Automotive Technology Curriculum Guide 2023-2024

Program Description

MCTI's Automotive Technology program is based on the ASE Education Foundation competency standards. Students train in the diagnosis and repair of brakes, suspensions, and electrical, heating/air conditioning, and engine performance systems, working toward State of Michigan and national (ASE) certifications.

Program Admissions Requirements

Students must have a valid driver's license before being enrolled in the Automotive Trade. Students who most closely match the **U.S. Department of Labor occupational profile** for a General Maintenance Technician are accepted for enrollment.

CASAS Scaled Score -Reading & Math 218 – 228

Aptitudes

- General Learning (G) CareerScope: 80+
- Verbal (V) CareerScope: 80+
- Numerical (N) CareerScope: 80+
- Spatial (S) CareerScope: 80+
- Motor Coordination (K) Career Scope: 80+
- Manual Dexterity (M) CareerScope: 80+
- Finger Dexterity (F) CareerScope: 80+

Temperaments

- Attain precise limits, tolerances, and standards using precision measuring instruments, prepare detailed records and comply with precise specifications.
- Perform a variety of duties involving different techniques, procedures, and physical demands without loss of efficiency or composure.
- Make judgments, evaluations, and generalizations based on sensory criteria or knowledge gained through experience in a wide variety of activities.

Physical Demands & Work Environment -Minimum Physical Requirements can be found on the Curriculum Guide online at www.michigan.gov/MCTI.

Certificate of Completion Programs (SOC code):

- General Maintenance Technician (49-9098)
- Suspension/Steering Technician (49-3023)
- Brake Technician (49-3023)
- Automotive Electrical Technician (49-3023)
- Engine Performance Technician (49-3023)
- HVAC Technician (49-3023)
- Auto Parts Specialist (41-2022)

The Automotive Technology department issues up to seven certificates. Students take core courses in the first term. During the middle of the first term, students will, based on interest and abilities, be directed towards the automotive technician track or the auto parts specialist track.

Students in the automotive technician track may be in the program up to six terms. Advancement past the third term requires successful completion of a State of Michigan mechanic test, a 3.0 or better grade point average, the instructor's permission, and good employability skills. Students in the auto parts track earn the Auto Parts Specialist certificate in one term, which includes an internship.

Required Courses

To advance from term to term, students must demonstrate academic progress (satisfactory grade point average of 2.0) and good employability skills.

General Maintenance Technician (first term)

Course Number	Course Name	Credits
AT 110B	General Maintenance Tech 1	3.5
AT 111A	General Maintenance Tech II	3.5
AT 112A	General Maintenance Tech III	5

For students who do not qualify to enroll into first term courses, the instructor may assign SP 100 and possibly an additional one of the two courses listed below per student selection. Upon completion, it is the instructor's discretion whether a student may earn an Achievement certificate or continue training, starting with first term courses.

Course Number	Course Name	Credits
SP 100[i]	Oil Change/Lube Specialist	6

One of the following maybe added per the instructor:

AT 113	Parts Specialist 1	6
SP 105	Auto Tire Specialist	6

Brake Technician (second or third Term)

Course Number	Course Name	Credits
AT 210	Brake Tech 1	4
AT 211	Brake Tech II	4
AT 212	Brake Tech III	4

Suspension/Steering Technician (second or third Term)

Course Number	Course Name	Credits
AT 220	Suspension/Steering Tech 1	4
AT 221	Suspension/Steering Tech II	4
AT 222	Suspension/Steering Tech III	4

Automotive Electrical Technician (fourth term)

Course Number	Course Name	Credits
AT 310	Electrical Tech 1	4
AT 311	Electrical Tech II	4
AT 312	Electrical Tech III	4

HVAC Technician (fifth or sixth term) Offered in spring or summer term only.

Course Number	Course Name	Credits
AT 410	HVAC Tech 1	4
AT 411	HVAC Tech II	4
AT 412	HVAC Tech III	4

Engine Performance Technician (fifth or sixth term)

Course Number	Course Name	Credits
AT 420	Engine Performance Tech 1	4
AT 421	Engine Performance Tech II	4
AT 422	Engine Performance Tech III	4

Other Courses (Instructor Approval Needed)

Course Number	Course Name	Credits
AT 680	Independent Study	2-12
AT 690	Work Internship	6-12

Instructors, program managers, and/or the referring counselor may recommend employability skills and elective classes based on the student's needs, interest, and approved by the Manager of Career and Technical Education programs. Job Seeking Skills

is required for all students expecting to graduate from MCTI abilities. Terms 2-6 culminate with a certification test through ASE entry-level and the State of Michigan Additional terms or courses are initiated by the instructor and

