

# Programs of Study

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## Automotive Technology and Repair Program

### Course Length:

900 hours total  
230 hours theory  
470 hours Laboratory/Shop/Hands On  
200 hours Internship

### Course Description:

The Twenty-six (26) weeks and 900 clock hour course is a hands-on program designed to teach students automotive repair for cars and light trucks, so students can perform world class quality auto repairs, as well as secure and retain employment in the automotive repair field.

This course will include Internet documentation and lecture materials, instruction, hands-on experience, diagrams, pictures, study guides, and other easy-to-use materials relating formalized training toward PA State & Enhanced Emission requirements. This course also includes light truck and car maintenance designed to help students understand changing brakes, muffler, steering and suspension systems, exhaust systems, tires, fluid exchanges, oil & filter changes, and tune-ups. Our automotive program prepares students for further study to pass the brakes, suspension, and engine ASE certification test. Our course of study also prepares students to sit in on additional ASE modules either offered online or in class.

With the training of this course students will be fully qualified to be a professional service mechanic, self-employed as the owner or manager of a repair facility, work in a parts retail store, become a sales service manager in a retail repair or dealership center, or work as an apprenticeship in a manufacturing operation as a technical manufacturing operator or machine repair journeyman, etc.

Admissions and State Inspection testing will be done externally and paid by PTTI one time only. Any Admissions and State Inspection make-up test or re-test will be paid for by the student.

Students who successfully complete 700 hours of classes, have proof of a secured internship and have completed and signed internship documentation from the PTTI Coordinator will be eligible to receive the toolbox and tools.

### Automotive Technology & Diploma Program

Course/Number		Clock	Hours	Total
Lesson	Title	Lecture	Shop	Clock Hours
ATR001	Shop Safety	2	5	7
ATR002	Shop Equipment	3	4	7
ATR003	Automotive Measurement and Math	29	1	30
ATR004	Brake Systems	8	10	18
ATR005	Front Brakes/Rear Brakes	2	22	24
ATR006	Brake System Maintenance	6	15	21
ATR007	Master Cylinders	10	24	34
ATR008	Suspension System Fundamentals	10	18	28
ATR009	Suspension Diagnosis/Maintenance/Repair	31	94	125
ATR010	Inner & Outer Tie Rods	12	20	32
ATR011	Alignments	6	28	34

ATR012 <sub>a/b</sub>	PA Emission & Safety Inspection – A&B required	48	26	74
ATR013	Exhaust/Torch/Mufflers	4	24	28
ATR014	Belts/Hoses/Thermostats	6	26	32
ATR015	Electrical Troubleshooting	5	20	25
ATR016	System Diagnosis	7	52	59
ATR017	Fluids (Oil, Transmission, Coolant)	6	36	42
ATR018	Tires and Tire Repair	5	25	30
ATR019	Resume Writing	15	5	20
ATR020	Customer Service/Interviewing Skills	15	15	30
ATR021	Internship	0	200	
<b>Total:</b>		<b>230</b>	<b>670</b>	<b>900</b>

### *Course Subjects:*

1. Shop safety
2. Shop equipment operation
3. Pennsylvania State & Emission license attainment
4. Diagnosis of vehicle mechanical systems
5. Remove & install front and rear brake pads and rear drum brakes
6. Perform vehicle alignments using advanced alignment machine
7. Fluid changes (Oil, Transmission, Coolant, Brake, & Power Steering Fluids)
8. Remove & install suspension components (struts, inner & outer tie rods, ball joints, stabilizer bar links/bushings)
9. Removal & replacement of exhaust systems (including use of a torch, mufflers, resonator pipes, catalytic converters)
10. Use of test lights & volt/ohm meters, OBDII diagnosis scanner
11. Proficient use of All Data & Mitchell technical specifications and maintenance data
12. Tire inspection, including repairs and replacement
13. Resume writing
14. Customer service, work orders, parts look-up, parts ordering
15. Interviewing, mentoring & life skill learning
16. Job attainment assistance & job retention
17. Budgeting & personal finances

### *Certification:*

A diploma of completion will be given to each student upon completing the course. This diploma will be used to show a prospective employer evidence of program completion and the skills attained for successful work in the automotive repair industry.

### **Course Descriptions – Automation Technology & Repair**

#### **ATR001 Auto Tech – Shop Safety**

In this course the student will acquire an in-depth knowledge of shop equipment, processes, and procedures for operating equipment so that the student and others remain safe in a working automotive repair center. Emphasis will be placed on truck and passenger lifts, safety data sheets, chemicals, and tire machines.

#### **ATR002 Auto Tech – Shop Equipment**

The student will acquire a working knowledge of Shop Equipment to perform automotive light duty repair on vehicles and light trucks. Equipment that the student will learn how to operate include: alignment lifts, passenger and light truck lifts, tire balance and tire change machines, and hand tools needed to perform mechanical and electrical repairs.

