

Area: Technical Education
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Degree: A.S. - Automotive Analysis
 A.S. - Automotive Component Service Technician
 A.S. - Automotive Technology

Certificates: Air Conditioning Service
 Alternative Fuels and Green Vehicle Technology
 Automotive Analysis
 Automotive Component Service Technician
 Automotive Emissions Inspection and Repair Technician
 Automotive Technology
 Extreme Tuner
 Parts and Service
 Small Engines
 Snap-On™ Certification
 Transmission Service
 Undercar Service

Department Certificates:
 Automotive Brakes
 Automotive Suspension and Steering



Small Engines Certificate

Major Code: 011034C01

(Certificate was added after catalog was printed, see June 2019 Addendum for full listing.)

For additional Automotive programs see:
 Automotive Collision Technology Program
 Diesel Technology Program

The automotive technology program is a combination of classroom and hands-on shop experiences that prepare students for careers in all phases of automotive service and repair on all types of cars. Students are trained on the use of workshop manuals in traditional and computerized formats, hand held meters and scanners, and special shop tools including power and hand tools.

Highlights include:

- NATEF certified in: brakes, electrical/electronic systems, engine performance, suspension and steering, automatic transmission/transaxle, engine repair, heating and air conditioning, manual drive trains and axles.
- ASE certified instructors and programs.
- Students may begin 5-week courses 3 times during the semester.
- 5-week courses allow completion of some certificate programs in one semester.
- Small class size ensures individual attention and access to specialized equipment.
- Preparation for ASE and State Smog Certification (Emissions Control) exams.

DEGREES AND CERTIFICATES

Automotive Analysis Degree and Certificate

Major Code, degree: 011480A01

Major Code, certificate: 011480C01

This program prepares students for entry-level employment as smog and driveability service technicians. It also prepares students for Automotive Service Excellence (ASE) certification in Engine Repair A1, Automatic Transmissions/

Transaxles A2, Electrical A6, Engine Performance A8, and Advanced Engine Performance L1. This program also fulfills the Bureau of Automotive Repair (BAR) requirements for California State Smog Check Inspector and California State Smog Check Repair Technician test candidates.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- identify and implement safety procedures involved in the diagnosis, service, and repair of all major automobile and light truck systems.
- describe the function, operation, and characteristics of all major components in the following automotive systems: engines, automatic transmissions, electrical, air conditioning, emission control and computerized engine controls.
- identify and follow manufacturer's standards for proper automobile diagnosis and repair.
- operate hand and power tools necessary for automobile and light truck repair.
- operate diagnostic equipment and interpret test results.
- analyze, diagnose, and repair automotive engines, automatic transmissions, electrical systems, fuel delivery systems, ignition systems, emissions control systems, and computerized engine controls.
- operate a variety of aftermarket and factory scan tools.

Career Opportunities

Automotive Technician; Smog Check Technician

See losrios.edu/gainful-emp-info/gedt.php?major=011480C01 for Gainful Employment Disclosure.

(continued on next page)

(Automotive Analysis Degree and Certificate continued)

Requirements for Degree or Certificate		40 Units
AT 100	Technical Basics for the Automotive Professional	3
AT 105	Mathematics for Automotive Technology.....	3
AT 180	Automotive Data Acquisition.....	3
AT 181	Snap-On Multimeter Basics.....	1
AT 186	Snap-On MODIS – Automotive Diagnostic Use and Operation.....	2
AT 188	Snap-On SOLUS– Automotive Diagnostic Use and Operation.....	1
AT 189	Snap-On VERUS – Automotive Diagnostic Use and Operation.....	2
AT 330	Automotive Electrical Systems	6
AT 331	Advanced Automotive Electrical Systems	6
AT 332	Engine Performance & Electronic Engine Controls.....	6
AT 333	California State Smog Check Inspector Training	6
A minimum of 1 unit from the following:		1
AT 298	Work Experience in Automotive Technology (1 - 4)	
or AT 140	Advanced Automotive Skill and Speed Development (4)	

Associate Degree Requirements: The Automotive Analysis Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

Automotive Component Service Technician Degree and Certificate

Major Code, degree: 011269A01
Major Code, certificate: 011269C01

This degree or certificate prepares the student for employment repairing of various automobile components including those requiring computer technology.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- diagnose and repair major automotive components.
- describe the relationships between automotive components.
- complete service and repair work to industry time and quality standards.
- follow Federal EPA guidelines for handling and use of hazardous material found in a automotive shop.
- demonstrate safe work practices in the auto shop.

Career Opportunities

Employment as a technician, shop foreman, service manager for new car dealers, automotive repair shops, fleet operators.

See losrios.edu/gainful-emp-info/gedt.php?major=011269C01 for Gainful Employment Disclosure.

