



Automotive Service Technician

On-the-Job Training Guide

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Apprenticeship and
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Commission



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Recognition:

To promote transparency and consistency, this document has been adapted from the 2016 Automotive Service Technician Red Seal Occupational Standard (RSOS) (Employment and Social Development Canada).

A complete version of the Occupational Standard can be found at www.red-seal.ca

STRUCTURE OF THE ON-THE-JOB TRAINING GUIDE

To facilitate understanding of the occupation, this guide to course content contains the following sections:

Task Matrix: a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard detailing the essential skills and the level of training where the content is covered. The Task Matrix is broken down into the following:

Major Work Activity: the largest division within the standard that is comprised of a distinct set of trade activities.

Task: distinct actions that describe the activities within a major work activity.

Sub-task: distinct actions that describe the activities within a task.

Training Profile Chart: a chart which outlines the model for Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training.

On-the-Job Training Content for the Automotive Service Technician Trade: a chart which outlines the topics of technical training with on-the-job examples for apprentice to achieve relevant experience at work.

TRAINING REQUIREMENTS FOR THE AUTOMOTIVE SERVICE TECHNICIAN TRADE

To graduate from each level of the apprenticeship program, an apprentice must successfully complete the required technical training and compile enough on-the-job experience to total at least 1800 hours each year. Total trade time required is 7200 hours and at least 4 years in the trade.

Journeyman to apprentice ratio for this trade is: 1:2

The information contained in this on-the-job training guide serves as a guide for employers and apprentices. Apprenticeship training is mutually beneficial to both employer and apprentice. The employer's investment in training apprentices' results in skilled and certified workers. The document summarizes the tasks to be covered by the apprentice during their on-the-job portion of apprenticeship training. An apprentice spends approximately 85% of their apprenticeship term training on-the-job.

It is the employer's or journeyman's responsibility to supervise an apprentice's practical skills development until a satisfactory level of proficiency has been reached.

EMPLOYER TRAINING RESPONSIBILITY

- promote a safety-conscious workplace
- provide mentored, hands-on practice in the use of tools and equipment
- demonstrate procedures relevant to the inspecting, diagnosing, servicing, repairing, replacing and overhauling of all components of an automobile, light truck or light bus
- provide the opportunity for apprentices to service the above systems and vehicles
- further the apprentice's ability to interpret technical drawings and schematics
- ensure that the apprentice can troubleshoot, diagnose and repair the vehicle and its systems

Employers should make every effort to expose their apprentices to work experience in as many areas of the trade as possible.

In the On-the-Job Training Guide, in-school instruction is listed first; on-the-job suggestions to help employers assist the apprentice to prepare for in-school training are listed next.

The content of the training components is subject to change without notice.

AUTOMOTIVE SERVICE TECHNICIAN TASK MATRIX CHART

This chart outlines the major work activities, tasks and sub-tasks from the 2016 Automotive Service Technician Red Seal Occupational Standard (RSOS). Each sub-task details the corresponding essential skill and level of training where the content is covered. *

* Sub Tasks with numbers in the boxes is where the content will be delivered in training.

A – Performs Common Occupational Skills

6%

A-1 Performs safety-related functions	1.01 Maintains safe work environment 1	1.02 Uses personal protective equipment (PPE) and safety equipment 1		
A-2 Uses tools, equipment and documentation	2.01 Uses tools and equipment 1 (2, 3, 4 In-Context)	2.02 Uses fasteners, tubing, hoses and fittings 1 (2, 3, 4 In-Context)	2.03 Uses hoisting and lifting equipment 1 (2, 3, 4 In-Context)	2.04 Uses technical information 1 (2, 3, 4 In-Context)
A-3 Uses communication and mentoring techniques	3.01 Uses communication techniques 1 (2, 3, 4 In-Context)	3.02 Uses mentoring techniques 4		

