Apprenticeship and Industry Training

Apprenticeship Curriculum Guide Companion Document

Automotive Service Technician

Alberta Government

Apprenticeship and Industry Training

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Program Guide

Introduction

Apprenticeship and Industry Training (AIT) utilizes the curriculum guide as a document to guide and direct the developers of training and lesson plans. The curriculum guide is written to reflect and identify competence-based learning through supporting competence statements. Although this model provides more flexibility and responsiveness for the stakeholders, it creates challenges to developers of lesson plans and assessments.

The Purpose

The purpose of this document is to expand on competence and supporting compentence statements by identifying and providing outcome and objective statements that are associated with the supporting competence statement.

Outcome Statements

Outcome statements are an observable major task or work activity that an entry-level journeyperson performs for compensation.

Objective Statements

Objective statements are the knowledge or skill an apprentice learns or demonstrates while attending in-classroom instruction. They support achievement of the outcome statement by the apprentice.

Course Content Overview

The term ***"In Context"*** indicates that the supporting competence will become integrated learning and/or utilized as a component of the competence statement. It will not have an assigned weighting and will not be assessed as an examination item.

PERIOD ONE COURSE CONTENT

CORE COMPETENCE ONE: Foundational Skills

Competence Statement:	Supporting Competences:		
	A	***B***	***C***
Apply foundational skills essential to convey and receive critical training and workplace information.	Demonstrate problem solving. ***In Context***	Demonstrate digital literacy.	Demonstrate team and customer communication.
	D		
	Demonstrate knowledge of mechanical and electrical fundamentals.		

CORE COMPETENCE TWO: Job Practices and Procedures

Competence Statement:	Supporting Competences:		
	A	***B***	***C***
Apply knowledge and understanding of practices and procedures associated with on-the-job activities.	Apply standards and regulations.	Apply organizational and manufacturer's specifications.	Select, use, and maintain personal protective equipment. ***In Context***
	D	***E***	
	Demonstrate safety awareness and safe work practices.	Organize work.	

CORE COMPETENCE THREE: (A) Shop Equipment and Tools

Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding, and proficiency regarding the use and maintenance of tools and shop equipment.	***A*** Select, use, and maintain hand tools. ***In Context***	***B*** Select, use, and maintain power tools. ***In Context***	***C*** Select, use, and maintain speciality tools.
	D Select, use, and maintain shop equipment.	***E*** Select, use, and maintain diagnostic equipment.	***F*** Select and use fastening devices.

CORE COMPETENCE FOUR: Maintenance Services

Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding and proficiency when performing motor vehicle maintenance services.	***A*** Perform motor vehicle maintenance services on braking systems.	***B*** Perform motor vehicle maintenance services on steering systems.	***C*** Perform motor vehicle maintenance services on suspension systems. ***In Context***
	D Perform motor vehicle maintenance services on drive train systems. ***In Context***	***E*** Perform motor vehicle maintenance services on heating, ventilation, and air conditioning systems.	***F*** Perform motor vehicle maintenance services on light utility trailers.
	G Perform motor vehicle maintenance services on oils, fluids, and greases. ***In Context***	***H*** Perform motor vehicle maintenance services on filters, gaskets, and sealants. ***In Context***	***I*** Perform motor vehicle maintenance services on tires and wheels.
	J Perform motor vehicle maintenance services on belts and hoses. ***In Context***	***K*** Perform motor vehicle maintenance services on electrical storage devices.	

CORE COMPETENCE FIVE: Inspect, Test, and Analyze

Competence Statement:

Demonstrate knowledge, understanding, and proficiency regarding the inspection, testing, and analysis of motor vehicle systems.

Supporting Competences:

A	B	C
Inspect, test, and analyze motor vehicle braking systems.	Inspect, test, and analyze motor vehicle steering systems.	Inspect, test, and analyze motor vehicle suspension systems.
In Context	***In Context***	
D	**E**	**F**
Inspect, test, and analyze motor vehicle drive train systems.	Inspect, test, and analyze motor vehicle electrical systems.	Inspect, test, and analyze motor vehicle heating, ventilation, and air conditioning systems.
In Context	***In Context***	***In Context***
G	**H**	**I**
Inspect, test, and analyze motor vehicle light utility trailers.	Inspect, test, and analyze motor vehicle tires and wheels.	Inspect, test, and analyze motor vehicle electrical storage devices.
In Context	***In Context***	***In Context***

CORE COMPETENCE SIX: Diagnostics

Competence Statement:

Demonstrate knowledge, understanding, and proficiency when performing motor vehicle system diagnostics.

Supporting Competences:

A	B	C
Perform motor vehicle diagnostics for braking systems.	Perform motor vehicle diagnostics for steering systems.	Perform motor vehicle diagnostics for suspension systems.
In Context	***In Context***	***In Context***
D	**E**	**F**
Perform motor vehicle diagnostics for drive train systems.	Perform motor vehicle diagnostics for electrical systems.	Perform motor vehicle diagnostics for light utility trailers.
In Context	***In Context***	***In Context***
G	**H**	
Perform motor vehicle diagnostics for tires and wheels.	Perform motor vehicle diagnostics for electrical storage devices.	
In Context	***In Context***	

CORE COMPETENCE SEVEN: Systems Repair

Competence Statement:

Demonstrate knowledge, understanding, and proficiency when performing motor vehicle system repairs.

Supporting Competences:

A	B	C
Perform motor vehicle repairs on braking systems.	Perform motor vehicle repairs on steering systems.	Perform motor vehicle repairs on suspension systems.
D	**E**	
Perform motor vehicle repairs on drive train systems.	Perform motor vehicle repairs on electrical systems.	

PERIOD TWO COURSE CONTENT

CORE COMPETENCE ONE: Foundational Skills

Competence Statement:

Apply foundational skills essential to convey and receive critical training and workplace information.

Supporting Competences:

A	B	C
Demonstrate problem solving.	Demonstrate digital literacy.	Demonstrate team and customer communication.
In Context	*In Context*	*In Context*

D
Demonstrate knowledge of mechanical and electrical fundamentals.
In Context

CORE COMPETENCE TWO: Job Practices and Procedures

Competence Statement:

Apply knowledge and understanding of practices and procedures associated with on-the-job activities.

Supporting Competences:

A	B	C
Apply standards and regulations.	Apply organizational and manufacturer's specifications.	Select, use, and maintain personal protective equipment.
In Context	*In Context*	*In Context*

D	E
Demonstrate safety awareness and safe work practices.	Organize work.
In Context	*In Context*

CORE COMPETENCE THREE: (A) Shop Equipment and Tools

Competence Statement:

Demonstrate knowledge, understanding, and proficiency regarding the use and maintenance of tools and shop equipment.

Supporting Competences:

A	B	C
Select, use, and maintain hand tools.	Select, use, and maintain power tools.	Select, use, and maintain speciality tools.
In Context	*In Context*	*In Context*

D	E	F
Select, use, and maintain shop equipment.	Select, use, and maintain diagnostic equipment.	Select and use fastening devices.
In Context	*In Context*	*In Context*

CORE COMPETENCE THREE: (B) Shop Equipment and Tools (Oxy-fuel heating and cutting and gas metal arc welding)

Competence Statement:	Supporting Competences:	
	A	***B***
Demonstrate knowledge, understanding, and proficiency when heating and cutting with oxy-fuel equipment and when welding with Gas Metal Arc Welding (GMAW) equipment.	Demonstrate handling procedures for oxy-fuel and GMAW equipment. ***In Context***	Use oxy-fuel equipment for heating and cutting and GMAW equipment for welding.

CORE COMPETENCE FOUR: Maintenance Services

Competence Statement:	Supporting Competences:		
	A	***B***	***C***
Demonstrate knowledge, understanding, and proficiency when performing motor vehicle maintenance services.	Perform motor vehicle maintenance services on propulsion systems. ***In Context***	Perform motor vehicle maintenance services on emission control systems. ***In Context***	Perform motor vehicle maintenance services on drive train systems. ***In Context***
	D	***E***	***F***
	Perform motor vehicle maintenance services on oils, fluids, and greases. ***In Context***	Perform motor vehicle maintenance services on filters, gaskets, and sealants. ***In Context***	Perform motor vehicle maintenance services on belts and hoses. ***In Context***
	G		
	Perform motor vehicle maintenance services on electrical storage devices. ***In Context***		

CORE COMPETENCE FIVE: Inspect, Test, and Analyze

Competence Statement:	Supporting Competences:		
	A	***B***	***C***
Demonstrate knowledge, understanding, and proficiency regarding the inspection, testing and analysis of motor vehicle systems.	Inspect, test, and analyze motor vehicle propulsion systems.	Inspect, test, and analyze motor vehicle emission control systems. ***In Context***	Inspect, test, and analyze motor vehicle drive train systems. ***In Context***
	D		
	Inspect, test, and analyze motor vehicle electrical systems. ***In Context***		

CORE COMPETENCE SIX: Diagnostics

Competence Statement:	Supporting Competences:		
	A	*B*	*C*
Demonstrate knowledge, understanding, and proficiency when performing motor vehicle system diagnostics.	Perform motor vehicle diagnostics for propulsion systems.	Perform motor vehicle diagnostics for emission control systems.	Perform motor vehicle diagnostics for drive train systems.
		In Context	***In Context***
	D		
	Perform motor vehicle diagnostics for electrical systems.		

CORE COMPETENCE SEVEN: Systems Repair

Competence Statement:	Supporting Competences:		
	A	*B*	*C*
Demonstrate knowledge, understanding, and proficiency when performing motor vehicle system repairs.	Perform motor vehicle repairs on propulsion systems.	Perform motor vehicle repairs on emission control systems.	Perform motor vehicle repairs on drive train systems.
	D		
	Perform motor vehicle repairs on electrical systems.		

