



ONTARIO COLLEGE OF TRADES

ORDRE DES MÉTIERS DE L'ONTARIO

Apprenticeship
Curriculum Standard

Parts Technician

Level 1

Trade Code: 240P

Development Date: 2003

Please Note:

Apprenticeship Training and Curriculum Standards were developed by the Ministry of Training, Colleges and Universities (MTCU). As of April 8th, 2013, the Ontario College of Trades (College) has become responsible for the development and maintenance of these standards. The College is carrying over existing standards without any changes.

However, because the Apprenticeship Training and Curriculum Standards documents were developed under either the *Trades Qualification and Apprenticeship Act* (TQAA) or the *Apprenticeship and Certification Act, 1998* (ACA), the definitions contained in these documents may no longer be accurate and may not be reflective of the *Ontario College of Trades and Apprenticeship Act, 2009* (OCTAA) as the new trades legislation in the province. The College will update these definitions in the future.

Meanwhile, please refer to the College's website (www.collegeoftrades.ca) for the most accurate and up-to-date information about the College. For information on OCTAA and its regulations, please visit: www.collegeoftrades.ca/about/legislation-and-regulations.

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INTRODUCTION

The Units of Learning Curriculum has been developed and reviewed in keeping with the prescribed Ministry of Training, Colleges and Universities Apprenticeship Training Standards for the trade of Parts Technician. This curriculum reflects the content necessary for an appropriate progression through the Units of Learning 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 Training, Colleges and Universities 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 Unit of Learning 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.

Program Summary of Reportable Subjects

Number	Reportable Subjects	Hours Total	Hours Theory	Hours Practical
Unit 1	Applied Work Practices	57	39	18
Unit 2	Communications & Customer Support	42	34	8
Unit 3	Merchandising & Inventory Management	75	45	30
Unit 4	Component Technology & Technical Skills	96	69	27
	Total	270	187	83

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: 57 Theory: 39 hours Practical: 18 hours

Prerequisites:

Co-requisites: None

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.

Theory Testing	60%
Practical Application Exercises	30%
Notebook and Organizational Skills	10%

Number: 1.1

Title: Shop Safety

Duration: Total Hours: 12 Theory: 12 Individual/Group Work: 0 Practical: 0

Prerequisites: None

Co-requisites: Level I, Section 2, 3, 4

Cross-Reference to Performance Objectives: 5360.02, 5360.03, 5360.04, 5360.06, 5360.07, 5360.08, 5360.09, 5360.10, 5360.11, 5360.16, 5360.17

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of safe work practices and the required legislation that has to be followed.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 1.1.1 Describe the history, purpose and fundamentals of safe work practices, and the use of personal protection equipment.
- 1.1.2 Describe *Workplace Hazardous Materials Information Safety (WHMIS)*.
- 1.1.3 Describe *Occupational Health and Safety Act (OHSA)*.
- 1.1.4 Describe the *Repair and Storage Liens Act (RSLA)*.
- 1.1.5 Describe the *Workplace Safety Insurance Board (WSIB)*.
- 1.1.6 Describe the fundamentals of Fire Prevention and Control.

LEARNING CONTENT:

1.1.1 Describe the history, purpose and fundamentals of safe work practices, and the use of personal protection equipment.

[3/0]

- personal attire
- glasses
- shields
- guards
- breathing filters
- ventilation
- masks
- gloves
- clothing & footwear
- rings and other jewelry
- physical activities
- lifting techniques
- handling of tools and equipment
- working conditions and organization of work area
- application of force on wrenches and levers
- facilities
- housekeeping / cleanliness
- ventilation / exhaustion
- shop layout
- test tanks
- lighting
- emergency responses
- loose clothing
- compressed air
- tools and equipment
- additives

1.1.2 Describe *Workplace Hazardous Materials Information Safety (WHMIS)*.

[2/0]

- right to know
- legislation
- safe handling of products
- hazardous materials
- Material Safety Data Sheets (MSDS)

