](https://mstc.edu/cpl).

## TECHNICAL DIPLOMA

### DIESEL & HEAVY EQUIPMENT TECHNICIAN ASSISTANT

Technical Diploma • 29 Credits

#### Start Your Career

- Light Maintenance Technician
- Parts Associate
- Undercarriage Technician

### DIESEL & HEAVY EQUIPMENT TECHNICIAN

Technical Diploma • 58 Credits

#### Start Your Career

- Bus and Truck Technician
- Heavy Equipment Technician
- Fleet Maintenance Technician

## BACHELOR'S DEGREE

### BACHELOR'S DEGREE OPTIONS

For those interested in continuing their education, Mid-State offers transfer agreements with various four-year colleges and universities. For more information and additional opportunities, visit [mstc.edu/transfer](https://mstc.edu/transfer).

## OTHER OPTIONS

### RELATED PROGRAMS

- Automotive Maintenance Technician
- Automotive Technician

OUTCOMES

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

- Diagnose major systems in the diesel and heavy equipment industry.
- Repair major systems in the diesel and heavy equipment industry.
- Service major systems in the diesel and heavy equipment industry.
- Practice personal and professional work habits.
- Document complaint, cause, and correction.

TECHNICAL SKILLS ATTAINMENT

The Wisconsin Technical College System (WTCS) has implemented a requirement that all technical colleges measure outcomes attained by students. This requirement is called Technical Skills Attainment (TSA). The main objective of TSA is to ensure graduates have the technical skills needed by employers. Students are notified of TSA reporting in the Capstone-Live Diesel Repair course.

This program meets the requirements for Master Truck Service Technology Accreditation, the highest level of program accreditation recognized by the National Institute for Automotive Service Excellence (ASE).

NOTES:

PROTECTIVE CLOTHING


Students are required to wear school uniform shirts while working in the diesel shop. Uniform shirts can be purchased from the Wisconsin Rapids campus Bookstore. Students are also required to provide and wear leather work shoes with oil-resistant soles.

STUDENT HANDBOOK

Visit [mstc.edu/studenthandbook](http://mstc.edu/studenthandbook) to view Mid-State’s student handbook, which contains information about admissions, enrollment, appeals processes, services for people with disabilities, financial aid, graduation, privacy, Mid-State’s Student Code of Conduct, and technology.

GRADUATION REQUIREMENT

The GPS for Student Success course is required for all Mid-State program students and is recommended to be completed before obtaining 12 credits. (Not counted in the total credit value for this program.) Some students are exempt from this requirement. Please see your program advisor for more information.

**GPS for Student Success**  **10890102 ..... 1 credit**  
Integrate necessary skills for student success by developing an academic plan, identifying interpersonal attributes for success, adopting efficient and effective learning strategies, and utilizing Mid-State resources, policies, and processes. This course is recommended to be completed prior to obtaining 12 credits and is a graduation requirement unless you receive an exemption from your program advisor.




ADDITIONAL COURSES AS NEEDED


The following courses may be recommended or required if the student does not achieve minimum Accuplacer scores.


**College Reading and Writing 1**  
**10831104 ..... 3 credits**  
Provides learners with opportunities to develop and expand reading and writing skills to prepare for college-level academic work. Students will employ critical reading strategies to improve comprehension, analysis, and retention of texts. Students will apply the writing process to produce well-developed, coherent, and unified written work.

**Pre-Algebra**  
**10834109 ..... 3 credits**  
Provides an introduction to algebra. Includes operations on real numbers, solving linear equations, percent and proportion, and an introduction to polynomials and statistics. Prepares students for elementary algebra and subsequent algebra-related courses.