Requirements for Degree or Certificate		37 Units
AT 100	Technical Basics for the Automotive Professional.....	3
AT 105	Mathematics for Automotive Technology	3
AT 110	Automotive Brakes.....	3
AT 130	Manual Drive Trains and Axles	3
AT 140	Advanced Automotive Skill and Speed Development	3
AT 180	Automotive Data Acquisition.....	3
AT 310	Heating and Air-Conditioning Systems.....	3
AT 311	Suspension and Steering Systems.....	3
AT 313	Automatic Transmission and Transaxles.....	3
AT 314	Automotive Engine Repair.....	3
AT 330	Automotive Electrical Systems	6
A minimum of 1 unit from the following:		1
AT 298	Work Experience in Automotive Technology (1 - 4)	

Associate Degree Requirements: The Automotive Component Service Technician Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

Automotive Technology Degree and Certificate

Major Code, degree: 011037A01
Major Code, certificate: 011037C01

This program prepares students for entry-level positions in the automotive industry with emphasis on engine management systems, emission controls, and complete automotive systems diagnosis and repair. It prepares students for all nine Automotive Service Excellence (ASE) certifications including Advanced Engine Performance (L-1). This program also fulfills the Bureau of Automotive Repair (BAR) requirements for California State Smog Check Inspector and California State Smog Check Repair Technician test candidates.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- apply algebraic and mathematical concepts essential to advancement in the automotive industry.
- operate equipment and tools safely.
- evaluate, adjust, test and diagnose components/system malfunctions.
- diagnose, assess, and repair manual and automatic transmissions and transaxles.
- locate, download, and analyze technical manuals from the Internet, digital, and text sources.
- analyze, diagnose, and repair automotive electrical and electronic systems to ASE performance level.
- diagnose, troubleshoot, and repair basic air conditioning (AC) systems.
- diagnose, disassemble, inspect, clean, and reassemble components of the steering and suspension system.
- analyze, diagnose, and repair engines to ASE performance levels.
- analyze and repair fuel injection systems to ASE standards.
- diagnose engine emission control systems to ASE standards.
- prepare for the State Smog Check Inspector and California State Smog Check Repair Technician tests.

See losrios.edu/gainful-emp-info/gedt.php?major=011037C01 for Gainful Employment Disclosure.

Requirements for Degree or Certificate		52 Units
AT 100	Technical Basics for the Automotive Professional	3
AT 105	Mathematics for Automotive Technology	3
AT 110	Automotive Brakes	3
AT 130	Manual Drive Trains and Axles	3
AT 180	Automotive Data Acquisition	3
AT 310	Heating and Air-Conditioning Systems	3
AT 311	Suspension and Steering Systems	3
AT 313	Automatic Transmission and Transaxles	3
AT 314	Automotive Engine Repair	3
AT 330	Automotive Electrical Systems	6
AT 331	Advanced Automotive Electrical Systems	6
AT 332	Engine Performance & Electronic Engine Controls.....	6
AT 333	California State Smog Check Inspector Training	6
A minimum of 1 unit from the following:		1
AT 298	Work Experience in Automotive Technology (1 - 4)	
or AT 140	Advanced Automotive Skill and Speed Development (4)	

Associate Degree Requirements: The Automotive Technology Associate in Science (A.S.) Degree may be obtained by completion of the required program, plus general education requirements, plus sufficient electives to meet a 60-unit total. See ARC graduation requirements.

Air Conditioning Service Certificate

Major Code: 011315C01

This certificate program prepares the student for an entry level position in the automotive industry. This program also prepares the student for Automotive Service Excellence (ASE) certification in Air Conditioning A-7.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- identify and implement safety procedures involved in the service and repair of Automotive Heating, Ventilation, Air Conditioning (HVAC) systems.
- describe the function, operation and characteristics of each component in automotive HVAC systems.
- operate diagnostic equipment and interpret results from the equipment.
- diagnose automotive HVAC systems including manual, semi-automatic, and automatic.
- repair automotive HVAC systems including manual, semi-automatic, and automatic.
- diagnose engine cooling systems.
- repair engine cooling systems.
- follow Federal EPA guidelines for the handling and use of refrigerants.

See losrios.edu/gainful-emp-info/gedt.php?major=011315C01 for Gainful Employment Disclosure.

Requirements for Certificate	18 Units
AT 100	Technical Basics for the Automotive Professional.....3
AT 105	Mathematics for Automotive Technology.....3
AT 180	Automotive Data Acquisition.....3
AT 310	Heating and Air-Conditioning Systems.....3
AT 330	Automotive Electrical Systems6

Alternative Fuels and Green Vehicle Technology Certificate

Major Code: 011036C01

This certificate covers the various technologies used in the alternative fuels vehicles of today. Topics include biodiesel production, hybrid electric vehicles, and fuel cell technology.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- perform basic automotive services on alternative fuels vehicles.
- describe different alternative fuels vehicle designs.
- describe the process of making biodiesel.
- analyze electrical and electronic components and identify failures.
- use automotive test equipment such as digital multimeters and scan tools.
- perform high voltage system disable procedures on hybrid electric vehicles.

Career Opportunities

Alternative fuels is an emerging career field that is rapidly growing. This certificate prepares automotive technology students for entrance into this field, from servicing alternative fuels vehicles to developing alternative fuels technology. Additional career opportunities are likely as the industry continues to grow.

Requirements for Certificate	27 Units
AT 100	Technical Basics for the Automotive Professional.....3
AT 307	Biodiesel Technology4
AT 309	Introduction to Hybrid and Electric Vehicle Technology4
AT 330	Automotive Electrical Systems6
AT 331	Advanced Automotive Electrical Systems6
AT 316	Alternative Fuels and Advanced Technology Vehicles4

Automotive Emissions Inspection and Repair Technician Certificate

Major Code: 011272C01

This certificate prepares students for entry-level positions in the automotive industry as emissions inspectors or emissions repair technicians. It meets the state of California requirements for students seeking to apply for a California state smog inspector and/or repair license(s).

