



**Skilled
Trades**
Ontario

**Métiers
spécialisés**
Ontario

Apprenticeship
Curriculum Standard

Parts Technician

Level 2

240P

2003

Apprenticeship Pathway to a Certificate of Qualification

Phase 1: Registration

Submit Application for Apprenticeship Training through the on-line portal or to local Service Delivery Office

For on-line portal, please follow instructions for registration. You will need to create a *My Ontario* account to access online services.

Training agreement signed and registered by both apprentice and sponsor

Access your Apprenticeship Training Standard Logbook**
skilledtradesontario.ca/about-trades/trades-information

** This is the official record of your training progress. You are responsible for keeping it up-to-date.

Complete on-the-job training

Demonstrate and receive sign-off on the competencies/skills in your Apprenticeship Training Standard Logbook

Complete in-school training

Attend and complete the in-class training set out in the Curriculum Training Standard

Apprentices eligible to apply for apprenticeship incentive grants (Red Seal trades) and loans.

Review and finalize your logbook with your sponsor

Submit proof of apprenticeship completion
via email, in-person or digital portal

Your Apprenticeship Training Standard Logbook details completion requirements. Submit the following:

- completed Apprenticeship Training Standard Logbook with signatures
- proof of hours

Certificate of Apprenticeship is issued

Trades without examination

CofA is the final step of the program

Trades with examination (compulsory and non-compulsory trades)*

Provisional Certificate of Qualification issued for a 12 month term

To prepare for the CofQ examination download the Provincial and/or Red Seal Exam preparation guides.

Make payment for your Certificate of Qualification examination

Call to make a payment (647-847-3000 or 1-855-299-0028)

Schedule a date to write your Examination

To schedule your examination, contact your local Service Delivery Office.

Pass Certificate of Qualification examination

Apprentices eligible to apply for Apprenticeship Completion Grant (Red Seal trades) or Apprentice Completion Bonus (non-Red Seal)

Certificate of Qualification is issued

Upon completion, Sponsors may be eligible for Apprenticeship grants, incentives, bonuses or tax credits

Phase 2: Apprenticeship

Phase 3: Certification

* For a list of trades subject to a certification examination, visit: skilledtradesontario.ca

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Please Note: This Standard has been revised to reflect the visual identity of Skilled Trades Ontario (STO) which replaced the Ontario College of Trades on January 1, 2022. The content of this Standard may refer to the former organization; however, all trade specific information or content remains relevant and accurate based on the original date of publishing.

Please refer to STO's website: skilledtradesontario.ca for the most accurate and up to date information. For information about BOSTA and its regulations, please visit [**Building Opportunities in the Skilled Trades Act, 2021 \(BOSTA\)**](#).

Any updates to this publication are available on-line; to download this document in PDF format, please follow the link: [Skilled Trades Ontario.ca](https://skilledtradesontario.ca).

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Maintained with transfer to Skilled Trades Ontario 2003 (V100)

Preface

This curriculum standard for the Parts Technician trade program is based upon the on-the-job performance objectives, located in the industry-approved training standard.

This is the second level of 2 levels of training. The Reportable Subjects Summary chart (located on page 4) summarizes the training hours for each reportable subject.

The curriculum identifies the learning that takes place in-school. The in-school program focuses primarily on the theoretical knowledge and the essential skills required to support the performance objectives of the Apprenticeship Training Standards.

Employers/Sponsors are expected to extend the apprentice's knowledge and skills through practical training on a work site. Regular evaluations of the apprentice's knowledge and skills are conducted throughout training to verify that all apprentices have achieved the learning outcomes identified in the curriculum standard.

It is not the intent of the in-school curriculum to perfect on-the-job skills. The practical portion of the in-school program is used to reinforce theoretical knowledge. Skill training is provided on the job.

Please refer to Skilled Trades Ontario website (www.skilledtradesontario.ca) for the most accurate and up-to-date information about Skilled Trades Ontario. For information on *Building Opportunities in the Skilled Trades Act, 2021 (BOSTA)* and its regulations, please visit [Building Opportunities in the Skilled Trades Act, 2021, S.O. 2021, c. 28 - Bill 288 \(ontario.ca\)](http://www.skilledtradesontario.ca/building-opportunities-in-the-skilled-trades-act-2021)

Pre-requisites

In order to advance to Level 2 of the apprenticeship program, an individual must have completed all of the units outlined in Level 1.

Hours Disclaimer (if applicable)

It is agreed that Training Delivery Agents (TDAs) may need to make slight adjustments (with cause) according to particular apprentice needs and may deviate from the unit sequencing and the prescribed practical and theoretical hours shown within the standard. However, all TDAs will comply with the hours at the reportable subject level.

Introduction

The curriculum has been developed and reviewed in keeping with the prescribed Ministry of Labour, Immigration, Training and Skills Development and Apprenticeship Training Standards for the trade of Parts Technician. This curriculum reflects the content necessary for an appropriate progression through the Reportable Subjects as identified in the program map.

For easy reference, a time allocation has been included for each respective unit, along with the Theory / Application breakdown for the delivery of the performance objectives. More detailed time allocations for the user have been provided for each topic area to assure consistency in delivery. The total time allocation for this program reflects the training requirements for in- school learning.

The continual introduction of innovative techniques and more complex parts systems, components and equipment is resulting in increasing demands for tradespersons who are not only skilled in the practical aspects of the parts trades, but who also have a sound theoretical knowledge of the testing, diagnosing and servicing requirements. The curriculum has been developed to provide this theoretical knowledge and to offer some practical applications to complement the on-the-job work experience of the Parts Technician apprentice.

The objectives of the curriculum therefore, are to provide comprehensive learning experiences for the specialty trade of Parts Technician in terms of:

- a. Sound theoretical training to meet the challenges presented by the increasingly more complex parts systems, component designs and testing techniques.
- b. The acquisition of fundamental and specific skills of the trade through the training of practical applications as identified in the specific Learning Outcomes.
- c. Strengthening the apprentice's high standards of craftsmanship, problem-solving skills and personal pride in their respective trades.
- d. Strengthening desirable work attitudes and a keen sense of responsibility, particularly in regard to public and personal safety.
- e. Providing alternative delivery opportunities where deemed appropriate.

The curriculum has been designed, also, to give the instructor every reasonable opportunity for flexibility and innovation without necessarily deviating to any significant degree from the course requirements, as determined by the Provincial Advisory Committees and as prescribed in the Regulations for the Trades. Since the scope of the prescribed curriculum is quite extensive, the apprentice must be expected to reinforce the acquired knowledge through regular independent out-of-classroom assignments. The curriculum has been presented in a chronological sequence in keeping with sound teaching methodologies. However, the actual application of this sequence may differ somewhat between colleges because of scheduling, staffing and facilities utilization differences.