B – Diagnoses and Repairs Engine and Engine Support Systems

19%

B-4 Diagnoses engine systems	4.01 Diagnoses cooling systems 2	4.02 Diagnoses lubricating systems 2	4.03 Diagnoses engine assembly 2	4.04 Diagnoses accessory drive systems 2
B-5 Repairs engine systems	5.01 Repairs cooling systems 2	5.02 Repairs lubricating systems 2	5.03 Repairs engine assembly 2	5.04 Repairs accessory drive systems 2
B-6 Diagnoses gasoline engine support systems	6.01 Diagnoses gasoline fuel delivery and injection systems 3	6.02 Diagnoses gasoline ignition systems 3	6.03 Diagnoses gasoline intake/exhaust systems 3	6.04 Diagnoses gasoline emission control systems 3
B-7 Repairs gasoline engine support systems	7.01 Repairs gasoline fuel delivery and injection systems 3	7.02 Repairs gasoline ignition systems 3	7.03 Repairs gasoline intake/exhaust systems 3	7.04 Repairs gasoline emission control systems 3
B-8 Diagnoses diesel engine support systems	8.01 Diagnoses diesel fuel delivery and injection systems 4	8.02 Diagnoses diesel intake/exhaust systems 4	8.03 Diagnoses diesel emission control systems 4	
B-9 Repairs diesel engine support systems	9.01 Repairs diesel fuel delivery and injection systems 4	9.02 Repairs diesel intake/exhaust systems 4	9.03 Repairs diesel emission control systems 4	

C – Diagnoses and Repairs Vehicle Module Communications Systems

9%

C-10 Diagnoses vehicle networking systems	10.01 Reads diagnostic trouble codes (DTCs)	10.02 Monitors data	10.03 Interprets tests results	10.04 Tests system circuitry and components	
	3 (1, 2, 4 In-Context)	3 (1, 2, 4 In-Context)	3 (1, 2, 4 In-Context)	3 (1, 2, 4 In-Context)	
	C-11 Repairs vehicle networking systems	11.01 Updates components software	11.02 Replaces components	11.03 Verifies vehicle module communications system repair	
		3 (1, 2, 4 In-Context)	3 (1, 2, 4 In-Context)	3 (1, 2, 4 In-Context)	

D – Diagnoses and Repairs Driveline Systems

15%

D-12 Diagnoses driveline systems	12.01 Diagnoses drive shafts and axles	12.02 Diagnoses manual transmissions/transaxles	12.03 Diagnoses automatic transmissions/transaxles	12.04 Diagnoses clutches	12.05 Diagnoses transfer cases	
	1	2	4	2	3	
	12.06 Diagnoses final drive assemblies					
	2					
	D-13 Repairs driveline systems	13.01 Repairs drive shafts and axles	13.02 Repairs manual transmissions/transaxles	13.03 Repairs automatic transmissions/transaxles	13.04 Repairs clutches	13.05 Repairs transfer cases
		1	2	4	2	3
13.06 Repairs final drive assemblies						
2						

E – Diagnoses and Repairs Electrical and Comfort Control Systems

17%

E-14 Diagnoses electrical systems and components	14.01 Diagnoses basic wiring and electrical systems 1	14.02 Diagnoses starting/ charging systems and batteries 1, 2	14.03 Diagnoses lighting and wiper systems 2	14.04 Diagnoses entertainment systems 4	14.05 Diagnoses electrical options 3
	14.06 Diagnoses instrumentation and information displays 4	14.07 Diagnoses electrical accessories 2, 3			
E-15 Repairs electrical systems and components	15.01 Repairs basic wiring and electrical systems 1	15.02 Repairs starting/ charging systems and batteries 1, 2	15.03 Repairs lighting and wiper systems 2	15.04 Repairs entertainment systems 4	15.05 Repairs electrical options 3
	15.06 Repairs instrumentation and information displays 4	15.07 Installs electrical accessories 3	15.08 Repairs electrical accessories 2		
E-16 Diagnoses heating, ventilation and air conditioning (HVAC) and comfort control systems	16.01 Diagnoses air flow control systems 4	16.02 Diagnoses refrigerant systems 4	16.03 Diagnoses heating systems 4		
	E-17 Repairs heating, ventilation and air conditioning (HVAC) and comfort control systems	17.01 Repairs air flow control systems 4	17.02 Repairs refrigerant systems 1, 4	17.03 Repairs heating systems 4	

F – Diagnoses and Repairs Steering and Suspension, Braking, Control Systems, Tires, Hubs and Wheel Bearings

21%

F-18 Diagnoses steering and suspension, braking, control systems, tires, wheels, hubs and wheel bearings	18.01 Diagnoses steering, suspension and control systems 1, 2	18.02 Diagnoses braking and control systems 1, 2	18.03 Diagnoses tires, wheels, hubs and wheel bearings 1
F-19 Repairs steering and suspension, braking, control systems, tires, wheels, hubs and wheel bearings	19.01 Repairs steering, suspension and control systems 1, 2	19.02 Repairs braking and control systems 1, 2	19.03 Repairs tires, wheels, hubs and wheel bearings 1