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- operate emission analyzers and tools safely.
- evaluate, adjust, test, and diagnose components/system malfunctions.
- research, download, and analyze technical manuals from the Internet, digital, and text sources.
- inspect, diagnose, and repair automotive electrical and electronic systems at Automotive Service Excellence (ASE) performance level.
- inspect, diagnose, and repair engines to ASE performance levels.
- inspect, diagnose, and repair fuel injection systems to ASE and BAR standards.
- diagnose engine emission systems to ASE and Bureau of Automotive Repair (BAR) standards.
- prepare for state smog inspector and repair technician certifications.

Career Opportunities

- California State Smog Inspector
- California State Smog Repair Technician

Requirements for Certificate	40 Units
AT 100	Technical Basics for the Automotive Professional.....3
AT 105	Mathematics for Automotive Technology.....3
AT 180	Automotive Data Acquisition.....3
AT 314	Automotive Engine Repair.....3
AT 330	Automotive Electrical Systems6
AT 331	Advanced Automotive Electrical Systems6
AT 332	Engine Performance & Electronic Engine Controls.....6
AT 333	California State Smog Check Inspector Training6
AT 334	BAR Specified Diagnostic and Repair Training.....4

Extreme Tuner Certificate

Major Code: 011482C01

This program covers advanced applications of emissions related principles including fuel control and efficiency management of modern automobiles. Topics include brakes, repair of electrical systems, suspension, steering, and engine repairs.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- evaluate vehicle horsepower safely and effectively by use of diagnostic equipment.
- analyze and demonstrate safe operating practices both in the shop and track environment with stock and modified vehicles.

(continued on next page)

(Extreme Tuner Certificate continued)

- validate and summarize outcomes of fuel, timing and power band modifications through hands-on exposure to live data derived before and after modifications.
- apply performance based principles to construct and operate a vehicle for competition, including classification divisions within a sanctioned racing organization.
- organize maintenance schedules and record keeping in order to keep vehicle competitive throughout a season.
- accurately interpret computer software data to make adjustments and modifications to improve performance and/or economy of a modern vehicle.

Career Opportunities

The “Tuner” industry is a rapidly growing industry. Professional technicians today are modifying vehicles for both on and off road application. This certificate prepares the students for the following career opportunities: alternative fuels diagnostic technician, off-road performance tuner, and a racing team crew member.

Requirements for Certificate	33 Units
AT 100 Technical Basics for the Automotive Professional.....	3
AT 110 Automotive Brakes.....	3
AT 130 Manual Drive Trains and Axles.....	3
AT 311 Suspension and Steering Systems.....	3
AT 314 Automotive Engine Repair.....	3
AT 316 Alternative Fuels and Advanced Technology Vehicles.....	4
AT 325 Engine Performance Testing & Tuning.....	4
AT 327 Introduction to Motorsports.....	4
AT 330 Automotive Electrical Systems.....	6

Parts and Service Certificate

Major Code: 011504C01

This certificate provides training for automotive parts and service advisors. Topics include parts knowledge, integrated computer management software, scheduling, inventory control, hazardous materials and warranty documentation requirements.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- apply established procedures in the automotive industry.
- ensure the satisfactory resolution of service-related customer issues.
- create a service work including dispatching and invoicing.

Career Opportunities

Various entry level positions in the automotive parts and service industry, such as service writers and parts specialists.

See losrios.edu/gainful-emp-info/gedt.php?major=011504C01 for Gainful Employment Disclosure.

Requirements for Certificate	18 Units
AT 100 Technical Basics for the Automotive Professional.....	3
AT 105 Mathematics for Automotive Technology.....	3
AT 107 Employability Skills for Technical Careers.....	2
AT 143 Automotive Parts.....	3
AT 146 Automotive Service Consultant.....	3
AT 180 Automotive Data Acquisition.....	3
And a minimum of 1 unit from the following:	1
AT 298 Work Experience in Automotive Technology (1 - 4)	

Snap-On™ Certification Certificate

Major Code: 011481C01

This certificate prepares students for entry-level positions in the automotive industry. It provides the knowledge and skills needed for certification using current Snap-On™ diagnostic tools.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- demonstrate safe, accurate use of tools and equipment.
- apply accurate measurement techniques.
- explain screen orientation and how to navigate through different functions of the VERUS scanner.
- perform the proper procedure to do an oil change on a vehicle.
- locate and analyze technical manuals from online computerized databases.
- apply retrieved data to specific vehicle conditions.

Career Opportunities

The automotive industry is growing and in need of technicians. Snap-On™ certifications are in high demand.

Requirements for Certificate	13 Units
AT 100 Technical Basics for the Automotive Professional.....	3
AT 107 Employability Skills for Technical Careers.....	2
AT 180 Automotive Data Acquisition.....	3
AT 181 Snap-On Multimeter Basics.....	1
AT 188 Snap-On SOLLUS— Automotive Diagnostic Use and Operation.....	1
AT 189 Snap-On VERUS – Automotive Diagnostic Use and Operation.....	2
A minimum of 1 unit from the following:	1
AT 140 Advanced Automotive Skill and Speed Development (3)	
AT 298 Work Experience in Automotive Technology (1 - 4)	

Transmission Service Certificate

Major Code: 011316C01

This certificate program prepares the student for an entry-level position in the automotive industry. This program includes Automotive Service Excellence (ASE) certification in A-2 automatic transmission and A-3 manual drive-train.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- analyze an automotive transmission, applying elements of drive-train theory.
- investigate an automotive electrical malfunction by locating, testing and identifying the failure in order to make the necessary repairs.
- research on-line and computer based automotive data sources in order to identify the correct repair procedure, and locate safety campaigns and bulletins.
- describe the operation of drive-train components in order to report and justify a recommended repair procedure.
- apply gear theory to drive-train malfunction.
- evaluate and recognize the drive-train malfunction.