## SAMPLE FULL-TIME CURRICULUM OPTION


| Term     |  | 15 credits |
|----------|--|------------|
| 10457119 | Fabrication Fundamentals 1   | 1          |
| 31442320 | Welding Foundations 1                         | 1          |
| 31442321 | Welding Foundations 2  | 1          |
| 32412340 | Intro to Electricity for the Diesel Industry  | 1          |
| 32412308 | Braking Systems-Diesel   | 5          |
| 32412309 | Suspension & Steering Systems  | 5          |
| 32412375 | Service Practices in Diesel Industry          | 1          |

| Term     |   | 14 credits |
|----------|---|------------|
| 31801368 | Workplace Communication  | 1          |
| 32412305 | Preventive Maintenance-Diesel   | 3          |
| 32412312 | Drivetrains   | 4          |
| 32412313 | Electrical Systems  | 4          |
| 32462302 | Mobile Hydraulics   | 2          |

| Term     |   | 15 credits |
|----------|---|------------|
| 31804305 | Applied Mathematics   | 2          |
| 32412303 | Heating/AC-Diesel  | 3          |
| 32412324 | Engine Repair   | 5          |
| 32412327 | Fuel Systems & Alternative Fuels  | 5          |

| Term     |                                       | 14 credits |
|----------|---------------------------------------|------------|
| 32412310 | Engine Performance & Emissions-Diesel | 5          |
| 32412311 | Advanced Electricity-Diesel           | 5          |
| 32412330 | Capstone-Live Diesel Repair           | 2          |
| 32806351 | Applied Science                       | 2          |





**Total credits 58**


 This course has options available to receive credit for prior learning (CPL) or work experience. Visit the website at [mstc.edu/cpl](http://mstc.edu/cpl) or contact your advisor for details.

Please Note:

- This curriculum sequence is only for student planning. Actual student schedules will vary depending on course availability.
- Program completion time may vary based on student scheduling and course availability. For details, go to [mstc.edu/schedule](http://mstc.edu/schedule).


## SAMPLE PART-TIME CURRICULUM OPTION

| Term     |  | 15 credit |
|----------|--|-----------|
| 10457119 | Fabrication Fundamentals 1                    | 1         |
| 31442320 | Welding Foundations 1                         | 1         |
| 31442321 | Welding Foundations 2  | 1         |
| 32412308 | Braking Systems-Diesel   | 5         |
| 32412309 | Suspension & Steering Systems  | 5         |
| 32412340 | Intro to Electricity for the Diesel Industry  | 1         |
| 32412375 | Service Practices in Diesel Industry          | 1         |

| Term     |   | 14 credits |
|----------|---|------------|
| 31801368 | Workplace Communication  | 1          |
| 32412305 | Preventive Maintenance-Diesel   | 3          |
| 32412312 | Drivetrains   | 4          |
| 32412313 | Electrical Systems  | 4          |
| 32462302 | Mobile Hydraulics   | 2          |

| Term     |                                  | 10 credits |
|----------|----------------------------------|------------|
| 32412324 | Engine Repair                    | 5          |
| 32412327 | Fuel Systems & Alternative Fuels | 5          |

| Term     |                                       | 10 credits |
|----------|---------------------------------------|------------|
| 32412310 | Engine Performance & Emissions-Diesel | 5          |
| 32412311 | Advanced Electricity-Diesel           | 5          |

| Term     |   | 5 credits |
|----------|---|-----------|
| 31804305 | Applied Mathematics   | 2         |
| 32412303 | Heating/AC-Diesel  | 3         |

| Term     |                             | 4 credits |
|----------|-----------------------------|-----------|
| 32412330 | Capstone-Live Diesel Repair | 2         |
| 32806351 | Applied Science             | 2         |

**Total credits 58**

### MULTIPLE MEASURES

**Multiple Measures Writing (MMW):** High school GPA of 2.6 and successful completion of 2.0 credits of high school writing courses with a "C" or better

**Multiple Measures Math 1 (MMM\_1):** High school GPA of 2.6 and successful completion of 1.0 credits of high school math (Algebra 1 or equivalent) with a "C" or better

**Multiple Measures Science 1 (MMS\_1):** High school GPA of 2.6 and successful completion of 1.0 credits of high school lab science course with a "C" or better

**Multiple Measures Reading (MMR):** High school GPA of 2.6 and successful completion of 2.0 credits of high school literature courses with a "C" or better

