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Degree: A.S. - Automotive Analysis  
 A.S. - Automotive Component Service Technician  
 A.S. - Automotive Technology  
 Certificates: Automotive Analysis  
 Automotive Claims Estimator  
 Automotive Component Service Technician  
 Automotive Service Technician  
 Automotive Technology  
 Transmission Service

Certificates of Completion offered by the department:  
 Air Conditioning Service  
 Parts and Service  
 Undercar Service

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.

### Automotive Analysis Degree and Certificate

This Automotive degree and certificate prepares the student for entry level employment as a smog and driveability service technician. The certificate also prepares the student for Automotive Service Excellence (ASE) certification in Engine Repair A1, Automatic Transmissions/Transaxles A2, Electrical A6, Engine Performance A8, Advanced Engine Performance L1 along with the California Enhanced Area (EA) Smog Check License.

#### 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, transmissions, brakes, suspension, electrical, air conditioning, emission control and computerized engine controls.
- Identify and follow manufacture 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.
- Demonstrate the skills and knowledge to analyze, diagnose, and repair automotive engines, automatic and manual transmissions, suspension systems, braking systems, electrical systems, fuel delivery systems, ignition systems, emissions control systems and computerized engine controls.

#### Career Opportunities

Automotive Technician; Smog Check Technician

Requirements for Degree or Certificate	52 Units
<b>1st Semester</b>	
AT 100	Technical Basics for the Automotive Professional .....2
AT 105	Mathematics for Automotive Technology .....3
AT 180	Automotive Data Acquisition .....3
<b>2nd Semester</b>	
AT 110	Automotive Brakes .....4
AT 311	Suspension and Steering Systems .....4
AT 312	Electrical Systems .....4
<b>3rd Semester</b>	
AT 130	Manual Drive Trains and Axles .....4
AT 313	Automatic Transmission and Transaxles .....4
AT 314	Automotive Engine Repair .....4
<b>4th Semester</b>	
AT 310	Heating and Air-Conditioning Systems .....4
AT 322	Engine Performance and Electronic Engine Controls ....6
<b>Final Semester</b>	
AT 315	Advanced Engine/Chassis Electrical .....4
AT 323	Clean Air Car Course .....6

**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

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.

Requirements for Degree or Certificate	40 Units
AT 100	Technical Basics for the Automotive Professional .....2
AT 105	Mathematics for Automotive Technology .....3
AT 110	Automotive Brakes .....4
AT 130	Manual Drive Trains and Axles .....4
AT 140	Advanced Automotive Skill and Speed Development ...4
AT 180	Automotive Data Acquisition .....3
AT 310	Heating and Air-Conditioning Systems .....4
AT 311	Suspension and Steering Systems .....4
AT 312	Electrical Systems .....4
AT 313	Automatic Transmission and Transaxles .....4
AT 314	Automotive Engine Repair .....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

This program prepares the student for an entry level position in the automotive industry with emphasis on engine management systems, emission controls, and complete automotive systems diagnosis and repair. The program also prepares the student for all 9 Automotive Service Excellence (ASE) certifications including Advanced Engine Performance (L-1) as well as the state Enhanced Area (EA) Smog Certification Test.

### Student Learning Outcomes

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

- Apply algebraic and mathematical concepts essential to and for 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, cdroms, and text sources.
- Analyze, diagnose, and repair automotive electrical and electronic systems to ASE performance level.

- Diagnose, trouble shoot, 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 EA smog certification.

Requirements for Degree or Certificate	60 Units
AT 100	Technical Basics for the Automotive Professional .....2
AT 105	Mathematics for Automotive Technology .....3
AT 110	Automotive Brakes .....4
AT 130	Manual Drive Trains and Axles .....4
AT 180	Automotive Data Acquisition .....3
AT 310	Heating and Air-Conditioning Systems .....4
AT 311	Suspension and Steering Systems .....4
AT 312	Electrical Systems .....4
AT 313	Automatic Transmission and Transaxles .....4
AT 314	Automotive Engine Repair .....4
AT 320	Engine Performance Technology .....12
AT 321	Engine Performance Technology .....12

**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

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.

