

# AUTOMOTIVE TECHNOLOGY (AT)

## AT 050 C Auto Tech Special Projects 0.5-3 Units

**Prerequisite(s):** Completion of or concurrent enrollment or a grade of C or better in AT 120 C or AT 130 C or AT 140 C or AT 150 C.

Term hours: 27-162 Laboratory. This course will include supervised independent lab work on units and "live" vehicles. It is designed to allow the student to gain more practical experience repairing components and servicing automotive systems. Only approved project work will be allowed. May be taken for credit 4 times. \$30.00 Material Fee - Payable at Registration. (CSU Transferable)

## AT 101 C Survey of the Automobile 3 Units

Term hours: 54 lecture. This course provides basic knowledge of the automobile, including engines, power trains, suspension and brakes, electrical and fuel systems. Other areas of instruction will be in the discussion of services typically required to maintain modern automobiles and the use of tools and equipment normally used in the care of the automobile. (CSU)

## AT 102 C Automotive History 3 Units

Term hours: 54 lecture. This course details the growth of the automotive industry in the U.S. from the late 1890's through the global business climate of today. Topics include biographical sketches of industry pioneers, geographical why's and where's of the industry, the roots of automotive design, and an in depth review of major engineering achievements. The course includes visits to historical automotive collections at a cost not to exceed \$40.00. (CSU)

## AT 105 C Automotive Electrical I 6 Units

Term hours: 81 Lecture and 81 Laboratory. This course introduces the concepts of electrical systems and electronic control of the automobile. Areas covered will include basic electrical concepts, batteries, starting systems, charging systems, and body electrical diagnosis, including ECU controlled circuits. Course instruction will consist of lecture, demonstration, web based learning with student application in the use of test equipment on simulator boards and "on-car" diagnosis with electrical wiring diagrams, charts, and schematics. \$25.00 Materials Fee - Payable at Registration (CSU)

## AT 106 C Automotive Electrical II 6 Units

**Prerequisite(s):** AT 105 C with a grade of C or better.

Term hours: 81 Lecture and 81 Laboratory. This course covers the concepts of ECU controlled circuits, vehicle ECU networks, supplemental restraint systems, advanced driver assistance systems and advanced vehicle systems including anti-theft, smart key and infotainment. Course instruction will consist of lecture, demonstration, web based learning with student application in the use of test equipment, simulator boards and "on-car" diagnosis using service information and applicable test equipment. \$25.00 Materials Fee - Payable at Registration. (CSU)

## AT 107 C Automotive Electrical III 4 Units

**Prerequisite(s):** Completion of or concurrent enrollment in AT 106 C.

Term hours: 54 lecture and 54 laboratory. This course covers the concepts of advanced diagnostic principles of power train and body electrical systems as they relate to modern vehicle network systems including CAN, Powertrain, and other manufacturer's network systems. Course instruction will consist of lecture, demonstration, web based learning with student application in the use of test equipment on simulator boards and "on-car" diagnosis with electrical wiring diagrams, charts, and schematics. \$25.00 Materials Fee - Payable at Registration. (CSU)

## AT 109 C Intro to Toyota Auto Tech 4 Units

**Advisory:** Note that this is a restricted course.

Students desiring to enroll in this course must have participated a T-TEN overview meeting and/or the T-TEN orientation meeting to obtain clearance to enroll. Term Hours: 54 lecture and 54 laboratory. This course provides essential knowledge for Toyota/Lexus automobiles. Also included will be instruction in the use of tools, equipment and processes normally used in Toyota/Lexus dealer service departments. Emphasis will be on the operating principles, nomenclature of car care, vehicle inspection, preventive maintenance and minor repair procedures. \$25.00 Material Fee - Payable at Registration. (CSU).

## AT 110 C Intro to Automotive Technology 4 Units

Term hours: 54 lecture and 54 laboratory. This course provides essential knowledge and hands-on experience including the following: Shop safety, use of vehicle lifts and jacks, accessing service information, types and use of tools/shop equipment, shop policies and procedures, technician career paths, ASE certification, automotive chemicals, repair orders, precision measuring tool use, fasteners, and other skills that may be required in the automotive shop environment. (CSU)

## AT 111 C Automotive Quick Service 6 Units

**Prerequisite(s):** AT 110 C with a grade of C or better.

Term hours: 81 lecture and 81 laboratory. This course covers the essential content and skill practice for a technician to perform quick service skills including, shop safety, correct use of required tools, service information use, repair order write up/documentation, vehicle inspection, oil change, fluid flush and other quick service maintenance work. \$25 Material Fee - Payable at Registration. (CSU)