G – Diagnoses and Repairs Restraint Systems, Body Components, Accessories and Trim

8%

G-20 Diagnoses restraint systems, body components, accessories and trim	20.01 Diagnoses restraint systems 1, 4	20.02 Diagnoses wind noises, rattles and water leaks 1 (2, 3, 4 In-Context)	20.03 Diagnoses interior and exterior components, accessories and trim 1 (2, 3, 4 In-Context)	20.04 Diagnoses latches, locks and movable glass 1 (2, 3, 4 In-Context)
G-21 Repairs restraint systems, body components, accessories and trim	21.01 Repairs restraint systems 4	21.02 Repairs wind noises, rattles and water leaks 1 (2, 3, 4 In-Context)	21.03 Repairs interior and exterior components, accessories and trim 1 (2, 3, 4 In-Context)	21.04 Repairs latches, locks and movable glass 1 (2, 3, 4 In-Context)

H – Diagnoses and Repairs Hybrid and Electric Vehicles (EV)

5%

H-22 Diagnoses hybrid and electric vehicles (EV)

22.01 Implements specific safety protocols for hybrid and electric vehicles (EV)

1, 4

22.02 Diagnoses hybrid and electric vehicle (EV) systems

4

H-23 Repairs hybrid and electric vehicles (EV)

23.01 Repairs hybrid vehicle systems

4

23.02 Repairs electric vehicle (EV) systems

4



TRAINING PROFILE CHART

This Training Profile Chart represents Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) apprenticeship technical training at the topic level.

Level One	Transcript Code	Hours
Automotive Shop Fundamentals	SHOP 123	30
Body Components and Service Inspection	ATBD 120	12
Braking Systems	BRAK 122 – Theory	30
	BRAK 123 – Shop	30
Driveline Systems	DRTR 122	30
Electrical System and Components	ELCT 120 – Theory	30
	ELCT 121 – Shop	18
Engine Systems	ENGN 124	30
Steering, Suspension and Control Systems	STER 120	30
		240

Level Two	Transcript Code	Hours
Braking and Stability Control Systems	BRAK 205 – Theory/Shop	18
Engine Systems	ENGN 208 – Theory	30
	ENGN 209 – Shop	48
Steering, Suspension and Control Systems	STER 200 – Theory	18
	STER 201 – Shop	24
Starting, Charging, Lighting and Wipers	ELCT 200 – Theory	20
	ELCT 201 – Shop	22
Transmission and Final Drive Systems	TRNM 206 – Theory	30
	TRNM 207 – Shop	30
		240

Level Three	Transcript Code	Hours
Electrical Accessories and Options	ELCT 300	30
Gasoline Engine Performance	FUEL 300 – Theory	45
	FUEL 301 – Shop	45
Ignition Systems	IGNS 300 – Theory/Shop	30
Transfer Cases and Manual Transmissions	TRNM 304 – Theory	30
	TRNM 305 – Shop	30
Vehicle Networking Systems	CNET 300 – Theory/Shop	30
		240

Level Four	Transcript Code	Hours
Automatic transmissions and Automated AWD/4WD Systems	TRNM 402 – Theory	30
	TRNM 403 – Shop	42
Diesel Engine Support Systems	FUEL 406 – Theory	18
	FUEL 407 – Shop	30
Entertainment Systems, Instrumentation and Information Displays	INST 403 – Theory/Shop	24
HVAC and Comfort Control Systems	HVAC 402 – Theory/Shop	30
Hybrid and Electric Vehicles (EV)	TECH 402 – Theory	18
Mentoring Techniques	MENT 400 – Theory	30
Restraint Systems	ATMC 400 – Theory/Shop	18
		240

ON-THE JOB AND IN-SCHOOL TRAINING

CONTENT FOR THE AUTOMOTIVE SERVICE

TECHNICIAN TRADE

This chart outlines on-the-job examples for apprentices to achieve relevant work experience to prepare for the topics of technical training. Topics of technical training are provided with the associated learning outcomes.