Requirements for Certificate	16 Units
AT 100	Technical Basics for the Automotive Professional .....2
AT 105	Mathematics for Automotive Technology .....3
AT 180	Automotive Data Acquisition .....3
AT 310	Heating and Air-Conditioning Systems .....4
AT 312	Electrical Systems .....4

## Automotive Claims Estimator Certificate

Requirements for Certificate	21 Units
AT 100	Technical Basics for the Automotive Professional .....2
AT 105	Mathematics for Automotive Technology .....3
AT 126	Automotive Collision Estimating .....2
AT 127	Automotive Collision Estimating II .....2
AT 310	Heating and Air-Conditioning Systems .....4
AT 311	Suspension and Steering Systems .....4
BUS 212	Marketing for Small Businesses .....1
BUS 218	Management Skills for the Small Business .....1
BUS 224	Customer Service .....1
<b>And a minimum of 1 unit from the following:</b> .....1	
BUSTEC 300	Beginning Keyboarding/Applications (1 - 3)

## Automotive Service Technician Certificate

This certificate prepares the student for an entry-level position in the automotive industry. It also prepares the student for Automotive Service Excellence (ASE) certifications in Automotive Brakes, Manual Drive Trains and Axles, Heating and Air-Conditioning Systems, Suspension and Steering Systems, Electrical Systems, Automatic Transmission and Transaxles, and Automotive Engine Repair.

### Student Learning Outcomes

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

- Apply essential algebraic and mathematical concepts in the automotive industry.
- Operate equipment and tools safely.
- Evaluate, adjust, test and diagnose brake components/system malfunctions.
- Diagnose, assess and repair manual transmission and transaxles.
- Locate, download, and analyze technical manuals from the Internet, CDROM, and text sources.
- Diagnose and troubleshoot basic Air Conditioning systems.
- Diagnose malfunctions and disassemble, inspect, clean and reassemble all components of the steering and suspension systems in accordance with service manual procedures.
- Diagnose and repair electrical systems at industry ASE performance standard levels.
- Diagnose and assess transmission and transaxle mechanical, electrical and hydraulic systems.
- Repair and diagnose engines at ASE performance standard levels.

### Career Opportunities

The Automotive Service Technician certificate prepares the student for entry level-positions in the fields of Auto Technician, Auto/Truck Specialist, Field Service, Sales Representative, Tune-up and Electrical Specialist.

Requirements for Certificate	36 Units
AT 100	Technical Basics for the Automotive Professional .....2
AT 105	Mathematics for Automotive Technology .....3
AT 110	Automotive Brakes .....4
AT 130	Manual Drive Trains and Axles .....4
AT 180	Automotive Data Acquisition .....3
AT 310	Heating and Air-Conditioning Systems .....4
AT 311	Suspension and Steering Systems .....4
AT 312	Electrical Systems .....4
AT 313	Automatic Transmission and Transaxles .....4
AT 314	Automotive Engine Repair .....4

## Parts and Service Certificate

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 positions in the automotive parts and service industry, such as service advisors and parts managers.

Requirements for Certificate	17 Units
AT 100	Technical Basics for the Automotive Professional .....2
AT 105	Mathematics for Automotive Technology .....3
AT 107	Employability Skills for Technical Careers .....2
AT 143	Automotive Parts .....3
AT 146	Automotive Service Advising .....3
AT 180	Automotive Data Acquisition .....3
<b>And a minimum of 1 unit from the following:</b> .....1	
AT 298	Work Experience in Automotive Technology (1 - 4)

## Transmission Service Certificate

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.

Requirements for Certificate	28 Units
AT 100	Technical Basics for the Automotive Professional .....2
AT 105	Mathematics for Automotive Technology .....3
AT 130	Manual Drive Trains and Axles .....4
AT 140	Advanced Automotive Skill and Speed Development ...4
AT 180	Automotive Data Acquisition .....3
AT 210	Advanced Automatic Transmission and Transaxle .....4
AT 312	Electrical Systems .....4
AT 313	Automatic Transmission and Transaxles .....4

## Undercar Service Certificate

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.

#### Requirements for Certificate: 17 Units

AT 100	Technical Basics for the Automotive Professional .....	2
AT 110	Automotive Brakes .....	4
AT 145	Automotive Exhaust System .....	4
AT 180	Automotive Data Acquisition .....	3
AT 311	Suspension and Steering Systems .....	4

### AT 100 Technical Basics for the Automotive Professional 2 Units

Hours: 36 hours LEC; 27 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. Lab 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

General Education: AA/AS Area II(b)

Hours: 54 hours LEC

This course covers mathematics as it relates to the automotive trades. Metric system, fraction, decimal equivalents, basic equations, ratio and proportion, gear and pulley ratios, power, efficiency, torque and thrust are covered.

