

## AUTOMOTIVE TECHNOLOGY (ATECH)

The Automotive Technology curriculum is designed to prepare students for employment as apprentice auto mechanics or to allow students to continue toward a Baccalaureate degree in other advanced schools of technology in preparation for future management and teaching careers in the automotive industry.

The **Program Learning Outcomes** for Automotive Technology include:

**Commitment to Learning:** Be 'lifelong learners' in the field of automotive technology, keeping up with changes in vehicles, in diagnostics and in repair procedures through a commitment to continual learning and training.

**Communication:** Communicate effectively with customers, supervisors and co-workers.

**Critical Thinking:** Apply critical thinking and problem solving skills in the process of diagnosing and repairing vehicles.

**Performance:** Competently perform industry standard automotive repair procedures, using proper tools, procedures and diagnostic techniques, as specified in the NATEF program certification process.

The College of Alameda ATECH program is certified by the National Institute for Automotive Service Excellence (ASE), and was recognized as the "Best Auto Mechanics Training Program" in California in 1999 and again in 2002 by the Industry Planning Council of the Motor Vehicle Manufacturers Association.

Instruction covers safety, trade ethics, use of hand and power tools, as well as the theory, repair and testing of automobiles and their components. Special emphasis is placed on the diagnosis and repair of electronic and computer control systems in late model automobiles.

Upon registering for a class in the automotive major area, a student will receive a list of required basic tools. **The student will be expected to purchase tools that relate to the course in which he/she has enrolled.** The purpose of this requirement is to assure that all students graduating from the program possess tools in a quantity sufficient for trade entry as an apprentice.

Upon graduating with an Associate in Science (AS) degree, the beginning apprentice will have the union four-year night school requirement waived. The graduate with only a Certificate of Completion will have two of the required four years of night school waived. The National Institute for Automotive Service Excellence (ASE) will give one year experience credit for our two-year program towards the ASE certification program in Auto Mechanics.

Confer with the division counselor for the specific course pattern of requirements and prerequisites. Students may not take more than one of the following 10-unit "major" courses in a single semester: ATECH 10, 11, 12, 14, 15, 40, 41, 42, and 45. Priority for enrollment in any "major" class will be given to students with the most seniority in the program. A minimum grade of "C" in ATECH 21 and 22 may be required for enrollment in a student's first "major" course.

### Associate in Science (AS) Degree and Certificate of Achievement Programs:

It is recommended that these courses be completed prior to enrollment in any of the "major" Auto Mechanics classes:

- Completion of ENGL 268A-268B or ESL 253A-253B, or equivalent with a grade of "C" or better.
- One year of high school algebra or completion of MATH 225 with a grade of "C" or better.

The **AS degree** will be awarded upon satisfactory completion of the major course requirements listed below for each option and the General Education requirements for the Associate in Arts Degree listed in the Degrees and Programs section of this Catalog.

A **Certificate of Achievement** will be awarded upon satisfactory completion of the major course requirements listed below for each option with a minimum GPA of 2.0.

A **Certificate of Proficiency in Light-Duty Auto Repair** is also available upon satisfactory completion of the required courses listed below.

**ENGINE PERFORMANCE****Degree Major/Certificate Requirements:**

Dept/No.	Title	Units
<b>FIRST SEMESTER</b>		
ATECH 21	Transportation Technology Principles	4
ATECH 22	Introduction to Auto Mechanics	4
BUS 208*	Communication Skills for Technicians	3
MATH 225*	Math for Technicians	<u>3</u>
	Semester Total	14
<b>SECOND SEMESTER</b>		
ATECH 11	Engines and Fuel Systems	<u>10</u>
	Semester Total	10
<b>THIRD SEMESTER</b>		
ATECH 12	Electrical/Electronic Systems	10
ATECH 24A**	Computer Controls and Fuel Injection	<u>4</u>
	Semester Total	14
<b>FOURTH SEMESTER</b>		
ATECH 14**	Advanced Engine Performance	10
ATECH 25**	Clean Air Course, Phase II	4
ATECH 27**	Advanced Emissions Diagnostics: Smog Check II	<u>2</u>
	Semester Total	16
	<b>Total Required Units:</b>	<b>54</b>

\*Candidates for the AS Degree should take Mathematics and English classes required for that degree.

\*\*Atech 11 is a prerequisite for Atech 24. Atech 11 and Atech 12 are prerequisites for Atech 14 and 25. Atech 24A is a prerequisite for Atech 27.