1.1.3 Describe *Occupational Health and Safety Act (OHSA)*.
[1/0]

- legislation
- obligation of employer and worker

1.1.4 Describe the *Repair and Storage Liens Act (RSLA)*.
[2/0]

- payment for repairs or storage
- lien
- search for:
 - Personal Property Security Registration (PPSR)
 - registration by vehicle identification number (VIN)
 - registration by individuals name
 - registration by business name
 - dispute over lien

1.1.5 Describe the *Workplace Safety Insurance Board (WSIB)*.
[1/0]

- reporting accidents to company
- reporting accidents to WSIB
- required records
- training requirements
- accident prevention
- safety precautions
- personal protection equipment
- house keeping
- locking and unlocking entrances and exits

1.1.6 Describe the fundamentals of Fire Prevention and Control.
[3/0]

- classes of fire: A, B, C and D
- types of fire extinguishers
- use of fire extinguishers
- servicing of fire extinguishers
- fire hazards
- fire emergency procedures
- associated fire hazards
- smoke and toxic gas
- entrapment
- electrical panel
- inadequate fire fighting equipment
- checking security and fire alarms

Number: 1.2

Title: Applied Computer Skills

Duration: Total Hours: 24 Theory: 13 Individual/Group Work: 0 Practical: 11

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5362.01, 5362.02, 5362.03, 5362.04, 5362.05, 5362.08

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge and understand how to operate a personal computer (PC).

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 1.2.1 Describe the purpose, functions and application of personal computer (PC) operating systems.
- 1.2.2 Create letters and reports.
- 1.2.3 Perform the following personal computer (PC) functions.
- 1.2.4 Describe the proper protocol and perform internal and external communications.
- 1.2.5 Perform internet, e-mail and office functions.

LEARNING CONTENT:

1.2.1 Describe the purpose, functions and application of a personal computer (PC) operating systems.

[2/1]

- introduction to the computer
- components
- device names and designations
- hard / floppy disc data retention
- CD-ROM
- software management
- format
- directory
- file naming
- copy
- delete
- rename

1.2.2 Create letters and reports.

[1/4]

- introduction to word processing programs
- menu structure
- naming / saving conventions
- search / replace
- documentation
- page layout
- copy / move
- file / merge / browse
- practical use
- letters
- reports

1.2.3 Perform the following personal computer (PC) functions.

[4/4]

- menu structure
- naming / saving conventions
- documentation
- spreadsheet layout
- copy / move
- file / merge / browse
- search / replace

1.2.4 Describe the proper protocol and perform internal and external communications for the following equipment:

[4/0]

- modems
- facsimile machines
- internet
- intranet
- telephone recorders
- computers
- research information

1.2.5 Perform the following functions using the following equipment:

[2/2]

- proper use of a computer modem
- use directories and addresses to send and receive messages from clients, co-workers, vendors and manufacturers
- access the internet to communicate with vendors, manufacturers and co-workers
- access the intranet to communicate with internal departments and co-workers
- use email software to effectively communicate internally and externally with vendors, co-workers, manufacturers and customers
- use of facsimile machines
- computer based
- stand alone
- preparation of facsimile pages
- retrieval of telephone messages

Number: 1.3

Title: Applied Calculations

Duration: Total Hours: 15 Theory: 10 Individual/Group Work: 0 Practical: 5

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5361.06, 5362.09, 5364.08

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of perform applied trade calculations and measurement.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 1.3.1 Explain the fundamentals of basic arithmetic.
- 1.3.2 Explain the fundamentals of basic arithmetic and perform applied calculations.
- 1.3.3 Explain the fundamentals of formulae manipulation and perform applied calculations.
- 1.3.4 Explain the fundamentals for systems of measurements used in the automotive industry and perform applied calculations.

LEARNING CONTENT:

1.3.1 Explain the fundamentals of basic arithmetic.

[3/0]

- adding, subtracting, multiplying and dividing
- square and square root
- apply mathematical calculations to complete:
 - work orders
 - estimates
 - invoices
 - service estimates

1.3.2 Explain the fundamentals of basic arithmetic and perform applied calculations.

[2/2]

- fractions and decimals
- percentages
- converting fractions to decimals
- precision measurement readings
- specifications

1.3.3 Explain the fundamentals of formulae manipulation and perform applied calculations.

[2/2]

- perimeter
- area
- pressure
- ratios
- volume

1.3.4 Explain the fundamentals for systems of measurements used in the automotive industry and perform applied calculations.