### AT 106 Automotive Dealership Operations 2 Units

Hours: 36 hours LEC

This course is an introduction to dealership operations and includes all of the various influences on the technician's position within the operation. Topics include service, sales, parts, and financial department's positions and operations. Customer Satisfaction Index (CSI) and the Bureau of Automotive Repair (BAR) are discussed. Field trips to local dealerships may be required.

### AT 107 Employability Skills for Technical Careers 2 Units

Same As: ET 250 and WELD 150

General Education: AA/AS Area III(b)

Hours: 36 hours LEC

This course provides the opportunity of exploring technical careers while developing valuable work and life skills. It is an introduction to a variety of technically-related occupations. Emphasis is placed on exploring technical careers in the Sacramento area. Activities are designed to enhance personal development, employability skills, and self esteem through leadership, citizenship, and character development.

### 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 4 Units

Corequisite: AT 100 and 180

Hours: 54 hours LEC; 54 hours LAB

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

### AT 121 Automotive Collision - Removal and Replacement of Non-Structural Components and Damage Analysis 4 Units

Hours: 54 hours LEC; 54 hours LAB

This course provides the technical information and hands-on experience to perform repairs to collision damaged vehicles. Topics covered are to correctly and safely remove, inspect, replace and align, bolt-on body components. It also covers the protection of mechanical and electrical systems, removal of damaged parts, anchoring theory and techniques applicable to damaged vehicles. Interpretation of damage analysis reports and types of collision damage are covered. Students enrolled in the Collision Technology program at American River College (ARC) may be eligible to apply for Inter-Industry Conference on Automotive Collision Repair (I-CAR) points. This ARC/I-CAR alliance course prepares students for Automotive Service Excellence (ASE) testing and National Automotive Technicians Education Foundation (NATEF) training standards.

### AT 122 Automotive Collision - Non-Structural Repairs 4 Units

Hours: 54 hours LEC; 54 hours LAB

This course provides the technical information and hands-on experience to perform limited and supervised repairs to collision damaged vehicles. It covers the principles and theory of automobile collision repair including procedures for replacement of door skins and quarter panels. Additionally, metal straightening theory, and techniques for steel and aluminum, and making repair versus replacement decisions are covered. Measuring systems techniques and their use in diagnosing and correcting collision damage are also presented. Students enrolled in the Collision Technology program at American River College (ARC) may be eligible to apply for Inter-Industry Conference on Automotive Collision Repair (I-CAR) points. This ARC/I-CAR alliance courses also prepares students for Automotive Service Excellence (ASE) testing and National Automotive Technicians Education Foundation (NATEF) training standards.

**AT 123 Automotive Collision - Structural Panel & Component Repairs 4 Units***Hours: 54 hours LEC; 54 hours LAB*

This course covers principles and theory of automobile collision repair including component alignment, component replacement, structural panel repair or replacement, and chassis/frame alignment. Sectioning and full-panel replacement techniques and procedures are covered. Practical applications are emphasized. Students enrolled in the Collision Technology program at American River College (ARC) may be eligible to apply for Inter-Conference on Automotive Collision Repair (I-CAR) points. This ARC/I-CAR alliance courses also prepares students for Automotive Service Excellence (ASE) testing and National Automotive Technicians Education Foundation (NATEF) training standards.

**AT 124 Automotive Refinishing Technology 4 Units***Hours: 54 hours LEC; 54 hours LAB*

This course covers the principles and theories of paint finish application, tinting and blending, color evaluation, color adjustment, and evaluating color mismatch problems. Topics include paint application techniques, restoration of corrosion protection, blending procedures, new and emerging paint technologies, color identification, and interpreting vehicle color codes. It also addresses compliance with rules and regulations as determined by Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), Clean Air Act, and Volatile Organic Compound (VOC). Students enrolled in the Collision Technology program at American River College (ARC) may be eligible to apply for Inter-Industry Conference on Automotive Collision Repair (I-CAR) points. This ARC/I-CAR alliance courses also prepares students for Automotive Service Excellence (ASE) testing and National Automotive Technicians Education Foundation (NATEF) training standards.