PERIOD THREE COURSE CONTENT

CORE COMPETENCE ONE: Foundational Skills

Competence Statement:

Apply foundational skills essential to convey and receive critical training and workplace information.

Supporting Competences:

A	B	C
Demonstrate problem solving.	Demonstrate digital literacy.	Demonstrate team and customer communication.
In Context	***In Context***	***In Context***

D
Demonstrate knowledge of mechanical and electrical fundamentals.

CORE COMPETENCE TWO: Job Practices and Procedures

Competence Statement:

Apply knowledge and understanding of practices and procedures associated with on-the-job activities.

Supporting Competences:

A	B	C
Apply standards and regulations.	Apply organizational and manufacturer's specifications.	Select, use, and maintain personal protective equipment.
In Context	***In Context***	***In Context***

D	E
Demonstrate safety awareness and safe work practices.	Organize work.
In Context	***In Context***

CORE COMPETENCE THREE: (A) Shop Equipment and Tools

Competence Statement:

Demonstrate knowledge, understanding, and proficiency regarding the use and maintenance of tools and shop equipment.

Supporting Competences:

A	B	C
Select, use, and maintain hand tools.	Select, use, and maintain power tools.	Select, use, and maintain speciality tools.
In Context	***In Context***	***In Context***

D	E	F
Select, use, and maintain shop equipment.	Select, use, and maintain diagnostic equipment.	Select and use fastening devices.
In Context		***In Context***

CORE COMPETENCE FOUR: Maintenance Services

Competence Statement:

Demonstrate knowledge, understanding, and proficiency when performing motor vehicle maintenance services.

Supporting Competences:

A	B	C
Perform motor vehicle maintenance services on fuel systems.	Perform motor vehicle maintenance services on emission control systems.	Perform motor vehicle maintenance services on oils, fluids, and greases.
In Context	***In Context***	***In Context***

D	E
Perform motor vehicle maintenance services on filters, gaskets, and sealants.	Perform motor vehicle maintenance services on belts and hoses.
In Context	***In Context***

CORE COMPETENCE FIVE: Inspect, Test, and Analyze

Competence Statement:

Demonstrate knowledge, understanding, and proficiency regarding the inspection, testing and analysis of motor vehicle systems.

Supporting Competences:

A	B	C
Inspect, test, and analyze motor vehicle propulsion systems.	Inspect, test, and analyze motor vehicle fuel systems.	Inspect, test, and analyze motor vehicle emission control systems.
In Context	***In Context***	***In Context***

D	E	F
Inspect, test, and analyze motor vehicle braking systems.	Inspect, test, and analyze motor vehicle steering systems.	Inspect, test, and analyze motor vehicle suspension systems.
In Context	***In Context***	***In Context***

G	H	I
Inspect, test, and analyze motor vehicle drive train systems.	Inspect, test, and analyze motor vehicle management systems.	Inspect, test, and analyze motor vehicle electrical systems.
In Context	***In Context***	***In Context***

J
Inspect, test, and analyze motor vehicle occupant crash protection systems.
In Context

CORE COMPETENCE SIX: Diagnostics

Competence Statement:

Demonstrate knowledge, understanding, and proficiency when performing motor vehicle system diagnostics.

Supporting Competences:

A	B	C
Perform motor vehicle diagnostics for propulsion systems.	Perform motor vehicle diagnostics for fuel systems.	Perform motor vehicle diagnostics for emission control systems.
In Context	***In Context***	***In Context***
D	**E**	**F**
Perform motor vehicle diagnostics for braking systems.	Perform motor vehicle diagnostics for steering systems.	Perform motor vehicle diagnostics for suspension systems.
In Context	***In Context***	***In Context***
G	**H**	**I**
Perform motor vehicle diagnostics for drive train systems.	Perform motor vehicle diagnostics for vehicle management systems.	Perform motor vehicle diagnostics for electrical systems.
In Context		
J		
Perform motor vehicle diagnostics for occupant crash protection systems.		
In Context		

CORE COMPETENCE SEVEN: Systems Repair

Competence Statement:

Demonstrate knowledge, understanding, and proficiency when performing motor vehicle system repairs.

Supporting Competences:

A	B	C
Perform motor vehicle repairs on fuel systems.	Perform motor vehicle repairs on emission control systems.	Perform motor vehicle repairs on vehicle management systems.
D	**E**	
Perform motor vehicle repairs on electrical systems.	Perform motor vehicle repairs on occupant crash protection systems.	

PERIOD FOUR COURSE CONTENT

CORE COMPETENCE ONE: Foundational Skills

Competence Statement:

Apply foundational skills essential to convey and receive critical training and workplace information.

Supporting Competences:

A	B	C
Demonstrate problem solving.	Demonstrate digital literacy.	Demonstrate team and customer communication.
In Context		*In Context*

D	E
Demonstrate mentorship.	Demonstrate knowledge of mechanical and electrical fundamentals.
	In Context

CORE COMPETENCE TWO: Job Practices and Procedures

Competence Statement:

Apply knowledge and understanding of practices and procedures associated with on-the-job activities.

Supporting Competences:

A	B	C
Apply standards and regulations.	Apply organizational and manufacturer's specifications.	Select, use, and maintain personal protective equipment.
In Context	*In Context*	*In Context*

D	E
Demonstrate safety awareness and safe work practices.	Organize work.
In Context	*In Context*

CORE COMPETENCE THREE: (A) Shop Equipment and Tools

Competence Statement:

Demonstrate knowledge, understanding, and proficiency regarding the use and maintenance of tools and shop equipment.

Supporting Competences:

A	B	C
Select, use, and maintain hand tools.	Select, use, and maintain power tools.	Select, use, and maintain speciality tools.
In Context	*In Context*	*In Context*

D	E	F
Select, use, and maintain shop equipment.	Select, use, and maintain diagnostic equipment.	Select and use fastening devices.
In Context	*In Context*	*In Context*

CORE COMPETENCE FOUR: Maintenance Services

Competence Statement:

Demonstrate knowledge, understanding, and proficiency when performing motor vehicle maintenance services.

Supporting Competences:

A	***B***	***C***
Perform motor vehicle maintenance services on propulsion systems.	Perform motor vehicle maintenance services on fuel systems.	Perform motor vehicle maintenance services on emission control systems.
In Context	***In Context***	***In Context***
D	***E***	***F***
Perform motor vehicle maintenance services on braking systems.	Perform motor vehicle maintenance services on drive train systems.	Perform motor vehicle maintenance services on heating, ventilation, and air conditioning systems.
In Context	***In Context***	***In Context***
G	***H***	**I**
Perform motor vehicle maintenance services on oils, fluids, and greases.	Perform motor vehicle maintenance services on filters, gaskets, and sealants.	Perform motor vehicle maintenance services on tires and wheels.
In Context	***In Context***	***In Context***
J		
Perform motor vehicle maintenance services on belts and hoses.		
In Context		

CORE COMPETENCE FIVE: Inspect, Test, and Analyze

Competence Statement:

Demonstrate knowledge, understanding, and proficiency regarding the inspection, testing and analysis of motor vehicle systems.

Supporting Competences:

A	***B***	***C***
Inspect, test, and analyze motor vehicle propulsion systems.	Inspect, test, and analyze motor vehicle emission control systems.	Inspect, test, and analyze motor vehicle braking systems.
In Context	***In Context***	***In Context***
D	***E***	***F***
Inspect, test, and analyze motor vehicle drive train systems.	Inspect, test, and analyze motor vehicle management systems.	Inspect, test, and analyze motor vehicle electrical systems.
In Context	***In Context***	***In Context***
G	***H***	
Inspect, test, and analyze motor vehicle heating, ventilation, and air conditioning systems.	Inspect, test, and analyze motor vehicle tires and wheels.	
In Context	***In Context***	

CORE COMPETENCE SIX: Diagnostics

Competence Statement:	Supporting Competences:		
	A	***B***	***C***
Demonstrate knowledge, understanding, and proficiency when performing motor vehicle system diagnostics.	Perform motor vehicle diagnostics for propulsion systems.	Perform motor vehicle diagnostics for fuel systems.	Perform motor vehicle diagnostics for emission control systems.
	D	***E***	***F***
	Perform motor vehicle diagnostics for braking systems.	Perform motor vehicle diagnostics for drive train systems.	Perform motor vehicle diagnostics for vehicle management systems.
	In Context		***In Context***
	G	***H***	**I**
	Perform motor vehicle diagnostics for electrical systems.	Perform motor vehicle diagnostics for heating, ventilation, and air conditioning systems.	Perform motor vehicle diagnostics for tires and wheels.
	In Context	***In Context***	***In Context***

CORE COMPETENCE SEVEN: Systems Repair

Competence Statement:	Supporting Competences:		
	A	***B***	***C***
Demonstrate knowledge, understanding, and proficiency when performing motor vehicle system repairs.	Perform motor vehicle repairs on propulsion systems.	Perform motor vehicle repairs on fuel systems.	Perform motor vehicle repairs on drive train systems.
	D		
	Perform motor vehicle repairs on heating, ventilation, and air conditioning systems.		

Period One
Course Content

(9 weeks – 270 hours)

Period One Core Competences	Weighting
Foundational Skills	**12%**
Job Practices and Procedures	**8%**
Shop Equipment and Tools (A)	**10%**
Maintenance Services	**28%**
Inspect, Test, and Analyze	**2%**
Diagnostics	**In Context**
Systems Repair	**40%**

Core Competence 1: Foundational Skills

Weighting – 12%

Automotive Service Technicians utilize a variety of foundational skills that enable them to understand and perform their job responsibilities. They form the basis upon which more specialized knowledge, skills, and abilities are developed. These skills are developed, practiced, and refined explicitly and implicitly throughout the entire apprenticeship education program and are essential components to a successful career in the trade.

The automotive service technician first period will provide instruction on the following skills: digital literacy, team and customer communication, and mechanical and electrical fundamentals.