Level One	8 weeks	240 hours
Automotive Shop Fundamentals <ul style="list-style-type: none"> describe occupation related safety procedures describe safe handling of refrigerants describe restraint systems safety precautions describe hybrid and electric vehicle safety describe occupation related tools and equipment describe road test procedures demonstrate knowledge of trade documents demonstrate knowledge of trade documents apply trade documents to vehicle repair prepare trade documents 		30 hours
<p>Mentors can assist the apprentice to prepare for this section of technical training by:</p> <ul style="list-style-type: none"> <i>providing instruction on the safe handling of refrigerant</i> <i>providing instruction of the safe work practices around vehicles restraint (SRS) systems</i> <i>providing instruction of the safe work practices around hybrid and electric vehicles</i> <i>providing instruction on road test procedures</i> <i>providing opportunities to learn Interpreting trade documents and communication techniques</i> 		
Braking Systems – Theory <ul style="list-style-type: none"> describe the operation, diagnosis and repair procedures for brake system operation describe brake system hydraulic component evaluation and replacement describe the evaluation and repair of drum brake, disc brake and park brake assemblies describe power assist brake system operation and evaluation 		30 hours
Braking Systems – Shop <ul style="list-style-type: none"> demonstrate brake system hydraulic component evaluation and replacement demonstrate brake system flushing and bleeding procedures demonstrate the evaluation and repair of drum brake, disc brake and park brake assemblies <ul style="list-style-type: none"> (oxy-fuel safety, setup and shutdown) diagnose power assist brake system operation <ul style="list-style-type: none"> (hybrid brake safety) diagnose brake system operation Communication Techniques: <ul style="list-style-type: none"> apply trade documents to vehicle repair 		30 hours

prepare trade documents

Mentors can assist the apprentice to prepare for this section of technical training by:

- *providing instruction in the operation, diagnosis and repair procedures for brake system operation*
- *providing instruction in brake system hydraulic component evaluation and replacement*
- *providing opportunities to perform the evaluation and repair of drum brake, disc brake and park brake assemblies*
- *providing instruction in power assist brake system operation and evaluation*
- *providing opportunities to perform brake system hydraulic component evaluation and replacement*
- *providing instruction in performing brake system flushing and bleeding procedures*
- *providing opportunities to perform evaluation and repair of drum brake, disc brake and park brake assemblies including Oxy-Fuel safety, setup and shutdown*
- *providing instruction in performing diagnoses of power assist brake system operation including Hybrid brake safety*
- *providing instruction in performing diagnoses of brake system operation*
- *providing instruction in applying trade documents to vehicle repair*

Body Components and Service Inspection

12 hours

- describe adjustment of doors, lids and moveable glass
- describe diagnosis and repair of body leaks and noises
- describe basic service inspections

Mentors can assist the apprentice to prepare for this section of technical training by:

- *providing instruction in the adjustment of doors, lids and moveable glass*
- *providing opportunities to perform diagnoses and repair of body leaks and noises*
- *providing opportunities to perform basic vehicle service inspections*

Driveline Systems

30 hours

- describe operation, diagnosis and repair of driveshafts and axles
- repair drive shafts and axles
- describe operation, diagnosis and repair procedures for wheels and tires
- describe operation, diagnosis and repair of wheel bearings and seals
- **Tires, Wheels, Hubs and Wheel Bearings:**
 - repair wheels and tires
 - service wheel bearings and seals
 - perform the evaluation and repair of tire pressure monitor systems

Mentors can assist the apprentice to prepare for this section of technical training by:

- *providing instruction in the operation, diagnoses and repair of driveshafts and axles*
- *providing instruction in the operation, diagnoses and repair procedures for wheels and tires*
- *providing instruction in the operation, diagnoses and repair procedures of wheel bearings and seals*
- *providing opportunities to perform repairs to wheels and tires*
- *providing opportunities to perform servicing wheel bearings and seals*
- *providing opportunities to perform the evaluation and repair of tire pressure monitor systems*

Electrical Systems and Components– Theory

30 hours

- describe types of electrical circuits
- construct electrical circuits
- use electrical test equipment
- describe battery operation, diagnosis and repair
- describe schematics and flowcharts
- describe conductors and insulators
- describe solid state components

describe the operation, diagnosis and repair of computer control systems

Electrical Systems and Components– Shop

18 hours

- repair conductors and connectors
- construct electrical circuits
- use electrical test equipment
- diagnose batteries