**AT 126 Automotive Collision Estimating 2 Units***Hours: 18 hours LEC; 54 hours LAB*

This course is designed to provide the student with both technical and practical skills necessary to properly diagnose collision damaged vehicles and to document the costs and times necessary to repair collision damaged vehicles. Using state-of-the-art computer-generated estimating programs and video imaging, the student will analyze collision-damaged vehicles and then prepare itemized estimates detailing the required procedures and parts necessary to correctly repair the vehicle.

**AT 127 Automotive Collision Estimating II 2 Units***Prerequisite: AT 126 with a grade of "C" or better.**Hours: 18 hours LEC; 54 hours LAB*

This course is a comprehensive study of computer-assisted estimating and office management systems used in the automotive collision repair industry. It includes a thorough study of all aspects of an estimator working in a collision repair facility environment. Advanced collision estimating concepts are presented.

**AT 130 Manual Drive Trains and Axles 4 Units***Corequisite: AT 100 and 180**Hours: 54 hours LEC; 54 hours LAB*

This course covers the basics of manual transmission and transaxles principles 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 4 Units***Corequisite: AT 110, 130, 311, 312, and 314.**Hours: 54 hours LEC; 54 hours LAB*

This course covers automotive heavy component diagnosis and repair, including engine and transmission removal and replacement, as well as in-car engine repairs, adjustments, and service. This course may be taken four times requiring a different project every semester.

**AT 143 Automotive Parts 3 Units***Corequisite: AT 100**Advisory: AT 102**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 4 Units***Prerequisite: AT 100 with a grade of "C" or better**Hours: 54 hours LEC; 54 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 prepares students for the Automotive Service Excellence (ASE X1) exhaust systems test, which is required for the ASE Under-Car Specialist Certificate. Different welding techniques are covered each semester. This course may be taken three times with a different technique.

**AT 146 Automotive Service Advising 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 advisor. 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 understanding of small business operations.

**AT 150 Introduction to Diesel Technology 4 Units***Hours: 54 hours LEC; 54 hours LAB*

This course introduces the field of diesel technology. It covers proper safety and hazardous waste training, use of basic hand and power tools, and the basic workings of the diesel engine.

**AT 151 Diesel Engine Repair 4 Units***Hours: 54 hours LEC; 54 hours LAB*

This course covers basic engine principles for the diesel engine. It covers disassembly and reassembly of diesel engine systems, including cleaning and safe removal of engines, fuel injection systems, valve trains, and engine heads.

**AT 152 Basic Hydraulic Principles of Diesel Technology 4 Units***Hours: 54 hours LEC; 54 hours LAB*

This course provides an introduction to the basic hydraulic principles and functions of the diesel engine. Topics include hydraulic fundamentals and principles, functions of hydraulic fluids, directional and flow control valves, and machine hydraulic overview.

**AT 153 Diesel Brake Systems 4 Units***Advisory: AT 100**Hours: 54 hours LEC; 54 hours LAB*

This course covers the operation of diesel brake systems and components. Topics include band, shoe, caliper, and full disc brakes.

**AT 154 Diesel Electrical Systems 4 Units***Corequisite: AT 105**Advisory: AT 100**Hours: 54 hours LEC; 54 hours LAB*

This course covers the operation of diesel electrical systems. Topics include electrical circuits, test instruments, charging systems, and electrical starting systems.

**AT 155 Diesel Power Trains 4 Units***Hours: 54 hours LEC; 54 hours LAB*

This course covers the diesel power train. Topics include inspection and adjustment of clutch linkage, flywheel inspection, and replacement of clutch brakes.

**AT 165 Advanced DSO/Scanner Operations 1.5 Units***Prerequisite: Completion of AT 175, 322, 323, and 324; or hold a current smog license.**Hours: 27 hours LEC*

This advanced course covers the use of various lab scopes and hand-held computer scanners with heavy emphasis on wave form analysis and data stream diagnostics. In addition, this course will provide a hands-on approach to evaluating system readiness monitors including mode 6 and 7 validation.

**AT 172 BAR A-6 Alternative - Electrical and Electronic Systems Training 1.5 Units***Hours: 27 hours LEC*

This course is an intensive Bureau of Automotive Repair-approved review of automotive electrical/electronic systems. It partially satisfies ASE certification requirements when applying for a Smog Check Technician license.

**AT 173 BAR A-8 Alternative - Engine Performance Systems 1.5 Units***Hours: 27 hours LEC*

This course is an intensive Bureau of Automotive Repair (BAR)-approved review of automotive engine performance offered as an alternative to the ASE A-8 certification. It partially qualifies auto technicians for a Smog Check Technician license exam.