Apply foundational skills essential to convey and receive critical training and workplace information.

Core Competence 1: Foundational Skills

Supporting Competence		Taxonomy	Weighting
1A.	Demonstrate problem solving		**In Context**
1B.	Demonstrate digital literacy	**II, III**	**9%**

Outcomes for this supporting competence include:

I. Use electronic service information
1. Access vehicle repair forums for diagnostic purposes.
2. Use electronic service information to repair vehicles.

1C.	Demonstrate team and customer communication	**I, II, III**	**9%**

Outcomes for this supporting competence include:

I. Apply communication techniques
1. Identify standard terms related to the trade.
2. Demonstrate effective communication of trade related information.
3. Demonstrate effective written documentation.
4. Develop a concern, cause, and correction report.

1D.	Demonstrate knowledge of mechanical and electrical fundamentals	**I, II**	**82%**

Outcomes for this supporting competence include:

I. Measure electrical circuits
1. Identify circuit types and their electrical properties.
2. Describe electrical units of measure.
3. Describe physical qualities of electrical components.
4. Explain power requirements in circuit design.
5. Calculate circuit values using Ohm's Law.
6. Calculate circuit power.
7. Interpret electrical symbols and wiring diagrams.

II. Apply magnetism principals
1. Describe magnetism principles.
2. Describe electromagnetic coil operation.
3. Describe how magnetism can change electrical energy into kinetic energy.

Core Competence 2: Job Practices and Procedures

Weighting – 8%

Automotive Service Technicians utilize a variety of on-the-job practices and procedures that enable them to perform their work in a safe, accurate, and efficient manner that meets criteria established by both manufacturers and regulatory agencies. These job practices and procedures are utilized and refined through explicit and implicit instruction extensively throughout the entire apprenticeship education program and are essential components to a successful career in the trade and beyond.

The automotive service technician first period will provide instruction on the following job practices and procedures: apply standards and regulations, apply organizational and manufacturer's specifications, demonstrate safety awareness and safe work practices, and organize work.

CS

Apply knowledge and understanding of practices and procedures associated with on-the-job activities.

Core Competence 2: Job Practices and Procedures

Supporting Competence		Taxonomy	Weighting
2A.	Apply standards and regulations	**I, II**	**9%**

Outcomes for this supporting competence include:

I. Apply legislation, regulations, and practices ensuring safe work

1. Describe the employer's and employee's role with Occupational Health and Safety (OH&S) regulations, Worksite Hazardous Materials Information Systems (WHMIS), fire regulations, Workers Compensation Board regulations and related advisory bodies and agencies.
2. Describe industry practices for hazard assessment and control procedures.
3. Describe the responsibilities of employees and employers to apply emergency procedures.
4. Describe tradesperson attitudes with respect to housekeeping, personal protective equipment, and emergency procedures.
5. Describe the roles and responsibilities of employers and employees with the selection and use of personal protective equipment (PPE).
6. Maintain required PPE for tasks.
7. Use required PPE for tasks.
8. Demonstrate the application of the Occupational Health and Safety Act, Regulation and Code.

Core Competence 2: Job Practices and Procedures

Supporting Competence		Taxonomy	Weighting
2B.	Apply organizational and manufacturer's specifications	**I, II**	**57%**

Outcomes for this supporting competence include:

I. Perform scheduled maintenance

1. Identify oils used in automotive applications.
2. Describe the characteristics of oils used in automotive applications.
3. Describe handling practices for all vehicle fluids.
4. Describe the characteristics of engine coolants.
5. Explain maintenance schedules.
6. Identify an appropriate preventative maintenance schedule.
7. Inspect vehicle fluids.
8. Replace accessory drive belts.
9. Service vehicle filters.

2C.	Select, use, and maintain personal protective equipment		**In Context**
2D.	Demonstrate safety awareness and safe work practices	**I, II**	**24%**

Outcomes for this supporting competence include:

I. Apply industry standard practices for hazardous materials and fire protection

1. Describe roles, responsibilities, features, and practices related to the Workplace Hazardous Materials Information System (WHMIS) program.
2. Describe four key elements of WHMIS.
3. Describe handling, storing, and transporting procedures for hazardous material.
4. Describe venting procedures when working with hazardous materials.
5. Describe hazards, classes, procedures, and equipment related to fire protection.

II. Apply hybrid and electric vehicle safety procedures

1. Identify hybrid and electric vehicles.
2. Identify safety protocols pertaining to hybrid and electric vehicle systems.

2E.	Organize work	**I, II**	**10%**

Outcomes for this supporting competence include:

I. Manage an apprenticeship to earn a journeyperson certificate

1. Describe the contractual responsibilities of the apprentice, employer and Alberta Apprenticeship and Industry Training.
2. Describe the purpose of the apprentice record book.
3. Describe the procedure for changing employers during an active apprenticeship.
4. Describe the purpose of the curriculum guide.
5. Describe the procedure for progressing through an apprenticeship.
6. Describe advancement opportunities in this trade.

Core Competence 3: Shop Equipment and Tools

Weighting – 10%

Automotive Service Technicians utilize various types of shop equipment and tools to perform their work. Completing tasks safely, efficiently, and effectively requires knowledge and experience to select, use, and maintain the appropriate tools for the specific task. Skill in this area will be developed, practiced, and refined explicitly and implicitly throughout the entire apprenticeship education program and is an essential component to a successful career in the trade.

The automotive service technician first period will provide instruction on selecting, using, and maintaining the following: specialty tools, shop equipment, diagnostic equipment, and fastening devices.

CS

Demonstrate knowledge, understanding and proficiency regarding the use and maintenance of tools and shop equipment.

Core Competence 3A: Shop Equipment and Tools

Supporting Competence		Taxonomy	Weighting
3A.	Select, use, and maintain hand tools		**In Context**
3B.	Select, use, and maintain power tools		**In Context**
3C.	Select, use, and maintain speciality tools Outcomes for this supporting competence include: ***I. Use specialty hand tools*** 1. Use thread-forming tools. 2. Perform thread repair. 3. Perform broken fastener removal. 4. Perform tube flaring. ***II. Use measuring tools*** 1. Identify measuring tools. 2. Maintain measuring tools. 3. Perform linear measurements. 4. Perform torque measurements.	**I, II**	**54%**
3D.	Select, use, and maintain shop equipment Outcomes for this supporting competence include: ***I. Use industry standard practices for lifting, rigging, and hoisting*** 1. Describe manual lifting procedures. 2. Describe the characteristics and applications of vehicle hoists and shop lifting equipment. 3. Identify type and capacity of hoisting and lifting equipment required for vehicle or item to be lifted. 4. Identify vehicle lifting points and required adapters and extensions. 5. Perform pre-operational safety checks on vehicle hoists and shop lifting equipment. 6. Operate vehicle hoists and shop lifting equipment. 7. Use PPE for lifting and load moving equipment.	**I, II**	**12%**

Core Competence 3A: Shop Equipment and Tools

Supporting Competence		Taxonomy	Weighting
3E.	Select, use, and maintain diagnostic equipment Outcomes for this supporting competence include: ***I. Use scan tools*** 1. Use scan tools to retrieve diagnostic data. 2. Use scan tools to perform function tests.	**II**	**19%**
3F.	Select and use fastening devices Outcomes for this supporting competence include: ***I. Use fastening devices*** 1. Describe plastic trim fastener usage. 2. Describe special retaining devices. 3. Explain sealer usage. 4. Explain adhesive usage. 5. Perform torquing procedures using threaded fasteners.	**I, II**	**15%**

Core Competence 4: Maintenance Services

Weighting – 28%

Automotive Service Technicians assess the need for and perform regular upkeep and servicing on vehicle systems and components to ensure their safe and efficient operation over time. Proficiency in carrying out these tasks and procedures helps prevent breakdowns, extends vehicle lifespan, and maintains optimal vehicle performance.

The automotive service technician first period will provide instruction on how to perform maintenance services on braking systems, steering systems, heating, ventilation and air conditioning systems, light utility trailers, tires and wheels, and electrical storage devices.

Demonstrate knowledge, understanding and proficiency when conducting motor vehicle maintenance services.

Core Competence 4: Maintenance Services

Supporting Competence		Taxonomy	Weighting
4A.	Perform motor vehicle maintenance services on braking systems Outcomes for this supporting competence include: ***I. Service brake systems*** 1. Describe bleeding procedure for brake systems. 2. Perform bleeding procedures on brake systems. 3. Diagnose problems related to brake systems.	**I, II, III**	**16%**

Core Competence 4: Maintenance Services

Supporting Competence		Taxonomy	Weighting
4B.	Perform motor vehicle maintenance services on steering systems Outcomes for this supporting competence include: ***I. Perform a wheel alignment*** 1. Describe the effects of steering angles on vehicle operation. 2. Describe the measurement procedures for each steering angle. 3. Describe the adjustment procedures for each steering angle. 4. Describe a road test procedure. 5. Select the appropriate alignment settings. 6. Perform a pre-alignment inspection. 7. Perform a wheel alignment.	**I, II, III**	**39%**
4C.	Perform motor vehicle maintenance services on suspension systems		**In Context**
4D.	Perform motor vehicle maintenance services on drive train systems		**In Context**
4E.	Perform motor vehicle maintenance services on heating, ventilation, and air conditioning systems Outcomes for this supporting competence include: ***I. Service air conditioning systems*** 1. Identify refrigerants. 2. Identify air conditioning components. 3. Explain refrigerant handling. 4. Explain refrigerant regulations. 5. Perform refrigerant recovery. 6. Perform air conditioning system recharge.	**I, II**	**15%**
4F.	Perform motor vehicle maintenance services on light utility trailers Outcomes for this supporting competence include: ***I. Service light utility trailers*** 1. Describe trailer brake operation. 2. Perform trailer brake service. 3. Perform light utility trailer service.	**I, II**	**8%**
4G.	Perform motor vehicle maintenance services on oils, fluids, and greases		**In Context**
4H.	Perform motor vehicle maintenance services on filters, gaskets, and sealants		**In Context**
4I.	Perform motor vehicle maintenance services on tires and wheels Outcomes for this supporting competence include: ***I. Service wheel assemblies*** 1. Describe wheel design. 2. Describe tire design. 3. Describe Tire Pressure Monitoring System (TPMS) operation. 4. Diagnose wheel assemblies. 5. Service wheels. 6. Service tires. 7. Service TPMS systems.	**I, II, III**	**13%**

Core Competence 4: Maintenance Services			
Supporting Competence		**Taxonomy**	**Weighting**
4J.	Perform motor vehicle maintenance services on belts and hoses		**In Context**
4K.	Perform motor vehicle maintenance services on electrical storage devices Outcomes for this supporting competence include: ***I. Service batteries*** 1. Describe battery operation. 2. Describe types and ratings of batteries. 3. Diagnose problems related to batteries. 4. Perform battery service. 5. Perform battery charging. 6. Perform battery boosting.	**I, II, III**	**9%**

Core Competence 5: Inspect, Test, and Analyze

Weighting – 2%

Automotive Service Technicians utilize a systematic approach to assess and understand the condition of the systems and components they are tasked with working on. Proficiency in this approach is a necessary step in addressing customer concerns in an efficient and effective manner.