## AT 115 C Automotive Air Conditioning 4 Units

**Prerequisite(s):** Completion of or concurrent enrollment in AT 105 C with a grade of C or better.

Term hours: 54 lecture and 54 laboratory. This course emphasizes the acquisition of the practical skills needed to both understand principles of refrigeration and perform system diagnosis and repair. Demonstrated lecture, shop lab simulators and "live" vehicles will be used to learn service diagnosis, repair and installation of air conditioning systems including automatic temperature control. Safety and environmental concerns along with CFC recovery, recycling, retrofitting R12 systems to R-134A and new refrigerant types will be covered. \$25 materials fee payable at registration. (CSU)

## AT 120 C Auto Engine Repair & Machining 12 Units

**Prerequisite(s):** AT 105 C and AT 110 C with grades of C or better.

Term hours: 162 lecture and 162 laboratory. This course covers the acquisition of practical skills needed for accurate internal combustion engine diagnosis and repair and all phases of engine rebuilding machine work. Demonstrated lecture, simulated problem diagnosis, and practical application on "live" vehicles will be used. Individualized instruction on Automotive rebuilding tools and machinery is an integral part of this course. Engine theory, design, repair, practical and theoretical high performance modifications are part of the course. Preparation for ASE certification test A1 will be covered. \$30 Material Fee-Payable at Registration. (CSU)

**AT 130 C Auto Chassis and Brake Systems****12 Units****Prerequisite(s):** AT 110 C or AT 109 C and AT 260 C with a grade of C or better.

Term hours 162 lecture and 162 laboratory. This course emphasizes the design, operating principles, service, repair and diagnosis of chassis and brake systems used on current production vehicles. Major topics of study will be wheel alignment procedures, tire and wheel balance, suspension and steering system repair, hydraulics, and brake system service and repair. Application will be applied under simulated repair shop procedures using "live" vehicles. Preparation for ASE (A4 and A5) certification is covered. \$30.00 Materials Fee - Payable at Registration. (CSU)

**AT 140 C Auto Drivetrains and Transmissions****12 Units****Prerequisite(s):** AT 110 C or AT 109 C and AT 105 C or AT 260 C with a grade of C or better.

Term hours: 162 lecture and 162 laboratory. This course will include operation principles, design, repair, rebuild and service procedures for manual transmissions, automatic transmissions, clutch assemblies, drive lines, final drive axles and trans-axles units. Demonstrated lectures and shop laboratory work on drive train components will be covered with emphasis on procedures to industry standards. Practical application will be under simulated shop conditions on "live" and "lab" vehicles. Preparation for ASE certification will be covered. \$30.00 Materials Fee - Payable at Registration (CSU)

**AT 150 C Auto Performance and Drivability****12 Units****Prerequisite(s):** AT 110 C or AT 109 C and AT 105 C or AT 260 C with a grade of C or better.

Term hours: 162 lecture and 162 laboratory. This course will include operating principles, design, and repair procedures of the computerized engine management system and the application of related diagnostic tools and equipment. In addition, alternators, starters, batteries, ignition systems, emission control systems, 5 gas analysis, and scan tool use will be covered. Skill competency development will be under simulated shop conditions on "live" vehicles. Preparation for ASE certification test A8 will be covered. \$30 materials fee payable at registration. (CSU)

**AT 170 C Clean Air Car Level 1 and 2****4 Units****Advisory:** AT 105 C

Term hours: 54 lecture and 54 laboratory. This course prepares students for the State of California Smog Check license for level 1 and 2 applicants. Course includes safety, BAR rules and regulations, engine performance, and emission control devices. Modern diagnostic equipment including a BAR 5 gas analyzer, low pressure EVAP tester, and scan tools will be covered as applicable to California's emissions inspection program \$15.00 Material Fee - Payable at Registration. (CSU)

**AT 171 C Advanced Clean Air Car Course****2 Units**

Term hours: 36 lecture. This course covers advanced operating procedures, diagnostic strategies, and repair procedures for emissions testing. Course emphasizes baseline techniques, five gas analysis and lab scope use. Course meets California BAR Smog Check licensing requirements. (CSU)

**AT 195 C Automotive Service Advisor****4 Units****Advisory:** AT 110 C.

Term hours: 54 lecture and 54 laboratory. This is a course in the concepts and application of the Service Advisor's job duties primarily as they apply to job skills required in the service department of new vehicle dealerships. Course instruction will include lecture, role playing, repair order writing, interactive computer based assignments, use of dealer management software, site visits and demonstration of knowledge in a simulated work environment. (CSU)

**AT 209 C Toyota Portfolio TPORT****1 Unit****Prerequisite(s):** AT 109 C with a grade of C or better or consent of Toyota T-TEN Coordinator.