**AT 174 BAR Approved L1 Alternative- Advanced Engine Performance/Emission Systems 2 Units***Advisory: AT 312 and AT 321 or 322, or engine performance experience in the automotive field.**Hours: 36 hours LEC*

This course is preparation for the Bureau of Automotive Repair (BAR) - approved Advanced Engine Performance Exam. Topics covered include Power Train Diagnosis, Computer Control Diagnostics, Ignition System Diagnostics, Fuel and Air Induction Diagnostics, Emission Control System Diagnostics, and I/M Failure Diagnosis. The BAR L1 Alternative test is administered at the end of the class. This course may be taken four times. Credit/No Credit only.

**AT 175 BAR OBD (On Board Diagnostics) II Update Course 1.5 Units***Hours: 27 hours LEC*

This course presents an overview of automotive On-Board Diagnostic (OBD) systems. Instruction will include a history of OBD systems, computer diagnostics, government and Society of Automotive Engineers (SAE) regulations, OBDII diagnostics, monitors and reference information. This is a Bureau of Automotive Repair approved course.

**AT 176 Bureau of Automotive Repair (BAR) Emissions Update 1 Unit***Hours: 18 hours LEC*

This course is required for all licensed smog technicians who need to meet California emissions controls smog license renewal standards. This course may be taken four times for credit.

**AT 180 Automotive Data Acquisition 3 Units***Hours: 54 hours LEC*

This course covers the skills needed to adequately retrieve and apply automotive data acquisition, including on-line technical manuals, CD-ROM based 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 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. This course may be taken four times for credit on different projects.

**AT 201 ASE A-1 Engine Repair Test Preparation .5 Units***Hours: 9 hours LEC*

This nine-hour course will help prepare for the ASE (Automotive Service Excellence) A-1 Engine Repair examination by reviewing ASE-style test questions and engine repair information. Credit/No Credit only. This course may be taken four times.

**AT 202 ASE A-2 Auto Transmission and Transaxles Test Preparation .5 Units***Hours: 9 hours LEC*

This nine-hour course will help prepare students for the ASE (Automotive Service Excellence) A-2 Transmission/Transaxle examination by reviewing ASE-style test questions and transmission/transaxle information. Credit/No Credit only. This course may be taken four times.

**AT 203 ASE A-3 Manual Drive Trains and Axles Test Preparation .5 Units***Hours: 9 hours LEC*

This nine-hour course will help prepare students for the ASE (Automotive Service Excellence) A-3 manual drive trains and axles examination by reviewing ASE-style test questions and drive trains information. Credit/No Credit only. This course may be taken four times.

**AT 204 ASE A-4 Suspension and Steering Test Preparation .5 Units***Hours: 9 hours LEC*

This nine-hour course will help prepare students for the ASE (Automotive Service Excellence) A-4 Suspension and Steering examination by reviewing ASE-style questions and suspension and steering information. Credit/No Credit only. This course may be taken four times.

**AT 205 ASE A-5 Brakes Test Preparation .5 Units***Hours: 9 hours LEC*

This nine-hour course will help prepare students for the ASE (Automotive Service Excellence) A-5 Brakes examination by reviewing ASE-style test questions and brakes information. Credit/No Credit only. This course may be taken four times.

**AT 206 ASE A-6 Electrical/Electronic Systems Test Preparation .5 Units**

Hours: 9 hours LEC

This nine-hour course will help prepare students for the ASE (Automotive Service Excellence) A-6 Electrical/Electronic Systems examination by reviewing ASE-style test questions and electrical/electronic systems information. Credit/No Credit only. This course may be taken four times.

**AT 207 ASE A-7 Heating & Air Conditioning Test Preparation .5 Units**

Hours: 9 hours LEC

This nine-hour course will help prepare students for the ASE (Automotive Service Excellence) A-7 Heating & Air Conditioning examination by reviewing ASE-style test questions and heating & air conditioning information. Credit/No Credit only. This course may be taken four times.

**AT 208 ASE A-8 Engine Performance Test Preparation .5 Units**

Hours: 9 hours LEC

This nine-hour course will help prepare students for the ASE (Automotive Service Excellence) A-8 Engine Performance examination by reviewing ASE-style test questions and engine performance information. Credit/No Credit only. This course may be taken four times.