The automotive service technician first period will provide instruction on how to inspect, test and analyze suspension systems.

CS

Demonstrate knowledge, understanding and proficiency regarding the inspection, testing and analysis of motor vehicle systems.

Core Competence 5: Inspect, Test, and Analyze			
Supporting Competence		**Taxonomy**	**Weighting**
5A.	Inspect, test, and analyze motor vehicle braking systems		**In Context**
5B.	Inspect, test, and analyze motor vehicle steering systems		**In Context**
5C.	Inspect, test, and analyze motor vehicle suspension systems Outcomes for this supporting competence include: ***I. Inspect vehicle frame and structure*** 1. Identify frame and structure damage. 2. Describe frame and structure inspection. 3. Identify hitches. 4. Describe hitch damage.	**I, II**	**100%**

Core Competence 5: Inspect, Test, and Analyze			
Supporting Competence		**Taxonomy**	**Weighting**
5D.	Inspect, test, and analyze motor vehicle drive train systems		**In Context**
5E.	Inspect, test, and analyze motor vehicle electrical systems		**In Context**
5F.	Inspect, test, and analyze motor vehicle heating, ventilation, and air conditioning systems		**In Context**
5G.	Inspect, test, and analyze motor vehicle light utility trailers		**In Context**
5H.	Inspect, test, and analyze motor vehicle tires and wheels		**In Context**
5I.	Inspect, test, and analyze motor vehicle electrical storage devices		**In Context**

Core Competence 6: Diagnostics

Weighting – In Context

Automotive Service Technicians utilize a variety of diagnostic tools and techniques to assess and understand the underlying reasons for observed faults, defects or performance issues on the systems and components they are tasked with working on. Proficiency in this area is a necessary step in addressing customer concerns in an efficient and effective manner.

All instruction for diagnostics in the first period will be provided in the context of instruction in systems repair.

CS

Demonstrate knowledge, understanding and proficiency when performing motor vehicle system diagnostics.

Core Competence 6: Diagnostics			
Supporting Competence		**Taxonomy**	**Weighting**
6A.	Perform motor vehicle diagnostics for braking systems		**In Context**
6B.	Perform motor vehicle diagnostics for steering systems		**In Context**
6C.	Perform motor vehicle diagnostics for suspension systems		**In Context**
6D.	Perform motor vehicle diagnostics for drive train systems		**In Context**

Core Competence 6: Diagnostics			
Supporting Competence		**Taxonomy**	**Weighting**
6E.	Perform motor vehicle diagnostics for electrical systems		**In Context**
6F.	Perform motor vehicle diagnostics for light utility trailers		**In Context**
6G.	Perform motor vehicle diagnostics for tires and wheels		**In Context**
6H.	Perform motor vehicle diagnostics for electrical storage devices		**In Context**

Core Competence 7: Systems Repair

Weighting – 40%

Automotive Service Technicians use a variety of tools and techniques to repair vehicle systems and components to restore the vehicle's functionality, reliability, and safety. Proficiency in this area is necessary to address customer concerns in an efficient and effective manner.

The automotive service technician first period will provide instruction on how to perform repairs on the following systems: braking, steering, suspension, drive train, and electrical.

Demonstrate knowledge, understanding, and proficiency when performing motor vehicle system repairs.

Core Competence 7: Systems Repair			
Supporting Competence		**Taxonomy**	**Weighting**
7A.	Perform motor vehicle repairs on braking systems	**I, II, III**	**33%**

Outcomes for this supporting competence include:

I. Repair hydraulic brake systems

1. Describe the operating principles of brake systems.
2. Identify brake fluids.
3. Explain Pascal's Law and its implications for brake systems.
4. Describe the design features of brake hydraulic systems.
5. Describe the operation of the hydraulic components when used as a system.
6. Repair hydraulic brake components.

II. Repair drum brake systems

1. Describe drum brake system operation.
2. Describe drum brake system components.
3. Describe drum park brake operation.
4. Repair drum brake systems.

Core Competence 7: Systems Repair

Supporting Competence	Taxonomy	Weighting
III. Repair disc brake systems 1. Describe disc brake system operation. 2. Describe disc brake system components. 3. Describe disc park brake operation. 4. Describe electric park brakes. 5. Repair disc brake systems. ***IV. Repair power assisted brake systems*** 1. Describe power assisted brake operation. 2. Describe hybrid vehicle braking system service precautions. 3. Demonstrate the procedures for testing a power assisted brake unit. 4. Diagnose power assisted brake units.		
7B. Perform motor vehicle repairs on steering systems Outcomes for this supporting competence include: ***I. Repair steering systems*** 1. Describe design features of steering systems. 2. Describe operating principles of steering systems. 3. Diagnose steering systems. 4. Repair steering systems. ***II. Repair electrically assisted steering systems*** 1. Describe electrically assisted steering system operation. 2. Repair mechanical problems related to electrically assisted steering gears. ***III. Repair hydraulically assisted steering systems*** 1. Identify hydraulic assist pumps. 2. Describe the operation of hydraulically assisted steering systems. 3. Diagnose hydraulically assisted steering problems. ***IV. Repair steering columns*** 1. Describe steering column operation. 2. Describe steering column replacement. 3. Diagnose steering column problems.	**I, II, III**	**34%**
7C. Perform motor vehicle repairs on suspension systems Outcomes for this supporting competence include: ***I. Repair suspension systems*** 1. Describe suspension systems. 2. Describe operating principles of suspension systems. 3. Diagnose suspension systems. 4. Repair suspension systems. ***II. Repair wheel bearings*** 1. Describe wheel bearing construction. 2. Diagnose problems related to wheel bearings. 3. Service wheel bearings.	**I, II, III**	**16%**
7D. Perform motor vehicle repairs on drive train systems Outcomes for this supporting competence include: ***I. Repair drive shafts*** 1. Describe drive shaft operation. 2. Describe drive shaft components. 3. Repair drive shaft assemblies.	**I, II, III**	**9%**

Core Competence 7: Systems Repair

Supporting Competence		Taxonomy	Weighting
7E.	Perform motor vehicle repairs on electrical systems Outcomes for this supporting competence include: ***I. Repair electrical circuits*** 1. Describe hazards of electrostatic discharge (ESD). 2. Perform circuit tests. 3. Identify types of circuit faults. 4. Perform circuit repairs.	**I, II, III**	**8%**

Period Two
Course Content

(9 weeks – 270 hours)

Period Two Core Competences	Weighting
Foundational Skills	**In Context**
Job Practices and Procedures	**In Context**
Shop Equipment and Tools (A)	**In Context**
Shop Equipment and Tools (B) Oxy Fuel Heating and Cutting and GMAW Welding	**7%**
Maintenance Services	**In Context**
Inspect, Test, and Analyze	**5%**
Diagnostics	**15%**
Systems Repair	**73%**

Core Competence 1: Foundational Skills

Weighting – In Context

Automotive Service Technicians utilize a variety of foundational skills that enable them to understand and perform their job responsibilities. They form the basis upon which more specialized knowledge, skills, and abilities are developed. These skills are developed, practiced, and refined explicitly and implicitly throughout the entire apprenticeship education program and are essential components to a successful career in the trade.

All instruction for foundational skills in the second period will be provided in the context of instruction in the other core competences.

CS

Apply foundational skills essential to convey and receive critical training and workplace information.

Core Competence 1: Foundational Skills			
Supporting Competence		**Taxonomy**	**Weighting**
1A.	Demonstrate problem solving		**In Context**
1B.	Demonstrate digital literacy		**In Context**
1C.	Demonstrate team and customer communication		**In Context**
1D.	Demonstrate knowledge of mechanical and electrical fundamentals		**In Context**

Core Competence 2: Job Practices and Procedures

Weighting – In Context

Automotive Service Technicians utilize a variety of on-the-job practices and procedures that enable them to perform their work in a safe, accurate, and efficient manner that meets criteria established by both manufacturers and regulatory agencies. These job practices and procedures are utilized and refined through explicit and implicit instruction extensively throughout the entire apprenticeship education program and are essential components to a successful career in the trade and beyond.

All instruction for job practices and procedures in the second period will be provided in the context of instruction in the other core competences.

Apply knowledge and understanding of practices and procedures associated with on-the-job activities.