Term hours: 18 lecture. This course monitors the progress of T-TEN students through the program. This course will also prepare the student for placement in the dealership internship. Course may be taken four times for credit and must be taken every semester the student is in the T-TEN program. (CSU)

**AT 210 C T-TEN Internal Combustion Engines and Alternative Fuels (formerly AT 121 C)****6 Units****Prerequisite(s):** AT 109 C and AT 260 C with a grade of C or better.

Term hours: 81 lecture and 81 laboratory. This course introduces engine designs and concepts used in current automotive applications by Toyota Motor Sales. Extensive lab experience will be provided. Preparation for ASE A1 will be covered. \$40 Materials Fee payable at registration. (CSU)

**AT 213 C Toyota Portfolio II TPORT II****1 Unit**

Term hours: 18 lecture. This course monitors the progress of T-TEN students through the program. This course focuses on their second year in the program with an emphasis on successful internship completion. This course must be taken in both the Fall and Spring semester the student is in year two of the T-TEN program. Course may be taken three times for credit. (CSU).

**AT 215 C ASE Test Prep - Heating and Air Conditioning****0.5 Units**

Term hours: 8-9 lecture. This is a review course and is designed to help prepare students to take and pass the ASE (National Institute for Automotive Service Excellence) heating and air conditioning certification test. This course will review the various task lists which detail the knowledge that a technician must have to pass the ASE heating and air conditioning certification test. Demonstrated lecture will include instruction concerning theory, operation, diagnosis, and repair of automotive climate control systems. (CSU)

**AT 223 C T-TEN Transmissions, Driveline and Electric Drivetrain (formerly AT 141 C)****12 Units****Prerequisite(s):** AT 110 C or AT 109 C and AT 260 C with a grade of C or better.

Term hours: 162 lecture and 162 laboratory. This course will include operation principles, design, repair, rebuild and service procedures for manual transmissions, automatic transmissions, clutch assemblies, drive lines, final drive axles and trans-axles units. Demonstrated lectures and shop laboratory work on drivetrain components will be covered with emphasis on procedures to industry standards. Practical application will be under simulated shop conditions on "live" and "lab" vehicles. Preparation for ASE certification will be covered. \$30 Materials Fee - Payable at Registration (CSU)

**AT 225 C ASE Test Prep - Engine Repair****0.5 Units**

Term hours: 9 lecture. This is a review course and is designed to help prepare students to take and pass the ASE (National Institute for Automotive Service Excellence) engine repair certification test. This course will review the various task lists which detail the knowledge that a technician must have to pass the ASE engine repair certification test. Demonstrated lecture will include instruction concerning theory, operation, diagnosis, and repair of the automotive engine. (CSU)

**AT 230 C Advanced Alignment and Chassis****4 Units**

Term hours: 54 lecture and 54 laboratory. This course covers advanced alignment concepts. Custom suspension theory and service is explored with practical laboratory experience included. \$30 Materials Fee - Payable at Registration. (CSU)

**AT 235 C ASE Test Prep - Brakes****0.5 Units**

Term hours: 9 lecture. This is a review course and is designed to help prepare students to take and pass the ASE (National Institute for Automotive Service Excellence) brake certification test. This course will review the various task lists which detail the knowledge that a technician must have to pass the ASE brake certification test. Demonstrated lecture will include instruction concerning theory, operation, diagnosis, and repair of the automotive brake systems. (CSU)

**AT 236 C ASE Test Prep - Steering/Suspension****0.5 Units**

Term hours: 9 lecture. This is a review course and is designed to help prepare students to take and pass the ASE (National Institute for Automotive Service Excellence) steering and suspensions certification tests. This course will review the various task lists which detail the knowledge that a technician must have to pass the ASE steering and suspension certification test. Demonstrated lecture will include instruction concerning theory, operation, diagnosis, and repair of the automotive steering and suspension systems. (CSU)

**AT 245 C ASE Test Prep - Manual Drivetrain****0.5 Units**

Term hours: 9 lecture. This is a review course and is designed to help prepare students to take and pass the ASE (National Institute for Automotive Service Excellence) manual transmission and drive-train certification tests. This course will review learning objectives as designated by NATEF (National Automotive Technician Educational Foundation) which detail the knowledge that a technician must possess to pass the ASE manual drive-train certification test. Demonstrated lecture will include instruction concerning theory, operation, diagnosis, and repair of manual transmissions/transaxles and other drive-train related components and systems. (CSU)

