

Automotive Systems Technology

The Automotive Systems Technology curriculum prepares individuals for employment as Automotive Service Technicians. It provides an introduction to automotive careers and increases student awareness of the challenges associated with this fast and ever-changing field.

Classroom and lab experiences integrate technical and academic coursework. Emphasis is placed on theory, servicing and operation of brakes, electrical/electronic systems, engine performance, steering/suspension, automatic transmission/transaxles, engine repair, climate control, and manual drive trains.

Upon completion of this curriculum, students should be prepared to take the ASE exam and be ready for full-time employment in dealerships and repair shops in the automotive service industry.

For specific information about potential positions and wages in automotive systems employment, visit the Central Piedmont Career Coach website.

Automotive Systems Technology (A60160) Degree Awarded

The Associate in Applied Science Degree - Automotive Systems Technology is awarded by the college upon completion of this program.

Admissions

- A high school diploma or equivalent is required.
- Many courses have prerequisites or co-requisites; check the Courses section for details.

Program Accreditation

The BMW-ADP and GM-ASEP programs are Master Certified by the National Automotive Technician Foundation (NATEF) Automotive Service Excellence (A.S.E.).

Program Manufacturer Partners

General Motors' Automotive Service Excellence Program (ASEP), and BMW (ADP) are options for this associate degree program. In addition, Central Piedmont currently offers a Honda Professional Automotive Career Training (PACT) program certificate as an Express Service Technician. Contact the Public Service & Transportation Division Cooperative Education Coordinator at 704.330.4157 or the Transport Systems Technology Division at 704.330.2722 ext. 7331 for manufacturer program information.

Note: Students must furnish required hand tools and protective clothing, as well as textbooks. A list of these items can be obtained from an instructor or by contacting the Program Chair at 704.330.2722 ext. 7331.

Contact Information

The Automotive Systems Technology program is in the Public Service & Transportation Division, which can be reached at 704.330.2722 ext. 7331.

General Education Requirements

ENG 111	Writing and Inquiry	3.0
Select 3 credits of the following:		3.0

COM 110	Introduction to Communication or COM 231 Public Speaking	
Select 3 credits of the following:		3.0
MAT 110	Mathematical Measurement and Literacy	
MAT 143	Quantitative Literacy	
MAT 152	Statistical Methods I	
MAT 171	Precalculus Algebra	
Select 3 credits of the following:		3.0
ART 111	Art Appreciation	
ART 114	Art History Survey I	
ART 115	Art History Survey II	
DRA 111	Theatre Appreciation	
HUM 120	Cultural Studies	
HUM 130	Myth in Human Culture	
MUS 110	Music Appreciation	
MUS 112	Introduction to Jazz	
PHI 215	Philosophical Issues	
PHI 240	Introduction to Ethics	
REL 110	World Religions	
Select 3 credits of the following:		3.0
ECO 251	Principles of Microeconomics	
ECO 252	Principles of Macroeconomics	
HIS 111	World Civilizations I	
HIS 112	World Civilizations II	
HIS 131	American History I	
HIS 132	American History II	
POL 120	American Government	
PSY 150	General Psychology	
SOC 210	Introduction to Sociology	
Major Requirements		
ACA 122	College Transfer Success	1.0
TRN 110	Introduction to Transport Technology	2.0
TRN 120	Basic Transportation Electricity	5.0
TRN 140	Transportation Climate Control	2.0
TRN 145	Advanced Transportation Electronics	3.0
AUT 141	Suspension & Steering Systems	3.0
AUT 151	Brake Systems	3.0
AUT 181	Engine Performance 1	3.0
AUT 183	Engine Performance 2	4.0
TRN 170	Pc Skills for Transportation	2.0
AUT 116	Engine Repair	3.0
AUT 163	Advanced Automotive Electricity	3.0
Select 2 credits from the following:		2.0
ATT 115	Green Trans Safety and Service	
TRN 180	Basic Welding for Transportation	
Select 6 credits of the following:		6.0
AUT 221	Automatic Transmissions/Transaxles	
AUT 231	Manual Transmissions/Transaxles/Drive Trains	
ATT 125	Hybrid-Electric Transportation	
Technical Electives		
Select 9 credits of the following:		9.0
TRN 120A	Basic Transportation Electrical Lab	

TRN 140A	Transportation Climate Control Lab
TRN 180A	Basic Welding for Transportation Lab
AUT 113	Automotive Servicing I
AUT 114	Safety and Emissions
AUT 114A	Safety and Emissions Lab
AUT 116A	Engine Repair Lab
AUT 141A	Suspension & Steering Lab
AUT 151A	Brakes Systems Lab
AUT 213	Automotive Servicing 2
AUT 221A	Automatic Transmissions/Transaxles Lab
AUT 231A	Manual Transmissions/Transaxles/Drive Trains Lab
WBL 112	Work-Based Learning I
WBL 122	Work-Based Learning II
WBL 132	Work-Based Learning III
WBL 212	Work-Based Learning IV
AUT 212	Auto Shop Management
ATT 140	Emerging Transportation Technology
AUT 281	Advanced Engine Performance
AUT 181A	
Total Credits	66

Automotive Systems Technology Diploma (D60160)

This diploma is also available for students enrolled in Career & College Promise.