Course Descriptions

AT 110B: General Maintenance Tech 1 - This course is designed to expose students to basic automotive concepts and the systems on modern vehicles. This course includes a variety of classroom and laboratory exercises, which allow the student to develop basic shop skills, electrical knowledge, and practices upon which they can build more complex skills and knowledge. The course is designed to allow the instructor to evaluate a student's potential success for progression in the program. **Topics covered**: Safety, tools, fasteners, information resources and electrical principles & fundamental troubleshooting. Adjunct topics include customer satisfaction, personal conduct, employability, and teamwork skills.

AT 111A: General Maintenance Tech II - A course for students with some prior knowledge of basic automotive concepts. Classroom and shop exercises allow the instructor to evaluate the student's potential success for progression in the program. **Topics covered**: safety, shop math, periodic vehicle maintenance, brake inspections/ assemblies, tire/wheel assemblies, customer service/ satisfaction, employability skills, teamwork.

AT 112A: General Maintenance Tech III - Students expand their knowledge of basic automotive concepts and modern motor vehicle systems. Classroom and shop exercises focus on building proficiency in brake and wheel/tire assemblies. The instructor evaluates the student's potential success for progression in the program. **Topics covered**: safety, tools, basic electrical terms/principles, batteries, and the charging system, starting system basics, customer service, employ-ability skills.

AT 210: Brake Tech 1 - A course for students who already have the skills/experience to complete general automotive maintenance. Students complete various exercises to begin diagnosing and repairing car and light duty truck braking systems. Prepares students for the State of Michigan or ASE certification test. **Topics covered**: brake fundamentals, design, inspection, measurement, service diagnosis, and repair.

AT 211: Brake Tech II - This course is for students who can complete general motor vehicle maintenance and have a basic knowledge of brakes/braking systems repair. Expand skills in diagnosing/repairing car and light duty truck braking systems and begin to work more independently. Prepares students for the State of Michigan or ASE certification test **Topics covered**: brake fundamentals (e.g., design, inspection, measurement, service, diagnosis, repair), electrical relationship with brake systems, computer functions.

AT 212 Brake Tech III - This course is for students who can complete general motor vehicle maintenance and are skilled in the service/repair of brakes and braking systems. Build new skills related to diagnosing/servicing brake systems. Prepares students for the State of Michigan or ASE certification test. **Topics covered**: disc and drum brake overhaul, brake malfunctions, brake hydraulic systems, ABS system components, ABS service information, diagnosis.

AT 220: Suspension/Steering Tech 1 - This course is for students who can complete general motor vehicle maintenance. Students' complete classroom and shop exercises to expand their skills in diagnosing/repairing car and light duty truck steering and suspension systems. Prepares students for the State of Michigan or ASE certification test **Topics covered**: tire and wheel construction, service, and repair; basic suspension system design, diagnosis, service, and repair.

AT 221: Suspension/Steering Tech II - This course is for students who can complete general motor vehicle maintenance and have a basic knowledge of servicing and repairing suspension/ steering systems. Students' complete classroom and shop exercises to build skills in diagnosing and repairing car and light duty truck steering and suspension systems. Prepares students for the State of Michigan or ASE certification test **Topics covered**: tire and wheel construction, alignment principles, techniques, diagnosis; basic suspension system (diagnosis, service, and repair).

AT 222: Suspension/Steering Tech III - This course is for students with solid knowledge/ skills in service and repair of suspension/steering systems. Students' complete classroom and shop exercises to build skills in service/repair of steering components and systems. Prepares students for the State of Michigan or ASE certification test. **Topics covered**: tires and wheels (service and repair), basic suspension system design, diagnosis, service/repair of suspension systems; alignment principles, techniques, and diagnosis; steering system construction, operation, diagnosis, service, and repair.

AT 310: Electrical Tech 1 - This course is for students with solid knowledge/ experience in general motor vehicle maintenance, brakes, suspension, and steering systems. Students' complete classroom and shop exercises to become familiar with diagnosis/repair of various electrical circuits. Prepares students for the State of Michigan or ASE certification test **Topics covered**: electrical fundamentals, battery service and testing, Schematics: organization and location.

AT 311: Electrical Tech II - A course for students with solid knowledge/ experience in general automotive maintenance, brakes, suspension and steering systems, and basic knowledge/skills of electrical components, schematics, and batteries. Prepares students for the State of Michigan or ASE certification test **Topics covered**: Electrical

fundamentals, battery service and testing, schematics (organization and location), starting and charging systems fundamentals (construction, diagnosis, service, and repair).