**AT 209 ASE L-1 Advanced Engine Performance Specialist Test Preparation .5 Units**

Hours: 9 hours LEC

This nine-hour course will help prepare students for the ASE (Automotive Service Excellence) L-1 Advanced Engine Performance Specialist examination by reviewing ASE-style test questions and engine repair information. Credit/No Credit only. This course may be taken four times.

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

Same As: ET 251

Corequisite: AT 312 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. Topics related to this course cover the areas for the certification testing required to become a qualified Mobile Electronics Certified Professional (MECP) installer. A field trip is required. This course is not open to students who have taken ET 251.

**AT 294 Topics in Automotive Technology .5-3 Units**

Hours: 9-54 hours LEC; 27-162 hours LAB

This course provides opportunity to study current topics in automotive technology that are not included in existing courses. It may be taken four times for a maximum of six units, provided there is no duplication of topics.

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

Advisory: AT 100

General Education: AA/AS Area III(b) (effective Summer 2008)

Enrollment Limitation: Be in a paid or non-paid internship, volunteer opportunity or job related to the automotive industry.

Hours: 60-300 hours LAB

This course provides students with opportunities to develop marketable skills in preparation for employment in the automotive field. It is designed for students interested in work experience and/or internships in the automotive industry. Course content includes understanding the application of education to the workforce; completion of required forms which document the student's progress and hours spent at the work site; and developing workplace skills and competencies. Rigor is ensured through the development of appropriate level learning objectives set between the student and the employer. During the course of the semester, the student is required to fulfill a weekly orientation and 75 hours of related paid work experience, or 60 hours of unpaid work experience for one unit. An additional 75 or 60 hours of related work experience is required for each additional unit. The weekly orientation is required for first time participants, returning participants are not required to attend the weekly orientation but are required to meet with the instructor as needed to complete all program forms and assignments. WEXP 298 may be taken for a total of 16 units when there are new or expanded learning objectives. Students can earn a total of 16 Work Experience units.

**AT 301 Small Gas Engines, 4-Cycle 2 Units**

Same As: HORT 330

Course Transferable to CSU

Hours: 18 hours LEC; 54 hours LAB

This course covers basic operational theory, servicing, adjusting and the maintenance of 4-cycle small gas engines as they pertain to the automotive and horticulture industries. This course is not open to students who have taken HORT 330.

**AT 302 Small Gas Engines, 2-Cycle 2 Units**

Same As: HORT 331

Course Transferable to CSU

Hours: 18 hours LEC; 54 hours LAB

This course covers basic operational theory, servicing, adjusting, and maintaining 2-cycle small gas engines as they pertain to the automotive and horticulture industries. This course is not open to students who have taken HORT 331.

**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 310 Heating and Air-Conditioning Systems 4 Units**

Corequisite: AT 100.

Course Transferable to CSU

Hours: 54 hours LEC; 54 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 4 Units**

*Corequisite: AT 100.*

*Course Transferable to CSU*

*Hours: 54 hours LEC; 54 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 312 Electrical Systems 4 Units**

*Corequisite: AT 100 and 105.*

*Course Transferable to CSU*

*Hours: 54 hours LEC; 54 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. This course meets Automotive Service Excellence (ASE) certification standards for the A6 electrical certification with completion of AT 315 and either AT 320 or AT 322.

**AT 313 Automatic Transmission and Transaxles 4 Units**

*Corequisite: AT 100*

*Course Transferable to CSU*

*Hours: 54 hours LEC; 54 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 4 Units**

*Corequisite: AT 100 and 105.*

*Course Transferable to CSU*

*Hours: 54 hours LEC; 54 hours LAB*

This course covers the principles, operation and diagnosis of automotive engines including basic engine operation and construction, parts identification and location, engine disassembly procedures, engine diagnosis using metric and English measurement systems, engine repair and rebuilding procedures, and engine reassembly procedures. Completion of AT 314 and either AT 320 or AT 322 meets Automotive Service Excellence (ASE) A1 standards.

**AT 315 Advanced Electrical: Engine/Chassis/Hybrid 4 Units**

*Prerequisite: AT 312 with a grade of "C" or better*

*Course Transferable to CSU*

*Hours: 54 hours LEC; 54 hours LAB*

This course covers the principles of advanced diagnostics of engine, chassis, and hybrid electrical systems. Topics include power windows, power seats, power locks (including keyless entry), multiplexing systems, computer-controlled charging systems, navigation systems, factory installed accessory circuits, and hybrid powertrain control systems. It meets Automotive Service Excellence (ASE) certification standards for the A6 electrical certification with the completion of AT 312 and either AT 320 or AT 322.