Diploma Awarded

A diploma in Automotive Systems Technology is awarded by the College upon completion of this program.

Admissions

- Completion of a high school diploma or equivalent is required as the foundation of a career in this area.
- Many courses have prerequisites or co-requisites; check the Courses section for details.

Program Accreditation

This program is Master Certified by the National Automotive Technician Foundation (NATEF) Automotive Service Excellence (A.S.E.).

Note: Students must furnish required hand tools and protective clothing, as well as textbooks. A list of these items can be obtained from an instructor or program chair by contacting the program chair at 704.330.4183.

Contact Information

The Automotive Systems Technology program is in the Transport Systems Technologies Division. For more information, call the program office at 704.330.4122 or the program chair at 704.330.4183.

Choose 42 hours from Major and Related Course Requirements listed below:

General Education Requirements

ENG 101	Applied Communications I	3.0
MAT 110	Mathematical Measurement and Literacy	3.0

Major Requirements

TRN 110	Introduction to Transport Technology	2.0
TRN 120	Basic Transportation Electricity	5.0
TRN 140	Transportation Climate Control	2.0
AUT 141	Suspension & Steering Systems	3.0
AUT 151	Brake Systems	3.0
AUT 181	Engine Performance 1	3.0
TRN 140A	Transportation Climate Control Lab	2.0
TRN 170	Pc Skills for Transportation	2.0
AUT 116	Engine Repair	3.0
AUT 116A	Engine Repair Lab	1.0
AUT 151A	Brakes Systems Lab	1.0
AUT 183	Engine Performance 2	4.0
AUT 221	Automatic Transmissions/Transaxles	3.0
AUT 231	Manual Transmissions/Transaxles/Drive Trains	3.0

Technical Electives

Select 1 credit of the following:		1.0
AUT 113	Automotive Servicing I	
WBL 112	Work-Based Learning I	
WBL 122	Work-Based Learning II	
AUT 213	Automotive Servicing 2	
AUT 141A	Suspension & Steering Lab	
TRN 120A	Basic Transportation Electrical Lab	

Total Credits

44

Automotive Systems Technology Certificates (C60160)

- Automotive Systems Technology Certificate Specialization in Transportation Service and Repair (C60160-20) (p.)
- Automotive Systems Technology Certificate Specialization in Transportation Welding and Alternative Fuels (C60160-25) (p. 2)
- Automotive Systems Technology Certificate Specialization in Basic Hybrid Vehicle Technology (C60160-30) (p. 3)

Automotive Systems Technology Certificate Specialization in Transportation and Repair (C60160-20)

Major Requirement

TRN 110	Introduction to Transport Technology
TRN 170	Pc Skills for Transportation
TRN 120	Basic Transportation Electricity
TRN 120A	Basic Transportation Electrical Lab
TRN 140	Transportation Climate Control
TRN 140A	Transportation Climate Control Lab
Total Credits	14.0

Automotive Systems Technology Certificate Specialization in Transportation Welding and Alternative Fuels (C60160-25)

Major Requirements

TRN 110	Introduction to Transport Technology	2.0
TRN 170	Pc Skills for Transportation	2.0
TRN 180	Basic Welding for Transportation	3.0

TRN 180A	Basic Welding for Transportation Lab	1.0
ATT 115	Green Trans Safety and Service	2.0
ATT 140	Emerging Transportation Technology	3.0
Total Credits		13

Automotive Systems Technology Certificate Specialization in Basic Hybrid Vehicle Technology (C60160-30)

Major Requirements

TRN 110	Introduction to Transport Technology	2.0
TRN 120	Basic Transportation Electricity	5.0
TRN 120A	Basic Transportation Electrical Lab	1.0
TRN 170	Pc Skills for Transportation	2.0
AUT 113	Automotive Servicing I	2.0
ATT 115	Green Trans Safety and Service	2.0
Total Credits		14

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.cpsc.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
	Credits	18

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	Mathematical Measurement and Literacy	3.0
or MAT 143	or Quantitative Literacy	
or MAT 152	or Statistical Methods I	
or MAT 171	or Precalculus Algebra	

You may have completed program certificate C60160-20. Confirm eligibility with your academic advisor.

Term III		Credits
WBL 112	Work-Based Learning I	2.0
Humanities/Fine Arts		3.0
	Credits	5

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	Introduction to Communication	3.0
or COM 231	or Public Speaking	
WBL 122	Work-Based Learning II	2.0
ATT 115	Green Trans Safety and Service	2.0
or TRN 180 <i>and</i>	or Basic Welding for Transportation <i>and</i> Basic	
TRN 180A	Welding for Transportation Lab	
	Credits	16

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
	Credits	15
	Total Credits	68

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