AT 312: Electrical Tech III - This course is for students with solid knowledge/skills related to electrical systems. Classroom and lab exercises help students build proficiency in the diagnosis and repair of a variety of electrical circuits. Emphasis is on a vehicle's electrical system. Prepares students for the State of Michigan or ASE certification test **Topics covered**: electrical fundamentals, battery service and testing, schematics (organization and location), starting and charging systems fundamentals (construction, diagnosis, service, and repair); accessory and power systems (e.g., wipers, lights, power. windows, etc.).

AT 410: HVAC Tech 1 - This course is for advanced Automotive Technology students. Students' complete classroom and lab exercises to become familiar with the construction, diagnosis and repair of heating, ventilation, and air conditioning systems (HVAC). Prepares students for the State of Michigan or ASE certification test **Topics covered**: electricity fundamentals, cooling system basics, diagnosis, service, and repair.

AT 411: HVAC Tech II - Advanced Automotive Technology students further develop skills in construction, diagnosis and repair of heating, ventilation, and air conditioning systems. Prepares students for the State of Michigan or ASE certification test **Topics covered**: electricity fundamentals, cooling systems basics − diagnosis, service, and repair; air conditioning fundamentals, elementary refrigeration principles, HVAC controls and operation.

AT 412: HVAC Tech III - This course is for advanced Automotive Technology students with solid knowledge of heating, ventilation, and air conditioning systems (HVAC). Students build diagnostic skills needed to service HVAC systems and components. Prepares students for the State of Michigan or ASE certification test **Topics covered**: electricity fundamentals, cooling system basics − diagnosis, service, and repair; air conditioning fundamentals, elementary refrigeration principles, HVAC controls, operation, diagnosis, service, and repair.

AT 420: Engine Performance Tech 1 - This course is for advanced Automotive Technology students. Construction, diagnosis, and repair of powertrain management systems. Prepares students for the State of Michigan or ASE certification test **Topics covered**: engine fundamentals and design, basic electricity, ignition fundamentals, testing/ repair; fuels, and fuel system construction.

AT 421: Engine Performance Tech II - Course is for advanced Automotive Technology students who understand engine and ignition fundamentals, fuels, and fuel system construction. Students develop skills in the construction, diagnosis, and repair of

powertrain management systems and build proficiency in skills learned in prior courses. Prepares students for the State of Michigan or ASE certification test **Topics covered**: engine fundamentals and design, basic electricity, ignition fundamentals, testing/repair; fuels and fuel system construction; gasoline fuel injection system, design, and service; OBD I and II system components: service and testing.

AT 422: Engine Performance Tech III - Course is for advanced Automotive Technology students with a solid background – knowledge and skills – related to engine performance. Students build proficiency in construction, diagnosis, and repair of powertrain management systems. Emphasis on knowledge and skills needed to pass the State of Michigan mechanics certification test (Engine Tune-up/ Performance category). **Topics covered**: engine fundamentals and design; basic electricity; ignition fundamentals testing, repair, fuels, and fuel system construction; gasoline fuel injection system design and service; OBD I and II system components: service and testing; emission controls − testing and service; performance and drivability issues.

AT 113: Part Specialist 1 - Students with experience in general automotive maintenance learn new skills needed to become an automotive parts counterperson. Emphasis on identifying/locating automotive parts while working in an automotive shop environment. **Topics covered**: shop tools, fasteners, equipment, automobile parts information resources, parts terminology, automotive components/systems (e.g., brakes, suspension/ steering, electrical, engine mechanical and cooling systems), customer service, teamwork.

SP 100: Oil Change/Lube Specialist - This course is designed for the student who does not qualify for the mainstream AT program. Many of the same topics are covered and are designed to fashion skills for entry-level work in an oil change facility or lube position in a variety work setting. This course has transferable credits for course AT 110B: General Maintenance Tech 1. **Topics covered**: Safety, Service Information, Tools, and Vehicle Maintenance.

SP 105: Auto Tire Specialist - This course is designed for the student who has successfully completed the SP 100 course along with the instructor's permission. The objective is to produce the skills needed to become a tire technician in a tire franchise or other similar setting. **Topics covered:** Safety, Automotive Math, Tire & Wheel Fundamentals/Service and TPMS systems.

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[i] SP 100: Oil Change/Lube Specialist has transferable credits for course AT 110B: General Maintenance Tech 1.