Career Opportunities

Entry-level positions in automatic transmission, clutch, and drive-train repair.

See losrios.edu/gainful-emp-info/gedt.php?major=011316C01 for Gainful Employment Disclosure.

Requirements for Certificate		27 Units
AT 100	Technical Basics for the Automotive Professional.....	3
AT 105	Mathematics for Automotive Technology.....	3
AT 130	Manual Drive Trains and Axles.....	3
AT 140	Advanced Automotive Skill and Speed Development.....	3
AT 180	Automotive Data Acquisition.....	3
AT 313	Automatic Transmission and Transaxles.....	3
AT 317	Advanced Drivetrain	3
AT 330	Automotive Electrical Systems	6

Undercar Service Certificate

Major Code: 011305C01

The Undercar Service certificate provides entry-level training to perform repairs in automotive suspension, brake and exhaust service facilities.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- develop a resume and cover letter to plan for future career opportunities.
- perform run-out and parallelism evaluations on brake rotors and machine to manufacturer's specifications.
- measure and analyze suspension angles of a modern automobile and make adjustments necessary to bring the angle within manufacturer's specifications.
- identify modern exhaust system components and demonstrate how they relate to California emission control laws.
- research and synthesize brake, suspension and exhaust system information on electronic service manuals to provide information on repairs to meet industry standards.

Career Opportunities

This certificate provides students with knowledge for entry-level careers in the automotive suspension, brake and exhaust repair facilities.

See losrios.edu/gainful-emp-info/gedt.php?major=011305C01 for Gainful Employment Disclosure.

Requirements for Certificate		18 Units
AT 100	Technical Basics for the Automotive Professional	3
AT 106	Automotive Shop Operations	2
AT 110	Automotive Brakes	3
AT 145	Automotive Exhaust System	3
AT 180	Automotive Data Acquisition	3
AT 311	Suspension and Steering Systems	3
A minimum of 1 unit from the following:		1
AT 140	Advanced Automotive Skill and Speed Development (3)	
or AT 298	Work Experience in Automotive Technology (1 - 4)	

DEPARTMENT CERTIFICATES

Small Engines Certificate

Major Code: 011034C01

This certificate prepares students for employment in the automotive industry, specializing in small engines.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- demonstrate accepted safety and work procedures, including Occupational Safety and Health Administration (OSHA) and proper hazardous materials disposal.

- service and repair the starter systems of 2-cycle and 4-cycle small engines.
- identify the external and internal parts of 2-cycle and 4-cycle small engines.
- determine the proper lubrication and fuel requirements for 2-cycle and 4-cycle small engines using factory maintenance data.
- service and repair the cooling and oil systems of 2-cycle and 4-cycle small engines.
- remove, rebuild, install, adjust, and tune 2-cycle and 4-cycle small engine fuel delivery and ignition system components.

Career Opportunities

The automotive small engines industry is growing and in need of technicians. This certificate prepares students for employment in many different areas, including horticulture, off road vehicles, marine applications, and many others.

Requirements for Certificate		12 Units
AT 100	Technical Basics for the Automotive Professional	3
AT 180	Automotive Data Acquisition	3
AT 181	Snap-On Multimeter Basics	1
AT 301	Small Gas Engines, Outdoor Power Equipment (4)	4
or HORT 330	Small Gas Engines, Outdoor Power Equipment (4)	
A minimum of 1 unit from the following:		1
AT 140	Advanced Automotive Skill and Speed Development (3)	
AT 298	Work Experience in Automotive Technology (1 - 4)	

Automotive Brakes Certificate

Major Code: 011029C01

This certificate prepares students for employment in the automotive industry, specializing in brakes.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- describe shop orientation and safety issues.
- discuss the basics of vehicle service including oil, lubrication, inspection, and replacement of fluids.
- demonstrate proper handling, use, and disposal of hazardous materials in the automotive shop environment, combined with safety test.
- practice safety precautions and procedures when inspecting and repairing braking systems.
- analyze the various brake components used on automobiles and describe the functions of each.
- evaluate and diagnose brake components/system malfunctions.
- reassemble and adjust all components of the brake system following service manual procedures.
- arrange, clean, inspect, and measure all components of brake systems following established service manual procedures.

Career Opportunities

The automotive brakes industry is growing and in need of technicians.

Requirements for Certificate		11 Units
AT 100	Technical Basics for the Automotive Professional	3
AT 110	Automotive Brakes	3
AT 180	Automotive Data Acquisition	3
AT 181	Snap-On Multimeter Basics	1
A minimum of 1 unit from the following:		1
AT 140	Advanced Automotive Skill and Speed Development (3)	
AT 298	Work Experience in Automotive Technology (1 - 4)	

Automotive Suspension and Steering Certificate

Major Code: 011033C01

This certificate prepares students for employment in the automotive industry, specializing in suspension and steering.