The curriculum includes specific references to the Ministry of Labour, Immigration, Training and Skills Development and Apprenticeship Training Standards. While these references to various terminal performance objectives in the Training Standards and the job learning outcomes have been linked to the respective in-school delivery focuses primarily on the knowledge required to master the respective performance objectives outlined in the Training Standards. Employers, therefore, are expected to complete the delivery of these objectives by applying the prescribed in-school knowledge to the required practical learning experiences in the work setting.

To ensure that successful students will be able to satisfy the individual objectives according to the performance criteria, specific times have been allocated in the respective areas to allow for some applications enhancement. It is of utmost importance that all in-school applications assignments relate to prescribed experiences only. Time constraints will not permit engaging students in irrelevant tasks of limited learning benefits.

Evaluations of the apprentice's competence for each Reportable Subjects must be performed in both theory and applications throughout the program to assure consistency in learning outcomes. Credits will be earned for each Learning Unit completed and the program will be considered complete when all the required unit credits are successfully achieved.

Level 2

Reportable Subject Summary – Level 2

Number	Reportable Subjects	Hours Total	Hours Theory	Hours Practical
Unit 1	Applied Work Practices	54	44	10
Unit 2	Communications & Customer Support	42	26	16
Unit 3	Merchandising & Inventory Management	60	48	12
Unit 4	Component Technology & Technical Skills	114	82	32
	Total	270	200	70

Evaluation Structure:

- Create an evaluation system by establishing the frequency of tests for theory and practical learning outcomes.
- Create evaluation techniques and practices for the prescribed student theory and practical learning outcomes.
- Maintain student performance records pertaining to theory and applications learning outcomes.
- Create final summary evaluation process to weight
 - Theory and applications
 - Term tests and assignments
 - Final examination
- Establish a policy for handling copies of term tests, assignments, and final examinations.

Number:	1		
Title:	Applied Work Practices		
Duration:	Total Hours: 54	Theory: 44	Practical: 10
Prerequisites:	Level 1		
Co-requisites:	Level 2, Section 2, 3, 4		

Number:	1.1		
Title:	Parts Handling Equipment		
Duration:	Total Hours: 24	Theory: 24	Practical: 0
Prerequisites:	Level I		
Co-requisites:	Level II, Section 2, 3, 4		
Cross-Reference to Learning Outcomes:	5360.01, 5360.13, 5360.14, 5360.18, 5363.02, 5364.02, 5364.10, 5367.01		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of safely operating parts handling equipment.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 1.1.1 Describe the function, composition, types, styles and applications of parts packaging.
- 1.1.2 Describe the function, construction, types, styles and application of manual parts handling equipment.
- 1.1.3 Describe the function, construction, types, styles and application of manual parts load security equipment.
- 1.1.4 Describe the use and safety related precautions to using powered lifting devices.
- 1.1.5 Explain the principles of operating a fork lift truck (certification required).

Learning Content

1.1.1 Describe the function, composition, types, styles and applications of parts packaging.

[4/0]

- packaging equipment:
 - bonding machine
 - shrink wrap machine
 - strapping machine
 - tape gun
 - stapler gun

1.1.2 Describe the function, construction, types, styles and application of manual parts handling equipment.

[4/0]

- handling equipment
 - pump lift trucks
 - conveyers
 - dollies
 - pallet jacks
 - weigh scales

1.1.3 Describe the function, construction, types, styles and application of manual parts load security equipment.

[3/0]

- belts
- belt tighteners
- chains
- chain tighteners
- load securing techniques

1.1.4 Describe the use and safety related precautions to using powered lifting devices.

[3/0]

- tractors
- jib cranes
- mobile cranes

1.1.5 Explain the principles of operating a fork lift truck (certification required).
[10/0]

- safety rules for operating a lift truck (Occupational Safety and Health Act)
- personal protection
- component identification
- safety features
- tip over and survive
- stability triangle
- calculating loads
- pre-start inspection (visual and manual)
- record keeping
- types of fuel systems
- operating techniques
- load capacity
- lifting capacity
- positioning forks
- load security
- load stability
- operation surface
- storing lift truck

Number:	1.2		
Title:	Fasteners		
Duration:	Total Hours: 6	Theory: 4	Practical: 2
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5361.02, 5361.18		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge identifying and to operation of various fasteners.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 1.2.1 Define the purpose and fundamentals of fasteners.
- 1.2.2 Describe the functions, construction, composition, types, styles and application of the following fasteners.
- 1.2.3 Explain the principles of operation of fasteners.
- 1.2.4 Perform installation and removal procedures for fasteners.

Learning Content

- 1.2.1 Define the purpose and fundamentals of fasteners.
[1/0]
 - thread terminology, fastener grades / application
 - SAE standards, International standards
 - tensile strength, shear strength
 - grade, pitch, threads per inch
 - diameter, length, head size, yield point and fatigue
 - dynamic and static seal applications
 - loctite grades
 - never-seize
 - sealant applications

1.2.2 Describe the functions, construction, composition, types, styles and application of the following fasteners.
[1/0]

- bolts
- nuts
- screws
- studs
- locking devices
- pins - rivets
- keys
- washers
- retaining rings
- heli-coils
- thread sealants and adhesives

1.2.3 Explain the principles of operation of fasteners.
[1/0]

- torque to yield bolts and cap screws
- torque effects of wet, dry and clean threads
- locking devices
- heli-coil thread repair principles
- temperature
- compatibility
- clamping free

1.2.4 Perform installation and removal procedures for fasteners.
[1/2]

- verify thread strengths and torque requirements for wet and dry
- thread repair
 - freeing seized threads, removal of broken studs / cap screws
 - installation of heli-coils, locking devices
- metal working practices
 - drilling
 - tapping
 - hacksawing
 - filing
- sealant selection, removal and installation practices
- loctite and never-seize application

Number:	1.3		
Title:	Hand Tools		
Duration:	Total Hours: 9	Theory: 7	Practical: 2
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes: 5360.11, 5360.12, 5360.13, 5361.17, 5361.24			

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of hand tools.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 1.3.1 Describe the purpose and fundamentals of hand tools.
- 1.3.2 Describe the functions, construction, composition, types, styles and application of basic hand tools.
- 1.3.3 Explain the operating principles of hand tools.
- 1.3.4 Perform the manufacturers' maintenance and recommended operating procedures for hand tools.

