AUTOMOTIVE SERVICE TECHNOLOGY

ASSOCIATE OF APPLIED SCIENCE (AAS) – 72 CREDITS

About this program

The automotive service technician works in an exciting and rapidly changing industry. Students in this program will receive training in the many service and diagnostic procedures necessary to maintain our nation on wheels. Students are trained in modern laboratories equipped with current service and testing equipment. Students in Automotive Service Technology have the option of choosing between diploma and AAS degree programs. Students entering this program should have good mechanical aptitude, good communication skills and the ability to read and comprehend service literature. Graduates of this program will have a variety of opportunities including drive line technician, drivability technician, alignment and suspension specialist, transmission specialist, service adviser and manager. A student with an AAS degree will be better prepared for advancement, including positions as factory and dealer representatives, management and self-employment.

Program outcomes

1. Demonstrate professionalism and related soft skills.
2. Apply theory of vehicle operating systems.
3. Diagnose vehicle operating systems.
4. Repair vehicle operating systems.
5. Interpret service information.
6. Exhibit safety practices and procedures.

Curriculum overview

Crds	Requirement type
57	Required courses
9	Restricted electives in subjects
6	Restricted electives in course types
72	**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. More information can be found at www.minnesota.edu/accreditation.

Curriculum requirement details

Required courses

Course	Crds
AMST1101 - Automotive Equipment Fundamentals	2
AMST1102 - Alignment and Suspension I	3
AMST1105 - Brakes I	3
AMST1110 - Batteries, Starting and Charging Systems	2
AMST1111 - Automotive Electronics	3
AMST1122 - Engines I	3
AMST1126 - Engines II	3
AMST1132 - Drivetrains I	3
AMST1136 - Drivetrains II	3
AMST2201 - Alignment and Suspension II	3
AMST2206 - Body Electrical and Mechanical I	3
AMST2210 - Body Electrical and Mechanical II	2
AMST2211 - Exhaust Analysis and Fuel Systems	3
AMST2214 - Electronic Powertrain Control I	3
AMST2218 - Electronic Powertrain Control II	3
AMST2220 - Ignition Systems	3
AMST2225 - Brakes II	3
AMST2233 - Automatic Transmissions I	3
AMST2237 - Automatic Transmissions II	3
AMST2240 - Heating, Ventilation and Air Conditioning	3

Other requirements or restricted electives

3 credits from one or more of these Subjects:

- HUM

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3 credits from one or more of these Subjects:

- COMM

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3 credits from one or more of these Subjects:

- ECON

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6 credits from these Course Types:

- General Education w/MnTC Goals

Course summaries

AMST1101 - Automotive Equipment Fundamentals ..... ***(2 credits)***
This course is designed to give the student 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 I ..... ***(3 credits)***
This course focuses on the varied suspension systems currently in use, including McPherson strut, leaf spring, coil spring and torsion bar. Also covered will be caster, camber and toe, and other alignment angles; wheel balance using the latest road force technology; and operation, diagnosis and repair of manual and power steering systems.

Corequisites:

- AMST1101

AMST1105 - Brakes I ..... ***(3 credits)***
This course teaches the basic principles of disc and drum brakes, hydraulic systems, parking brakes and power assist units. Emphasis is placed on operation, diagnosis and repair of various types of brake systems. Basic operation of anti-lock brake systems will be covered.

Corequisites:

- AMST1101

AMST1110 - Batteries, Starting and Charging Systems ..... ***(2 credits)***
This course involves the understanding and servicing of batteries, charging systems and starting systems. The student will perform tests on these items using bench testing and vehicle testing. Students also will disassemble and reassemble components so they understand how those items operate. Students will determine cost of replacement versus repair.

Corequisites:

- AMST1101
- AMST1111

AMST1111 - Automotive Electronics ..... ***(3 credits)***
This course involves understanding Ohm's law, multimeter usage, schematic reading, electrical circuit operation and electronic components. The student will perform electrical tests and repairs on training boards and on various vehicles. This course is a prerequisite for all second-year automotive courses.

Corequisites:

- AMST1101

AMST1122 - Engines I ..... ***(3 credits)***
This course covers the fundamentals of internal combustion engine operation, repair and maintenance. The procedures for removal, replacement, diagnosing, rebuilding and assembly are presented. Proper tool and equipment application and failure diagnosis are emphasized.

Corequisites:

- AMST1101

AMST1126 - Engines II ..... ***(3 credits)***
This course covers the disassembly, diagnosis, measurement, service, assembly and adjustment of engines and components. Cylinder heads, valve trains, cylinder block assemblies, cooling and lubrication systems are thoroughly covered.

Corequisites:

- AMST1101
- AMST1122

AMST1132 - Drivetrains I ..... ***(3 credits)***
This course covers service and theory of operation of clutch, manual transmission, drive shaft and drive axle systems. Service involves removal, disassembly, repair, reassembly and adjustment of these systems. Noise vibration and harshness in the drive train system will be diagnosed and repaired.

Corequisites:

- AMST1101

AMST1136 - Drivetrains II ..... ***(3 credits)***
This course covers drive axles, drive shafts, front and rear wheel bearings and analysis of vehicle noise vibration and harshness. Theory, service skills and diagnosis are covered on bench and in-vehicle units. Drive line phasing, alignment and balance are covered.

AMST2201 - Alignment and Suspension II ..... ***(3 credits)***
This is a continuation of Alignment and Suspension I. The student will perform repairs and adjustments pertaining to wheel alignments and work with electrical sensors and controls affecting a vehicle's stability control. Diagnostics and repair of steering columns and supplemental restraints also will be covered.