[3/1]

- differences between the metric and imperial systems of measurement
- convert measurements from standard to metric
- convert measurements from metric to standard
- use of conversion tables and charts

Number: 1.4

Title: Safety Restraint Systems

Duration: Total Hours: 6 Theory: 4 Individual/Group Work: 0 Practical: 2

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5360.06, 5360.08, 5360.17

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of application and use of personal safety restraint systems.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 1.4.1 Describe the fundamentals of Safety Restraint Systems.
- 1.4.2 Describe the function, construction, composition, types, styles and application of Safety Restraint Systems.
- 1.4.3 Observe the operation of Safety Restraint Systems as recommended by the manufacturer.
- 1.4.4 Perform the inspection of the Safety Restraint Systems as recommended by the manufacturer.

LEARNING CONTENT:

1.4.1 Describe the fundamentals of Safety Restraint Systems.

[1/0]

- materials
- inspection requirements
- replacements requirements

1.4.2 Describe the function, construction, composition, types, styles and application of Safety Restraint Systems.

[2/0]

- snapshots
- shock absorbers
- lanyard
- rope grab
- lifeline
- anchor point
- harness assembly
 - full body design
 - webbing
 - D-ring

1.4.3 Observe the operation of Safety Restraint Systems as recommended by the manufacturer.

[1/0]

- snap hooks
- shock absorbers
- lanyard
- rope grab
- lifeline
- anchor point
- harness assembly

1.4.4 Perform the inspection of the Safety Restraint Systems as recommended by the manufacturer.

[0/2]

- observe service life (yellow) tag date
- maximum of 5 years service
- if no tag present, take the Safety restraint out of service
- Webbing and Lanyard condition checks
- cuts, fraying, broken stitching
- chemical or heat damage
- discoloured
- brittle
- melted fibers
- grommets in place with plastic and metal keepers okay
- buckles for distortion, cracks and sharp or rough edges
- should operate freely
- shock absorbers checked for damage
- D-ring and snap hook condition checks
- distortion, cracks, sharp or rough edges
- chemical or heat damage
- adjustment plate is free from defects

Number: 2

Title: Communications and Customer Support

Duration: Total Hours: 42 Theory: 34 hours Practical: 8 hours

Prerequisites:

Co-requisites: None

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.

Theory Testing	60%
Practical Application Exercises	20%
Research Assignment	10%
Notebook and Organizational Skills	10%

Number: 2.1

Title: Applied Learning and Communication Techniques

Duration: Total Hours: 6 Theory: 4 Individual/Group Work: 0 Practical: 2

Prerequisites: None

Co-requisites: Level I, Section 1, 3, 4

Cross-Reference to Performance Objectives: 5361.01, 5361.02, 5361.03, 5361.07, 5361.14

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of basic learning and business communication techniques.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 2.1.1 Describe the purpose and fundamentals of business communication techniques.
- 2.1.2 Identify learning techniques.
- 2.1.3 Identify communication techniques.
- 2.1.4 Access information from manufacturers' service manuals and other related service materials.

LEARNING CONTENT:

2.1.1 Describe the purpose and fundamentals of business communication techniques.
[2/0]

- define the following:
 - communication
 - learning to learn and methods of inquiry
 - shop systems and lines of communication
 - employability skills
 - attitude
 - behaviour
 - reliability
 - organizational skills
 - time management
 - teamwork
 - information accessing
 - service manuals
 - computer programs
 - texts
 - periodicals
 - internet
 - intranet
 - customer service

2.1.2 Identify learning techniques.
[1/0]

- reading techniques
- newspaper, periodicals, magazines
- service literature
- texts
- writing techniques
- technical terms
- principle of operations
- work orders and invoice clarity
- hard copy language
- listening techniques
- concentration
- importance of verbal skills
- clarity of voice
- tone of voice
- pronunciation of words

