

# Automotive Systems Technology

## Automotive Systems Technology Suggested Course Sequence

The following is the suggested plan for when to take each course to complete the Associate in Applied Science degree, based on the program requirements of the 2023-2024 catalog. This is only a recommendation — you may take courses in another order upon consultation with your advisor. This plan is based on you starting with college-level math and English courses, starting your program in the fall, and attending full-time. You can also follow this sequence if you attend part-time. Speak with your academic advisor about the plan and any questions. This program might also offer diplomas or certificates; visit the catalog or contact the program for details. Visit the Academic Advising page for instructions on locating your assigned advisor: <https://www.cpcc.edu/academics/academic-advising>

Term I		Credits
TRN 110	Introduction to Transport Technology	2.0
TRN 170	Pc Skills for Transportation	2.0
AUT 116	Engine Repair	3.0
AUT 116A	Engine Repair Lab	1.0
TRN 120	Basic Transportation Electricity	5.0
TRN 120A	Basic Transportation Electrical Lab	1.0
ENG 111	Writing and Inquiry	3.0
ACA 122	College Transfer Success	1.0
<b>Credits</b>		<b>18</b>
Term II		Credits
AUT 151	Brake Systems	3.0
AUT 151A	Brakes Systems Lab	1.0
AUT 141	Suspension & Steering Systems	3.0
TRN 140	Transportation Climate Control	2.0
TRN 140A	Transportation Climate Control Lab	2.0
MAT 110 or MAT 143 or MAT 152 or MAT 171	Mathematical Measurement and Literacy or Quantitative Literacy or Statistical Methods I or Precalculus Algebra	3.0
<b>You may have completed program certificate C60160-20. Confirm eligibility with your academic advisor.</b>		
<b>Credits</b>		<b>14</b>
Term III		Credits
WBL 112	Work-Based Learning I	2.0
Humanities/Fine Arts		3.0
<b>Credits</b>		<b>5</b>
Term IV		Credits
AUT 181	Engine Performance 1	3.0
AUT 163	Advanced Automotive Electricity	3.0
AUT 231	Manual Transmissions/Transaxles/Drive Trains	3.0
COM 110 or COM 231	Introduction to Communication or Public Speaking	3.0
WBL 122	Work-Based Learning II	2.0
ATT 115 or TRN 180 <b>and</b> TRN 180A	Green Trans Safety and Service or Basic Welding for Transportation <b>and</b> Basic Welding for Transportation Lab	2.0
<b>Credits</b>		<b>16</b>
Term V		Credits
AUT 183	Engine Performance 2	4.0
TRN 145	Advanced Transportation Electronics	3.0
AUT 221	Automatic Transmissions/Transaxles	3.0

Behavioral/Social Science		3.0
WBL 132	Work-Based Learning III	2.0
<b>Credits</b>		<b>15</b>
<b>Total Credits</b>		<b>68</b>

**AUT 113. Automotive Servicing I. 2.0 Credits.** Class-0.0. Clinical-0.0. Lab-6.0. Work-0.0

This course is a lab used as an alternative to co-op placement. Emphasis is placed on shop operations, troubleshooting, testing, adjusting, repairing, and replacing components using appropriate test equipment and service information. Upon completion, students should be able to perform a variety of automotive repairs using proper service procedures and to operate appropriate equipment.

Prerequisites: Take AUT 141 and AUT 151, minimum grade of C

**AUT 114A. Safety and Emissions Lab. 1.0 Credit.** Class-0.0.

Clinical-0.0. Lab-2.0. Work-0.0

This course is an optional lab that allows students to enhance their understanding of North Carolina State Emissions Inspection failures. Topics include evaporative, positive crankcase ventilation, exhaust gas recirculation and exhaust emissions systems operation, including catalytic converter failure diagnosis. Upon completion, students should be able to employ diagnostic strategies to repair vehicle emissions failures resulting from North Carolina State Emissions inspection.