Learning Content

- 1.3.1 Describe the purpose and fundamentals of hand tools.
[1/0]
 - features that determine quality
 - durability
 - metal alloys
 - coatings
 - factors that determine application
 - weight
 - metal thickness
 - angles
 - gripping features
 - imperial and metric

1.3.2 Describe the functions, construction, composition, types, styles and application of basic hand tools.
[4/0]

- wrenches
 - torque wrenches
 - open end, box and combination
 - flare nut (line)
 - adjustable
- socket sets
 - drives – 1/4", 3/8", 1/2", 3/4", 1"
 - ratchets
 - flex handles
- pliers
 - diagonal cutters
 - slip joint, channel lock, needle nose
 - vise grip
- screwdrivers
 - flat blade and slotted
 - Phillips
 - Torx
 - Robertson
 - Clutch
- cutting tools
 - hacksaw
 - chisel
 - files
 - twist drills
 - reamers
 - taps and dies
- driving tools
 - hammers
 - ball-peen, bell-faced, soft-faced
 - punches
 - center, pin, starting, aligning
- cleaning tools
 - scrapers
 - wire brushes
 - solvent brushes

1.3.3 Explain the operating principles of hand tools
[2/0]

- wrenches
- sockets
- pliers
- screwdrivers
- cutting tools
- driving tools
- cleaning tools

1.3.4 Perform the manufacturers' maintenance and recommended operating procedures for hand tools.
[0/2]

- maintenance
 - lubrication
 - cleaning
 - storage
- demonstrate and perform the applied operating techniques
 - holding techniques
 - pulling and torquing
 - gripping techniques

Number:	1.4		
Title:	Measuring Tools		
Duration:	Total Hours: 9	Theory: 6	Practical: 3
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5360.13, 5361.17, 5367.01		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of operation and calibration of measuring tools.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 1.4.1 Describe the purpose and fundamentals of precision and non-precision tools.
- 1.4.2 Describe the functions, construction, composition, types, styles and application of precision measuring tools.
- 1.4.3 Explain the principles of operation of precision measuring tools.
- 1.4.4 Perform the manufactures' maintenance and calibration procedures of precision and non-precision measuring tools.

Learning Content

- 1.4.1 Describe the purpose and fundamentals of precision and non-precision tools.
[1/0]
 - metric and Imperial measurements, and conversions
- 1.4.2 Describe the functions, construction, composition, types, styles and application of precision measuring tools.
[3/0]
 - micrometers
 - inside, outside, depth
 - small hole gauges
 - calipers
 - precision, vernier, non-precision

- telescoping gauges
- straight edges
- dial indicators
- universal gauges

1.4.3 Explain the principles of operation of precision measuring tools.
[2/0]

- micrometers
 - inside, outside, depth
- small hole gauges
- calipers
 - precision, vernier, non-precision
- telescoping gauges
- straight edges
- thickness gauges
- dial indicators
- universal gauges

1.4.4 Perform the manufactures' maintenance and calibration procedures of precision and non-precision measuring tools.
[0/3]

- storage
- lubrication
- methods of restoring critical surfaces
- adjustments, calibration
- perform required measuring

Number:	1.5		
Title:	Shop Equipment		
Duration:	Total Hours: 6	Theory: 3	Practical: 3
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes: 5360.05, 5360.13, 5363.02, 5364.02, 5367.01			

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of operating shop equipment safely.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 1.5.1 Describe the functions, construction, composition, types, styles and application of shop equipment.
- 1.5.2 Explain the principles of operation of power tools and equipment.
- 1.5.3 Demonstrate the ability to operate shop equipment and power according to manufacturers' recommended safe operating procedures.

Learning Content

- 1.5.1 Describe the functions, construction, composition, types, styles and application of shop equipment.
[2/0]
 - definitions
 - shop layout
 - shop equipment installation
 - grinders
 - bench grinders
 - portable grinders
 - drills
 - portable drills
 - drill press

- presses
 - hydraulic press
 - portable press
 - mechanical press
- vises
 - solid and swivel
 - soft and hard jaw
- lifting equipment
 - chain lifts
 - hoists
 - hydraulic jacks
 - pneumatic jacks
 - blocking equipment (safety stands)
- grease guns
 - hydraulic operated
 - air operated
- fluid draining
- cleaning equipment
- power spray
- wash tanks
 - non corrosive
 - hot caustic corrosive
- degreasing / cleaning agents
- component protection - personal protection

1.5.2 Explain the principles of operation of power tools and equipment.
[1/0]

- power tools
 - impact wrenches
 - portable drills
 - drill press
 - hydraulic press
 - grinder-bench, portable
 - washers and degreasers
- equipment
 - chain lifts
 - hydraulic, pneumatic and electric
 - mechanical and hydraulic jacks
 - safety blocking devices

1.5.3 Demonstrate the ability to operate shop equipment and power according to manufacturers' recommended safe operating procedures.
[0/3]

- lifting and jacking equipment
 - lifting techniques single person/ two person
 - chain lifts
 - hydraulic hoists
 - jacking mechanical / hydraulic
 - safety blocking
- power tools
 - impact wrenches
 - portable drills
 - drill press
 - hydraulic press
 - grinders
 - bench
 - portable
- cleaning equipment
 - power spray
 - wash tank
 - degreasing / cleaning agents
- maintenance
 - electrical cords and connections
 - air lines and connections
 - hydraulic lines and connectors
 - moisture contamination
 - refilling of grease guns

Evaluation:

The following evaluation structure is only a suggested format. Specific evaluation of theory and practical components of training varies due to the resource material and training aides utilized.

Evaluation Structure			
Theory Testing	Practical Application Exercises	Research Assignment	Notebook and Organizational Skills
50%	25%	15%	10%

Number:	2		
Title:	Communications and Customer Support		
Duration:	Total Hours: 42	Theory: 26	Practical: 16
Prerequisites:	Level 1		
Co-requisites:	Level 2, Section 1, 3, 4		

Number:	2.1		
Title:	Customer Needs Assessment Protocol & Product Requirements		
Duration:	Total Hours: 18	Theory: 9	Practical: 9
Prerequisites:	Level I		
Co-requisites:	Level II, Section 1, 3, 4		
Cross-Reference to Learning Outcomes: 5361.01, 5361.02, 5361.03, 5361.05, 5361.08, 5361.14, 5361.16, 5361.24, 5365.03, 5365.04			

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of assessing customers needs.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 2.1.1 Demonstrate proper protocol when assessing customer needs for internal and external counter sales.
- 2.1.2 Identify product and customer needs for specific vehicle repairs.
- 2.1.3 Identify related parts issues.