Pre-requisite: ATR001

#### **ATR003 Auto Tech – Automotive Measurement and Math**

Students will learn mathematics such as fractions, multiplication, division, slopes, volumes, areas,

percentages, variables, and bar graphs, line charts and their relationship to volts, ohms, current, capacitance, transformers, diodes, transistors, as well as temperature-pressure-speed. In addition, students will gain knowledge of customary and metric measuring systems, basic measuring tool identification, uses of common measuring tools, conversion charts, and safety rules relating to measurement tools Pre-requisite: ATR001, ATR002

#### **ATR004 Auto Tech – Brake Systems**

Students taking this course will gain a theoretical knowledge of the entire braking system which includes master cylinder, brake lines, hoses, calipers, brake line fittings, brake pads, safety measurements, wheel cylinders, and the full brake system operation as an integrated system.

Pre-requisite: ATR001, ATR002, ATR003

#### **ATR005 Auto Tech – Front Brakes**

In this course, students will learn about the front brake system for cars and light trucks. This course will teach students how to change, trouble-shoot, measure brake thickness, brake safety limits, and diagnosis of the front brake system. This course will also provide hands-on education so that students have a practical knowledge base on how the front brakes are maintained for the correct operation of vehicles on the road and highway. The student will learn the rear brake system for both rear brake pads/calipers and rear brake shoes/drums. The student will learn to perform brake changes, safety measurements, adjustments, diagnosis, repair and maintenance for the proper operation of both passenger cars and light trucks for Pennsylvania Inspection Safety Standards.

Pre-requisite: ATR001, ATR002, ATR003, ATR004

#### **ATR006 Auto Tech – Brake System Maintenance**

Students will gain knowledge of brake diagnosis, inspection, and the proper way to maintain a brake system. Students will also learn to describe the basic procedures for servicing master cylinder and a brake booster, in addition to servicing both disc and drum brakes. Students will learn to describe the proper procedure for both manual and pressure bleeding of a brake system. Students will also gain knowledge that ensures safety protocol when servicing brake systems. Pre-requisite: ATR001, ATR002, ATR003, ATR004, ATR005

#### **ATR007 Auto Tech – Master Cylinders**

The course will allow every student the opportunity to learn the function and application of master cylinders, how and when to check for leaks, replacement, and unique failure modes. This course will allow the student to have a well-rounded understanding of the master cylinder and its use for stopping vehicles on the road and how air over hydraulics work.

Pre-requisite: ATR001, ATR002, ATR003

#### **ATR008 Auto Tech – Fundamentals of Suspension**

In this course the student will understand the theory and how suspension components operate, function, fail, replaced and maintained for the safety according to the manufacturer requirements and PA State Inspection Regulations. The student will learn about various car suspension types, shocks, struts, front and rear suspension, foreign and domestic vehicle on cars and trucks. After learning about the suspension systems, the student will be required to assemble and disassemble suspension components, perform routine maintenance, understand how to perform first stage suspension diagnosis checks and alignments.

Pre-requisite: ATR001, ATR002, ATR003

#### **ATR009 Auto Tech – Suspension Diagnosis/Maintenance/Repair**

The student will be taught to understand various struts and shock systems and their relationship to other suspension components like: inner/outer tie rods, ball joints, sway bar links, power steering rack and pinion systems, steering boxes, upper and lower control arms, front and rear frame systems and adjustments during alignments. Emphasis is placed on how to determine failure, replacement, and maintainability for proper use. Hands-on training will be emphasized during this course so that each student can afterward feel at ease with performing diagnosis and maintenance of struts and shocks.

Pre-requisite: ATR001, ATR002, ATR003, ATR008

### **ATR010 Auto Tech – Inner & Outer Tie Rods**

Student will get an in-depth experience with understanding the need for inner and outer tie rods, their use in cars and light trucks, their replacement, and adjustments during installation and alignments.

Pre-requisite: ATR001, ATR002, ATR003

### **ATR011 Auto Tech - Alignments**

The student will acquire a working knowledge of Alignments to perform automotive light duty repair on vehicles and light trucks so that students can learn the skills needed to perform quality auto repairs in a timely fashion as well as secure and retain employment in the automotive repair field. Each student will perform over 20 alignments before the course has ended. Students will inspect, report any failures, repair failed vehicles, and perform alignments as required by dealer specification on the Hunter Hawkeye alignment machine.

Pre-requisite: ATR001, ATR002, ATR003, ATR008, ATR009, ATR010

### **ATR012a Auto Tech – PA Emission Inspection**

Students in this course will learn about the Pennsylvania Emissions Inspection, all theory and practices in repair centers. Emphasis will be placed on documenting the evidence of PA Emissions, fraud prevention, and how to explain inspection results to management and customers alike. After completion, students will be required to pass a PA State Emissions Licensing Exam and obtain a PA State Emission License. Obtaining a PA State Emissions License is a critical component to securing a job in the automotive repair industry. If needed PTTI will help to schedule the PA State Emissions Licensing Exam and provide transportation.