Corequisites: Take AUT 114

**AUT 114. Safety and Emissions. 2.0 Credits.** Class-1.0. Clinical-0.0.

Lab-2.0. Work-0.0

This course covers the laws, procedures, and specifications needed to perform a North Carolina State Safety and Emissions inspection. Topics include brake, steering and suspension, lighting, horn, windshield wiper, tire, mirrors, and emission control devices inspection. Upon completion, students should be able to perform complete and thorough North Carolina State Safety and Emissions inspections.

**AUT 116. Engine Repair. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0.

Work-0.0

This course covers the theory, construction, inspection, diagnosis, and repair of internal combustion engines and related systems. Topics include fundamental operating principles of engines and diagnosis, inspection, adjustment, and repair of automotive engines using appropriate service information. Upon completion, students should be able to perform basic diagnosis, measurement and repair of automotive engines using appropriate tools, equipment, procedures, and service information.

**AUT 116A. Engine Repair Lab. 1.0 Credit.** Class-0.0. Clinical-0.0.

Lab-3.0. Work-0.0

This course is an optional lab to be used as an alternative to co-op placement in meeting the NATEF standards for total hours. Topics include diagnosis, inspection, adjustment, and repair of automotive engines using appropriate service information. Upon completion, students should be able to perform basic diagnosis, measurement and repair of automotive engines using appropriate tools, equipment, procedures, and service information.

Corequisites: Take AUT 116

**AUT 141. Suspension & Steering Systems. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers principles of operation, types, and diagnosis/repair of suspension and steering systems to include steering geometry. Topics include manual and power steering systems and standard and electronically controlled suspension and steering systems. Upon completion, students should be able to service and repair steering and suspension components, check and adjust alignment angles, repair tires, and balance wheels.

**AUT 141A. Suspension & Steering Lab. 1.0 Credit.** Class-0.0. Clinical-0.0. Lab-3.0. Work-0.0

This course is an optional lab to be used as an alternative to co-op placement in meeting the NATEF standards for total hours. Topics include manual and power steering systems and standard and electronically controlled suspension and steering systems. Upon completion, students should be able to service and repair steering and suspension components, check and adjust alignment angles, repair tires, and balance wheels. Corequisites: Take AUT 141

**AUT 151. Brake Systems. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers principles of operation and types, diagnosis, service, and repair of brake systems. Topics include drum and disc brakes involving hydraulic, vacuum boost, hydra-boost, electrically powered boost, and anti-lock and parking brake systems. Upon completion, students should be able to diagnose, service, and repair various automotive braking systems.

**AUT 151A. Brakes Systems Lab. 1.0 Credit.** Class-0.0. Clinical-0.0. Lab-3.0. Work-0.0

This course is an optional lab to be used as an alternative to co-op placement in meeting the NATEF standards for total hours. Topics include drum and disc brakes involving hydraulic, vacuum-boost, hydra-boost, electrically powered boost, and anti-lock, parking brake systems and emerging brake systems technologies. Upon completion, students should be able to diagnose, service, and repair various automotive braking systems. Corequisites: Take AUT 151

**AUT 163. Advanced Automotive Electricity. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers electronic theory, wiring diagrams, test equipment, and diagnosis, repair, and replacement of electronics, lighting, gauges, horn, wiper, accessories, and body modules. Topics include networking and module communication, circuit construction, wiring diagrams, circuit testing, and troubleshooting. Upon completion, students should be able to properly use wiring diagrams, diagnose, test, and repair wiring, lighting, gauges, accessories, modules, and electronic concerns. Prerequisites: Take TRN 120

**AUT 181. Engine Performance 1. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers the introduction, theory of operation, and basic diagnostic procedures required to restore engine performance to vehicles equipped with complex engine control systems. Topics include an overview of engine operation, ignition components and systems, fuel delivery, injection components and systems and emission control devices. Upon completion, students should be able to describe operation and diagnose/repair basic ignition, fuel and emission related driveability problems using appropriate test equipment/service information.