Mentors can assist the apprentice to prepare for this section of technical training by:

- *providing instruction in the various types of electrical circuits*
- *providing instruction in constructing electrical circuits*
- *providing instruction in the use of electrical testing equipment*
- *providing opportunities to maintain, charge, and test batteries*
- *providing instruction in interpreting electrical schematics and flowcharts*
- *providing instruction in understanding conductors, insulators and solid state components*
- *providing opportunities to perform computer control systems diagnoses and repair*
- *providing opportunities to perform conductors and connectors repair*

Engine Systems – Theory/Shop

30 hours

- describe the operation of engine types
- describe the operation and diagnosis of engine cooling and lubrication systems
- describe the operation and diagnosis of engine induction and exhaust systems
- test engine cooling and lubrication system
- inspect induction and exhaust systems

Mentors can assist the apprentice to prepare for this section of technical training by:

- *discussing the operation of gasoline and diesel engines and their support systems*
- *providing opportunities to inspect, diagnose and repair cooling, lubrication, and exhaust systems*
- *providing opportunities to conduct cooling system pressure tests, exhaust restriction tests, and oil pressure tests*

Steering, Suspension and Control Systems

30 hours

- describe the operation and diagnosis of suspension systems
- describe the operation and diagnosis of steering systems
- perform the evaluation of suspension systems
- perform the evaluation of steering systems

Mentors can assist the apprentice to prepare for this section of technical training by:

- *discussing the evaluation, operation and diagnoses of steering, suspension and control systems*
- *providing opportunities to perform the basic evaluation, operation and diagnoses of steering, suspension and control systems*

Level Two**8 weeks****240 hours**

Braking and Stability Control Systems**18 hours**

- describe the operation, diagnoses and repair of anti-lock, traction and stability control systems
- perform the evaluation and repair of anti-lock brake, traction and stability control systems

Mentors can assist the apprentice to prepare for this section of technical training by:

- *discussing the operation, diagnoses and repair of anti-lock, traction and stability control systems*
 - *providing opportunities to perform the diagnoses and repair of anti-lock, traction and stability control systems*
-

Engine Systems – Theory**30 hours**

- describe the operation, diagnosis and construction of cylinder head and block assembly
- describe the types and use of automotive engine measuring tools
- describe the engine assembly procedures
- describe the diagnosis and repair of an engine
- describe engine replacement procedures
- describe the diagnoses and repair of induction and exhaust systems
- describe the diagnoses and repair of lubrication and cooling systems

Engine Systems – Shop**48 hours**

- perform the evaluation and repair of cylinder head and block assemblies
- use precision measuring tools
- assemble engine
- diagnose engine faults
- replace engine
- perform the evaluation and repair of induction and exhaust systems
- perform the evaluation and repair of engine lubrication and cooling systems

Mentors can assist the apprentice to prepare for this section of technical training by:

- *describing the operation, diagnoses and construction of the various cylinder head and block assemblies*
 - *explaining the various precision engine measuring tools and their uses*
 - *describing engine assembly procedures*
 - *providing opportunities to perform engine assembly procedures*
 - *providing opportunities to perform the diagnosis and repair of an engine*
 - *describing engine replacement procedures*
 - *providing opportunities to perform engine replacement procedures*
 - *describing the diagnoses and repair of induction and exhaust systems*
 - *describing the diagnoses and repair of lubrication and cooling systems*
 - *providing opportunities to perform the evaluation and repair of cylinder head and block assemblies*
 - *providing opportunities to diagnose engine faults*
 - *providing opportunities to perform the evaluation and repair of induction and exhaust systems*
 - *providing opportunities to perform the evaluation and repair of engine lubrication and cooling systems*
-

Starting, Charging, Lighting and Wipers – Theory**20 hours**

- describe the operation, diagnoses and repair of charging systems
- describe the operation, diagnoses and repair of wiper systems
- describe the operation, diagnoses and repair of lighting systems

- describe the operation, diagnoses and repair of starting systems

Starting, Charging, Lighting and Wipers – Shop

22 hours

- perform the evaluation and repair of a starting system
- replace a starter
- perform the evaluation and repair of a charging system
- replace a generator
- perform the evaluation and repair of lighting systems
- perform the evaluation and repair of wiper systems

Mentors can assist the apprentice to prepare for this section of technical training by:

- *describing the operation, diagnoses and repair of various starting and charging systems*
- *providing opportunities to perform the evaluation and repair of a starting system*
- *providing opportunities to perform the evaluation and repair of a charging system*
- *describing the operation, diagnoses and repair of various wiper and lighting systems*
- *providing opportunities to perform the evaluation of a wiper system*
- *providing opportunities to perform the evaluation of a lighting system*

Steering, Suspension and Control Systems – Theory

18 hours

- describe the diagnoses and repair of steering systems
- describe the diagnoses and repair of suspension systems
- describe the principles of wheel alignment

Steering, Suspension and Control Systems – Shop

24 hours

- perform the diagnoses and repair of steering systems
- perform the diagnoses and repair of suspension systems
- perform wheel alignment procedures

Mentors can assist the apprentice to prepare for this section of technical training by:

- *describing the operation, diagnoses and repair steering, suspension and control systems*
- *providing opportunities to perform the diagnoses and repair of steering systems*
- *providing opportunities to perform the diagnoses and repair of suspension systems*
- *providing opportunities to perform wheel alignment procedures*

Transmission and Final Drive Systems – Theory

30 hours

- describe the operation, diagnoses and repair of differential assemblies
- describe the evaluation and repair of clutch assemblies
- describe transmission, transaxle, transfer case removal and installation procedures
- describe maintenance procedure for transmission, transaxle, transfer case, differential and engine

Transmission and Final Drive Systems – Shop

30 hours

- perform the evaluation and repair of differential systems
- perform the evaluation and repair of clutch assemblies
- replace manual transmission and automatic transmissions
- perform maintenance procedures on differential assemblies, transfer case, automatic transmission and engine

Mentors can assist the apprentice to prepare for this section of technical training by:

- *describing the operation, diagnoses and repair of differential assemblies*
- *describing the evaluation and repair of clutch assemblies*
- *describing transmission, transaxle, transfer case removal and installation procedures.*
- *describing maintenance procedure for transmission, transaxle, transfer case, differential and engine*

- *providing opportunities to perform the evaluation and repair of differential systems*
- *providing opportunities to perform the evaluation and repair of clutch assemblies*
- *providing opportunities to perform the removal and replacement of manual transmission and automatic transmissions*
- *providing opportunities to perform the maintenance procedures on differential assemblies, transfer case, automatic transmission and engine*



Level Three**8 weeks****240 hours**

Electrical Accessories and Options**30 hours**

- describe the operation, diagnoses and repair of electrical accessories
- describe the operation, diagnoses and repair of electrical options
- perform the evaluation and repair of electrical accessories
- perform the evaluation and repair of electrical options

Mentors can assist the apprentice to prepare for this section of technical training by:

- *describing the operation, diagnoses and repair of electrical accessories*
 - *describing the operation, diagnoses and repair of electrical options*
 - *providing opportunities to perform the evaluation and repair of electrical accessories*
 - *providing opportunities to perform the evaluation and repair of electrical options*
-

Gasoline Engine Performance – Theory**45 hours**

- describe vehicle emission legislation
- describe types of engine management systems
- describe the operation, diagnoses and repair of electronic fuel injection (EFI) systems
- describe the operation, diagnoses and repair of On Board Diagnostics (OBD) engine management systems
- describe the operation, diagnoses and repair of emission systems
- describe maintenance procedures for fuel delivery, emission and injection systems
- describe diagnostic tools for on-board diagnostic (OBD) systems
- describe the operation, diagnoses and repair of alternative fuel systems
- describe the operation, diagnoses and repair of turbochargers and superchargers

Gasoline Engine Performance – Shop**45 hours**

- perform the diagnoses and repair of engine management systems
- perform the diagnoses and repair of electronic fuel injection (EFI) systems
- perform the diagnoses and repair of emission systems
- perform maintenance procedures on fuel delivery, emission and injection systems
- perform the diagnoses and repair of alternative fuel systems

Mentors can assist the apprentice to prepare for this section of technical training by:

- *explaining vehicle emission legislation*
- *describing the various types of engine management systems*
- *describing the operation, diagnoses and repair of electronic fuel injection (EFI) systems*
- *describing the operation, diagnoses and repair of On Board Diagnostics (OBD) engine management systems*
- *describing the operation, diagnoses and repair of emission systems*
- *providing opportunities to perform the maintenance procedures for fuel delivery, emission and injection systems*
- *explaining the diagnostic tools for on-board diagnostic (OBD) systems*
- *describing the operation, diagnoses and repair of alternative fuel systems*
- *describing the operation, diagnoses and repair of turbochargers and superchargers*
- *providing opportunities to perform the diagnoses and repair of engine management systems*
- *providing opportunities to perform the diagnoses and repair of electronic fuel injection (EFI) systems*
- *providing opportunities to perform the diagnoses and repair of emission systems*

- *providing opportunities to perform the maintenance procedures on fuel delivery, emission and injection systems*
- *providing opportunities to perform the diagnoses and repair of alternative fuel systems*

Ignition Systems

30 hours

- describe the operation, diagnoses and repair of ignition systems
- describe the use of ignition system testing equipment
- perform the diagnoses and repair of ignition systems
- use ignition system testing equipment

Mentors can assist the apprentice to prepare for this section of technical training by:

- *describing the operation, diagnoses and repair of ignition systems*
- *describing the use of Ignition system testing equipment*
- *providing opportunities to perform the diagnoses and repair of ignition systems*
- *providing opportunities to perform Ignition system testing equipment procedures*

Transfer Case and Manual Transmissions – Theory

30 hours

- describe the operation, diagnoses and repair of manual transmissions and transaxles
- describe the operation, diagnoses and repair of transfer cases
- describe All Wheel Drive (AWD) and Four Wheel Drive (4WD) systems

Transfer Case and Manual Transmissions – Shop

30 hours

- perform the evaluation and repair of manual transmissions and transaxles
- perform the evaluation and repair of transfer cases
- perform the evaluation and repair of All Wheel Drive and Four Wheel Drive systems

Mentors can assist the apprentice to prepare for this section of technical training by:

- *describing the operation, diagnoses and repair of manual transmissions and transaxles*
- *describing the operation, diagnoses and repair of transfer cases*
- *describing the operation, diagnoses and repair of All Wheel Drive (AWD) and Four Wheel Drive (4WD) systems*
- *providing opportunities to perform the evaluation and repair of manual transmissions and transaxles*
- *providing opportunities to perform the evaluation and repair of transfer cases*
- *providing opportunities to perform the evaluation and repair of All Wheel Drive and Four Wheel Drive systems*

Vehicle Networking Systems

30 hours

- describe the diagnostic code types and formats
- describe the various types of networks
- utilize diagnostic code protocols and actions to identify open, short and ground faults
- describe the various types, operation and the interrelationship of modules
- perform computer programming procedures

Mentors can assist the apprentice to prepare for this section of technical training by:

- *describing the diagnostic code types and formats*
- *describing the types of networks*
- *utilizing diagnostic code protocols and actions to identify open, short and ground faults*
- *describing the various types, operation and the interrelationship of modules*
- *providing opportunities to perform computer programming procedures*

Level Four	8 weeks	240 hours
<p>Automatic Transmissions and Automated AWD/4WD Systems – Theory 30 hours</p> <ul style="list-style-type: none"> describe operation, diagnoses and repair of automatic transmissions describe alternate types of transmissions describe operation, diagnoses and repair of Intelligent/computer controlled AWD/4WD systems 		
<p>Automatic Transmissions and Automated AWD/4WD Systems – Shop 42 hours</p> <ul style="list-style-type: none"> perform the evaluation and repair of automatic transmissions perform the evaluation and repair of Intelligent/computer controlled AWD/4WD systems 		
<p>Mentors can assist the apprentice to prepare for this section of technical training by:</p> <ul style="list-style-type: none"> <i>providing advanced instruction on diagnostic testing and evaluation of automatic transmissions, transaxles, and electronic control systems</i> <i>providing opportunities to disassemble, inspect, measure, evaluate, reassemble, adjust, and test automatic transmissions and torque converters</i> <i>describing the various alternate types of transmissions</i> <i>providing opportunities to perform diagnoses and repair of Intelligent/computer controlled AWD/4WD systems</i> <i>providing opportunities to perform the evaluation and repair of automatic transmissions</i> <i>providing opportunities to perform the evaluation and repair of Intelligent/computer controlled AWD/4WD systems</i> 		
<p>Diesel Engine Support Systems – Theory 18 hours</p> <ul style="list-style-type: none"> describe operation, diagnoses and repair of the diesel fuel injection systems describe operation, diagnoses and repair of the turbo charged systems describe the operation, diagnoses and repair of the supercharged systems 		
<p>Diesel Engine Support Systems – Shop 30 hours</p> <ul style="list-style-type: none"> perform the evaluation and repair of diesel fuel injection systems perform the evaluation and repair of turbo charged systems perform the evaluation and repair of supercharged systems 		
<p>Mentors can assist the apprentice to prepare for this section of technical training by:</p> <ul style="list-style-type: none"> <i>providing opportunities to explain the operation and perform the diagnoses and repair of the diesel fuel injection systems</i> <i>providing opportunities to explain the operation and perform the diagnoses and repair the turbo charged systems</i> <i>providing opportunities to explain the operation and perform the diagnoses and repair the supercharged systems</i> <i>providing opportunities to perform the evaluation diesel fuel injection systems</i> <i>providing opportunities to perform the evaluation of turbo charged systems</i> <i>providing opportunities to perform the evaluation supercharged systems</i> 		
<p>Entertainment Systems, Instrumentation and Information Displays 24 hours</p> <ul style="list-style-type: none"> describe the operation, diagnoses and repair of entertainment systems describe the operation, diagnoses and repair of instrumentation and information displays perform the evaluation and repair of entertainment systems perform the evaluation and repair of instrumentation and information displays 		