**AT 246 C ASE Test Prep-Automatic Trans****0.5 Units**

Term hours: 9 lecture. This is a review course and is designed to help prepare students to take and pass the ASE (National Institute for Automotive Service Excellence) automatic transmission and transaxle certification test. This course will review the learning objectives as designated by NATEF (National Automotive Technician Educational Foundation) which detail the knowledge that a technician must possess to pass the ASE automatic transmission/transaxle certification test. Demonstrated lecture will include instruction concerning theory, operation, diagnosis, and repair of automatic transmissions related components and systems. (CSU)

**AT 250 C Adv Performance Driveability****4 Units**

**Prerequisite(s):** Completion of or concurrent enrollment or a grade of C or better in AT 105 C and AT 110 C.

Term hours: 48 lecture and 48 laboratory. The course includes advanced principles, design and repair procedures of automotive electrical, ignition and computerized engine management systems, including emission controls. Demonstrated lectures and laboratory work using modern testing equipment, oscilloscopes, dynamometer and other diagnostic equipment are included. Practical application under simulated repair shop conditions on "live" vehicles is an integral part of the course. (CSU)

**AT 254 C T-TEN Brakes, Steering, Suspension and Chassis Electronics****12 Units**

**Prerequisite(s):** AT 109 C or AT 110 C and AT 260 C, with a grade of C or better

Term hours 162 lecture and 162 laboratory. This course emphasizes the design, operating principles, service, repair and diagnosis of chassis and brake systems used on current production vehicles. Major topics of study will be wheel alignment procedures, tire and wheel balance, suspension and steering system repair, hydraulics, brake system, and related electronics service and repair. Preparation for ASE (A4 and A5) certification is covered. \$30 materials fee payable at registration. (CSU)

**AT 255 C ASE Test Prep - Engine Perf****0.5 Units**

Term hours: 9 lecture. This is a review course and is designed to help prepare students to take and pass the ASE (National Institute for Automotive Service Excellence) engine performance certification test. This course will review the various task lists which detail the knowledge that a technician must have to pass the ASE engine performance certification test. Demonstrated lecture will include instruction concerning theory, operation, diagnosis, and repair of automotive engine. (CSU)

**AT 256 C ASE Test Prep - Adv Eng Perf****0.5 Units**

Term hours: 9 lecture. This is a review course and is designed to help prepare students to take and pass the ASE (National Institute for Automotive Service Excellence) advanced engine performance certification test. This course will review the various task lists which detail the knowledge that a technician must have to pass the ASE advanced engine performance certification test. Demonstrated lecture will include instruction concerning theory, operation, diagnosis, and repair of automotive engine control systems. (CSU)

**AT 260 C T-TEN Toyota Electrical Sys****12 Units**

**Prerequisite(s):** Completion of AT 109 C with a minimum grade of B and selected as part of the T-TEN cohort based AT 109 C grade point ranking. Term hours: 162 lecture and 162 laboratory. This course emphasizes operating principles, design and repair procedures of automotive electrical/electronic systems. In addition, lighting systems, power windows, power door locks, under dash components, charging systems, starters, batteries, and computerized vehicle networks systems will be covered. Modern test equipment such as scan tools and oscilloscopes will be used. Skill competency development will be simulated under shop conditions on OBD II and newer vehicles. \$10 Materials Fee - Payable at Registration. (CSU)

**AT 265 C ASE Test Prep - Electrical****0.5 Units**

Term hours: 9 lecture. This is a review course and is designed to help prepare students to take and pass the ASE (National Institute for Automotive Service Excellence) electrical certification test. This course will review the various task lists which detail the knowledge that a technician must have to pass the ASE electrical certification test. Demonstrated lecture will include instruction concerning theory, operation, diagnosis, and repair of automotive electrical systems. (CSU)

**AT 270 C T-TEN Climate Control Systems****4 Units**

**Prerequisite(s):** Completion of or concurrent enrollment in AT 260 C with a grade of C or better.

Term hours: 54 lecture and 54 laboratory. This course emphasizes the acquisition of the practical skills needed to both understand principles of vehicle climate control systems and perform diagnosis and repair. Demonstrated lecture, shop lab simulators and specially prepared Toyota and Lexus vehicles will be used to learn service diagnosis, repair of air conditioning systems including automatic temperature control. Safety and environmental concerns along with CFC recovery, recycling, retrofitting R12 systems to R-134A, R1234 refrigerant and new refrigerant types will be covered. \$25 Material Fees - Payable at Registration. (CSU)