Core Competence 2: Job Practices and Procedures			
Supporting Competence		**Taxonomy**	**Weighting**
2A.	Apply standards and regulations		**In Context**
2B.	Apply organizational and manufacture's specifications		**In Context**
2C.	Select, use, and maintain personal protective equipment		**In Context**
2D.	Demonstrate safety awareness and safe work practices		**In Context**
2E.	Organize work		**In Context**

Core Competence 3: Shop Equipment and Tools

Automotive Service Technicians utilize various types of shop equipment and tools to perform their work. Completing tasks safely, efficiently, and effectively requires knowledge and experience to select, use, and maintain the appropriate tools for the specific task. Skill in this area will be developed, practiced, and refined explicitly and implicitly throughout the entire apprenticeship education program and is an essential component to a successful career in the trade.

The automotive service technician second period will provide instruction on the use of oxy-fuel equipment for heating and cutting and Gas Metal Arc Welding (GMAW) equipment for welding.

Core Competence 3A: Shop Equipment and Tools

Weighting – In Context

CS

Demonstrate knowledge, understanding and proficiency regarding the use and maintenance of tools and shop equipment.

Core Competence 3A: Shop Equipment and Tools

Supporting Competence		Taxonomy	Weighting
3aA.	Select, use, and maintain hand tools		**In Context**
3aB.	Select, use, and maintain power tools		**In Context**
3aC.	Select, use, and maintain specialty tools		**In Context**
3aD.	Select, use, and maintain shop equipment		**In Context**
3aE.	Select, use, and maintain diagnostic equipment		**In Context**
3aF.	Select and use fastening devices		**In Context**

Core Competence 3B: Oxy Fuel Heating and Cutting and GMAW Welding

Weighting – 7%

CS

Demonstrate knowledge, understanding and proficiency when heating and cutting with oxy-fuel equipment and when welding with GMAW equipment.

Core Competence 3B: Oxy Fuel Heating and Cutting and GMAW Welding			
Supporting Competence		**Taxonomy**	**Weighting**
3bA.	Demonstrate handling procedures for oxy-fuel and GMAW equipment		**In Context**
3bB.	Use oxy-fuel equipment for heating and cutting and GMAW equipment for welding Outcomes for this supporting competence include: ***I. Use oxy-fuel and gas metal arc welding (GMAW) equipment*** 1. Describe characteristics of welding equipment. 2. Describe handling procedures for using welding equipment. 3. Describe oxy-fuel and GMAW equipment. 4. Use PPE when using oxy-fuel and GMAW equipment. 5. Demonstrate handling procedures for oxy-fuel and GMAW equipment. 6. Demonstrate the use of oxy-fuel and GMAW equipment. 7. Perform cutting operations. 8. Perform GMAW procedures.	**I, II**	**100%**

Core Competence 4: Maintenance Services

Weighting – In Context

Automotive Service Technicians assess the need for and perform regular upkeep and servicing on vehicle systems and components to ensure their safe and efficient operation over time. Proficiency in carrying out these tasks and procedures helps prevent breakdowns, extends vehicle lifespan, and maintains optimal vehicle performance.

All instruction for maintenance services in the second period will be provided in the context of instruction in the other core competences.

CS

Demonstrate knowledge, understanding and proficiency when conducting motor vehicle maintenance services.

Core Competence 4: Maintenance Services			
Supporting Competence		**Taxonomy**	**Weighting**
4A.	Perform motor vehicle maintenance services on propulsion systems		**In Context**
4B.	Perform motor vehicle maintenance services on emission control systems		**In Context**
4C.	Perform motor vehicle maintenance services on drive train systems		**In Context**
4D.	Perform motor vehicle maintenance services on oils, fluids, and greases		**In Context**

Core Competence 4: Maintenance Services			
Supporting Competence		**Taxonomy**	**Weighting**
4E.	Perform motor vehicle maintenance services on filters, gaskets, and sealants		**In Context**
4F.	Perform motor vehicle maintenance services on belts and hoses		**In Context**
4G.	Perform motor vehicle maintenance services on electrical storage devices		**In Context**

Core Competence 5: Inspect, Test, and Analyze

Weighting – 5%

Automotive Service Technicians utilize a systematic approach to assess and understand the condition of the systems and components they are tasked with working on. Proficiency in this approach is a necessary step in addressing customer concerns in an efficient and effective manner.

The automotive service technician second period will provide instruction on how to inspect, test and analyze propulsion systems.

CS

Demonstrate knowledge, understanding and proficiency regarding the inspection, testing and analysis of motor vehicle systems.

Core Competence 5: Inspect, Test, and Analyze			
Supporting Competence		**Taxonomy**	**Weighting**
5A.	Inspect, test, and analyze motor vehicle propulsion systems Outcomes for this supporting competence include: ***I. Inspect internal engine components*** 1. Describe design features of crankshaft components. 2. Describe service options to repair damaged crankshaft components. 3. Describe the design features of piston assemblies. 4. Describe the design features of connecting rods. 5. Describe piston assembly fitting procedure. 6. Describe engine balance. 7. Describe service options for piston assemblies. 8. Inspect piston assemblies. 9. Inspect crankshaft.	**I, II**	**100%**
5B.	Inspect, test, and analyze motor vehicle emission control systems		**In Context**
5C.	Inspect, test, and analyze motor vehicle drive train system		**In Context**

Core Competence 5: Inspect, Test, and Analyze			
Supporting Competence		**Taxonomy**	**Weighting**
5D.	Inspect, test, and analyze motor vehicle electrical systems		**In Context**

Core Competence 6: Diagnostics

Weighting – 15%

Automotive Service Technicians utilize a variety of diagnostic tools and techniques to assess and understand the underlying reasons for observed faults, defects or performance issues on the systems and components they are tasked with working on. Proficiency in this area is a necessary step in addressing customer concerns in an efficient and effective manner.

The automotive service technician second period will provide instruction on how to perform diagnostics on the following systems: propulsion and electrical.

Demonstrate knowledge, understanding and proficiency when performing motor vehicle system diagnostics.

Core Competence 6: Diagnostics			
Supporting Competence		**Taxonomy**	**Weighting**
6A.	Perform motor vehicle diagnostics for propulsion systems Outcomes for this supporting competence include: ***I. Diagnose engine mechanical problems*** 1. Diagnose engine mechanical problems using physical senses. 2. Diagnose engine mechanical problems using engine test equipment.	**I, II, III**	**40%**
6B.	Perform motor vehicle diagnostics for emission control systems		**In Context**
6C.	Perform motor vehicle diagnostics for drive train systems		**In Context**
6D.	Perform motor vehicle diagnostics for electrical systems Outcomes for this supporting competence include: ***I. Diagnose electrical systems*** 1. Interpret electrical circuit diagrams. 2. Connect scan tools to vehicles and monitor scan data on applicable second period automotive systems. 3. Use diagnostic strategies to locate circuit faults. 4. Diagnose circuit faults.	**I, II, III**	**60%**

Core Competence 7: Systems Repair
Weighting – 73%

Automotive Service Technicians use a variety of tools and techniques to repair vehicle systems and components to restore the vehicle's functionality, reliability, and safety. Proficiency in this area is necessary to address customer concerns in an efficient and effective manner.

The automotive service technician second period will provide instruction on how to perform repairs on the following systems: propulsion, emission control, drive train, and electrical.

CS

Demonstrate knowledge, understanding, and proficiency when performing motor vehicle system repairs.

Core Competence 7: Systems Repair

Supporting Competence	Taxonomy	Weighting
7A. Perform motor vehicle repairs on propulsion systems	**I, II, III**	**35%**

Outcomes for this supporting competence include:

I. ***Repair Engines***
1. Identify internal combustion engine types.
2. Describe the principles of engine operation.
3. Describe design features of automotive engines.
4. Describe service options for damaged engine components.
5. Inspect engine block.
6. Disassemble an engine.
7. Assemble an engine.

II. ***Repair cylinder head assemblies***
1. Describe combustion chamber designs.
2. Describe cylinder head design.
3. Describe valve design.
4. Perform cylinder head assembly inspection.

III. ***Repair valve train components***
1. Describe valve train component design.
2. Describe valve train operation.
3. Describe valve train lubrication.
4. Describe valve train drive mechanisms.
5. Describe variable valve timing mechanisms.
6. Describe cylinder deactivation.
7. Inspect camshafts and lifters.
8. Inspect valve train drive mechanisms.
9. Inspect valve train components.
10. Diagnose variable valve timing systems.

Core Competence 7: Systems Repair

Supporting Competence	Taxonomy	Weighting
IV. Repair air induction systems 1. Identify the types of induction systems. 2. Describe intake manifolds design. 3. Describe the construction of forced air induction systems. 4. Describe forced air induction system maintenance and repair. 5. Diagnose forced air induction systems. ***V. Repair lubrication systems*** 1. Describe lubrication systems. 2. Describe lubrication system components. 3. Describe positive crankcase ventilation (PCV) operation. 4. Diagnose PCV systems. 5. Service PCV systems. 6. Repair lubrication systems. ***VI. Repair Cooling Systems*** 1. Describe heat transfer. 2. Describe cooling system operation. 3. Describe cooling system components. 4. Diagnose cooling systems.		
7B. Perform motor vehicle repairs on emission control systems	**I, II, III**	**2%**
Outcomes for this supporting competence include: ***I. Repair exhaust systems*** 1. Describe exhaust components. 2. Describe exhaust system diagnostics. 3. Describe exhaust component replacement.		
7C. Perform motor vehicle repairs on drive train systems	**I, II, III**	**46%**
Outcomes for this supporting competence include: ***I. Repair manual transmissions and transaxles*** 1. Identify gear designs. 2. Identify types of bearings and seals in manual transmissions and transaxles. 3. Identify the path of power through a manual transmission and transaxle. 4. Describe operating principles of a manual transmission and transaxle. 5. Describe manual transmission and transaxle lubrication requirements. 6. Describe shift mechanism operation. 7. Describe synchromesh operation. 8. Describe the adjustment of manual transaxle linkages. 9. Describe internal manual transmission component lubrication. 10. Diagnose manual transmissions. 11. Diagnose manual transaxles. 12. Disassemble a manual transmission. 13. Assemble a manual transmission. 14. Disassemble a manual transaxle. 15. Assemble a manual transaxle.		

