AUTOMOTIVE SERVICE TECHNOLOGY

DIPLOMA – 60 CREDITS

About this program

The 60-credit diploma in Automotive Service Technology provides students with the essential skills and hands-on experience to excel in the fast-evolving automotive industry. Taught by industry experts, this program blends cutting-edge technology with real-world applications, preparing students for success in diagnosing, repairing and maintaining vehicles of all makes and models. The curriculum covers key areas, including engine performance, electrical systems, transmission repair, brake systems and diagnostic tools, ensuring students gain a comprehensive understanding of automotive service. Regularly reviewed by local and regional industry leaders, the program stays up to date with industry trends and technological advancements. Students benefit from practical, hands-on training in state-of-the-art labs, supported by instructors who are seasoned professionals with real-world expertise. With National Institute for Automotive Service Excellence (ASE) accreditation, this program is recognized for meeting the highest industry standards, enhancing employability and setting students up for career advancement in the automotive field.

Program outcomes

1. Exhibit safety precautions and professionalism. Maintain a clean and safe work environment following OSHA and manufacturer's guidelines.
2. Use computerized software programs to interpret, document and repair multiple vehicle platforms.
3. Perform diagnostic tests on vehicle operating systems. Follow and understand manufacturer flow charts and strategy-based diagnostics.
4. Perform vehicle repairs in accordance with manufacturer service guidelines, ensuring precision and adherence to industry standards.
5. Understand vehicle system designs and apply knowledge to repair and diagnose vehicles.
6. Handle customer needs, concerns and questions about repairs and service with professionalism and courtesy.

Curriculum overview

Crds	Requirement type
60	Required courses
60	**Total**

Developmental courses note: A student may be required to enroll in developmental courses in reading, writing and math. A student's scores on the Accuplacer assessment will determine enrollment in developmental courses. The purpose of developmental courses is to prepare students for the demands of a college-level curriculum. *Credits may vary.*

Accreditation: Minnesota State Community and Technical College is accredited by the Higher Learning Commission, a regional accreditation agency recognized by the U.S. Department of Education. The Higher Learning Commission 230 South LaSalle Street, Suite 7-500 Chicago, IL 60604-1411 http://www.ncahigherlearningcommission.org Phone: 312.263.0456 / 800.621.7440

Curriculum requirement details

Required courses

Course	Crds
AMST1101 - Automotive Equipment Fundamentals	2
AMST1102 - Alignment and Suspension	3
AMST1105 - Brakes	3
AMST1112 - Automotive Electrical Fundamentals	4
AMST1127 - Internal Combustion Engines	4
AMST1135 - Drivetrains	4
AMST2206 - Body Electrical and Mechanical	3
AMST2212 - Advanced Automotive Electrical Systems	3
AMST2219 - Electronic Powertrain Control I	3
AMST2221 - Electronic Powertrain Control II	4
AMST2222 - Light Duty Diesel	2
AMST2223 - Electronic Braking and Suspension Systems	4
AMST2236 - Automatic Transmissions	5
AMST2240 - Heating, Ventilation and Air Conditioning	3
COMM1130 - Small Group Communication	3
ECON1150 - Essentials of Economics	3
HYEV2605 - Hybrid Vehicle Technologies	2
HYEV2606 - Electric Platform Technologies	2
PSYC2800 - Psychology of Health and Resiliency	3

Other requirements or restricted electives

Course summaries

AMST1101 - Automotive Equipment Fundamentals ..... ***(2 credits)***
This course is designed to give students an understanding of an automotive shop environment. They will learn occupational safety, proper use of power and hand tools, shop equipment, fasteners, precision measuring instruments, electronic information, writing electronic repair orders and industry expectations.

AMST1102 - Alignment and Suspension ..... ***(3 credits)***
This course covers suspension and steering systems currently in use. Students learn suspension and steering designs and applications. The course covers vehicle alignments and alignment measurements, including: camber, caster, toe and advanced measurements.