Learning Content

- 2.1.1 Demonstrate proper protocol when assessing customer needs for internal and external counter sales.
[3/3]
 - greet customer professionally
 - communicate at customer level
 - maintain positive / helpful attitude
 - demonstrate image of competence
 - probe for specific required data

2.1.2 Identify product and customer needs for specific vehicle repairs.
[3/3]

- Interpret customer information
- product type
- make, model, year
- arrangement number
- CPL number
- casting number
- date coding
- OEM numbers
- VIN
- Recommend solutions
- Advise customer of part number, part quality, part quantities

2.1.3 Identify related parts issues.
[3/3]

- required additional parts
- available styles
- warranties
- price and delivery time
- parts order options and costs
- availability from external sources
- follow up sales and / or purchases

Number:	2.2		
Title:	Organizational Climate		
Duration:	Total Hours: 6	Theory: 6	Practical: 0
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5360.04, 5360.09, 5361.01		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of maintaining a organizational business climate.

Learning Outcomes

Upon successful completion, the apprentice is able to:

2.2.1 Describe the fundamentals of “organizational climate” of a business.

2.2.2 Describe Entrepreneurial Skills and economic strategies.

Learning Content

2.2.1 Describe the fundamentals of “organizational climate” of a business.
[4/0]

- power structure
 - chain of command
 - formal / informal power structure
 - effects on staff relations
 - internal lines of communication (meeting, transfer of information etc.)
 - one on one
 - two or three tier
 - open discussion
 - advantages / disadvantages
- formal/informal meetings
 - “Roberts’s Rules” to carry out a proper meeting
 - Parliamentary procedure
 - effects on staff relations

- working environment
 - shop systems employed
 - facilities factor
 - safety factor
 - effects on staff relations / customer relations
- morale
 - importance
 - effects on staff / customers

2.2.2 Describe Entrepreneurial Skills and economic strategies.
[2/0]

- marketing
- income
- service sales
- others
- overhead
- labour
- taxes
- utilities
- leasing

Number:	2.3		
Title:	Effective Telephone Operation & Techniques		
Duration:	Total Hours: 9	Theory: 7	Practical: 2
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5361.14, 5365.01, 5365.02		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of effective telephone operating techniques.

Learning Outcomes

Upon successful completion, the apprentice is able to:

2.3.1 Demonstrate effective telephone systems operation.

2.3.2 Demonstrate effective telephone techniques.

Learning Content

2.3.1 Demonstrate effective telephone systems operation.
[3/0]

- receiver, headset and call queue
- answering machines
- voice mail
- call forwarding, dialing, links, etc.

2.3.2 Demonstrate effective telephone techniques.
[4/2]

- answer promptly
- employ proper listening and speaking skills
- address customer concerns / discrepancies
- respond promptly to requests
- take messages / customer assistance
- interpret customer information
- provide parts availability information
- note customer name / address / phone number

- communicate at customer's level
- probe for further required product information
- follow-up on conversation and requests
- identify urgency, timing and availability
- complete verbal sale
- record inquiries in log book, work sheet or computer for quick reference

Number:	2.4		
Title:	Invoice Completion		
Duration:	Total Hours: 9	Theory: 4	Practical: 5
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes: 5361.06, 5361.23, 5361.25, 5362.06, 5362.12, 5365.06			

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge invoice / business form completion for the parts business.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 2.4.1 Identify various stages of business transactions.
- 2.4.2 Conduct sales transactions with potential customers.
- 2.4.3 Produce a customer invoice / business forms and print a hard copy.

Learning Content

- 2.4.1 Identify various stages of business transactions.
[1/0]
 - introduction
 - follow-up using phone, fax, e-mail
- 2.4.2 Conduct sales transactions with potential customers.
[1/2]
 - cash, charge, Interac, cheque, etc. according to company policy

2.4.3 Produce a customer invoice / business forms and print a hard copy.
[2/3]

- forms
 - charge and cash invoice
 - work orders
 - shipping and receiving records
 - inventory and parts order forms
 - daily sales records
 - bills of lading
 - error or shortage reports
 - estimating
 - hard copy
 - fax
 - telephone
- input customer sale information
- search data base to access customer information i.e.:
 - name
 - account number
 - terms of sale
 - shipping address
 - purchase order number
 - shipping method
- input part numbers, prices, shipping charges, taxes, using mouse, keyboard
- use a scanner to enter prices from bar codes
- use a calculator / adding machine to determine discounts, taxes, total sales
- use a interac / credit card terminal to complete cash sales or credit card charges
- update daily cash sale and charge transactions using the appropriate business machines
- check over work order to verify all parts, special tools and all materials have been charged out

Evaluation:

The following evaluation structure is only a suggested format. Specific evaluation of theory and practical components of training varies due to the resource material and training aides utilized.

Evaluation Structure			
Theory Testing	Practical Application Exercises	Research Assignment	Notebook and Organizational Skills
50%	25%	15%	10%

Number:	3		
Title:	Merchandising and Inventory Management		
Duration:	Total Hours: 60	Theory: 48	Practical: 12
Prerequisites:	Level 1		
Co-requisites:	Level 2, Section 1, 2, 4		

Number:	3.1		
Title:	Product Sales		
Duration:	Total Hours: 21	Theory: 17	Practical: 4
Prerequisites:	Level I		
Co-requisites:	Level II, Section 1, 2, 4		
Cross-Reference to Learning Outcomes:	5361.06, 5366.02, 5366.03, 5366.04, 5366.05, 5366.06, 5366.07, 5366.08		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of understanding and practicing required product sales procedures.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 3.1.1 Describe the purchasing habits of the general public.
- 3.1.2 Describe the major parts of good advertising.
- 3.1.3 Describe the media types and the advantages and disadvantages of each.
- 3.1.4 State the factors used in creating a good advertisement.
- 3.1.5 Describe the effect of displays in regards to impulse buying, additional sales and incentives.
- 3.1.6 Design, organize and set-up a parts display and discuss the use of visual aids.
- 3.1.7 Describe the fundamentals of preparing for a sales presentation.