Pre-requisite: ATR001, ATR002, ATR003

### **ATR012b Auto Tech – PA Safety Inspection**

In this course the student will become proficient at understanding the procedures, rules, regulations, fraud prevention, and documentation needed for performing Pennsylvania (PA) State Safety Inspections to for Pass/Failure of automobiles and light duty repair on vehicles. Students will learn the skills needed to perform PA Safety Inspections in a timely fashion. After completion, students will be required to pass a PA State licensing exam and obtain a PA State Safety License. Obtaining a PA State Safety License is a critical component to securing a job in the automotive repair industry.

If needed PTTI will help to schedule the PA State Safety Licensing Exam and provide transportation.

Pre-requisite: ATR001, ATR002, ATR003

### **ATR013 Auto Tech – Exhaust/Torch/Mufflers**

Participating students will gain education and training to diagnosis exhaust problems, determine corrective actions, use oxy-acetylene torch for heating and cutting, remove and install exhaust components such as catalytic converters, flex pipes, resonator, under axle, mufflers and tail pipes. Students will be expected to learn how to remove sections of exhaust without destroying components before and after the section that needs to be removed. Students will be expected to perform the actual work themselves and gain proficiency.

Pre-requisite: ATR001, ATR002, ATR003

### **ATR014 Auto Tech – Belts/Hoses/Thermostats**

Students will acquire a thorough understanding of how drive belts work, the purpose of hoses and their proper use, how thermostats function and the replacement of all these components. Every student will manually change different types of serpentine and v-belts, air-vacuum-coolant-power steering-brake hoses as well as thermostats on various types of cars and trucks for both foreign and domestic vehicles.

Pre-requisite: ATR001, ATR002, ATR003

### **ATR015 Auto Tech – Electrical Troubleshooting**

Students will learn ohms law and how to apply it to perform basic electrical diagnosis for engine component wiring, shorted or open circuit wiring, and determine why power is not getting to various electrical sub-systems in a vehicle. All students will be required to learn how to use and apply a strong

working knowledge of volt-ohm meters to diagnosis wiring failures on vehicle inside the classroom.

Pre-requisite: ATR001, ATR002, ATR003

### **ATR016 Auto Tech – System Diagnosis**

In this course, students learn how to utilize computerized diagnosis scanners using AllDatapro and Mitchell "On Demand" software to perform basic diagnosis to vehicle engine sensors, transmission and body control systems. Each student will be expected to learn different types of scanners and software to perform the first level of diagnosis related to the engine, transmission and body control operations of vehicle.

Pre-requisite: ATR001, ATR002, ATR003

### **ATR017 Auto Tech – Fluids (Oil, Transmission, Brake, Power Steering, Coolant)**

Theory of fluids will be taught so there is a thorough understanding of why certain fluids are used for different reasons. Every student will learn to operate Robinair and RTI fluid machines for transmission, coolant and brake fluid flushes. Each student will also be required to perform engine oil & filter changes and flush brake fluids and power steering system.

Pre-requisite: ATR001, ATR002, ATR003

### **ATR018 Auto Tech – Tires and Tire Repair**

In this course, every student will learn about tire specifications and how-to diagnosis and repair tire related issues. Students will be provided a full education of tires and their relationship to rims, how tires are mounted to rims, high speed wheel balancing, and repairs to tires within the legal specified limits. Students will be given various sizes and types of tires, so they can diagnosis, repair and perform maintenance in a timely fashion.

Pre-requisite: ATR001, ATR002, ATR003

### **ATR019 Auto Tech – Resume Writing**

Student will be taught the proper format to place skill-based content into their resumes. Resume writing will focus on content with abilities and strengths that students have and what employers seek. The skills section of the resume will reflect the soft and technical skills (before and after the student graduated from PTT.edu). Students will complete skill and work-related questionnaires, interview with PTTI's job developers, and finally develop resume while corresponding PTTI's job developer and the staff. Resumes will be stored on PTTI's secure web-portal for updates and future job opportunities as a continued service for the student.

Pre-requisite: ATR001, ATR002, ATR003

### **ATR020 Auto Tech – Interviewing/Customer Service Skills**

In this course, each student will be taught how to undergo successful interviews and provide customer service. This course is designed with both lecture and interactive learning. Students will participate in group as well as individual interview training sessions that simulate business communication, question/answer sessions, along with shop demonstrations, right and wrong customer service communications. Emphasis will be placed on securing employment, problem solving skills, professional customer service, and employment literacy.

Pre-requisite: ATR001, ATR002, ATR003, ATR019

### **ATR021 Auto Tech - Internship**

Students will acquire real-time, hands-on, on-the-job education-related experience and apply learned skills as a component of their education. Emphasis will be placed on applying skills learned, working well with other employees, teamwork, and helping companies become more productive. The 200-hour internship experience will provide students with the opportunity to provide employers high quality standards of work.

Pre-requisite: All courses from ATR001 through ATR020