Corequisites:

- AMST1101

AMST1105 - Brakes ..... ***(3 credits)***
This course covers the fundamental principles of disc and drum brakes, hydraulic systems, parking brakes and power assist units. Students learn about the operation, diagnosis and repair of various brake systems. Additionally, the course includes an introduction to electric brake control systems.

Corequisites:

- AMST1101

AMST1112 - Automotive Electrical Fundamentals ..... ***(4 credits)***
This course involves understanding Ohm's Law, multimeter usage, using electrical schematics, batteries, starting systems and charging systems. Students perform testing and repairs on electrical systems used in all aspects of vehicles.

Prerequisites:

- AMST1101

AMST1127 - Internal Combustion Engines ..... ***(4 credits)***
This course covers all aspects of internal combustion engines. Diagnosis, measurement and repair of engine cylinder head components, timing components and cylinder block components are thoroughly covered. Service information and vehicle research is performed to test and repair vehicles.

Prerequisites:

- AMST1101

AMST1135 - Drivetrains ..... ***(4 credits)***
This course goes over the theory and operation of manual transmissions, clutch systems and vehicle drive systems. Students learn how engine power is delivered through the transmission, transfer case, driveshaft and differentials. The course covers all-wheel and four-wheel drive systems and operation. Differential design and operation is explored in depth.

Prerequisites:

- AMST1101

AMST2206 - Body Electrical and Mechanical ..... ***(3 credits)***
This course teaches diagnosis and repair of interior and exterior lighting, safety devices, comfort systems, convenience accessories, door, window and seat control systems. Students understand, diagnose and repair vehicle security systems, remote functions and safety systems using service information and various scan tools. Students understand the processes for software transfers, updates and reprogramming of electrical modules.

Corequisites:

- TRNS1102

AMST2212 - Advanced Automotive Electrical Systems ..... ***(3 credits)***
This course covers the principles of networks and Binary Unit Systems (BUS). Students learn the use of an oscilloscope, the testing of high voltage systems, and high voltage safety.

AMST2219 - Electronic Powertrain Control I ..... ***(3 credits)***
This class covers engine control inputs and outputs, allowing students to evaluate sensor data and its relationship to engine performance. The course discusses various scan tools, including factory and aftermarket options. Students also learn to access service information and diagnose powertrain-related concerns.

Prerequisites:

- AMST1101

AMST2221 - Electronic Powertrain Control II ..... ***(4 credits)***
Fuel delivery, fuel injection and control, crankcase emissions, exhaust gas re-circulation, evaporative emissions and catalytic converters are covered in this course. Emphasis is on different monitors and on-board diagnostic strategies for fuel, ignition and emissions systems. The class covers powertrain diagnostics and root cause analysis.

AMST2222 - Light Duty Diesel ..... ***(2 credits)***
This course focuses on understanding light-duty diesel engines used in automotive applications. Students learn and adhere to safety precautions for diesel repairs. Additionally, they explore diesel engine control systems and examine the differences and similarities between gas and diesel engines.

Prerequisites:

- AMST1101

AMST2223 - Electronic Braking and Suspension Systems ..... ***(4 credits)***
This course covers electronic brake and suspension control systems. Students learn Antilock Braking System (ABS), electronic ride control, variable suspension control, electronic power steering and Advanced Driver Assistance Systems (ADAS) operation and uses.

Prerequisites:

- AMST1102
- AMST1105

AMST2236 - Automatic Transmissions ..... ***(5 credits)***
This course covers the principles of automatic transmissions, including power flow, hydraulic systems, Pascal's law and electronic controls. Students learn planetary gearing, clutch operation, band application, one-way clutching and power flow inside an automatic transmission. Students overhaul an automatic transmission, identify components, and assemble the transmission to be tested.

AMST2240 - Heating, Ventilation and Air Conditioning ..... ***(3 credits)***
This course covers the principles of heating, air conditioning and ventilation systems. Students research service information, including refrigerant/oil types, vehicle service history, service precautions and technical service bulletins. They learn to understand, diagnose and repair various types and designs of heating and air conditioning systems and refrigerants.