Learning Content

- 3.1.1 Describe the purchasing habits of the general public.
[3/0]
- behavioural sciences in purchasing habits
 - anthropology
 - sociology
 - psychology
 - general habits
 - impulse buying
- 3.1.2 Describe the major parts of good advertising.
[2/0]
- purpose
 - definition
 - uses
 - conditions
 - types
 - advertising to the consumer
 - advertising to business and professions
 - marketing
- 3.1.3 Describe the media types and the advantages and disadvantages of each.
[3/0]
- types
 - television
 - radio
 - newspaper
 - magazines
 - outdoor billboards
 - direct-response / direct-mail
 - transit
 - internet
 - telephone marketing

3.1.4 State the factors used in creating a good advertisement.
[3/0]

- factors
 - assessing the situation
 - defining the problem
 - use of subconscious in creativity
 - idea producing sessions
 - use of judgment in selecting the best idea
- summary
- reviewing of ad's effectiveness
- components
 - headline
 - sub-caption
 - body

3.1.5 Describe the effect of displays in regards to impulse buying, additional sales and incentives.
[3/0]

- displays
 - location
 - factors
 - themes
- incentives
 - idea of incentives
 - employee needs
 - customer needs
 - factors
 - payment
- push-pull idea
- types
- appeal to customer
- result

3.1.6 Design, organize and set-up a parts display and discuss the use of visual aids.
[1/2]

- showroom use
- parts counter use
- window display
- use of colour on signage
- related sales items around displays
- requirements of a good display

3.1.7 Describe the fundamentals of preparing for a sales presentation.
[2/2]

- sales presentation
 - qualities of good presentation
 - preparation and delivery on a product
- assist company's sales strategies and development plans
 - data on product pricing and availability
 - range of product
 - brochures
 - delivery time
 - internet information
 - sales promotions e.g. seasonal sales
 - maintain ongoing communication with suppliers e.g. new products, new
 - applications
 - maintaining and updating of cataloging and pricing systems
- future sales promotions
 - promotional pricing
 - required order quantities
 - combination offers
 - assist in promotional advertising and displays
 - competitor comparison
- promotions for repeat business
 - delivery time
 - seminars
 - trade shows

Number:	3.2		
Title:	Product Handling Policies and Regulations		
Duration:	Total Hours: 18	Theory: 12	Practical: 6
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes: 5361.04, 5361.07, 5361.12, 5361.17, 5363.13, 5364.05, 5364.06, 5364.08, 5364.09, 5364.13, 5364.14, 5364.16, 5367.01, 5367.02, 5367.03, 5367.04			

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of product handling policies and regulations.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 3.2.1 Identify warranty procedures and reports.
- 3.2.2 Identify the factors needed to do proper warranty inspection and core returns
- 3.2.3 Identify the factors needed in a return policy.
- 3.2.4 Describe short shipments, damage goods and procedures
- 3.2.5 Describe tax, tariff, duty and Canada Custom's regulations.

Learning Content

- 3.2.1 Identify warranty procedures and reports.
[3/0]
 - demonstrate knowledge of warranty procedures:
 - proper administration and formulation of warranty policies
 - non-warranty return good policy
 - classifications of non-warranty goods
 - written reports
 - demonstrate the need for accuracy of reference material and data
 - use a brief and clear description of the conditions
 - identify policy or memorandum references
 - use positive statements for adjustments carried out
 - process warranty claims

- 3.2.2 Identify the factors needed to do proper warranty inspection and core returns.
[4/2]
- perform visual inspection and identify the guidelines utilized when determining warranty claims and core value as far as possible visual inspection for remanufacturing
 - identify core return policies
 - identify terms such as:
 - core charges
 - pro-rating
 - core conditions, e.g. missing components, wear or damage
 - packaging
 - process warranty and core returns:
 - packaging
 - labeling
 - proper forms, approval codes and reviewing of credit notes
- 3.2.3 Identify the factors needed in a return policy.
[2/1]
- company requirements:
 - invoice or proof of purchase
 - ime frame
 - restocking charges
 - repayment process e.g. cashes, crediting account, etc.
- 3.2.4 Describe short shipments, damage goods and procedures.
[1/2]
- processing of claims
 - recording damages
 - documenting discrepancies
 - using specific stock reports
 - using fax, hard copy, computer

3.2.5 Describe tax, tariff, duty and Canada Custom's regulations.
[2/1]

- knowledge of company's tax exemptions such as provincial and/or federal tax and duties
- knowledge of tariff and taxes for importing and exporting of goods
- knowledge of provincial and federal taxes as they apply to end use
- knowledge of tax rates
- ability to determine if purchase is taxable
- ability to determine end use of product
- ability to calculate tax payable
- ability to enter tax / duty payable on invoice
- brokerage fees

Number:	3.3		
Title:	Parts Facilities Planning		
Duration:	Total Hours: 6	Theory: 4	Practical: 2
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5360.16, 5363.11, 5366.01		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of planning and designing a parts facility.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 3.3.1 Describe the physical requirements of a parts business and the effect of the various layouts upon efficiency of various activities.
- 3.3.2 Describe the factors necessary to maintain a parts area.

Learning Content

- 3.3.1 Describe the physical requirements of a parts business and the effect of the various layouts upon efficiency of various activities.
[3/2]
 - location, layout and space allotment in a dealership
 - location of parts department in physical building
 - counters
 - shipping / receiving
 - offices
 - bin locations
 - parts location
 - location, layout and space allotment in a jobber
 - location of parts department in physical building
 - counters
 - shipping / receiving
 - offices
 - bin locations
 - parts locations

- location, layout and space allotment in a specialty shop
 - location of parts department in physical building
 - counters
 - shipping / receiving
 - offices
 - bin locations
 - parts locations
- location, layout and space allotment in service center
 - location of parts department in physical building
 - counters
 - shipping / receiving
 - offices
 - bin locations
 - parts location

3.3.2 Describe the factors necessary to maintain a parts area.
[1/0]

- design a clean-up sheet
- carry out a daily inspection and clean up
- review weekly clean up procedures

Number:	3.4		
Title:	Record Keeping Procedures		
Duration:	Total Hours: 9	Theory: 9	Practical: 0
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes: 5361.17, 5361.23, 5361.25, 5362.10, 5365.07			

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of various recording keeping procedures required in the parts business.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 3.4.1 Describe the needs to establish a good method of record keeping.
- 3.4.2 Examine the areas of a business's operation, which are affected by proper utilization of accounting information.
- 3.4.3 Describe the various forms of credit rating used in business.
- 3.4.4 Identify the means of establishing a customer's credit or credit rating.
- 3.4.5 Describe extending and using credit within the business.
- 3.4.6 Describe inventories and the cost of goods sold.
- 3.4.7 Describe payroll liabilities.