2.1.3 Identify communication techniques. [1/0]

- writing techniques
- use of trade terminology
- choice of words
- non-verbal communication
- body language and actions
- verbal communication
- tone of voice
- selection of key words
- focus on information
- telephone techniques
- trade language terminology uses
- listening techniques

2.1.4 Access information from manufacturers' service manuals and other related service materials. [0/2]

- locate parts and service information by use of:

- microfiche
- service manuals
- parts manuals
- bulletins
- computer software
- CD-ROM
- identify:
- parts numbers
- prices
- service procedures
- specifications
- service bulletins

- locate:

- shop supplies
- special tools
- electrical test equipment
- special equipment
- technical data
- update:
- parts manuals
- service manuals
- microfiche
- computers
- service bulletins

Number: 2.2

Title: Memos, Letters and Resume Writing

Duration: Total Hours: 6 Theory: 3 Individual/Group Work: 0 Practical: 3

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5361.06, 5361.10

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of the construction and writing of memos, letters and resume.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 2.2.1 Describe the fundamentals of writing good memos, letters and resumes and perform the required functions.

LEARNING CONTENT:

2.2.1 Describe the fundamentals of writing good memos, letters and resumes and perform the required functions.

[3/3]

- basic characteristics
 - intent of each
 - acceptable format
 - information required
- job opportunities
 - required qualifications
- practical aspect
 - compose and type proper memos for various situations
 - compose and type a letter of complaint
 - produce a properly typed job ad using local paper as guide
 - answer your ad with typed application letter and resume

Number: 2.3

Title: Interview Preparation

Duration: Total Hours: 6 Theory: 3 Individual/Group Work: 0 Practical: 3

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5361.01, 5361.03

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of properly preparing for a job interview.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 2.3.1 Describe the fundamentals of preparing for a job interview situation and perform the required functions.

LEARNING CONTENT:

2.3.1 Describe the fundamentals of preparing for a job interview situation and perform the required functions.

[3/3]

- interview preparation
 - physical and mental factors
 - review common interviewer questions
 - review common interviewee questions
 - review sample interviewer check sheet
 - areas looked at
 - rating factor
- practical aspect
 - participate in a number of interview situations
 - interviewee perspective
 - interviewer perspective
 - analyze the results

Number: 2.4

Title: Human Relations

Duration: Total Hours: 6 Theory: 6 Individual/Group Work: 0 Practical: 0

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5361.01, 5361.02

GENERAL LEARNING OUTCOME

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

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

2.4.1 Describe the fundamentals of “human relations”.

LEARNING CONTENT:2.4.1 Describe the fundamentals of “human relations”.
[6/0]

- forces within a person
 - tension vs. stress
 - excessive tension and its effect
 - relationship vs. task tension
 - factors that increase / decrease relationship tension
 - factors that increase / decrease task tension
 - ego states found in a person
 - attitude vs. behaviour
 - behaviour modification
 - emotional disequilibrium
 - displaced aggression
- perception of attitude / attitude
 - viewed by individual vs. others
 - shaping
 - positive vs. negative reinforcement
 - modification techniques of undesirable behaviours
- effects of human relations
 - customer care
 - employer / employee

Number: 2.5

Title: Personnel Relations

Duration: Total Hours: 6 Theory: 6 Individual/Group Work: 0 Practical: 0

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5361.14

GENERAL LEARNING OUTCOME

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

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

2.5.1 Describe the fundamentals of “personnel relations”.

LEARNING CONTENT:

2.5.1 Describe the fundamentals of “personnel relations”.

[6/0]

- employer view point
 - desirable / undesirable character traits of an employee
 - expectations of an employer
 - extrinsically vs. intrinsically motivated goals
 - various positions’ job description
 - methods used to evaluate employee performance
- employee view point
 - desirable / undesirable character traits of an employer
 - expectations of an employer
 - extrinsically vs. intrinsically motivated goals
 - various positions’ job description
- staff relations’ skills
 - employee / employer / retraining
 - superior / subordinate
 - employee / employer
- case studies
 - present and analyze various situations
- ethics

Number: 2.6

Title: Customer Relations

Duration: Total Hours:6 Theory: 6 Individual/Group Work: 0 Practical: 0

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5361.01, 5361.02, 5361.03, 5361.14

GENERAL LEARNING OUTCOME

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

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 2.6.1 Describe the fundamentals of “customer relations”.
- 2.6.2 Outline a working knowledge of applying interpersonal skills.