Corequisites:

- AMST1101
- AMST1111

COMM1130 - Small Group Communication ..... ***(3 credits)***
Meets MnTC Goal Areas 1 and 2. This course focuses on communication issues in small groups and the importance of small group work in business today. An emphasis will be placed on improving communication skills for successful teamwork, group cohesiveness and the responsibility to group goals and tasks. Students will be provided with opportunities to build their group communication skills through practice.

Prerequisites:

- Assessment into ENGL 1101

ECON1150 - Essentials of Economics ..... ***(3 credits)***
Meets MnTC Goal Areas 2 and 5. This course is an introductory study of economics and exposes the student to a variety of economic concepts. In order to enjoy a successful career, people need to understand how economics impacts the environment in which they live and work. This course helps satisfy those needs by exploring the principles of microeconomics, macroeconomics and international economics. At the microeconomic level, students will learn how the choices they make affect particular markets. They will examine resource allocation and pricing structure by analyzing demand and supply applications. Students will survey the competitive environment by exploring the market structures of perfect competition, monopolistic competition, monopoly and oligopoly. At the macroeconomic level, students will learn about the business cycle by analyzing the gross domestic product (GDP), the inflation rate, the unemployment rate, deficit spending, the national debt and other economic indicators. They will also investigate the debate over activism and non-activism in monetary and fiscal policies. Finally, the student will examine international issues including tariffs/quotas, foreign exchange, the concept of comparative advantage and trends in globalization. This course is not intended for business or economics majors.

HYEV2605 - Hybrid Vehicle Technologies ..... ***(2 credits)***
This course covers hybrid engines, high voltage safety, batteries and drive trains unique to the hybrid chassis. Regenerative braking is also covered, along with module communications classes necessary and unique to hybrid vehicles.

Prerequisites:

- AMST1101
- AMST1111

HYEV2606 - Electric Platform Technologies ..... ***(2 credits)***
This course focuses on electric plug-in platforms, batteries, electric drive motors and modules unique to plug-in vehicles. It also covers vehicle diagnostics, charging stations and charging diagnostics specific to this platform, as well as service and diagnosis.

Prerequisites:

- AMST1101
- AMST1112

PSYC2800 - Psychology of Health and Resiliency ..... ***(3 credits)***
Meets MnTC Goal Area 5. This course studies the interaction of psychology and health, including how to attain mental and physical health through thoughts, emotions and behavior. Students will explore concepts such as stress, resiliency, personality, happiness, purpose and work-life balance. This course is beneficial for students across career fields such as education, fire, health and law enforcement.

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DIPLOMA – 60 CREDITS

Program Plan — "Automotive Service Technology Diploma"

Locations: Moorhead

1st Fall Term (15 credits)

Courses

Course	Crds
AMST1101 - Automotive Equipment Fundamentals	2
AMST1102 - Alignment and Suspension	3
AMST1105 - Brakes	3
AMST1127 - Internal Combustion Engines	4
ECON1150 - Essentials of Economics	3

1st Spring Term (14 credits)

Courses

Course	Crds
AMST1112 - Automotive Electrical Fundamentals	4
AMST1135 - Drivetrains	4
AMST2206 - Body Electrical and Mechanical	3
COMM1130 - Small Group Communication	3

2nd Fall Term (18 credits)

Courses

Course	Crds
AMST2212 - Advanced Automotive Electrical Systems	3
AMST2219 - Electronic Powertrain Control I	3
AMST2223 - Electronic Braking and Suspension Systems	4
AMST2236 - Automatic Transmissions	5
PSYC2800 - Psychology of Health and Resiliency	3

2nd Spring Term (13 credits)

Courses

Course	Crds
AMST2221 - Electronic Powertrain Control II	4
AMST2222 - Light Duty Diesel	2
AMST2240 - Heating, Ventilation and Air Conditioning	3
HYEV2605 - Hybrid Vehicle Technologies	2
HYEV2606 - Electric Platform Technologies	2