Learning Content

- 3.4.1 Describe the needs to establish a good method of record keeping.
[1/0]
 - inventory control
 - control of sales
 - control of lost sales
 - control of business expenses
 - file management

3.4.2 Examine the areas of a business's operation, which are affected by proper utilization of accounting information.
[3/0]

- profitability (time, cost, efficiency study)
- inventory control based on cost of inventory
- net vs. gross profit

3.4.3 Describe the various forms of credit rating used in business.
[1/0]

- definition
- purpose
- credit organizations
- rating systems
 - letter
 - star
 - number

3.4.4 Identify the means of establishing a customer's credit or credit rating.
[1/0]

- credit bureau and bank information
- credit procedure
- establishing a credit policy
- selection of good credit risks
- collections from wholesale customers
- ways and means to getting new customers

3.4.5 Describe extending and using credit within the business.
[1/0]

- pros and cons for extending credit

3.4.6 Describe inventories and the cost of goods sold.
[1/0]

- matching merchandising cost with revenues
- merchandising inventory
- elements of merchandising cost
- taking an ending inventory
- assigning costs to inventory items
- inventory errors – periodic system
- perpetual inventory systems
- lower of cost or market
- methods of estimating inventory value
- merchandise turnover and day's stock on hand

3.4.7 Describe payroll liabilities.
[1/0]

- items withheld from employee's wages
- the payroll register
- paying the employees
- payroll deductions required of the employer
- accruing payroll deductions on wages
- employee (FRINGE) benefit costs
- computerized payroll systems

Number:	3.5		
Title:	Basic Accounting Principles		
Duration:	Total Hours: 6	Theory: 6	Practical: 0
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5361.06, 5362.09, 5362.17		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge basic accounting systems as they apply to the parts business.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 3.5.1 Explain business accounting and its ethics.
- 3.5.2 Describe accounting for merchandising activities.
- 3.5.3 Identify and describe financial statements and accounting principles.

Learning Content

- 3.5.1 Explain business accounting and its ethics.
[2/0]
 - accounting and its role in organizations
 - using accounting to serve internal and external needs
 - difference between accounting and bookkeeping
 - ethics in accounting
- 3.5.2 Describe accounting for merchandising activities.
[2/0]
 - nature of merchandising activities
 - total revenue from sales
 - cost of goods sold
 - alternative income statement formats
 - closing entries for merchandising
 - worksheet for a merchandising company
 - acid test ratio

3.5.3 Identify and describe financial statements and accounting principles.
[2/0]

- financial statements
- assets, liabilities and equity
- accounting principles
- forms of business organizations
- using the balance sheet equation to provide useful information
- effects of transactions on the accounting equation
- revenue recognition principle
- understanding financial statements
- return of equity

Evaluation:

The following evaluation structure is only a suggested format. Specific evaluation of theory and practical components of training varies due to the resource material and training aides utilized.

Evaluation Structure			
Theory Testing	Practical Application Exercises	Research Assignment	Notebook and Organizational Skills
50%	25%	15%	10%

Number:	4		
Title:	Components Technology and Technical Skills		
Duration:	Total Hours: 114	Theory: 82	Practical: 32
Prerequisites:	Level 1		
Co-requisites:	Level 2, Section 1, 2, 3		

Number:	4.1		
Title:	Suspension Systems		
Duration:	Total Hours: 15	Theory: 8	Practical: 7
Prerequisites:	Level I		
Co-requisites:	Level II, Section 1, 2, 3		
Cross-Reference to Learning Outcomes:	5361.19, 5361.26		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of identifying and operation of suspension system components.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 4.1.1. Identify suspension system, component, construction and application features.
- 4.1.2 Perform inspection and testing according to manufacturers' recommendations.

Learning Content

- 4.1.1 Identify suspension system, component, construction and application features.
[6/1]
 - independent
 - short and long arm design
 - double wishbone
 - multi-link
 - McPherson strut
 - twin I beam
 - semi-independent
 - trailing arms
 - axle beam
 - coil spring
 - shock strut assembly

- non- independent
 - drag links
 - relay rod
 - solid axle
 - coil spring
 - shock strut assembly
- control arms and bushings
- shock absorbers
 - hydraulic
 - gas
 - air
- stabilizers
 - radius rod
 - strut rod
- springs
 - leaf
 - coils
 - torsion bar
 - air
 - rubber block
 - nitrogen / oil
- axles
 - driving
 - non- driving
 - hubs, bearings and seals
- automatic levelling, riding and handling
 - input devices
 - speed sensors
 - steering wheel sensor
 - brake sensors
 - electronic control unit
 - height sensor
 - ride control switch
- suspension control module
- output devices
 - shock and strut actuator
 - air shock
 - air compressor assembly
 - dampening force actuator stepper motor

- undercarriage
 - track
 - drive sprocket
 - rollers
 - front idler
 - tension mechanism
 - roller guards
 - frame
- tracks
 - track links
 - conventional master
 - split master
- track shoe types
- track chains
 - flush type
 - interlocking type
- track seals
 - conventional
 - lubricated

4.1.2 Perform inspection and testing according to manufacturers' recommendations.
[2/6]

- inspect suspension components for visual damage
- clean and lubricate components as per maintenance schedule
- observe for excessive wear and / or scheduled replacement intervals

Number:	4.2		
Title:	Diagnostic Test Equipment		
Duration:	Total Hours: 12	Theory: 6	Practical: 6
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5361.19, 5361.26		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of use of various pieces of diagnostic test equipment.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 4.2.1 Describe the purpose and fundamentals of diagnostic test equipment.
- 4.2.2 Describe the functions, construction, types, styles and application of diagnostic test equipment.
- 4.2.3 Explain the operating principles of diagnostic test electronic equipment.
- 4.2.4 Connect and operate diagnostic test equipment according to manufacturers' operating procedures.

Learning Content

- 4.2.1 Describe the purpose and fundamentals of diagnostic test equipment.
[1/0]
 - pressure gauges
 - flow meters
 - electric meters
 - electronic scan tools

4.2.2 Describe the functions, construction, types, styles and application of diagnostic test equipment.
[2/0]

- gauges
- pressure
- compression
- vacuum
- leakage
- electrical equipment
- ammeter
- voltmeter
- ohmmeter
- continuity circuit testers
- heavy duty carbon pile load tester
- electronic equipment
- module testers
- hand-held scan tools
- digital tachometer
- low impedance multimeters

4.2.3 Explain the operating principles of diagnostic test electronic equipment.
[3/1]

- pressure gauges
- vacuum gauges
- cylinder leakage gauges
- ammeter, voltmeters and ohmmeters
- heavy duty carbon pile load testers
- module testers
- hand-held scan tools
- digital tachometers
- low impedance multimeters

4.2.4 Connect and operate diagnostic test equipment according to manufacturers' operating procedures.
[0/5]

- pressure gauges
- vacuum gauges
- cylinder leakage gauges
- ammeter, voltmeters and ohmmeters
- heavy duty carbon pile load testers
- module testers
- hand-held scan tools
- digital tachometers
- low impedance multimeters

Number:	4.3		
Title:	Battery Fundamentals		
Duration:	Total Hours: 9	Theory: 5	Practical: 4
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5361.19, 5361.26		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of battery fundamentals and testing procedures.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 4.3.1 Describe the purpose and fundamentals of batteries.
- 4.3.2 Describe the function, construction, composition, types, styles and application of batteries.
- 4.3.3 Explain the principles of operation of batteries.
- 4.3.4 Perform inspection and testing procedures on batteries with the prescribed service tools and equipment.
- 4.3.5 Perform assigned operations according to manufacturers' procedures.

