



## Program Planning Guide

### **Automotive Systems Technology Associate in Applied Science (A60160T)**

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**Program Length:** 5 semesters

**Program Sites:** Lee Main Campus - Day Program

**Career Pathway Options:** Associate in Applied Science Degree in Automotive Systems Technology

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# Automotive Systems Technology AAS (A60160T)

Page 2

Suggested Course Schedule		Class	Lab	Work	Credits	Notes:
<b>1st Semester (fall)</b>						
ACA 122	College Transfer Success	0	2	0	1	
AUT 151	Brake Systems	2	3	0	3	
AUT 151A	Brake Systems Lab	0	3	0	1	
TRN 110	Intro to Transport Tech	1	2	0	2	
TRN 120	Basic Transp Electricity	4	3	0	5	
TRN 170	PC Skills for Transp	1	2	0	2	
Math/Science Requirement, select from:						
MAT 110	Math Measurement & Literacy	2	2	0	3	
<b>OR</b>						
PHY 110	Conceptual Physics	3	0	0	3	
PHY 110A	Conceptual Physics Lab	0	2	0	1	
	<b>Total Semester Hours</b>	<b>10/11</b>	<b>17</b>	<b>0</b>	<b>17/18</b>	
<b>2nd Semester (spring)</b>						
AUT 141	Suspension & Steering Sys	2	3	0	3	
AUT 141A	Suspension & Steering Lab	0	3	0	1	
AUT 163	Adv Auto Electricity	2	3	0	3	
AUT 163A	Adv Auto Electricity Lab	0	3	0	1	
AUT 181	Engine Performance I	2	3	0	3	
AUT 181A	Engine Performance I Lab	0	3	0	1	
ENG 111	Writing and Inquiry	3	0	0	3	
	<b>Total Semester Hours</b>	<b>9</b>	<b>18</b>	<b>0</b>	<b>15</b>	
<b>3rd Semester (summer)</b>						
AUT 114	Safety and Emissions	1	2	0	2	
AUT 114A	Safety and Emissions Lab	0	2	0	1	
AUT 183	Engine Performance 2	2	6	0	4	
TRN 140	Transp Climate Control	1	2	0	2	
TRN 140A	Transp Climate Cont Lab	1	2	0	2	
	<b>Total Semester Hours</b>	<b>5</b>	<b>14</b>	<b>0</b>	<b>11</b>	



# Automotive Systems Technology AAS (A60160T)

Page 3

<b>4th Semester (fall)</b>						
AUT 116	Engine Repair	2	3	0	3	
AUT 116A	Engine Repair Lab	0	3	0	1	
AUT 231	Man Trans/Axles/Drtrains	2	3	0	3	
AUT 231A	Man Trans/Axles/Drtrains Lab	0	3	0	1	
AUT 281	Adv Engine Performance	2	2	0	3	
ENG 114	Professional Research & Reporting	3	0	0	3	
	<b>Total Semester Hours</b>	9	14	0	14	
<b>5th Semester (spring)</b>						
AUT 221	Auto Transm/Transaxles	2	3	0	3	
AUT 221A	Auto Transm/Transaxles Lab	0	3	0	1	
TRN 130	Intro to Sustainable Transp	2	2	0	3	
TRN 145	Adv Transp Electronics	2	3	0	3	
Humanities/Fine Arts Elective		3	0	0	3	
Social/Behavioral Science Elective		3	0	0	3	
	<b>Total Semester Hours</b>	12	11	0	16	
<b>Total Semester Credit Hours Required for Graduation: 73</b>						



# Automotive Systems Technology AAS (A60160T)

Page 4

## Course Descriptions

### **ACA 122 College Transfer Success**

This course provides information and strategies necessary to develop clear academic and professional goals beyond the community college experience. Topics include the CAA, college policies and culture, career exploration, gathering information on senior institutions, strategic planning, critical thinking, and communications skills for a successful academic transition. Upon completion, students should be able to develop an academic plan to transition successfully to senior institutions. This course has been approved for transfer under the CAA/ICAA as a premajor and/or elective course requirement.

### **AUT 114 Safety and Emissions**

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 114A Safety and Emissions Lab**

*Corequisite: Take AUT 114*

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.