Student Learning Outcomes

Upon completion of this program, the student will be able to:

- analyze, describe, and avoid unsafe working conditions and unsafe acts, as well as observe safety regulations in an auto repair facility.
- identify the various components used on automotive steering and suspension systems and describe the function of each.
- perform geometric centerline and thrustline alignments.
- disassemble, inspect, clean, and reassemble all components of the steering and suspension systems in accordance to service manual procedures.
- determine the need for and perform four-wheel alignments.
- diagnose any malfunction of the steering suspension components used on automobiles.

Career Opportunities

The automotive suspension and steering industry is growing and in need of technicians.

Requirements for Certificate		11 Units
AT 100	Technical Basics for the Automotive Professional	3
AT 180	Automotive Data Acquisition	3
AT 181	Snap-On Multimeter Basics	1
AT 311	Suspension and Steering Systems.....	3
A minimum of 1 unit from the following:		1
AT 140	Advanced Automotive Skill and Speed Development (3)	
AT 298	Work Experience in Automotive Technology (1 - 4)	

Automotive Technology

AT 100 Technical Basics for the Automotive Professional 3 Units

Hours: 26 hours LEC; 84 hours LAB

This course presents theoretical and practical training for entry-level automotive technicians. It presents basic automotive diagnosis and service procedures used in automotive shops. Projects performed in an automotive shop environment provide hands-on experience with industry shop tools. Shop service operations which meet Automotive Service Excellence (ASE) standards including safety, electrical, and other general automotive procedures are covered.

AT 105 Mathematics for Automotive Technology 3 Units

Corequisite: AT 100

General Education: AA/AS Area II(b)

Hours: 54 hours LEC

This course covers mathematics relative to the automotive trades. Course topics include the metric system, fraction, decimal equivalents, basic equations, ratio and proportion, gear ratio calculations, power, efficiency, and torque. This course is designed for Automotive Technology majors and covers all automotive-related mathematical areas from basic technician calculations to shop money management.

AT 106 Automotive Shop Operations 2 Units

Hours: 36 hours LEC

This course introduces operations of automotive dealerships, independent shops, and fleet shops. Emphasis is placed on the various influences that affect the technician's position within the operation. Topics include service, sales, parts, and financial operations. Customer Satisfaction Index (CSI) and the Bureau of Automotive Repair (BAR) are discussed. Field trips to local shops may be required.

AT 107 Employability Skills for Technical Careers 2 Units

Same As: ET 250 and WELD 150

Advisory: ENGWR 102 or 103, and ENGRD 116 with a grade of "C" or better; OR ESLR 320, ESLL 320, and ESLW 320 with a grade of "C" or better.

General Education: AA/AS Area III(b)

Hours: 36 hours LEC

This course provides the opportunity to explore technical careers while developing valuable work and life skills. It is an introduction to a variety of technically-related occupations, emphasizing technical careers in the Sacramento area. Activities are designed to enhance personal development, employability skills, and self esteem through leadership, citizenship, and character development. This course is not open to students who have completed ET 250 or WELD 150.

AT 108 Successful Automobile Selling Skills 1.5 Units

Hours: 27 hours LEC

This course covers successful automobile sales techniques. Topics include the process of selling cars, from greeting the consumer to closing the sale. It also covers understanding today's information age consumer.

AT 110 Automotive Brakes 3 Units

Corequisite: AT 100 and 180

Advisory: AT 181 and 188

Hours: 26 hours LEC; 84 hours LAB

This course covers the theory, design, adjustment, and repair or overhaul of brake systems and components. It covers the proper operation of power and hand devices used in the servicing of brake systems and components. This course meets Automotive Service Excellence (ASE) A5 standards.

AT 130 Manual Drive Trains and Axles 3 Units

Corequisite: AT 100 and 180

Advisory: AT 181 and 188

Hours: 26 hours LEC; 84 hours LAB

This course covers the basic principles of manual transmissions and transaxles and service. Topics include clutches, manual transmissions and transaxles, drive line and shafts, differentials/limited slip differentials, and four-wheel drive/all-wheel drive. This course meets Automotive Service Excellence (ASE) standard A3.

AT 140 Advanced Automotive Skill and Speed Development 3 Units

Corequisite: AT 100

Advisory: AT 110, 130, 311, and 314

Hours: 22.5 hours LEC; 94.5 hours LAB

This course covers automotive component diagnosis and repair, including brakes, suspension, heating and air conditioning, engine, transmissions, and other areas in preparation for competing in the regional, state, and national Skills USA competition. This course may be taken up to four times with different competitions.

AT 143 Automotive Parts 3 Units

Corequisite: AT 100

Hours: 45 hours LEC; 27 hours LAB

This course introduces the key workings of automotive systems and their related parts. It also offers preparation for the Automotive Service Excellence (ASE) P-2 Parts Specialist test. Topics include suspension systems, hazardous waste regulations, and inventory management.

AT 145 Automotive Exhaust System 3 Units

Prerequisite: AT 100 with a grade of "C" or better
Hours: 26 hours LEC; 84 hours LAB

This course is an introduction to the principles and service of exhaust systems, including pipe bending, cutting, welding, installation, repair, and inspection. It offers preparation to students for the Automotive Service Excellence (ASE) X1 exhaust systems test, which is required for the ASE Under-Car Specialist Certificate. Various welding techniques are covered during the semester.