Learning Content

- 4.3.1 Describe the purpose and fundamentals of batteries.
[2/0]
 - system operating voltages (6, 12, 42 volts)
 - reserve capacity
 - cold cranking rating
 - temperature effects
 - internal resistance factors
 - specific gravity and temperature compensation for electrolyte

- 4.3.2 Describe the function, construction, composition, types, styles and application of batteries.
[1/0]
- lead acid
 - low maintenance
 - maintenance-free batteries
 - gelled cell batteries
- 4.3.3 Explain the principles of operation of batteries.
[2/0]
- battery chemical action during charging and discharging
 - temperature effect on charging and internal resistance ratings
- 4.3.4 Perform inspection and testing procedures on batteries with the prescribed service tools and equipment.
[0/2]
- visual inspection
 - state of charge
 - surface discharge
 - load test
 - high rate discharge
 - three-minute charge
 - temperature adjustments
 - conductance testing
- 4.3.5 Perform assigned operations according to manufacturers' procedures.
[0/2]
- maintenance
 - state of charge
 - storage
 - activation
 - charging procedures
 - cleaning procedures
 - removal and replacement procedures

Number:	4.4		
Title:	Electrical / Electronic Components		
Duration:	Total Hours: 18	Theory: 14	Practical: 4
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5361.19, 5361.26		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of identifying electrical and electronic components.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 4.4.1 Identify electrical and electronic components and their applications and functions.

Learning Content

- 4.4.1 Identify electrical and electronic components and their applications and functions.
[14/4]

- components
 - electric starter motor breakdown
 - solenoids
 - relays
 - alternator breakdown
 - electronic regulators
 - ignition coils
 - circuit protection
 - fuses
 - circuit breakers
 - fusible links
 - circuit controls
 - diodes
 - transistors
 - resistors
 - switches
 - sensors

- conductors and insulators
 - wiring harness
 - wire sizing
 - weather proofing
- lamps and bulbs
- computers
- control modules
- ignition system
 - ignition coil
 - distributor breakdown
 - ignition cables
 - ignition control units
- batteries
 - wet / dry cell
 - sizing
 - pro-rating
 - failure analysis
 - filling
 - charging
 - electrolyte
 - safety requirements
- inspect batteries, alternators and starters

Number:	4.5		
Title:	Electrical Fundamentals		
Duration:	Total Hours: 18	Theory: 14	Practical: 4
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5361.19, 5361.26		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of the fundamentals of electricity.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 4.5.1 Describe the history, purpose, fundamentals and principles of electricity.
- 4.5.2 Describe the application of electrical concepts.
- 4.5.3 Performed assigned operations following manufacturers' recommendations.

Learning Content

- 4.5.1 Describe the history, purpose, fundamentals and principles of electricity.
[10/0]
 - atomic structure
 - conductors and insulators
 - magnetism
 - electromagnetism
 - electron and conventional theories
 - sources of electricity
 - heat
 - pressure
 - friction
 - chemical
 - light
 - magnetism
 - Ohm's Law
 - current flow, heat and resistance
 - electromagnetic induction

4.5.2 Describe the application of electrical concepts.
[4/0]

- voltage
- amperage
- resistance
- wattage
- electrical circuit schematics
- electrical circuit component

4.5.3 Performed assigned operations following manufacturers' recommendations.
[0/4]

- series circuit
- parallel circuit
- series / parallel series circuits

Number:	4.6		
Title:	Electromagnetic Devices Fundamentals		
Duration:	Total Hours: 9	Theory: 9	Practical: 0
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5361.19, 5361.26		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of operation for electromagnetic devices.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 4.6.1 Describe the history, purpose and fundamentals of electromagnetic devices.
- 4.6.2 Describe the function, construction, composition, types, styles and application of electromagnetic devices.
- 4.6.3 Explain the principles of operation of electromagnetic devices.

Learning Content

- 4.6.1 Describe the history, purpose and fundamentals of electromagnetic devices.
[3/0]
 - magnetism
 - electromagnetism
 - current flow and magnetic fields applied to relays, solenoids and motors
 - right and left-handed rules
 - counter-electromotive force effect

4.6.2 Describe the function, construction, composition, types, styles and application of electromagnetic devices.
[3/0]

- electric motors
- solenoids
- relays
- generators
- coils
- stepper motors

4.6.3 Explain the principles of operation of electromagnetic devices.
[3/0]

- motors
 - torque and power
- solenoids
- relays
- coils
- generators
- stepper motors

Number:	4.7		
Title:	Electronic Fundamentals		
Duration:	Total Hours: 9	Theory: 7	Practical: 2
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5361.19, 5361.26		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of the fundamentals on electronics.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 4.7.1 Describe the construction, composition, types, style and applications of electronic devices.
- 4.7.2 Describe the principles of operation of electronic devices.
- 4.7.3 Perform inspection and testing procedures for electronic devices following manufacturers' recommendations.

Learning Content

- 4.7.1 Describe the construction, composition, types, style and applications of electronic devices.
[2/0]
 - diodes
 - forward and reverse bias
 - current control
 - transistors
 - forward and reverse bias
 - PNP and NPN
 - switching
 - amplification
 - capacitors

- sensors
 - voltage generating
 - pulse generators
 - piezoelectric
 - galvanic
 - Hall effect
 - optical
 - thermistors

4.7.2 Describe the principles of operation of electronic devices.
[4/0]

- diodes
 - forward and reverse bias
 - current control
- transistors
 - forward and reverse bias
 - PNP and NPN
 - switching
 - amplification
- capacitors
- sensors
 - voltage generating
 - pulse generators
 - piezoelectric
 - galvanic
 - Hall effect
 - optical
 - thermistors
 - piezoelectric
 - variable resistor
 - rheostat
 - potentiometers
 - piezoresistive

4.7.3 Perform inspection and testing procedures for electronic devices following manufacturers' recommendations.
[0/2]

- diodes
 - forward and reverse bias
 - current control
- transistors
 - forward and reverse bias
 - PNP and NPN
 - switching
 - amplification
- capacitors
- sensors
 - voltage generating
 - pulse generators
 - piezoelectric
 - galvanic
 - Hall effect
 - optical
 - thermistors
 - variable resistor
 - rheostat
 - potentiometers
 - piezoresistive

Number:	4.8		
Title:	Bearings, Seals and Sealants		
Duration:	Total Hours: 6	Theory: 4	Practical: 2
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5361.19, 5361.26		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of bearings, seals and sealants.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 4.8.1 Describe the purpose and fundamentals of bearings, seals and sealants.
- 4.8.2 Describe the functions, construction, composition, types, styles and application of bearings, seals and sealants.
- 4.8.3 Describe the principles of operation of bearings, seals and sealants.
- 4.8.4 Perform inspection and testing procedures.
- 4.8.5 Performed assigned operations following manufacturers' procedures.