**Multiple Measures Math 2 (MMM\_2):** High school GPA of 2.6 and successful completion of 2.0 credits of high school math including Algebra 1 and Algebra 2 with a "C" or better

**Multiple Measures Science 2 (MMS\_2):** High school GPA of 2.6 and successful completion of 1.0 credits of high school chemistry with a "C" or better

*Past high school and college transcripts are used in making course placement decisions.*

# COURSE DESCRIPTIONS

## Advanced Electricity-Diesel

### **32412311 .....5 credits**

Learner receives advanced training in the theory, operating principles, and diagnosis and repair of vehicle electronic/electrical systems. Emphasis on diagnosis and repair of vehicle ignition, starting, charging, lighting, and electronic powertrain systems as related to the transportation, agriculture, and heavy equipment industry.

*Prerequisites: Engine Repair 32412324 and Fuel Systems & Alternative Fuels 32412327*

## Applied Mathematics

### **31804305 .....2 credits**

Students taking Applied Mathematics make and convert various measurements. Students use formulas to solve problems. They compute dimensions of geometric shapes. Students use statistical tools to represent and analyze data. They analyze various financial situations. Students use basic right triangle trigonometry to solve problems. In each topic area, students solve application problems.

## Applied Science

### **32806351 .....2 credits**

This survey course in basic physics is designed for students in the Automotive Technician, Diesel & Heavy Equipment Technician, and Precision Machining Technician programs. Topics have been specially selected to provide students with basic support material for principles applied in the above listed programs. Topics to be covered include basic measurement skills; problem solving; motion; forces and energy transfer in linear and rotary systems; properties of solids, liquids and gases; temperature and heat; and basic DC electricity.

## Braking Systems-Diesel

### **32412308 .....5 credits**

Learners employ fundamentals of vehicle braking systems, including drum, disc, hydraulic, and air systems to perform on vehicle diagnosis and repairs. Includes power and anti-skid systems, with emphasis on troubleshooting and component replacement.

## Capstone-Live Diesel Repair

### **32412330 .....2 credits**

Learners have the opportunity to work on "live" diagnostic and repair projects and have their knowledge and skills assessed across a wide spectrum of projects provided by business and industry. Work orders, troubleshooting, parts ordering, installation, and quality checks are all elements included to provide real-life experiences as students prepare to begin their diesel and heavy equipment career.

*Prerequisites: Engine Repair 32412324 and Fuel Systems & Alternative Fuels 32412327; Corequisites: Engine Performance & Emissions-Diesel 32412310 and Advanced Electricity-Diesel 32412311*

## Drivetrains

### **32412312 .....4 credits**

Learners practice on-vehicle diagnosis and repair of clutches, manual transmissions, drive shafts and universal joints, and drive axles. Provides general overview of the most common transmissions and drive train components used in industry. The diagnostic and service procedures studied apply to the truck, construction, and heavy equipment industries.

*Prerequisites: Suspension & Steering Systems 32412309 and Braking Systems-Diesel 32412308.*

## Electrical Systems

### **32412313 .....4 credits**

Learners employ principles of construction, function, and operation of batteries, starting systems, charging systems, and controls. Incorporates basic electronics, including series and parallel circuits, magnetism and Ohm's Law, wiring schematics, soldering techniques, and use of diagnostic equipment.

*Prerequisite: Intro to Electricity for the Diesel Industry 32412340*

## Engine Performance & Emissions-Diesel

### **32412310 .....5 credits**

Learners employ principles of construction, function, and operation of ignition systems, fuel systems, air induction systems, exhaust systems, emission control systems. Emphasizes the proper diagnosis, repair, and tune-up of system components as related to the transportation, agriculture, and heavy equipment industry.

*Prerequisites: Engine Repair 32412324 and Fuel Systems & Alternative Fuels 32412327*

## Engine Repair

### **32412324 .....5 credits**

Learners disassemble, measure, and inspect all mechanical components of a diesel engine. This course emphasizes the diagnosis and repair of cylinder heads, valve train, cylinder Components, engine blocks, and related hardware. Also covers engine support systems, such as lubrication and cooling.