### **AUT 116 Engine Repair**

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**

*Corequisite: Take AUT 116*

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.

### **AUT 141 Suspension & Steering Sys**

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**

*Corequisite: Take AUT 141*

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.

### **AUT 151 Brake Systems**

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.



# Automotive Systems Technology AAS (A60160T)

Page 5

**AUT 151A Brakes Systems Lab***Corequisite: Take AUT 151*

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.

**AUT 163 Adv Auto Electricity***Prerequisite: Take TRN 120*

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.

**AUT 163A Adv Auto Electricity Lab***Corequisite: Take AUT 163*

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 networking and module communication, circuit construction, wiring diagrams, circuit testing, troubleshooting and emerging electrical/electronic systems technologies. Upon completion, students should be able to properly use wiring diagrams, diagnose, test, and repair wiring, lighting, gauges, accessories, modules, and electronic concerns.

**AUT 181 Engine Performance I**

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 181A Engine Performance I Lab***Corequisite: Take AUT 181*

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 overviews of engine operation, ignition components and systems, fuel delivery, injection components and systems and emission control devices and emerging engine performance technologies. 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***Prerequisite: Take AUT 181*

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.

**AUT 221 Auto Transm/Transaxles**

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 Auto Transm/Transaxles Lab***Corequisite: Take AUT 221*

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.

**AUT 231 Man Trans/Axles/Drtrains**



## Automotive Systems Technology AAS (A60160T)

Page 6

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 231A      Man Trans/Ax/Drtrains Lab**

*Corequisite: Take AUT 231*

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.

### **AUT 281      Adv Engine Performance**

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.

### **ENG 111      Writing and Inquiry**

*Corequisite: Take ENG 045*

This course is designed to develop the ability to produce clear writing in a variety of genres and formats using a recursive process. Emphasis includes inquiry, analysis, effective use of rhetorical strategies, thesis development, audience awareness, and revision. Upon completion, students should be able to produce unified, coherent, well-developed essays using standard written English. This course has been approved for transfer under the CAA/ICAA as a general education course in English Composition.

### **ENG 114      Prof Research & Reporting**

*Prerequisite: Take ENG 111*

This course, the second in a series of two, is designed to teach professional communication skills. Emphasis is placed on research, listening, critical reading and thinking, analysis, interpretation, and design used in oral and written presentations. Upon completion, students should be able to work individually and collaboratively to produce well-designed business and professional written and oral presentations. This course has been approved for transfer under the CAA/ICAA as a general education course in English Composition.

### **MAT 110      Math Measurement & Literacy**

This course provides an activity-based approach that develops measurement skills and mathematical literacy using technology to solve problems for non-math intensive programs. Topics include unit conversions and estimation within a variety of measurement systems; ratio and proportion; basic geometric concepts; financial literacy; and statistics including measures of central tendency, dispersion, and charting of data. Upon completion, students should be able to demonstrate the use of mathematics and technology to solve practical problems, and to analyze and communicate results.

### **PHY 110      Conceptual Physics**

This course provides a conceptually-based exposure to the fundamental principles and processes of the physical world. Topics include basic concepts of motion, forces, energy, heat, electricity, magnetism, and the structure of matter and the universe. Upon completion, students should be able to describe examples and applications of the principles studied. This course has been approved for transfer under the CAA/ICAA as a general education course in Natural Science.

### **PHY 110A      Conceptual Physics Lab**

*Corequisite: Take PHY 110*

This course is a laboratory for PHY 110. Emphasis is placed on laboratory experiences that enhance materials presented in PHY 110. Upon completion, students should be able to apply the laboratory experiences to the concepts presented in PHY 110. This course has been approved for transfer under the CAA/ICAA as a general education course in Natural Science.



# Automotive Systems Technology AAS (A60160T)

Page 7

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**TRN 110      Intro to Transport Tech**

This course covers workplace safety, hazardous materials, environmental regulations, hand tools, service information, basic concepts, vehicle systems, and common transportation industry terminology. Topics include familiarization with major vehicle systems, proper use of various hand and power tools, material safety data sheets, and personal protective equipment. Upon completion, students should be able to demonstrate appropriate safety procedures, identify and use basic shop tools, and describe government regulations regarding transportation repair facilities.