AT 146 Automotive Service Consultant 3 Units

Corequisite: AT 180
Advisory: AT 100
Hours: 45 hours LEC; 27 hours LAB

This course introduces the basic requirements needed to perform the duties of an automotive service consultant. It also offers preparation for the Automotive Service Excellence (ASE) C-1 Service Consultant exam. Topics include utilization of diagnostic flow charts, recruiting techniques, and small business operations.

**AT 156 Light Duty Diesel/
Green Diesel Technology 4 Units**

Advisory: AT 314
Hours: 54 hours LEC; 54 hours LAB

This course introduces the diagnosis and repair of light duty diesel vehicles and covers the theory and operation of light duty diesel engines and their fuel delivery systems. Topics include diesel engine characteristics, early mechanical fuel delivery systems, early cylinder head design, and early engine construction. It also covers how to prepare these engines for conversion to green technology, such as low sulfur fuel, biodiesel, and alternative fuels. This course along with AT 157 is applicable for the field technician seeking training for ASE A9 certification and preparation for green technologies.

**AT 157 Advanced Light Duty Diesel/
Green Diesel Technology 4 Units**

Advisory: AT 156 and 330
Hours: 54 hours LEC; 54 hours LAB

This course focuses on late model turbocharged light duty diesel vehicles operating on low sulfur, biodiesel, or alternative fuels. Topics include computer controlled injection, emission control systems, sensors, actuators, computer modules, exhaust gas recirculation (EGR) systems, particulate traps, selective catalytic reduction (SCR) systems, and lean oxides of nitrogen (NO_x) traps. Diagnosis and repair of these systems are covered using computer diagnostic equipment to meet state emission compliance. This course along with AT 156 is applicable for the field technician seeking training for ASE A9 certification and preparation for green technologies.

**AT 177 Bureau of Automotive Repair (BAR)
Emissions Update UT032 1 Unit**

Advisory: AT 332 with a grade of "C" or better
Hours: 18 hours LEC

This course improves technicians' abilities to diagnose and repair emissions failures on complex computer-controlled vehicles.

AT 180 Automotive Data Acquisition 3 Units

Hours: 54 hours LEC

This course covers the skills needed to adequately retrieve and apply automotive data, including on-line technical manuals and computerized shop management programs. Computer-based automotive service repair order generation is covered as well as usage and application currently utilized in many automotive repair facilities.

AT 181 Snap-On Multimeter Basics 1 Unit

Hours: 18 hours LEC; 9 hours LAB

This course explores the functionality and capability of the digital multimeter to improve technicians' diagnostic expertise when working with electrical related problems and prepares them for the Snap-on certification.

AT 182 General Motors Diagnostic Tools 2 Units

Hours: 27 hours LEC; 27 hours LAB

This course explores the functionality and capability of General Motors diagnostic tools to improve technicians' expertise when working with On-Board computer-related problems.

**AT 184 Toyota Techstream – Automotive
Diagnostic Use and Operation 2 Units**

Hours: 27 hours LEC; 27 hours LAB

This course explores the functionality and capability of Toyota's Techstream to improve technicians' diagnostic expertise when working with On-Board computer-related problems.

**AT 186 Snap-On MODIS – Automotive
Diagnostic Use and Operation 2 Units**

Hours: 27 hours LEC; 27 hours LAB

This course explores the functionality and capability of Snap-On's MODIS (Modular Diagnostic Information System) to improve the technician's diagnostic expertise when working with On-Board computer related problems.

**AT 188 Snap-On SOLUS – Automotive
Diagnostic Use and Operation 1 Unit**

Hours: 18 hours LEC; 9 hours LAB

This course explores the functionality and capability of Snap-On's SOLUS to improve the technician's diagnostic expertise when working with On-Board computer-related problems.

**AT 189 Snap-On VERUS - Automotive
Diagnostic Use and Operation 2 Units**

Hours: 27 hours LEC; 27 hours LAB

This course explores the functionality and capability of Snap-On's VERUS to improve technicians' diagnostic expertise when working with on-board computer-related problems.

AT 190 Advanced Student Projects 2 Units

Prerequisite: AT 100 with a grade of "C" or better
Hours: 108 hours LAB

This course provides opportunities to pursue advanced laboratory projects in all eight of the Automotive Service Excellence (ASE) educational areas. Projects are selected by the Automotive Department.

**AT 251 Automotive Electronic
Accessories and Installation 3 Units**

Corequisite: AT 330 or ET 302
Hours: 36 hours LEC; 54 hours LAB

This course covers the principles and processes involved in the installation of mobile entertainment, security, positioning, and other electrical and electronic related systems and components. Safety, circuit diagrams, inspection, wiring, installation, and troubleshooting techniques are covered along with the operational characteristics of the various electrical circuits. This course offers preparation to become a qualified Mobile Electronics Certified Professional (MECP) installer. This course is not open to students who have taken ET 251. Field trips are required.

**AT 295 Independent Studies
in Automotive Technology 1-3 Units**

Prerequisite: None

Hours: 54-162 hours LAB

Independent Study is an opportunity for the student to extend classroom experience in this subject, while working independently of a formal classroom situation. Independent study is an extension of work offered in a specific class in the college catalog. To be eligible for independent study, students must have completed the basic regular catalog course at American River College. They must also discuss the study with a professor in this subject and secure approval. Only one independent study for each catalog course will be allowed.