## Fabrication Fundamentals 1

### **10457119 .....1 credit**

An introduction to structural shapes and sheet metal fabrication. Presents fabrication techniques, metal selection, and layout, cutting, bending, drilling, threading, and joining using manual equipment and techniques. Information is presented to the student and followed up with lab activities to provide a hands-on experience. Emphasizes developing an understanding of the tools, techniques, safe work habits, and application of sheet metal fabrication skills.

## Fuel Systems & Alternative Fuels

### **32412327 .....5 credits**

Learners employ principles of construction, function, and operation of low pressure fuel systems, governors, mechanical distributor pumps, multiple plunger pumps, electronic unit injectors, hydraulic actuated electronic unit injectors, and common rail fuel systems. This course emphasizes diagnosis and repair of mechanical, hydraulic, and common rail fuel systems.

# COURSE DESCRIPTIONS

## Heating/AC-Diesel ☑

**32412303 .....3 credits**

Introduces the learner to the theory and operation of the heating and air conditioning systems found in transportation, farm, and heavy equipment industries. Focuses on the inspection, diagnoses, and repair of heating and air conditioning systems found in the diesel field. Learners have the opportunity to acquire their EPA 608 and 609 Certification. Offers experience in installation, operation, and repair of auxiliary power units along with refrigeration units.

## Intro to Electricity for the Diesel Industry ☑

**32412340 .....1 credit**

Introduces learners to electrical measurement tools and techniques. Includes both hands-on experience and theory on topics including multimeter operation, Ohm's law, wiring diagram interpretation, and circuit testing. Content is focused on tools and procedures commonly used in automotive, and diesel/heavy equipment industries. Learners will have the opportunity to earn NC3 multimeter certification during this course.

## Mobile Hydraulics

**32462302 .....2 credits**

Learners employ basic principles and application of pumps, compressors, motors, valves, actuators, and conductors to demonstrate the understanding of hydraulic systems as well as the physical properties of liquids. Learners will identify various parts of a circuit in order to perform light maintenance and troubleshooting in hydraulic systems used on heavy truck, earth-moving, or agricultural equipment.

## Preventive Maintenance-Diesel

**32412305 .....3 credits**

Introduces learner to vehicle preventive maintenance and inspection. Focuses on maintaining and inspecting the engine system, cab, electrical and electronics, and frame and chassis components with an emphasis on DOT inspections. Learners practice proper service on vehicle systems and perform a visual inspection of all vehicle components. Learners also practice how to properly document all maintenance and inspection findings.

*Prerequisites: Suspension & Steering Systems 32412309 and Braking Systems-Diesel 32412308.*

## Service Practices in Diesel Industry ☑

**32412375 .....1 credit**

Introduces the learner to common tools, terminology, and service practices in the transportation field. Covers safety, environmental concerns, and basic customer relations. Service shop management practices and the use of automated work order, parts ordering, and time management concepts are included.

## Suspension & Steering Systems

**32412309 .....5 credits**

Analyze the construction and working principles of chassis components to perform on vehicle repairs. Includes instruction on frames, suspension systems, steering gears and linkages, wheels and tires, and wheel alignment. Learners practice on-vehicle diagnosis and repair of suspension and steering systems.

## Welding Foundations 1 ☑

**31442320 .....1 credit**

An introduction to fundamental welding techniques with an emphasis on safe work habits that covers the processes of SMAW, GMAW, and OXY-Fuel cutting. Classroom instruction paired with lab activities are designed to provide fundamental skills in each of the welding processes covered in the class.

## Welding Foundations 2

**31442321 .....1 credit**

An introduction to fundamental welding techniques with an emphasis on safe work habits that covers the processes of GTAW, FCAW and Plasma cutting. Classroom instruction paired with lab activities are designed to provide fundamental skills in each of the welding processes covered in the class.

## Workplace Communication ☑

**31801368 .....1 credit**

Analyze workplace communication situations to develop professional verbal and written communication skills. Learners apply verbal and written communication skills, as well as conflict resolution strategies, to improve workplace communication climates and promote personal and professional growth.