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

*Corequisite: AT 100 or 150*

*Course Transferable to CSU*

*Hours: 54 hours LEC; 54 hours LAB*

This course provides an overview of existing fuels (hydrocarbon), renewable/sustainable alternative fuels, gaseous, and future fuels. It covers how they function in various fuel delivery systems, including hybrid, by examining the history, chemistry, production, and practicality of each. Field trips may be required.

**AT 317 Advanced Drivetrain 4 Units**

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

*Hours: 54 hours LEC; 54 hours LAB*

This course covers advanced aspects of automatic transmission and transaxle 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 320 Engine Performance Technology 12 Units**

*Prerequisite: AT 312 and 314 with grades of "C" or better*

*Course Transferable to CSU*

*Hours: 162 hours LEC; 162 hours LAB*

This course covers the principles and diagnosis of the following systems: chassis electrical, engine electrical, engine mechanical, conventional and electronic computer-controlled ignition systems, basic fuel injection, and basic computer systems. It also includes extensive troubleshooting with use of hand-held test equipment, lab oscilloscopes, scanners, digital storage oscilloscopes (DSO) and 4- and 5-gas analyzers. It meets Bureau of Automotive Repair (BAR) and Automotive Service Excellence (ASE) A-8 certifications. It also satisfies A-1 and A-6 requirements when AT 312, AT 314 and AT 315 are completed.

**AT 321 Engine Performance Technology 12 Units**

*Prerequisite: AT 320 with a grade of "C" or better*

*Course Transferable to CSU*

*Hours: 162 hours LEC; 162 hours LAB*

This course covers theory, operation, and diagnosis of fuel delivery and emission control systems. Fuel supply, electronic feedback carburetors, mechanical and electronic fuel injection, emission components as well as operation and diagnosis are also presented. It also includes Bureau of Automotive Repair (BAR) Basic Area Clean Air Course, Enhanced Area Clean Air Course, and BAR Update Courses. This course meets Automotive Service Excellence (ASE) A8 and L1 requirements when AT 312, 314, 315 and 320 are completed.

**AT 322 Engine Performance & Electronic Engine Controls 6 Units**

*Prerequisite: AT 312 and 314 with grades of "C" or better*

*Course Transferable to CSU*

*Hours: 72 hours LEC; 108 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. Instruction includes extensive troubleshooting, use of diagnostic test equipment, lab oscilloscopes, scantools, and emission analyzers. This course meets Automotive Service Excellence (ASE) certification standards for the A8 engine performance certification with completion of AT 323.

**AT 323 Clean Air Car Course 6 Units**

*Prerequisite:* AT 322 (Engine Performance & Electronic Engine Controls) with a grade of "C" or better or one year work experience in automotive engine performance

*Course Transferable to CSU*

*Hours:* 72 hours LEC; 108 hours LAB

This course covers the Bureau of Automotive Repair (BAR) certified Basic and Advanced Clean Air Car Course, which now includes the former On Board Diagnostics (OBD) II update course, and the BAR 03/04 and 05/06 update courses. Topics include: smog check laws, rules and regulations; exhaust emission analysis; emission control systems diagnosis; smog inspection procedures; digital storage oscilloscopes (DSO) usage; loaded mode emission testing and smog check failure diagnosis. It is required for first-time licensed technicians or for those whose license has been expired for more than one year. This course may be taken four times for credit.

**AT 325 Performance Evaluation and Planning 4 Units**

*Prerequisite:* AT 110, 130, 311, 312, and 314 with grades of "C" or better

*Advisory:* AT 320 and 322

*Course Transferable to CSU*

*Hours:* 54 hours LEC; 54 hours LAB

This course explores the performance and efficiency of the modern vehicle power-train. Course topics include performance and economy modifications through systematic testing procedures while maintaining credible results through the use of modern measurement tools. This course may be taken two times on different projects.

**AT 327 Advanced Motorsports 4 Units**

*Prerequisite:* AT 110, 130, 311, 312, and 314 with grades of "C" or better

*Advisory:* AT 130, 313, and 321

*Course Transferable to CSU*

*Hours:* 54 hours LEC; 54 hours LAB

This course is an introduction to motorsports through lecture and raceway experience. It covers real time operation of a race team, racing events, and race track operation. Field trips may be required. This course may be taken two times on different projects.