Corequisites:

- AMST1101
- AMST1102
- AMST1111

AMST2206 - Body Electrical and Mechanical I ..... ***(3 credits)***
This course teaches diagnosis and repair of interior and exterior lighting, safety devices, comfort systems, and door, window and seat control systems. The student will use wiring diagrams to pinpoint body electrical concerns. Window, door and seat control service will be performed, and common vehicle accessories will be addressed.

Corequisites:

- AMST1101
- AMST1111

AMST2210 - Body Electrical and Mechanical II ..... ***(2 credits)***
This course focuses on computer-controlled body components and safety systems. Diagnostics will involve the use of scan tools, multimeters and lab scopes applied to a variety of body controlled devices. Students will learn how controllers communicate with each other through bussed circuits.

Prerequisites:

- AMST1101
- AMST1111
- AMST2206

AMST2211 - Exhaust Analysis and Fuel Systems ..... ***(3 credits)***
This course will cover the various emission devices used on an automobile as well as the fuel delivery to maintain an efficient operating engine. Items covered will be positive crankcase ventilation systems, exhaust gas recirculation systems, air injection systems, evaporative systems, catalytic converters and fuel injection controls. Students will diagnose and repair problems using a variety of equipment on project vehicles.

Corequisites:

- AMST1101
- AMST1111

AMST2214 - Electronic Powertrain Control I ..... ***(3 credits)***
This course is an introduction to vehicle computer systems and related components that assist in the management of engine fuel, ignition and emission systems. Sensor inputs, management operation and operational commands are addressed.

Corequisites:

- AMST1101
- AMST1111

AMST2218 - Electronic Powertrain Control II ..... ***(3 credits)***
Students in this course will study the many electronic control systems used on today's passenger cars and light trucks. Second-generation on-board diagnostic strategies will be covered for ignition, fuel and emissions systems. The course will also incorporate hybrid technology, high-pressure gas fuel injection and diesel injection operation and testing.

Prerequisites:

- AMST1101
- AMST1111
- AMST2214

AMST2220 - Ignition Systems ..... ***(3 credits)***
This course will cover the operation of ignition systems. Students will learn how various ignition systems work so they will have the understanding to diagnose and repair ignition problems.

Corequisites:

- AMST1101
- AMST1111

AMST2225 - Brakes II ..... ***(3 credits)***
This class is a continuation of AMST 1105 Brakes I. Students will look at a progression of anti-lock brake, traction control and electronic stability control systems and manufacturer variations of these systems. Students will perform scan tool diagnostics, circuit analysis, circuit repair and bleeding procedures involving anti-lock brake systems. Student will perform on-car operations with brake part replacement, machining of drums and rotors, and hydraulics.

Corequisites:

- AMST1101
- AMST1105
- AMST1111

AMST2233 - Automatic Transmissions I ..... ***(3 credits)***
This course involves the principles of the multiple systems combined into an automatic transmission. The student will understand planetary gearing, clutch operation, band application and one-way clutching as they pertain to power flow through the transmission. The student will disassemble and make necessary adjustments and repairs on a variety of transmissions. The student will perform transmission fluid and filter changes where applicable.

Prerequisites:

- AMST1101
- AMST1111

AMST2237 - Automatic Transmissions II ..... ***(3 credits)***
The student will practice many of the procedures used in transmission diagnosis, vehicle repair sequences, scan tool data interpretation and diagnosis, and transmission removal, installation and adjustment. Transmission cooling system diagnosis and service are also covered.

Corequisites:

- AMST1101
- AMST1111
- AMST2233

AMST2240 - Heating, Ventilation and Air Conditioning ..... ***(3 credits)***
This course teaches the principles of heating, air conditioning and ventilation systems. Types and designs, component variations, diagnosis, testing and repair are studied and practiced on functioning units. System performance, recovery, evacuation and recharging are also covered in depth.

Corequisites:

- AMST1101
- AMST1111

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Program Plan — "Primary"

Locations: Moorhead

1st Fall Term (17 credits)

Courses

Course	Crds
AMST1101 - Automotive Equipment Fundamentals	2
AMST1102 - Alignment and Suspension I	3
AMST1105 - Brakes I	3
AMST1122 - Engines I	3
AMST1126 - Engines II	3

3 credits in one or more of the following:

Course Subject: COMM

1st Spring Term (17 credits)

Courses

Course	Crds
AMST1110 - Batteries, Starting and Charging Systems	2
AMST1111 - Automotive Electronics	3
AMST1132 - Drivetrains I	3
AMST1136 - Drivetrains II	3
AMST2206 - Body Electrical and Mechanical I	3

3 credits in one or more of the following:

General Education w/MnTC Goals

2nd Fall Term (18 credits)

Courses

Course	Crds
AMST2201 - Alignment and Suspension II	3
AMST2211 - Exhaust Analysis and Fuel Systems	3
AMST2214 - Electronic Powertrain Control I	3
AMST2220 - Ignition Systems	3
AMST2225 - Brakes II	3

3 credits in one or more of the following:

Course Subject: ECON

2nd Spring Term (20 credits)

Courses

Course	Crds
AMST2210 - Body Electrical and Mechanical II	2
AMST2218 - Electronic Powertrain Control II	3
AMST2233 - Automatic Transmissions I	3
AMST2237 - Automatic Transmissions II	3
AMST2240 - Heating, Ventilation and Air Conditioning	3

3 credits in one or more of the following:

Course Subject: HUM

3 credits in one or more of the following:

General Education w/MnTC Goals