LEARNING CONTENT:

2.6.1 Describe the fundamentals of “customer relations”.
[4/0]

- types of people
 - characteristics
 - methods used to distinguish types
- interpersonal skills
 - definition
 - problem-solving techniques
- transactional analysis
 - definition
 - types of transactions
 - effects of transactions
- case studies
 - present and analyze various situations

2.6.2 Outline a working knowledge of applying interpersonal skills.
[2/0]

- build and maintain customer complaints
- advertisement
- effective resolution of customer complaints
- identifying individual personalities and relate to typical customer relations problems
- professionalism
- identify personality types of people
- identify employee attitudes and actions that affect customer relations
- identify:
 - conflict resolution techniques
 - tension management techniques

Number: 2.7

Title: Motivation and Leadership

Duration: Total Hours: 6 Theory: 6 Individual/Group Work: 0 Practical: 0

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5361.01, 5361.02, 5361.03

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of motivation and leadership in a business environment.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

2.7.1 Describe the fundamentals of “motivation and leadership” of a business.

LEARNING CONTENT:

2.7.1 Describe the fundamentals of “motivation and leadership” of a business.
[6/0]

- motivation
 - definition
 - techniques or styles
 - effects on customer / staff relations
- leadership
 - definition
 - focus (old and new)
 - forces
 - objectives
 - classification & styles
 - effects on customer / staff relations
- expectations and obligations
 - employer
 - employee
 - effects on customer / staff relations

Number: 3

Title: Merchandising and Inventory Management

Duration: Total Hours: 75 Theory: 45 hours Practical: 30 hours

Prerequisites:

Co-requisites: None

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.

Theory Testing	50%
Practical Application Exercises	30%
Research Assignment	10%
Notebook and Organizational Skills	10%

Number: 3.1

Title: Parts Organizations

Duration: Total Hours: 6 Theory: 6 Individual/Group Work: 0 Practical: 0

Prerequisites: None

Co-requisites: Level I, Section 1, 2, 4

Cross-Reference to Performance Objectives: 5361.26, 5366.01

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of parts organization and structure.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 3.1.1 Trace the organizational structure of the automotive parts industry.
- 3.1.2 Identify the organizational chart for each of the following.
- 3.1.3 Identify job descriptions for the various positions in parts businesses.

LEARNING CONTENT:

3.1.1 Trace the organizational structure of the automotive parts industry.
[2/0]

- flow charts
 - motive power service industry organizations and functions
 - distribution flow of automotive and industrial replacement parts

3.1.2 Identify the organizational chart for each of the following.
[2/0]

- charts
 - wholesale outlet
 - retail outlet
 - jobber
 - dealership
 - large-volume dealer
 - mall-volume dealer

3.1.3 Identify job descriptions for the various positions in parts businesses.
[2/0]

- positions
 - manager
 - counter person
 - sales person
 - delivery person
 - inventory clerk / order editor
 - shipper / receiver
 - secretary
 - accountant / bookkeeper

Number: 3.2

Title: Warehouse Storage Procedures

Duration: Total Hours: 6 Theory: 5 Individual/Group Work: 0 Practical:1

Prerequisites: None

Co-requisites: None

Cross-Reference to Learning Outcomes: 5360.11, 5363.02, 5363.03, 5363.11, 5363.14, 5364.15

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of parts warehouse storage procedures.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 3.2.1 Identify storage by classification for dangerous goods.
- 3.2.2 Identify and be aware of advantageous locations of specific items and materials in the warehouse.
- 3.2.3 Demonstrate correct stocking procedures and precautions.
- 3.2.4 Identify the introduction of new parts and stock levels while maintaining existing inventory.