Mentors can assist the apprentice to prepare for this section of technical training by:

- *providing advanced instruction on the operation, diagnoses and repair of entertainment systems*
- *providing advanced instruction on the Operation, diagnoses and repair of instrumentation and information displays*
- *providing opportunities to perform the evaluation and repair of entertainment systems*
- *providing opportunities to perform the evaluation and repair of instrumentation and information displays*

HVAC and Comfort Control Systems

30 hours

- explain physical properties of gases, liquids and solids
- describe operation, diagnoses and repair of heating system
- describe operation, diagnoses and repair of air conditioning systems and components
- describe operation, diagnoses and repair of air conditioning control systems
- perform the evaluation and repair of the heating systems
- perform the evaluation and repair of the air conditioning systems and components
- perform the evaluation and repair of the air conditioning control systems

Mentors can assist the apprentice to prepare for this section of technical training by:

- *describing the physical properties of gases, liquids and solids*
- *describing the operation, diagnoses and repair of heating system*
- *describing the operation, diagnoses and repair of air conditioning systems and components*
- *describing the operation, diagnoses and repair of air conditioning control systems*
- *providing opportunities to perform the evaluation and repair of the heating systems*
- *providing opportunities to perform the evaluation and repair of the air conditioning systems and components*
- *providing opportunities to perform the evaluation and repair of the air conditioning control systems*

Hybrid and Electric Vehicles (EV) – Theory

18 hours

- describe hybrid vehicles
- describe electric vehicles
- explain hybrid electrical vehicle operation
- describe hybrid electrical vehicle service procedures
- describe hybrid electric vehicle brakes systems

Mentors can assist the apprentice to prepare for this section of technical training by:

- *describing the hybrid electrical vehicle operation*
- *describing the hybrid electrical vehicle service procedures*
- *describing the hybrid electrical vehicle brake systems*

Mentoring Techniques – Theory

30 hours

- research trends and innovations in the automotive industry
- present research findings
- identify and explain strategies for learning skills in the workplace
- demonstrate strategies for learning skills in the workplace
- identify and explain strategies for teaching workplace skills
- demonstrate strategies for teaching workplace skills

Mentors can assist the apprentice to prepare for this section of technical training by:

- *describing strategies for learning skills in the workplace*
- *providing opportunities to demonstrate strategies for teaching skills in the workplace*

Restraint Systems

18 hours

- describe occupant restraint systems
- repair occupant restraint systems

Mentors can assist the apprentice to prepare for this section of technical training by:

- *describing the various types of occupant restraint systems*
- *providing opportunities to perform the evaluation and repair of occupant restraint systems*



Consider apprenticeship training as an investment in the future of your company and in the future of your workforce. Ultimately, skilled and certified workers increase your bottom line.

Get involved in the apprenticeship training system. Your commitment to training helps to maintain the integrity of the trade.

Do you have employees who have been working in the trade for a number of years but don't have trade certification?

Contact your local apprenticeship office for details on how they might obtain the certification they need.

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Fax: (306) 787-5105

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