**CHASSIS AND DRIVETRAIN****Degree Major/Certificate Requirements:**

Dept/No.	Title	Units
<b>FIRST SEMESTER</b>		
ATECH 21	Transportation Technology Principles	4
ATECH 22	Introduction to Auto Mechanics	4
BUS 208*	Communication Skills for Technicians	3
MATH 225*	Math for Technicians	<u>3</u>
	Semester Total	14
<b>SECOND SEMESTER</b>		
ATECH 10	Automotive Chassis	10
ATECH 26	Auto Electrical Systems	<u>4</u>
	Semester Total	14
<b>THIRD SEMESTER</b>		
ATECH 15	Drivetrain/Transmissions	10
ATECH 23	Automotive Air Conditioning	<u>4</u>
	Semester Total	14
	<b>Total Required Units:</b>	<b>42</b>

\*Candidates for the AS Degree should take Mathematics and English classes required for that degree.

**CHASSIS SPECIALIST****Degree Major/Certificate Requirements:**

Dept/No.	Title	Units
<b>FIRST SEMESTER</b>		
ATECH 21	Transportation Technology Principles	4
ATECH 22	Introduction to Auto Mechanics	4
BUS 208*	Communication Skills for Technicians	3
MATH 225*	Math for Technicians	<u>3</u>
	Semester Total	14
<b>SECOND SEMESTER</b>		
ATECH 10	Automotive Chassis	<u>10</u>
	Semester Total	10
<b>THIRD SEMESTER</b>		
ATECH 40	Advanced Automotive Chassis	<u>10</u>
	Semester Total	10
	<b>Total Required Units:</b>	<b>34</b>

\*Candidates for the AS Degree should take Mathematics and English classes required for that degree.

**ENGINE REPAIR SPECIALIST****Degree Major/Certificate Requirements:**

Dept/No.	Title	Units
<b>FIRST SEMESTER</b>		
ATECH 21	Transportation Technology Principles	4
ATECH 22	Introduction to Auto Mechanics	4
BUS 208*	Communication Skills for Technicians	3
MATH 225*	Math for Technicians	<u>3</u>
	Semester Total	14
<b>SECOND SEMESTER</b>		
ATECH 12	Automotive Electrical and Electronic Systems	<u>10</u>
	Semester Total	10
<b>THIRD SEMESTER</b>		
ATECH 41	Advanced Engine Repair	<u>10</u>
	Semester Total	10
	<b>Total Required Units:</b>	<b>34</b>

\*Candidates for the AS Degree should take Mathematics and English classes required for that degree.

## AUTOMOTIVE ELECTRONICS SPECIALIST

### Degree Major/Certificate Requirements:

Dept/No.	Title	Units
<b>FIRST SEMESTER</b>		
ATECH 21	Transportation Technology Principles	4
ATECH 22	Introduction to Auto Mechanics	4
BUS 208*	Communication Skills for Technicians	3
MATH 225*	Math for Technicians	<u>3</u>
	Semester Total	14
<b>SECOND SEMESTER</b>		
ATECH 12	Electrical/Electronic Systems	<u>10</u>
	Semester Total	10
<b>THIRD SEMESTER</b>		
ATECH 42	Advanced Auto Electronics	<u>10</u>
	Semester Total	10
	<b>Total Required Units:</b>	<b>34</b>

\*Candidates for the AS Degree should take Mathematics and English classes required for that degree.

## DRIVETRAIN SPECIALIST

### Degree Major/Certificate Requirements:

Dept/No.	Title	Units
<b>FIRST SEMESTER</b>		
ATECH 21	Transportation Technology Principles	4
ATECH 22	Introduction to Auto Mechanics	4
BUS 208*	Communication Skills for Technicians	3
MATH 225*	Math for Technicians	<u>3</u>
	Semester Total	14
<b>SECOND SEMESTER</b>		
ATECH 15	Drivetrain/Transmissions	<u>10</u>
	Semester Total	10
<b>THIRD SEMESTER</b>		
ATECH 45	Adv Automotive Transaxles	<u>10</u>
	Semester Total	10
	<b>Total Required Units:</b>	<b>34</b>

\*Candidates for the AS Degree should take Mathematics and English classes required for that degree.

## LIGHT-DUTY AUTO REPAIR

Students completing the following required courses will be eligible for the **Certificate of Proficiency in Light-Duty Auto Repair**. Confer with a counselor or division dean concerning the specific pattern of requirements for this program.

### Certificate of Proficiency Requirements:

Dept/No.	Title	Units
ATECH 22	Introduction to Auto Mechanics	4
ATECH 26	Introduction to Automotive Electrical Systems	4
ATECH 24A	Computer Controls and Fuel Injection	4
ATECH 234	Introduction to Brakes, Alignment and Headlamp Aiming	<u>4</u>
	<b>Total Required Units:</b>	<b>16</b>

### ATECH 10

#### Automotive Chassis

10 units, 6 hours lecture, 12 hours laboratory (GR)  
Recommended preparation: Atech 21 and 22 and Math 225 and Bus 208