LEARNING CONTENT:

3.2.1 Identify storage by classification for dangerous goods.

[1/0]

- parts number sequence
- related parts or groups
- speed of movements
- manufacturer
- area of usage

3.2.2 Identify and be aware of advantageous locations of specific items and materials in the warehouse for:

[2/0]

- weight, shape and dimension consideration
- item movement considerations
 - fast moving
 - rotational
 - seasonal
 - overstock
 - cores
 - warehouse traffic patterns
 - special procedure for kits
- handling of item considerations
 - bulk
 - promotional
 - returns
 - bearings and bushings
 - displays
 - dangerous goods
 - fragile items
- proper use of shelves and bins
 - efficiency
 - safety
 - protective considerations (height and depth factors)
- provisions for use of mechanical and / or electronic equipment
- awareness of the effects of climatic conditions on certain material or items
 - humidity and temperature
 - rubber (seats, moldings and gaskets)
 - light fabrics
 - perishable items
 - cork and other gaskets

- welding rods
- greases, paints, chemicals
- moldings (plastic or chrome)
- decals

3.2.3 Demonstrate correct stocking procedures and precautions for dangerous goods.
[0/1]

- flammable, corrosive and toxic fluids (properly marked containers)
- fragile and perishable
- interpretation of recognized safety standards and instructions
- use of guard rails or enclosures when required

3.2.4 Identify the introduction of new parts and stock levels while maintaining existing inventory.
[2/0]

- stock components in proper locations e.g. bins, shelves, drawers, cabinets, containers, automated carousels
- prompt procedures in checking off and putting stock orders away
- rotation of stock to maintain shelf life and product expiry date
- relocate and reorganize shelves as required
- create stock orders and identify possible back orders
- create new part number, locations and stocking levels
- review lost sales reports
- review sales history reports
- review stock levels e.g. maximum and minimum
- updating of parts status on obsolete parts

Number: 3.3

Title: Shipping and Receiving

Duration: Total Hours: 12 Theory: 8 Individual/Group Work: 0 Practical: 4

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5361.09, 5361.15, 5361.21, 5361.24, 5362.10, 5362.11, 5362.16, 5363.01, 5363.04, 5363.08, 5363.09, 5363.10, 5364.01, 5364.02, 5364.03, 5364.04, 5364.07, 5364.09, 5364.10, 5364.11, 5364.12, 5364.13, 5364.16, 5364.17, 5365.0

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of parts shipping and receiving procedures.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 3.3.1 Identify and perform shipping and receiving procedures.
- 3.3.2 Identify all transportation charges and documentation for both inbound and outbound to verify shipping and receiving costs.
- 3.3.3 Outline the inspection, packaging and shipping requirements of hazard related items.
- 3.3.4 Identify and perform the fundamentals of receiving.
- 3.3.5 Choose parts as listed on parts order and deliver either in-house or to external customer.
- 3.3.6 Discuss the need for proper planning of work and apply the information to developing a customer contact / delivery route.
- 3.3.7 Order parts and supplies as directed from external sources.

LEARNING CONTENT:

3.3.1 Identify and perform shipping and receiving procedures.

[2/0]

- shipping
 - picking required parts
 - verify and box parts properly as necessary
 - filling out of any necessary paper work e.g. addresses and special instructions
 - going out with driver to deliver parts and identify routes
 - determine correct packages e.g. skid, envelopes, strapping etc.
 - maintain shipping supplies

3.3.2 Identify all transportation charges and documentation for both inbound and outbound to verify shipping and receiving costs.

[1/0]

- type of material, product size, weight
- type of shipping and carrier
- carrier documentation e.g. hazardous materials, customs and tariff documents requirements
- notification to co-ordinate parts pick up and delivery
- apply necessary tariffs and taxes for import and export

3.3.3 Outline the inspection, packaging and shipping requirements of hazard related items.

[1/1]

- air bags / pyrotechnic devices
- any compressed contents vessel
- hazardous materials e.g. waste materials
- spring activated components
- utilizing heavy duty cartons and labeling systems plus required documentation and notifications