Core Competence 7: Systems Repair

Supporting Competence	Taxonomy	Weighting

II. ***Repair automotive clutches***
1. Describe clutch operation.
2. Describe clutches.
3. Describe clutch service.
4. Diagnose a clutch assembly.

III. ***Repair Four Wheel Drive (4WD) Systems***
1. Describe transfer case operation.
2. Describe 4WD hubs and axle operation.
3. Diagnose transfer cases.
4. Diagnose 4WD hubs and axles.

IV. ***Repair All Wheel Drive (AWD) Systems***
1. Describe AWD system operation.
2. Diagnose AWD systems.

V. ***Repair axle shafts and bearings***
1. Identify axle shaft types.
2. Describe drive axle assembly components.
3. Describe bearing maintenance.
4. Diagnose axle shafts.
5. Diagnose axle bearings.

VI. ***Repair drive axle assembly***
1. Identify differential types.
2. Describe the operation of differentials.
3. Describe the lubrication requirements for differentials.
4. Describe the procedure to test a traction-enhancing differential.
5. Identify the path of power from the drive pinion gear to the axle.
6. Describe the operation of final drive gear sets.
7. Describe how the final drive gear set support bearings are lubricated.
8. Describe final drive gear sets.
9. Demonstrate the effect of gear position on contact pattern.
10. Diagnose Drive Axle Assembly.
11. Perform final drive gear set disassembly.
12. Perform final drive gear set reassembly.

7D. Perform motor vehicle repairs on electrical systems — **I, II, III** — **17%**

Outcomes for this supporting competence include:

I. ***Repair charging systems***
1. Describe generator operating principles.
2. Describe charging system operation.
3. Describe charging system-warning indicator operation.
4. Describe computer-controlled charging systems.
5. Describe dual generator systems.
6. Perform charging system diagnostics.

II. ***Repair starting systems***
1. Describe the operating principles of Direct Current (DC) motors.
2. Describe starting system operation.
3. Describe electronically controlled starting systems.
4. Perform starter system diagnostics.

Period Three
Course Content

(9 weeks – 270 hours)

Period Three Core Competences	Weighting
Foundational Skills	**6%**
Job Practices and Procedures	**In Context**
Shop Equipment and Tools (A)	**6%**
Maintenance Services	**In Context**
Inspect, Test, and Analyze	**In Context**
Diagnostics	**16%**
Systems Repair	**72%**

Core Competence 1: Foundational Skills

Weighting – 6%

Automotive Service Technicians utilize a variety of foundational skills that enable them to understand and perform their job responsibilities. They form the basis upon which more specialized knowledge, skills, and abilities are developed. These skills are developed, practiced, and refined explicitly and implicitly throughout the entire apprenticeship education program and are essential components to a successful career in the trade.

The automotive service technician third period will provide instruction on mechanical and electrical fundamentals.

Apply foundational skills essential to convey and receive critical training and workplace information.

Core Competence 1: Foundational Skills

Supporting Competence		Taxonomy	Weighting
1A.	Demonstrate problem solving		**In Context**
1B.	Demonstrate digital literacy		**In Context**
1C.	Demonstrate team and customer communication		**In Context**
1D.	Demonstrate knowledge of mechanical and electrical fundamentals Outcomes for this supporting competence include: ***I. Evaluate system operation*** 1. Use wiring diagrams and service information to verify system operation. 2. Use wiring diagrams and test procedures to isolate system faults. ***II. Analyze the combustion process*** 1. Describe fuel properties. 2. Describe the combustion process. 3. Describe combustion emission gases. 4. Describe the effect of engine management and design on exhaust emissions.	**I, II, III**	**100%**

Core Competence 2: Job Practices and Procedures

Weighting – In Context

Automotive Service Technicians utilize a variety of on-the-job practices and procedures that enable them to perform their work in a safe, accurate, and efficient manner that meets criteria established by both manufacturers and regulatory agencies. These job practices and procedures are utilized and refined through explicit and implicit instruction extensively throughout the entire apprenticeship education program and are essential components to a successful career in the trade and beyond.

All instruction for job practices and procedures in the third period will be provided in the context of instruction in the other core competences.

CS

Apply knowledge and understanding of practices and procedures associated with on-the-job activities.

Core Competence 2: Job Practices and Procedures			
Supporting Competence		**Taxonomy**	**Weighting**
2A.	Apply standards and regulations		**In Context**
2B.	Apply organizational and manufacture's specifications		**In Context**
2C.	Select, use, and maintain personal protective equipment		**In Context**
2D.	Demonstrate safety awareness and safe work practices		**In Context**
2E.	Organize work		**In Context**

Core Competence 3: Shop Equipment and Tools

Weighting – 6%

Automotive Service Technicians utilize various types of shop equipment and tools to perform their work. Completing tasks safely, efficiently, and effectively requires knowledge and experience to select, use, and maintain the appropriate tools for the specific task. Skill in this area will be developed, practiced, and refined explicitly and implicitly throughout the entire apprenticeship education program and is an essential component to a successful career in the trade.

The automotive service technician third period will provide instruction on selecting, using, and maintaining diagnostic equipment.

Demonstrate knowledge, understanding and proficiency regarding the use and maintenance of tools and shop equipment.

Core Competence 3A: Shop Equipment and Tools			
Supporting Competence		**Taxonomy**	**Weighting**
3aA.	Select, use, and maintain hand tools		**In Context**
3aB.	Select, use, and maintain power tools		**In Context**
3aC.	Select, use, and maintain specialty tools		**In Context**
3aD.	Select, use, and maintain shop equipment		**In Context**

Core Competence 3A: Shop Equipment and Tools

Supporting Competence		Taxonomy	Weighting
3aE.	Select, use, and maintain diagnostic equipment Outcomes for this supporting competence include: ***I. Diagnose component faults using a lab scope*** 1. Describe lab scope function. 2. Describe vibration analysis. 3. Perform vibration analysis. 4. Perform current ramping test. 5. Perform pressure transducer diagnosis.	**I, II, III**	**100%**
3aF.	Select and use fastening devices		**In Context**

Core Competence 4: Maintenance Services

Weighting – In Context

Automotive Service Technicians assess the need for and perform regular upkeep and servicing on vehicle systems and components to ensure their safe and efficient operation over time. Proficiency in carrying out these tasks and procedures helps prevent breakdowns, extends vehicle lifespan, and maintains optimal vehicle performance.

All instruction for maintenance services in the third period will be provided in the context of instruction in the other core competences.

CS

Demonstrate knowledge, understanding and proficiency when conducting motor vehicle maintenance services.

Core Competence 4: Maintenance Services

Supporting Competence		Taxonomy	Weighting
4A.	Perform motor vehicle maintenance services on fuel systems		**In Context**
4B.	Perform motor vehicle maintenance services on emission control systems		**In Context**
4C.	Perform motor vehicle maintenance services on oils, fluids, and greases		**In Context**
4D.	Perform motor vehicle maintenance services on filters, gaskets, and sealants		**In Context**
4E.	Perform motor vehicle maintenance services on belts and hoses		**In Context**

Core Competence 5: Inspect, Test, and Analyze

Weighting – In Context

Automotive Service Technicians utilize a systematic approach to assess and understand the condition of the systems and components they are tasked with working on. Proficiency in this approach is a necessary step in addressing customer concerns in an efficient and effective manner.

All instruction for inspecting, testing, and analyzing systems in the third period will be provided in the context of instruction in the other core competences.

CS

Demonstrate knowledge, understanding and proficiency regarding the inspection, testing and analysis of motor vehicle systems.

Core Competence 5: Inspect, Test, and Analyze

Supporting Competence		Taxonomy	Weighting
5A.	Inspect, test, and analyze motor vehicle propulsion systems		**In Context**
5B.	Inspect, test, and analyze motor vehicle fuel systems		**In Context**
5C.	Inspect, test, and analyze motor vehicle emission control systems		**In Context**
5D.	Inspect, test, and analyze motor vehicle braking systems		**In Context**
5E.	Inspect, test, and analyze motor vehicle steering systems		**In Context**
5F.	Inspect, test, and analyze motor vehicle suspension systems		**In Context**
5G.	Inspect, test, and analyze motor vehicle drive train systems		**In Context**
5H.	Inspect, test, and analyze motor vehicle management systems		**In Context**
5I.	Inspect, test, and analyze motor vehicle electrical systems		**In Context**
5J.	Inspect, test, and analyze motor vehicle occupant crash protection systems		**In Context**

Core Competence 6: Diagnostics

Weighting – 16%

Automotive Service Technicians utilize a variety of diagnostic tools and techniques to assess and understand the underlying reasons for observed faults, defects or performance issues on the systems and components they are tasked with working on. Proficiency in this area is a necessary step in addressing customer concerns in an efficient and effective manner.

The automotive service technician third period will provide instruction on how to perform diagnostics on the following systems: vehicle management and electrical.

CS

Demonstrate knowledge, understanding and proficiency when performing motor vehicle system diagnostics.

Core Competence 6: Diagnostics

Supporting Competence		Taxonomy	Weighting
6A.	Perform motor vehicle diagnostics for propulsion systems		**In Context**
6B.	Perform motor vehicle diagnostics for fuel systems		**In Context**
6C.	Perform motor vehicle diagnostics for emission control systems		**In Context**
6D.	Perform motor vehicle diagnostics for braking systems		**In Context**
6E.	Perform motor vehicle diagnostics for steering systems		**In Context**
6F.	Perform motor vehicle diagnostics for suspension systems		**In Context**
6G.	Perform motor vehicle diagnostics for drive train systems		**In Context**
6H.	Perform motor vehicle diagnostics for vehicle management systems	**I, II, III**	**77%**

Outcomes for this supporting competence include:

I. Diagnose input devices

1. Identify sensor classifications.
2. Describe input switch operation.
3. Describe operation and application of sensors.
4. Describe a feedback loop system.
5. Perform input sensor and switch diagnosis.