Acceptable for credit: CSU

Introduction to automotive chassis systems: Principles of automotive brake and suspension systems, wheel balance, tire service, suspension and headlamp alignment; maintenance, troubleshooting procedures, and proper use of alignment and balancing machines, brake lathes and other diagnostic equipment; diagnosis, disassembly, inspection, and rebuilding of suspension and brake systems; emphasis on proper use of manuals and safe use of tools and equipment; preparation for CA State Brake and Lamp licensing exams. 0948.00

### ATECH 11

#### Engines, Fuel and Ignition Systems

10 units, 6 hours lecture, 12 hours laboratory (GR)  
Recommended preparation: Atech 21 and 22 and Math 225 and Bus 208

Acceptable for credit: CSU

Principles of automotive engines, fuel and ignition systems: Tool and equipment safety, maintenance procedures, use of diagnostic equipment, minor head and block machining; diagnosis, disassembly, inspection, and rebuilding of engines, fuel and ignition systems. 0948.00

**For all program degree and certificate updates, please visit:**  
<http://alameda.peralta.edu>

**ATECH 12****Automotive Electrical and Electronic Systems**

10 units, 6 hours lecture, 12 hours laboratory (GR)

Recommended preparation: Atech 21 and 22 and Math 225 and BUS 208

Eligible for credit by examination.

Acceptable for credit: CSU

Basic electrical theory and the function, diagnosis, and repair of modern automotive electrical systems: Emphasis on the use of instrumentation in the diagnosis of electrical circuits and component failures. 0948.00

**ATECH 14****Advanced Engine Performance (Clean Air Course, Phase I)**

10 units, 6 hours lecture, 12 hours laboratory (GR)

Prerequisite: Atech 11 and 12

Recommended preparation: Atech 21 and 22 and Math 225 and Bus 208

Course includes 22 of the 120 hours of training mandated by the California State Smog Inspection program.

Eligible for credit by examination.

Acceptable for credit: CSU

Advanced engine performance principles and procedures: Generic computer and fuel-injection controls and emission-control systems; preparation for the ASE Engine Performance examination, as well as partial preparation for the California State Test and Repair Technician examination. 0948.00

**ATECH 15****Drivetrain and Automatic Transmissions**

10 units, 6 hours lecture, 12 hours laboratory (GR)

Recommended preparation: Atech 21 and 22 and Math 225 and Bus 208

Acceptable for credit: CSU

Theory, operation, diagnosis, repair and maintenance of drivetrain and automatic transmissions: Single dry-disc clutches, manual transmissions/transaxles, universal joints, final drives, and hydraulically-controlled automatic transmissions and transaxles. 0948.00

**ATECH 21****Transportation Technology Principles**

4 units, 4 hours lecture (GR)

Recommended preparation: Math 225

Acceptable for credit: CSU

Introduction to materials, mechanics, fluids, heat and electricity: Applications of physical principles to motor vehicle systems and repair; practice researching information in technical publications. 0948.00

**ATECH 22****Introduction to Auto Mechanics**

4 units, 3 hours lecture, 3 hours laboratory (GR)

Also offered as Appr 471. Not open for credit to students who have completed or are currently enrolled in Appr 471.

Acceptable for credit: CSU

How cars work: Construction and operation of engines, engine support systems, drivetrains and chassis; vehicle maintenance services; shop procedures including safety, proper use of tools, equipment and shop manuals; how to write repair orders. 0948.00

**ATECH 23****Automotive Air Conditioning**

4 units, 3 hours lecture, 3 hours laboratory (GR)

Recommended preparation: Atech 21 and 22 and Math 225 and Bus 208

Also offered as Appr 486. Not open for credit to students who have completed or are currently enrolled in Appr 486.

Acceptable for credit: CSU

Study of automotive air conditioning systems: Principles and systems necessary for the installation, design, function, and repair of air conditioning units; maintenance, troubleshooting procedures, proper use of air conditioning charging station and recovery/recycle equipment; emphasis on proper use of manuals and safe use of tools and equipment. 0948.00

**ATECH 24A****Computer Controls and Fuel Injection**

4 units, 3 hours lecture, 3 hours laboratory (GR)

Prerequisite: Atech 11 or Appr 482

Also offered as Appr 473A. Not open for credit to students who have completed or are currently enrolled in Appr 473A.

Acceptable for credit: CSU

Automotive computer-control and fuel-injection systems: Service and repair of computer-control and fuel-injection systems by all manufacturers, with emphasis on "hands-on" electronic testing and diagnostic procedures of ignition, fuel, emission-control, and generic electronic fuel-injection systems. 0948.00

**For all program degree and certificate updates, please visit:**

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**ATECH 25****Clean Air Course Phase II**

4 units, 4 hours lecture (GR)

Prerequisite: Atech 11 and 12

Recommended preparation: Atech 21 and 22 and Math 225 and Bus 208

Eligible for credit by examination.