**TRN 120      Basic Transp Electricity**

This course covers basic electrical theory, wiring diagrams, test equipment, and diagnosis, repair and replacement of batteries, starters, and alternators. Topics include Ohm's Law, circuit construction, wiring diagrams, circuit testing, and basic troubleshooting. Upon completion, students should be able to properly use wiring diagrams, diagnose, test, and repair basic wiring, battery, starting, charging, and electrical concerns.

**TRN 130      Intro to Sustainable Transp**

This course provides an overview of alternative fuels and alternative fuel vehicles. Topics include composition and use of alternative fuels including compressed natural gas, biodiesel, ethanol, hydrogen, and synthetic fuels, hybrid/electric, and vehicles using alternative fuels. Upon completion, students should be able to identify alternative fuel vehicles, explain how each alternative fuel delivery system operates, and perform minor repairs.

**TRN 140      Transp Climate Control**

This course covers the theory of refrigeration and heating, electrical/electronic/pneumatic controls, and diagnosis and repair of climate control systems. Topics include diagnosis and repair of climate control components and systems, recovery/recycling of refrigerants, and safety and environmental regulations. Upon completion, students should be able to diagnose and repair vehicle climate control systems.

**TRN 140A      Transp Climate Control Lab**

This course provides experiences for enhancing student skills in the diagnosis and repair of transportation climate control systems. Emphasis is placed on reclaiming, recovery, recharging, leak detection, climate control components, diagnosis, air conditioning equipment, tools and safety. Upon completion, students should be able to describe the operation, diagnose, and safely service climate control systems using appropriate tools, equipment, and service information.

**TRN 145      Adv. Transp Electronics**

*Prerequisite: Take TRN 120*

This course covers advanced transportation electronic systems including programmable logic controllers, on-board data networks, telematics, high voltage systems, navigation, collision avoidance systems and electronic accessories. Topics include interpretation of wiring schematics, reprogramming PLC's, diagnosing and testing data networks and other electronic concerns. Upon completion, students should be able to reprogram PLC's, diagnose and test data networks and other electronic concerns, and work safely with high voltage systems.

**TRN 170      PC Skills for Transp**

This course introduces students to personal computer literacy and Internet literacy with an emphasis on the transportation service industry. Topics include service information systems, management systems, computer-based systems, and PC-based diagnostic equipment. Upon completion, students should be able to access information pertaining to transportation technology and perform word processing.



# Automotive Systems Technology AAS (A60160T)

Page 8

Approved Humanities/Fine Arts Electives Associate in Applied Science Degree/Diploma		Approved Social/Behavioral Science Electives Associate in Applied Science Degree/Diploma	
ART 111	Art Appreciation	ANT 210	General Anthropology
ART 114	Art History Survey I	ANT 220	Cultural Anthropology
ART 115	Art History Survey II	ECO 151	Survey of Economics
DRA 111	Theatre Appreciation	ECO 251	Principles of Microeconomics
ENG 125	Creative Writing I	ECO 252	Principles of Macroeconomics
ENG 231	American Literature I	HIS 111	World Civilization I
ENG 232	American Literature II	HIS 112	World Civilization II
ENG 241	British Literature I	HIS 131	American History I
ENG 242	British Literature II	HIS 132	American History II
HUM 110	Technology & Society	HIS 222	African-American History I
HUM 115	Critical Thinking	HIS 223	African-American History II
HUM 120	Cultural Studies	HIS 226	The Civil War
HUM 122	Southern Culture	HIS 236	North Carolina History
HUM 150	American Women's Studies	POL 120	American Government
HUM 160	Introduction to Film	PSY 150	General Psychology
MUS 110	Music Appreciation	PSY 237	Social Psychology
MUS 112	Introduction to Jazz	PSY 241	Developmental Psychology
PHI 240	Introduction to Ethics	PSY 246	Adolescent Psychology
REL 110	World Religions	PSY 281	Abnormal Psychology
REL 211	Intro to Old Testament	SOC 210	Introduction to Sociology
REL 212	Intro to New Testament	SOC 213	Sociology of the Family
		SOC 220	Social Problems
		SOC 225	Social Diversity
		SOC 232	Social Context of Aging
		SOC 240	Social Psychology