**AUT 183. Engine Performance 2. 4.0 Credits.** Class-2.0. Clinical-0.0. Lab-6.0. Work-0.0

This course covers study of the electronic engine control systems, the diagnostic process used to locate engine performance concerns, and procedures used to restore normal operation. Topics will include currently used fuels and fuel systems, exhaust gas analysis, emission control components and systems, OBD II (on-board diagnostics) and inter-related electrical/electronic systems. Upon completion, students should be able to diagnose and repair complex engine performance concerns using appropriate test equipment and service information. Prerequisites: Take AUT 181, minimum grade of C

**AUT 212. Auto Shop Management. 3.0 Credits.** Class-3.0. Clinical-0.0. Lab-0.0. Work-0.0

This course covers the principles of management essential to decision-making, communication, authority, and leadership. Topics include shop supervision, shop organization, customer relations, cost effectiveness and work place ethics. Upon completion, students should be able to describe basic automotive shop operation from a management standpoint.

**AUT 213. Automotive Servicing 2. 2.0 Credits.** Class-1.0. Clinical-0.0. Lab-3.0. Work-0.0

This course is a lab used as an alternative to co-op placement. Emphasis is placed on shop operations, troubleshooting, testing, adjusting, repairing, and replacing components using appropriate test equipment and service information. Upon completion, students should be able to perform a variety of automotive repairs using proper service procedures and to operate appropriate equipment. Prerequisites: Take AUT 141, AUT 151, AUT 181, and AUT 163; Minimum grade; C

**AUT 221. Automatic Transmissions/Transaxles. 3.0 Credits.** Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers operation, diagnosis, service, and repair of automatic transmissions/transaxles. Topics include hydraulic, pneumatic, mechanical, and electrical/electronic operation of automatic drive trains and the use of appropriate service tools and equipment. Upon completion, students should be able to explain operational theory, diagnose and repair automatic drive trains.

**AUT 221A. Automatic Transmissions/Transaxles Lab. 1.0 Credit.** Class-0.0. Clinical-0.0. Lab-3.0. Work-0.0

This course is an optional lab to be used as an alternative to co-op placement in meeting the NATEF standards for total hours. Topics include hydraulic, pneumatic, mechanical, and electrical/electronic operation of automatic drive trains and the use of appropriate service tools and equipment. Upon completion, students should be able to diagnose and repair automatic drive trains. Corequisites: Take AUT 221

**AUT 231A. Manual Transmissions/Transaxles/Drive Trains Lab. 1.0 Credit.** Class-0.0. Clinical-0.0. Lab-3.0. Work-0.0

This course is an optional lab for the program that needs to meet NATEF hour standards but does not have a co-op component in the program. Topics include manual drive train diagnosis, service and repair using appropriate service information, tools, and equipment. Upon completion, students should be able to diagnose and repair manual drive trains. Corequisites: Take AUT 231

**AUT 231. Manual Transmissions/Transaxles/Drive Trains. 3.0 Credits.**

Class-2.0. Clinical-0.0. Lab-3.0. Work-0.0

This course covers the operation, diagnosis, and repair of manual transmissions/transaxles, clutches, driveshafts, axles, and final drives. Topics include theory of torque, power flow, and manual drive train servicing and repair using appropriate service information, tools, and equipment. Upon completion, students should be able to explain operational theory, diagnose and repair manual drive trains.

**AUT 281. Advanced Engine Performance. 3.0 Credits. Class-2.0.**

Clinical-0.0. Lab-2.0. Work-0.0

This course utilizes service information and specialized test equipment to diagnose and repair power train control systems. Topics include computerized ignition, fuel and emission systems, related diagnostic tools and equipment, data communication networks, and service information. Upon completion, students should be able to perform diagnosis and repair.

Prerequisites: Take AUT 181 TRN 120, minimum grade of C