**AT 298 Work Experience
in Automotive Technology 1-4 Units**

Advisory: AT 100; and eligible for ENGRD 310 or ENGRD 312 AND ENGWR 300; OR ESLR 340 AND ESLW 340.

Enrollment Limitation: Students must be in a paid or unpaid internship, volunteer position, or job related to the automotive industry with a cooperating site supervisor. Students are advised to consult with the Automotive Department faculty to review specific certificate and degree work experience requirements.

General Education: AA/AS Area III(b)

Hours: 60-300 hours LAB

This course provides students with opportunities to develop marketable skills in preparation for employment or advancement within the automotive field. It is designed for students interested in work experience and/or internships in associate degree level or certificate occupational programs. Course content includes understanding the application of education to the workforce, completion of Title 5 required forms which document the student's progress and hours spent at the work site, and developing workplace skills and competencies. During the semester, the student is required to complete 75 hours of related paid work experience, or 60 hours of related unpaid work experience for one unit. An additional 75 or 60 hours of related work experience is required for each additional unit. All students are required to attend the first class meeting, a mid-semester meeting, and a final meeting. Additionally, students who have not already successfully completed a Work Experience course will be required to attend weekly orientations while returning participants may meet individually with the instructor as needed. Students may take up to 16 units total across all Work Experience course offerings. This course may be taken up to four times when there are new or expanded learning objectives. Only one Work Experience course may be taken per semester.

**AT 301 Small Gas Engines,
Outdoor Power Equipment 4 Units**

Same As: HORT 330

Course Transferable to CSU

Hours: 54 hours LEC; 54 hours LAB

This course covers the basic operational theory, servicing, adjusting, and maintenance of 2-cycle and 4-cycle small gas engines as they pertain to the automotive and horticulture industries. In addition, the small engine repair skill areas included in the regional, state, and national Skills USA competitions are covered. AT 301 and/or HORT 330 may be taken two times for credit for a maximum of 8 units, using different equipment.

AT 307 Biodiesel Technology 4 Units

Corequisite: AT 100 or 150

Course Transferable to CSU

Hours: 54 hours LEC; 54 hours LAB

This course covers the chemistry, production, and impact of biodiesel technology. It also covers how to convert vehicle fuel systems to biodiesel and how this process affects warranties.

**AT 309 Introduction to Hybrid
and Electric Vehicle Technology 4 Units**

Prerequisite: AT 315 with a grade of "C" or better

Advisory: AT 110, 310, 313, 314, and 322

Course Transferable to CSU

Hours: 54 hours LEC; 54 hours LAB

This course covers the theory and operation of hybrid and electric vehicle operation. Each of the major manufacturers' vehicles is discussed along with the safety and service procedures that apply to these vehicles. Hands-on activities include major service procedures and basic diagnostics on the most common hybrid and electric vehicles in the market today. It is recommended that a student take the electrical, brakes, and air conditioning courses or a have previous field experience before taking this course.

AT 310 Heating and Air-Conditioning Systems 3 Units

Corequisite: AT 100

Advisory: AT 181 and 188

Course Transferable to CSU

Hours: 26 hours LEC; 84 hours LAB

This course is an introduction to automotive heating and air conditioning theory. It meets Automotive Service Excellence (ASE) standard A7 and combines performance testing and repair practices as utilized in the industry.

AT 311 Suspension and Steering Systems 3 Units

Corequisite: AT 100

Advisory: AT 181 and 188

Course Transferable to CSU

Hours: 26 hours LEC; 84 hours LAB

This course is an introduction to advanced principles and service of suspension and steering systems, including alignment of equipment, alignment procedures, and the diagnosis and repair of suspension components. It meets Automotive Service Excellence (ASE) A4 certification standards.

**AT 313 Automatic Transmission
and Transaxles 3 Units**

Corequisite: AT 100

Advisory: AT 181 and 188

Course Transferable to CSU

Hours: 26 hours LEC; 84 hours LAB

This course covers the basics of automatic transmission and transaxle principles and service. Topics include hydraulic principles, diagnosis and service, power conversion, and automatic transmission operation. AT 313 and AT 317 together meet Automotive Service Excellence (ASE) standard A2.

AT 314 Automotive Engine Repair 3 Units

Corequisite: AT 100 and 105

Course Transferable to CSU

Hours: 26 hours LEC; 84 hours LAB

This course covers the principles, operation, and diagnosis of automotive engines, including basic engine operation and construction, parts identification and location, engine dis-assembly procedures, engine diagnosis, engine repair and rebuilding procedures, and engine reassembly procedures. Completion of AT 314 and AT 332 meet Automotive Service Excellence (ASE) A1 standards.

**AT 316 Alternative Fuels
and Advanced Technology Vehicles 4 Units**

Corequisite: AT 100

Course Transferable to CSU

Hours: 54 hours LEC; 54 hours LAB

This hands-on course provides an overview of both conventional and alternative fuels with their impact on vehicle emissions in both gasoline and diesel engines. In addition, advanced vehicle

technologies such as hybrid electric, direct injection, and fuel cells are explored. Topics include gasoline, E85, M85, diesel, biodiesel, CNG, LPG, LNG, RNG, EVs, HEVs, fuel cells, and dynamometer testing. Completion of this course helps students prepare for the Automotive Service Excellence (ASE) F1 Alternative Fuels Certification in addition to the ASE L3 Hybrid/Electric Vehicle Specialist Certification. Field trips may be required.