**AT 275 C Automotive Service Advisor Internship****1 Unit**

**Prerequisite(s):** AT 195 C with a grade of C or better.

Term hours: 54 laboratory. This course is designed to give the student credit for work experience at a related occupational worksite while being concurrently enrolled in a vocational major. For each unit of credit, a minimum of 75 total hours of worksite hours for paid internships (minimum 60 hours for unpaid internships). This internship allows students to apply knowledge gained in college courses to an actual work setting, sample career choices and improve job-readiness skills. Supplemental reading and course assignments are required. Course may be taken three times for credit. (CSU)

**AT 280 C Intro to Alternative Fuels****4 Units**

Term hours: 54 lecture and 54 laboratory. This is an introductory course in alternative fuels as used in the transportation industry. Various gaseous fuels and vehicle propulsion systems will be discussed. Topics include the theory, design, operation, conversion, light diagnosis, and light repair will be discussed as applicable by the automotive industry. Laboratory activities will emphasize skill competency in vehicle preparation, system maintenance and the diagnosis and repair of alternative fuel vehicles. (CSU)

**AT 281 C Intro to Elec.-Hybrid Vehicles****4 Units**

**Prerequisite(s):** AT 105 C and AT 110 C with a grade of B or better.

Term hours: 54 lecture and 54 laboratory. This is an introductory course in electric (EV) and electric/hybrid vehicles as used in the transportation industry. Topics include the theory, design, operation, maintenance, and repair of batteries, motors, controllers, chargers, and regenerative braking systems. Technician safety is also covered. (CSU)

**AT 282 C Hybrid Vehicle Maintenance****4 Units**

**Prerequisite(s):** Completion of or concurrent enrollment in AT 281 C.

Term hours: 54 lecture and 54 laboratory. This course covers hybrid and plug-in hybrid vehicle theory of operation, charging, batteries, maintenance process and procedures as specified by vehicle manufacturers. The course will be taught using lecture, collaborative work groups and lab. (CSU)

**AT 283 C T-TEN ICE-HV-EV Perf****12 Units**

**Prerequisite(s):** Completion of or concurrent enrollment of AT 109 C and AT 260 C with a grade of C or better.

Term hours: 162 lecture and 162 laboratory. This course will include operating principles, design, and repair procedures of the computerized ICE/Hybrid/EV management system and the application of related diagnostic tools and equipment. In addition, alternators, starters, batteries, ignition systems, emission control systems, 5 gas analysis, hybrid electric motor operation and PCM control, EV motor and motor control and scan tool use will be covered. Skill competency development will be under simulated shop conditions on "live" vehicles. Preparation for ASE certification test A8 will be covered. \$30 Materials Fee - Payable at Registration (CSU)

**AT 295 C Automotive Internship****1-4 Units**

Term hours: 18 lecture and 240 laboratory depending on units attempted. This course is designed to give the student credit for work experience at a related occupational worksite, while being concurrently enrolled in a vocational major. For each unit of credit, a minimum of 75 total hours of worksite hours for paid internships (minimum 60 hours for unpaid internships). The internship allows students to apply knowledge gained in college courses to an actual work setting, sample career choices and improve job-readiness skills. Supplemental reading and course assignments required. May be taken for credit 1-4 times. Open Entry/Open Exit. Pass/No Pass or Pass/No Pass/Letter Grade Option. (CSU)

**AT 296 C T-TEN Automotive Internship I****1 Unit**

**Prerequisite(s):** Completion of or concurrent enrollment in the T-TEN coursework for Year One of the program (T-TEN Electrical in the Fall and T-TEN Brake/Chassis in the Spring)

Term hours: 54 laboratory. This course offers practical work experience in an approved aviation and travel-related industry for students in the Aviation and Travel Careers program. This course is designed to provide vocational learning opportunities throughout employment. Pass/No Pass/Letter Grade option. Course may be taken four times for credit. (CSU)

**AT 297 C T-TEN Automotive Internship II****1 Unit**

**Prerequisite(s):** Completion of or concurrent enrollment in the T-TEN coursework for Year One of the program (T-TEN Driveline in the Fall and T-TEN ICE-EV-Hybrid in the Spring)

Term hours: 54 laboratory. This course supports practical work experience for students employed at a Toyota or Lexus dealer as an entry level. Pass/No Pass/Letter Grade option. (CSU)