II. Diagnose output devices

1. Describe operation and application of output devices.
2. Describe strategy of output controls.
3. Perform output device diagnosis.

Core Competence 6: Diagnostics			
Supporting Competence		**Taxonomy**	**Weighting**
	III. Diagnose control modules 1. Describe microprocessor function. 2. Describe control module interactions. 3. Describe solid-state device operation. 4. Perform control module diagnosis.		
6I.	Perform motor vehicle diagnostics for electrical systems. Outcomes for this supporting competence include: ***I. Perform electrical test procedures*** 1. Interpret electrical circuit diagrams. 2. Use electrical test equipment for circuit diagnosis. 3. Diagnose Parasitic Draw.	**II, III**	**23%**
6J.	Perform motor vehicle diagnostics for occupant crash protection systems.		**In Context**

Core Competence 7: Systems Repair

Weighting – 72%

Automotive Service Technicians use a variety of tools and techniques to repair vehicle systems and components to restore the vehicle's functionality, reliability, and safety. Proficiency in this area is necessary to address customer concerns in an efficient and effective manner.

The automotive service technician third period will provide instruction on how to perform repairs on the following systems: fuel, emission control, vehicle management, electrical, and occupant crash protection.

CS

Demonstrate knowledge, understanding, and proficiency when performing motor vehicle system repairs.

Core Competence 7: Systems Repair			
Supporting Competence		**Taxonomy**	**Weighting**
7A.	Perform motor vehicle repairs on fuel systems Outcomes for this supporting competence include: ***I. Repair fuel supply systems*** 1. Describe fuel supply system operation. 2. Describe fuel system components. 3. Describe the safety devices in fuel supply systems. 4. Describe fuel pump operation. 5. Perform fuel supply system diagnosis. 6. Repair fuel supply systems.	**I, II, III**	**29%**

Core Competence 7: Systems Repair

Supporting Competence	Taxonomy	Weighting

II. ***Repair fuel injection systems***

1. Identify fuel injection system components.
2. Describe air measurement.
3. Describe fuel injector operation.
4. Describe idle speed control methods.
5. Describe fuel metering.
6. Describe the operation of alternate fuel systems.
7. Explain a fuel injection system operation.
8. Demonstrate practices for working with pressurized fuel systems.
9. Diagnose fuel injection system problems.

7B. Perform motor vehicle repairs on emission control systems — **I, II, III** — **8%**

Outcomes for this supporting competence include:

I. ***Repair exhaust gas recirculation systems***

1. Describe exhaust gas recirculation system operation.
2. Perform exhaust gas recirculation system diagnosis.

II. ***Repair air injection systems***

1. Describe air injection system operation.

III. ***Repair exhaust after treatment systems***

1. Describe exhaust aftertreatment system operation.
2. Perform exhaust aftertreatment system diagnosis.

IV. ***Repair evaporative emission control systems***

1. Describe evaporative emissions.
2. Describe evaporative emission control system operation.
3. Perform evaporative emission control system diagnosis.

7C. Perform motor vehicle repairs on vehicle management systems — **I, II, III** — **34%**

Outcomes for this supporting competence include:

I. ***Repair vehicle networks***

1. Describe the purpose of the data stream.
2. Describe multiplexing functions.
3. Describe data buses in a network.
4. Diagnose network faults.
5. Describe vehicle software update.
6. Repair network faults.

II. ***Repair ignition systems***

1. Identify the inputs and outputs of an ignition system.
2. Describe ignition systems.
3. Describe the function of an ignition system.
4. Interpret ignition system waveforms.
5. Perform ignition system diagnosis.

III. ***Repair vehicle speed control systems***

1. Describe vehicle speed control systems.
2. Perform vehicle speed control system diagnosis.

IV. ***Repair Advanced Driver Assistance Systems (ADAS)***

1. Identify the levels of autonomy.
2. Describe Advanced Driver Assistance System.
3. Identify ADAS components.
4. Describe ADAS component characteristics and applications.
5. Describe operating principals of ADAS Components
6. Diagnose ADAS components.
7. Calibrate ADAS components.
8. Repair ADAS components.

Core Competence 7: Systems Repair

Supporting Competence		Taxonomy	Weighting
	V. Repair anti-lock brake (ABS) and Stability Control systems 1. Describe ABS and Stability Control systems. 2. Perform ABS and Stability Control system diagnosis.		
7D.	Perform motor vehicle repairs on electrical systems Outcomes for this supporting competence include: ***I. Repair instrument panel and warning systems*** 1. Describe instrument panel gauge operation. 2. Describe warning device operation. 3. Perform visual warning device diagnosis. 4. Perform audible warning device diagnosis. ***II. Repair vehicle lighting systems*** 1. Identify lighting systems. 2. Describe vehicle lighting system operation. 3. Perform vehicle lighting system diagnosis. 4. Perform headlamp alignment. ***III. Repair wiper and washer systems*** 1. Describe wiper and washer systems. 2. Perform wiper and washer system diagnosis. ***IV. Repair power accessories*** 1. Identify emerging technologies. 2. Perform power accessory fault diagnosis. 3. Repair power accessories faults. 4. Perform electric motors with feedback system diagnosis. 5. Perform actuator system diagnosis. 6. Perform solenoid system diagnosis. 7. Perform electric heating and cooling system diagnosis. 8. Perform auxiliary power supply system diagnosis. ***V. Repair information and entertainment systems*** 1. Describe information system operation. 2. Describe entertainment system operation. 3. Perform information system diagnosis. 4. Perform entertainment system diagnosis. ***VI. Repair factory-installed security systems*** 1. Perform anti-theft and alarm system diagnosis. 2. Perform remote system diagnosis.	**I, II, III**	**24%**
7E.	Perform motor vehicle system repairs on occupant crash protection systems Outcomes for this supporting competence include: ***I. Repair occupant crash protection systems*** 1. Identify types of occupant crash protection systems and their components. 2. Describe characteristics and applications of occupant crash protection systems and components. 3. Perform occupant crash protection system diagnosis.	**I, II**	**5%**

Period Four
Course Content

(9 weeks – 270 hours)

Period One Core Competences	Weighting
Foundational Skills	**4%**
Job Practices and Procedures	**In Context**
Shop Equipment and Tools (A)	**In Context**
Maintenance Services	**In Context**
Inspect, Test, and Analyze	**In Context**
Diagnostics	**45%**
Systems Repair	**51%**

Core Competence 1: Foundational Skills

Weighting – 4%

Automotive Service Technicians utilize a variety of foundational skills that enable them to understand and perform their job responsibilities. They form the basis upon which more specialized knowledge, skills, and abilities are developed. These skills are developed, practiced, and refined explicitly and implicitly throughout the entire apprenticeship education program and are essential components to a successful career in the trade.

The automotive service technician fourth period will provide instruction on the following skills: digital literacy and mentorship.

Apply foundational skills essential to convey and receive critical training and workplace information.

Core Competence 1: Foundational Skills

Supporting Competence		Taxonomy	Weighting
1A.	Demonstrate problem solving		**In Context**
1B.	Demonstrate digital literacy Outcomes for this supporting competence include: ***I. Use Red Seal resources to prepare for an interprovincial examination*** 1. Identify Red Seal resources used to develop interprovincial examinations. 2. Use Red Seal resources to prepare for an interprovincial examination.	**I, II**	**75%**
1C.	Demonstrate team and customer communication		**In Context**
1D.	Demonstrate mentorship Outcomes for this supporting competence include: ***I. Use coaching skills when training an apprentice*** 1. Describe the process for coaching apprentices.	**II**	**25%**
1E.	Demonstrate knowledge of mechanical and electrical fundamentals		**In Context**

Core Competence 2: Job Practices and Procedures

Weighting – In Context

Automotive Service Technicians utilize a variety of on-the-job practices and procedures that enable them to perform their work in a safe, accurate, and efficient manner that meets criteria established by both manufacturers and regulatory agencies. These job practices and procedures are utilized and refined through explicit and implicit instruction extensively throughout the entire apprenticeship education program and are essential components to a successful career in the trade and beyond.

All instruction for job practices and procedures in the fourth period will be provided in the context of instruction in the other core competences.

CS

Apply knowledge and understanding of practices and procedures associated with on-the-job activities.

Core Competence 2: Job Practices and Procedures

Supporting Competence		Taxonomy	Weighting
2A.	Apply standards and regulations		**In Context**
2B.	Apply organizational and manufacture's specifications		**In Context**
2C.	Select, use, and maintain personal protective equipment		**In Context**
2D.	Demonstrate safety awareness and safe work practices		**In Context**
2E.	Organize work		**In Context**

Core Competence 3: Shop Equipment and Tools

Weighting – In Context

Automotive Service Technicians utilize various types of shop equipment and tools to perform their work. Completing tasks safely, efficiently, and effectively requires knowledge and experience to select, use, and maintain the appropriate tools for the specific task. Skill in this area will be developed, practiced, and refined explicitly and implicitly throughout the entire apprenticeship education program and is an essential component to a successful career in the trade.

All instruction for shop equipment and tools in the fourth period will be provided in the context of instruction in the other core competences.

Demonstrate knowledge, understanding and proficiency regarding the use and maintenance of tools and shop equipment.

