

## Program Planning Guide

### Automotive Systems Technology, Associate in Applied Science Degree (A60160)

Program Length: 5 semesters

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

Program Sites: Lee Main Campus - Day Program

Suggested Course Schedule:		HOURS			Grade	Semester	Notes
		Class	Lab	Credit			
<b>1st Semester (Fall)</b>							
ACA 111	College Student Success	1	0	1			
AUT 151	Brake Systems	2	3	3			
AUT 151A	Brake Systems Lab	0	3	1			
CIS 111	Basic PC Literacy	1	2	2			
MAT 110	Mathematical Measurement & Literacy	2	2	3			
TRN 110	Intro to Transport Tech	1	2	2			
TRN 120	Basic Transp Electricity	4	3	5			
		11	15	17			
<b>2nd Semester (Spring)</b>							
AUT 141	Suspension & Steering Systems	2	3	3			
AUT 141A	Suspension & Steering Lab	0	3	1			
AUT 163	Adv. Automotive Electricity	2	3	3			
AUT 163A	Adv. Automotive Electricity Lab	0	3	1			
AUT 181	Engine Performance I	2	3	3			
AUT 181A	Engine Performance Lab	0	3	1			
ENG 111	Writing and Inquiry	3	0	3			
		9	18	15			
<b>3rd Semester (Summer)</b>							
AUT 114	Safety and Emissions	1	2	2			
AUT 114A	Safety and Emissions Lab	0	2	1			
AUT 183	Engine Performance II	2	6	4			
TRN 140	Transp. Climate Control	1	2	2			
TRN 140A	Transp Climate Control Lab	1	2	2			
		5	14	11			
<b>4th Semester (Fall)</b>							
AUT 116	Engine Repair	2	3	3			
AUT 116A	Engine Repair Lab	0	3	1			
AUT 231	Manual Drive Train/Axles	2	3	3			
AUT 231A	Manual Trans/Axles/Drtrains Lab	0	3	1			
AUT 281	Advanced Engine Performance	2	2	3			
ENG 114	Professional Research & Reporting	3	0	3			
		9	14	14			
<b>5th Semester (Spring)</b>							
AUT 221	Auto Transm/Transaxles	2	3	3			
AUT 221A	Auto Transm/Transaxles Lab	0	3	1			
TRN 145	Adv. Transp. Electronics	2	3	3			
TRN 130	Intro to Sustainable Transp	2	2	3			
	Humanities/Fine Arts Elective	3	0	3			
	Social/Behavioral Science Elective	3	0	3			
		12	11	16			

Total Semester Hours Credit: 73

## Course Descriptions:

<p><b>ACA 111 College Student Success</b> 1-0-1</p> <p>This course introduces the college's physical, academic, and social environment and promotes the personal development essential for success. Topics include campus facilities and resources; policies, procedures, and programs; study skills; and life management issues such as health, self-esteem, motivation, goal-setting, diversity, and communication. Upon completion, students should be able to function effectively within the college environment to meet their educational objectives.</p>	<p><b>AUT 141A Suspension &amp; Steering Lab</b> 0-3-1</p> <p><i>Corequisite: AUT 141</i></p> <p>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.</p>
<p><b>AUT 114 Safety and Emissions</b> 1-2-2</p> <p>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.</p>	<p><b>AUT 151 Brake Systems</b> 2-3-3</p> <p>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.</p>
<p><b>AUT 114A Safety and Emissions Lab</b> 0-2-1</p> <p><i>Corequisite: AUT 114</i></p> <p>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.</p>	<p><b>AUT 151A Brake Systems Lab</b> 0-3-1</p> <p><i>Corequisite: AUT 151</i></p> <p>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.</p>
<p><b>AUT 116 Engine Repair</b> 2-3-3</p> <p>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.</p>	<p><b>AUT 163 Adv Auto Electricity</b> 2-3-3</p> <p><i>Prerequisite: TRN 120</i></p> <p>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.</p>
<p><b>AUT 116A Engine Repair Lab</b> 0-3-1</p> <p><i>Corequisite: AUT 116</i></p> <p>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.</p>	<p><b>AUT 163A Adv Auto Electricity Lab</b> 0-3-1</p> <p><i>Corequisite: AUT 163</i></p> <p>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.</p>
<p><b>AUT 141 Suspension &amp; Steering Sys</b> 2-3-3</p> <p>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.</p>	<p><b>AUT 181 Engine Performance 1</b> 2-3-3</p> <p>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.</p>

# Automotive Systems Technology, Associate in Applied Science Degree (A60160)

~ 3 ~

<b>AUT 181A</b> <b>Engine Performance 1 Lab</b> <b>0-3-1</b> <i>Corequisite: AUT 181</i> 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 drive ability problems using appropriate test equipment/service information.	<b>AUT 281</b> <b>Adv Engine Performance</b> <b>2-2-3</b> This course utilizes service information and specialized test equipment to diagnose/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 advanced engine performance diagnosis and repair.
<b>AUT 183</b> <b>Engine Performance 2</b> <b>2-6-4</b> <i>Prerequisite: AUT 181</i> 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.	<b>ENG 111</b> <b>Writing and Inquiry</b> <b>3-0-3</b> <i>Prerequisites: Take one set: RED 090 and ENG 090, ENG 095, DRE 098, or appropriate placement test scores; or Multiple Measures waiver.</i> 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 and ICAA as a universal general education transfer component (UGETC) course in English Composition.
<b>AUT 221</b> <b>Auto Transm/Transaxles</b> <b>2-3-3</b> 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 and diagnose and repair automatic drive trains.	<b>ENG 114</b> <b>Professional Research and Reporting</b> <b>3-0-3</b> <i>Prerequisite: ENG 111</i> 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. The computer is used as a writing and design tool for this course. This course has been approved for transfer under the CAA and ICAA as a general education course in English Composition.
<b>AUT 221A</b> <b>Auto Transm/Transax Lab</b> <b>0-3-1</b> <i>Corequisite: AUT 221</i> 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.	<b>MAT 110</b> <b>Math Measurement &amp; Literacy</b> <b>2-2-3</b> <i>Prerequisite: Take one set: Set 1: DMA 010, DMA 020, and DMA 030 Set 2: MAT 060 and MAT 070 Set 3: MAT 060 and MAT 080 Set 4: MAT 060 and MAT 090 Set 5: MAT 095 or appropriate placement scores.</i> 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.
<b>AUT 231</b> <b>Man Trans/Axles/Drtrains</b> <b>2-3-3</b> 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 and diagnose and repair manual drive trains.	<b>TRN 110</b> <b>Intro to Transport Tech</b> <b>1-2-2</b> 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
<b>AUT 231A</b> <b>Man Trans/Ax/Drtrains Lab</b> <b>0-3-1</b> <i>Corequisite: AUT 231</i> 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.	

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 4-3-5**

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 2-2-3**

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 1-2-2**

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 Cont Lab 1-2-2**

*Corequisites: TRN 140*

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 2-3-3**

*Prerequisites: 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.