Learning Content

- 4.8.1 Describe the purpose and fundamentals of bearings, seals and sealants.
[1/0]
 - friction
 - temperature
 - lubrication
 - preload

4.8.2 Describe the functions, construction, composition, types, styles and application of bearings, seals and sealants.
[1/0]

- friction bearings
- anti-friction bearings
- ball, roller, needle
- seals
- dynamic, static
- sealants
- hardening and non-hardening
- gaskets

4.8.3 Describe the principles of operation of bearings, seals and sealants.
[2/0]

- friction bearings
- hydrodynamic suspension
- anti-friction bearings
- ball, roller, needle
- seals
- dynamic, static
- sealants
- anaerobic
- non-anaerobic
 - gaskets
 - yield
 - creep

4.8.4 Perform inspection and testing procedures.
[0/1]

- failure analysis
- scoring
- spalling
- over-heating
- noise
- vibration
- clearance
- migration
- checks for leakage of seals or gaskets
- shaft and housing bore condition
- fluid compatibility

4.8.5 Performed assigned operations following manufacturers' procedures.
[0/1]

- bearings
 - friction
 - non-friction
- seals
 - static
 - dynamic
- sealants
- gaskets
- applied safety precautions
 - eye, hand and face protection
 - ventilation precautions
- applied tools and equipment
 - special tools
 - seal drivers
- practical report
- information accessing

Number:	4.9		
Title:	Air-Conditioning, Heating and Ventilation		
Duration:	Total Hours: 12	Theory: 9	Practical: 3
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5361.19, 5361.26		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of the safe handling of ozone depleting substances and the identification of air-conditioning, heating and ventilation components.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 4.9.1 Identify the health and safety issues concerning the handling of ozone depleting substances.
- 4.9.2 Describe and identify the components utilized in refrigeration systems.
- 4.9.3 Locate and identify the types and designs of various heating, ventilation and air- conditioning control systems

Learning Content

- 4.9.1 Identify the health and safety issues concerning the handling of ozone depleting substances.
[3/0]
 - identify requirement for obtaining Ozone Depletion Handlers Certification
 - identify personal safety equipment used when handling CFC / HFC / HCFC
 - eye, hand and face protection
 - skin and eye contact
 - identify dangers related to handling of CFC / HFC / HCFC
 - toxicity
 - flammability
 - handling precautions
 - inhalation
 - cylinder temperature / pressure

4.9.2 Describe and identify the components utilized in refrigeration systems:
[4/2]

- A/C system components
 - compressor
 - condenser
 - evaporator
 - fan and motor
 - lines / hoses
 - fittings
 - control units
 - sensors
 - thermostatic expansion valve
 - orifice tube
 - low and high pressure cutout switch
 - low charge switch
 - compressor clutch switch
 - receiver / drier (accumulator)
 - lubricants
 - quick disconnects and one-way check valves
 - refrigerant and lubricant
 - R12
 - R22
 - R134a

4.9.3 Locate and identify the types and designs of various heating, ventilation and air-conditioning control systems

- Control system components
 - programmers
 - cables
 - mode doors
 - control heads
 - vacuum lines
 - air mix doors
 - switches and valves
 - blower motors

Number:	4.10		
Title:	Body and Trim Components		
Duration:	Total Hours: 6	Theory: 6	Practical: 0
Prerequisites:	None		
Co-requisites:	None		
Cross-Reference to Learning Outcomes:	5361.19, 5361.26		

General Learning Outcomes

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of body and trim components.

Learning Outcomes

Upon successful completion, the apprentice is able to:

- 4.10.1 Identify the construction and body types of vehicles.
- 4.10.2 Identify the body components of various vehicles in accordance with the prescribed terminology of the respective parts and service manuals.
- 4.10.3 Identify the proper storage, crating and shipping of body components.
- 4.10.4 Identify the V.I.N., body and trim codes.
- 4.10.5 Identify the various types of refinishing materials and equipment.
- 4.10.6 Identify occupant safety devices.

Learning Content

4.10.1 Identify the construction and body types of vehicles.
[1/0]

- construction
 - full frame
 - unitize-body
- body types (two door/four door)
 - sedan
 - coupe
 - hatchback
 - hardtop
 - convertible
 - truck
 - loaders, track tractors, cranes etc.

4.10.2 Identify the body components of various vehicles in accordance with the prescribed terminology of the respective parts and service manuals.
[1/0]

- external body components
 - front end assembly sheet metal
 - main body sheet metal
 - rear end sheet metal
- glass
 - laminated
 - tempered
- linkage, latches and interior panels
 - locks
 - handles
 - hinges, linkages
 - latches
 - clips
 - trim panels, channels
- window regulators
 - wiper transmission and linkage
 - dashes
 - instrument panels
 - solenoids
 - motors
 - wiper blades and arms

4.10.3 Identify the proper storage, crating and shipping of body components.
[1/0]

- body components
 - glass
 - exterior components
 - interior components

4.10.4 Identify the V.I.N., body and trim codes.
[1/0]

- codes
 - vehicle identification number breakdown
 - body and trim plate breakdown

4.10.5 Identify the various types of refinishing materials and equipment.
[1/0]

- OEM systems
 - topcoats
 - undercoats
 - metal conditioners
 - abrasives
 - specialty tools and equipment

4.10.6 Identify occupant safety devices.
[1/0]

- seat belts
- air bags
- ROPS, FOPS
- safety cages
- shields
- impact protection devices etc.

Evaluation:

The following evaluation structure is only a suggested format. Specific evaluation of theory and practical components of training varies due to the resource material and training aides utilized.

Evaluation Structure			
Theory Testing	Practical Application Exercises	Research Assignment	Notebook and Organizational Skills
50%	25%	15%	10%

Reference Material

“By the Numbers, Principles of Automotive Parts Management” by Gary J. Naples;
Published by the Society of Automotive Engineers; ISBN 1-56091-520-X

“Beyond the Numbers, Managing the Assets of an Automotive Parts Business” by Gary J. Naples; ISBN 0-7680-122-6

“Counterman’s Guide to Parts and Service Management” by Gary A. Molinaro; Published by Delmar Publishers Inc.; ISBN 0-8273-3629-2

“Financial Accounting Principles”, 8th Canadian Edition by Larson, Nelson, Zin, Carroll;
Published by Times Mirror Professional Publishing Ltd. IRWIN; ISBN 0-256-17496-2



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