Core Competence 3A: Shop Equipment and Tools

Supporting Competence		Taxonomy	Weighting
3aA.	Select, use, and maintain hand tools		**In Context**
3aB.	Select, use, and maintain power tools		**In Context**
3aC.	Select, use, and maintain specialty tools		**In Context**
3aD.	Select, use, and maintain shop equipment		**In Context**

Core Competence 3A: Shop Equipment and Tools			
Supporting Competence		**Taxonomy**	**Weighting**
3aE.	Select, use, and maintain diagnostic equipment		**In Context**
3aF.	Select and use fastening devices		**In Context**

Core Competence 4: Maintenance Services

Weighting – In Context

Automotive Service Technicians assess the need for and perform regular upkeep and servicing on vehicle systems and components to ensure their safe and efficient operation over time. Proficiency in carrying out these tasks and procedures helps prevent breakdowns, extends vehicle lifespan, and maintains optimal vehicle performance.

All instruction for maintenance services in the fourth period will be provided in the context of instruction in the other core competences

Demonstrate knowledge, understanding and proficiency when conducting motor vehicle maintenance services.

Core Competence 4: Maintenance Services			
Supporting Competence		**Taxonomy**	**Weighting**
4A.	Perform motor vehicle maintenance services on propulsion systems		**In Context**
4B.	Perform motor vehicle maintenance services on fuel systems		**In Context**
4C.	Perform motor vehicle maintenance services on emission control systems		**In Context**
4D.	Perform motor vehicle maintenance services on braking systems		**In Context**
4E.	Perform motor vehicle maintenance services on drive train systems		**In Context**
4F.	Perform motor vehicle maintenance services on heating, ventilation, and air conditioning systems		**In Context**
4G.	Perform motor vehicle maintenance services on oils, fluids, and greases		**In Context**
4H.	Perform motor vehicle maintenance services on filters, gaskets, and sealants		**In Context**

Core Competence 4: Maintenance Services			
Supporting Competence		**Taxonomy**	**Weighting**
4I.	Perform motor vehicle maintenance services on tires and wheels		**In Context**
4J.	Perform motor vehicle maintenance services on belts and hoses		**In Context**

Core Competence 5: Inspect, Test, and Analyze

Weighting – In Context

Automotive Service Technicians utilize a systematic approach to assess and understand the condition of the systems and components they are tasked with working on. Proficiency in this approach is a necessary step in addressing customer concerns in an efficient and effective manner.

All instruction for inspecting, testing, and analyzing systems in the fourth period will be provided in the context of instruction in the other core competences.

Demonstrate knowledge, understanding and proficiency regarding the inspection, testing and analysis of motor vehicle systems.

Core Competence 5: Inspect, Test, and Analyze			
Supporting Competence		**Taxonomy**	**Weighting**
5A.	Inspect, test, and analyze motor vehicle propulsion systems		**In Context**
5B.	Inspect, test, and analyze motor vehicle emission control systems		**In Context**
5C.	Inspect, test, and analyze motor vehicle braking systems		**In Context**
5D.	Inspect, test, and analyze motor vehicle drive train systems		**In Context**
5E.	Inspect, test, and analyze motor vehicle management systems		**In Context**
5F.	Inspect, test, and analyze motor vehicle electrical systems		**In Context**
5G.	Inspect, test, and analyze motor vehicle heating, ventilation, and air conditioning systems		**In Context**
5H.	Inspect, test, and analyze motor vehicle tires and wheels		**In Context**

Core Competence 6: Diagnostics

Weighting – 45%

Automotive Service Technicians utilize a variety of diagnostic tools and techniques to assess and understand the underlying reasons for observed faults, defects or performance issues on the systems and components they are tasked with working on. Proficiency in this area is a necessary step in addressing customer concerns in an efficient and effective manner.

The automotive service technician fourth period will provide instruction on how to perform diagnostics on the following systems: propulsion, fuel, emission control, and drive train.

CS

Demonstrate knowledge, understanding and proficiency when performing motor vehicle system diagnostics.

Core Competence 6: Diagnostics

Supporting Competence		Taxonomy	Weighting
6A.	Perform motor vehicle diagnostics for propulsion systems Outcomes for this supporting competence include: ***I. Diagnose diesel engine performance*** 1. Diagnose diesel engine performance.	**I, II, III**	**13%**
6B.	Perform motor vehicle diagnostics for fuel systems Outcomes for this supporting competence include: ***I. Diagnose diesel fuel storage and supply systems*** 1. Describe diesel fuel properties. 2. Describe low pressure supply system operation. 3. Diagnose low pressure supply system. 4. Perform fuel sample testing.	**I, II, III**	**7%**
6C.	Perform motor vehicle diagnostics for emission control systems Outcomes for this supporting competence include: ***I. Diagnose diesel emission systems*** 1. Explain diesel emission systems. 2. Explain crankcase ventilation systems. 3. Describe emissions systems service. 4. Perform diesel exhaust fluid system diagnosis. 5. Perform regeneration procedures.	**I, II, III**	**12%**
6D.	Perform motor vehicle diagnostics for braking systems		**In Context**

Core Competence 6: Diagnostics

Supporting Competence		Taxonomy	Weighting
6E.	Perform motor vehicle diagnostics for drive train systems Outcomes for this supporting competence include: ***I. Diagnose planetary gear sets*** 1. Describe single planetary gear set operation. 2. Describe compound planetary gear set operation. 3. Diagnose planetary gear set failures. ***II. Diagnose torque converters*** 1. Describe torque converter operation. 2. Describe torque converter control circuit operation. 3. Diagnose torque converter systems. ***III. Diagnose transmission controls*** 1. Describe manual valve operation. 2. Describe the operation of transmission shifting controls. 3. Describe pressure controls. ***IV. Diagnose hydraulic circuits in an automatic transmission*** 1. Explain hydraulic circuit diagrams. 2. Diagnose hydraulic circuits. ***V. Diagnose automatic transmissions and transaxles*** 1. Diagnose automatic transmissions. 2. Diagnose automatic transaxles. 3. Perform control circuit tests. ***VI. Diagnose auto-shifting manual transmissions*** 1. Describe auto-shifting manual transmission operation. 2. Describe auto-shifting manual transmission service procedures. 3. Diagnose auto-shifting manual transmissions. ***VII. Diagnose Continuously Variable Transmissions (CVTs)*** 1. Describe CVT operation. 2. Describe CVT service procedures. 3. Diagnose CVTs.	**I, II, III**	**68%**
6F.	Perform motor vehicle diagnostics for vehicle management systems		**In Context**
6G.	Perform motor vehicle diagnostics for electrical systems		**In Context**
6H.	Perform motor vehicle diagnostics for heating, ventilation, and air conditioning systems		**In Context**
6I.	Perform motor vehicle diagnostics for tires and wheels		**In Context**

Core Competence 7: Systems Repair

Weighting – 51%

Automotive Service Technicians use a variety of tools and techniques to repair vehicle systems and components to restore the vehicle's functionality, reliability, and safety. Proficiency in this area is necessary to address customer concerns in an efficient and effective manner.

The automotive service technician fourth period will provide instruction on how to perform repairs on the following systems: propulsion, fuel, drive train, and heating, ventilation, and air conditioning.

CS

Demonstrate knowledge, understanding, and proficiency when performing motor vehicle system repairs.

Core Competence 7: Systems Repair

Supporting Competence	Taxonomy	Weighting
7A. Perform motor vehicle repairs on propulsion systems	**I, II, III**	**35%**

Outcomes for this supporting competence include:

I. Repair induction systems
1. Describe positive air shut-off.
2. Explain pre-heater systems.
3. Explain forced induction systems.
4. Perform pre-heater system test.
5. Perform induction system diagnosis.

II. Repair hybrid electric and electric vehicles
1. Identify hybrid vehicle systems and components.
2. Identify electric vehicle systems and components.
3. Describe hybrid vehicle operation.
4. Describe electric vehicle operation.
5. Describe hybrid and electric vehicle cooling and heating systems.
6. Describe high voltage charging systems.
7. Perform high voltage system diagnosis.
8. Perform hybrid and electric vehicle control system diagnosis.

7B. Perform motor vehicle repairs on fuel systems	**I, II, III**	**10%**

Outcomes for this supporting competence include:

I. Repair diesel injection systems
1. Explain injection system types.
2. Explain high pressure pumps.
3. Explain injector operation.
4. Explain electronic controls.
5. Perform injector testing.

7C. Perform motor vehicle repairs on drive train systems	**I, II, III**	**27%**

Outcomes for this supporting competence include:

I. Repair oil pumps
1. Describe automatic transmission oil pump operation.
2. Diagnose automatic transmission oil pumps.
3. Disassemble an automatic transmission oil pump.
4. Assemble an automatic transmission oil pump.

Core Competence 7: Systems Repair

Supporting Competence	Taxonomy	Weighting
II. Repair automatic transmission clutches and bands 1. Describe clutch assembly operation. 2. Describe band and servo assembly operation. 3. Diagnose clutch assemblies. 4. Diagnose band and servo assemblies. ***III. Repair automatic transmissions and transaxles*** 1. Describe emerging transmission technologies. 2. Explain operating principles of an automatic transmission and transaxle. 3. Explain transmission fluid flush procedures. 4. Disassemble an automatic transmission or transaxle. 5. Assemble an automatic transmission or transaxle. 6. Perform fluid check. 7. Perform adaptive shift strategy relearn. 8. Perform automatic transmission or transaxle operation test.		
7D. Perform motor vehicle repairs on heating, ventilation, and air conditioning systems	**I, II, III**	**28%**
Outcomes for this supporting competence include: ***I. Repair the operation of refrigerant systems*** 1. Describe the principles of heat. 2. Describe refrigerant properties. 3. Describe refrigerant oil properties. 4. Describe refrigerant system operation. 5. Describe the function of refrigeration system components. 6. Explain cooling fan operation. 7. Diagnose refrigerant system. ***II. Repair climate control systems*** 1. Explain climate control system operation. 2. Explain climate control system components. 3. Explain climate control integration with vehicle systems. 4. Perform climate control systems diagnosis.		

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