Acceptable for credit: CSU

Course covers the second phase of the 120-hour Clean Air Course required by California's Biennial Inspection and Maintenance Program ("Smog Check Program"). Successful completion of the 120 hours of training qualifies the student to take the Test and Repair Technician examination.

Advanced engine performance principles and procedures: Carburetor/low-emission adjustments, spark controls, positive crankcase ventilation and fuel evaporation systems, thermostatic air cleaners, exhaust gas recirculation, air injection and catalytic converter systems, administrative rules, inspection procedures, nitrates of oxide (Nox) readings, and computer-controlled testing. 0948.00

**ATECH 26****Introduction to Automotive Electrical Systems**

4 units, 3 hours lecture, 3 hours laboratory (GR or P/NP)

Recommended preparation: Math 225 and Bus 208

Also offered as Appr 472. Not open for credit to students who have completed or are currently enrolled in Appr 472.

Acceptable for credit: CSU

Introduction to automotive electrical systems: Electrical theory, chassis wiring, batteries, cranking, charging, and ignition systems; special emphasis placed on diagnosis and repair of vehicle chassis wiring. 0948.00

**ATECH 27****Advanced Emissions Diagnostics: Smog Check II**

2 units, 1.5 hours lecture, 1.5 hours laboratory (GR or P/NP)

Prerequisite: Atech 24A

Also offered as Appr 485. Not open for credit to students who have completed or are currently enrolled in Appr 485.

Eligible for credit by examination.

Acceptable for credit: CSU

Five-gas analysis using BAR 97: Advanced emissions diagnostics and related topics. 0948.00

**ATECH 40****Advanced Automotive Chassis**

10 units, 6 hours lecture, 12 hours laboratory (GR)

Prerequisite: Atech 10

Recommended preparation: Atech 21 and 22 and Math 225 and Bus 208

Acceptable for credit: CSU

Advanced and in-depth study of automotive brake and suspension systems, wheel balance, tire service, and suspension alignment: Tool and equipment safety; maintenance and troubleshooting procedures; proper use of alignment and balancing machines, brake lathes, and other diagnostic equipment; diagnosis, disassembly, inspection, and rebuilding of suspension and brake systems; emphasis on proper use of manuals and safe use of tools and equipment. 0948.00

**ATECH 41****Advanced Engine Repair**

10 units, 6 hours lecture, 12 hours laboratory (GR)

Prerequisite: Atech 11

Recommended preparation: Atech 21 and 22 and Math 225 and Bus 208

Acceptable for credit: CSU

Advanced principles of automotive engine construction, design, and repair: Tool and equipment safety, use of diagnostic equipment, advanced head and block diagnosis, repair and machining; diagnosis, disassembly, inspection, reconditioning, and rebuilding of engines; troubleshooting engine problems. 0948.00

**ATECH 42****Advanced Automotive Electronics**

10 units, 6 hours lecture, 12 hours laboratory (GR)

Prerequisite: Atech 12

Recommended preparation: Atech 21 and 22 and Math 225 and Bus 208

Eligible for credit by examination.

Acceptable for credit: CSU

Advanced diagnosis and repair techniques for modern automotive electrical systems: Stresses heavy use of instrumentation in the diagnosis of electrical circuitry and component failure. 0948.00

**ATECH 45****Advanced Automotive Transaxles and Transmissions**

10 units, 6 hours lecture, 12 hours laboratory (GR)

Prerequisite: Atech 15

Acceptable for credit: CSU

Advanced automotive transaxle and transmission theory: Theory of operation, diagnosis, and service techniques on a variety of computer-controlled automatic transmissions and transaxles for imported and domestic passenger vehicles or light trucks. 0948.00

**ATECH 48AA-FZ****Selected Topics in Automotive Technology**

.5-9 units, 0-9 hours lecture, 0-27 hours laboratory (GR or P/NP)

Acceptable for credit: CSU

See section on Selected Topics. 0948.00

**ATECH 49****Independent Study in Automotive Technology**

.5-5 units, .5-5 hours lecture (GR)

Acceptable for credit: CSU

See section on Selected Topics. 0948.00

**ATECH 234****Introduction to Brakes, Alignment and Headlamp Aiming**

4 units, 3 hours lecture, 3 hours laboratory (GR)

Also offered as Appr 484. Not open for credit to students who have completed or are currently enrolled in Appr 484.

Introduction to brake, alignment, and headlamp aiming systems: Operation, maintenance, troubleshooting, and adjustment of steering, suspension, braking, and headlamp aiming systems; emphasis on proper use of manuals and safe use of tools and equipment; preparation for the California State Brake and Lamp licensing exams. 0948.00

**ATECH 248AA-FZ****Selected Topics in Auto Mechanics**

.5-9 units, 0-9 hours lecture, 0-27 hours laboratory (GR or P/NP)

See section on Selected Topics. 0948.00