AT 317 Advanced Drivetrain 3 Units

Prerequisite: AT 313 with a grade of "C" or better

Course Transferable to CSU

Hours: 26 hours LEC; 84 hours LAB

This course covers advanced aspects of automatic transmissions, automatic transaxles, manual drivetrains, diagnosis, service, and repair. Topics include mechanical, electrical, and electronic diagnosis, diagnosis and repair of vibration problems, advanced scan tool operation, and dynamometer testing. AT 317 and AT 313 together meet Automotive Service Excellence (ASE) standard A2.

AT 325 Engine Performance Testing & Tuning 4 Units

Prerequisite: AT 301, 316, and 333 with grades of "C" or better

Course Transferable to CSU

Hours: 54 hours LEC; 54 hours LAB

This course explores the performance and efficiency of modern vehicle engine systems through the use of engine dynamometers and flowbench test equipment. Course topics include dynamometer performance testing, high performance engine assembly, engine computer reprogramming, fuel injector flow testing, forced induction systems and how to achieve maximum performance by choosing components that complement each other. Field trips may be required.

AT 327 Introduction to Motorsports 4 Units

Prerequisite: AT 110, 130, and 311 with grades of "C" or better

Advisory: AT 325, 330, and 333

Course Transferable to CSU

Hours: 54 hours LEC; 54 hours LAB

This course is an introduction to motorsports through lecture, hands-on activities, and raceway experience. It discusses the operation of a race team, racing events, and race track operation. Course topics include the setup and modification of vehicle safety equipment, suspension, braking, and data acquisition systems. Field trips may be required.

AT 330 Automotive Electrical Systems 6 Units

Corequisite: AT 100, 105, and 180

Course Transferable to CSU

Hours: 81 hours LEC; 81 hours LAB

This course covers the principles, operation, and diagnosis of automotive electrical systems including fundamentals of electricity (DC), electrical circuits, battery operation, fundamentals of magnetism, charging systems, starting systems, and electrical schematics. Along with completion of AT 331, this course meets Automotive Service Excellence (ASE) certification standards for the A6 Electrical Systems certification.

AT 331 Advanced Automotive Electrical Systems 6 Units

Prerequisite: AT 180 and 330 with grades of "C" or better

Advisory: AT 110 and 310

Course Transferable to CSU

Hours: 81 hours LEC; 81 hours LAB

This course covers the principles of advanced electrical diagnostics. Topics include automotive computers, vehicle networks, driver information systems and accessories, supplemental restraint systems, antilock brakes, tire pressure monitoring systems, and climate control. Along with completion of AT 330, this course meets Automotive Service Excellence (ASE) certification standards for the A6 Electrical Systems certification.

AT 332 Engine Performance & Electronic Engine Controls 6 Units

Prerequisite: AT 331 and AT 333 with grades of "C" or better

Course Transferable to CSU

Hours: 81 hours LEC; 81 hours LAB

This course covers the principles, operation, and diagnosis of automotive engine performance systems including engine mechanics, ignition, fuel delivery, and electronic engine controls. It includes extensive troubleshooting, use of diagnostic test equipment, lab oscilloscopes, scantools, and emission analyzers. Along with completion of AT 333, this course meets Automotive Service Excellence (ASE) certification standards for the A8 Engine Performance certification. This course is formerly known as AT 326.

AT 333 California State Smog Check Inspector Training 6 Units

Prerequisite: AT 314 with a grade of "C" or better

Course Transferable to CSU

Hours: 81 hours LEC; 81 hours LAB

This course covers the Bureau of Automotive Repair (BAR) certified Level 1 and Level 2 smog inspector training. Topics include smog check laws, rules and regulations; standards of practice; engine theory, design, and operation; emission control theory, design, identification, operation, and testing; smog inspection visual and functional testing procedures; and loaded mode emission testing. It is required for first-time licensed inspection technicians. Along with completion of AT 332, this course meets Automotive Service Excellence (ASE) certification standards for the A8 Engine Performance certification. This course is formerly known as AT 323.

AT 334 BAR Specified Diagnostic and Repair Training 4 Units

Course Transferable to CSU

Hours: 72 hours LEC

State law currently requires that applicants for a Smog Check Repair license possess Automotive Service Excellence (ASE) certifications in the following areas: A6 - Automotive Electrical/Electronic systems; A8 - Automotive Engine Performance; L1 - Advanced Engine Performance. This course is an intensive review of automotive electrical/electronic systems, engine mechanical systems, emission control systems, and computer control systems as they relate to automotive emissions controls. It satisfies the ASE certification requirement when applying for a Smog Check technician license and may be used by the applicant in lieu of the ASE certifications.

AT 495 Independent Studies in Automotive Technology 1-3 Units

Course Transferable to CSU

Hours: 54-162 hours LAB

Independent Study is an opportunity for the student to extend classroom experience in this subject, while working independently of a formal classroom situation. Independent study is an extension of work offered in a specific class in the college catalog. To be eligible for independent study, students must have completed the basic regular catalog course at American River College. They must also discuss the study with a professor in this subject and secure approval. Only one independent study for each catalog course will be allowed.