3.3.4 Identify and perform the fundamentals of receiving.
[2/2]

- receive parts order or shipped packages
- check off packing slips for correctness
- properly put away
- input into computer data bases
- verify number of cartons as per way bill
- inspect all cartons for damage and notify carrier
- unload stock from delivery vehicles
- verify count as per packing slips
- verify all items for any possible damage
- separate possible customer orders from stock order
- checking also for any back ordered items
- document all damaged product in log book or data base

3.3.5 Choose parts as listed on parts order and deliver either in-house or to external customer.
[0/1]

- documentation
- location

3.3.6 Discuss the need for proper planning of work and apply the information to developing a customer contact / delivery route.
[1/0]

- schedules
- delivery practices

3.3.7 Order parts and supplies as directed from external sources.
[1/0]

- follow-up on:
 - missing invoices
 - parts / special orders
 - lost sales
 - shortages and damaged goods

Number: 3.4

Title: Parts Terminology

Duration: Total Hours: 6 Theory: 6 Individual/Group Work: 0 Practical: 0

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5361.12, 5361.14, 5361.18

GENERAL LEARNING OUTCOME

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

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 3.4.1 Describe some of the terminology used in the parts field.
- 3.4.2 Describe the term “turn over” as how it relates to inventory control.
- 3.4.3 Describe the term “obsolescence” and its relation to an overall inventory control system.
- 3.4.4 Describe the terminology used in reference to pricing and price structure.

LEARNING CONTENT:

3.4.1 Describe some of the terminology used in the motive power parts field.

[2/0]

- definitions:

- stores
- stockroom
- parts department
- wholesale outlet
- retail outlet
- jobber
- dealership
- sales item
- leader
- lost leader
- sales incentive
- lost sales
- gross profit, discounts, net profit, ROI
- sales calls
- product turns, etc.

3.4.2 Describe the term “turn over” as how it relates to inventory control.

[1/0]

- describe turn over analysis as it pertains to:

- relation of turn over to investment return (yield)
- determining the turn over in actual terms
- descriptive terms of turn over expression
- relation of turn over to customer service
- recognition and evaluation of the “low inventory / high turn over” point, or system. advantages weighed against:
 - down time loss to the customer
 - production loss to management
 - time / income loss to mechanics, etc.

3.4.3 Describe the term “obsolescence” and its relation to an overall inventory control system.

[1/0]

- describe the handling of obsolete materials:
 - classes
 - no current application
 - phase out pending
 - others
- identify the reasons for obsolescence:
 - superseded
 - discontinued lines
 - unsatisfactory performance
 - non-returnable special items
- describe and demonstrate disposal procedures:
 - internal policies – application for “write off” (scrap)
 - subject to factory or supplier policies

3.4.4 Describe the terminology used in reference to pricing and price structure.

[2/0]

- pricing
 - wholesale
 - retail
 - dealer net
 - trade price
 - A, B, C, D, W code for pricing and stocking
- profit

Number: 3.5

Title: Catalogue Systems

Duration: Total Hours: 21 Theory: 8 Individual/Group Work: 0 Practical: 13

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5361.11, 5361.20, 5361.22, 5361.18

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of parts catalogue system.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 3.5.1 Describe the function of catalogues, manuals and reports.
- 3.5.2 Identify the functional purpose and general structure of all catalogue forms and types.
- 3.5.3 After obtaining the appropriate information from the customer identify and demonstrate use of various lookup systems.
- 3.5.4 Perform a cataloging system maintenance routine.

LEARNING CONTENT:

3.5.1 Describe the function of each of the following systems:

[3/0]

- application chart or manual
- parts catalogue or manual
- microfiche plates or viewers
- counter reports
- interchange manuals
- computer look up systems

3.5.2 Identify the functional purpose and general structure of all catalogue forms and types including:

[3/0]

- master catalogues
- accessory catalogues
- supplementary catalogues
- special equipment / tools
- collision
- cross reference catalogues (interchangeability)
- electronic (computer / microfiche)
- price listings
- service bulletins

3.5.3 After obtaining the appropriate information from the customer identify and demonstrate use of various lookup systems such as:

[0/9]

- master cataloguing lookup systems
- computer lookup systems
- microfiche lookup systems
- cross references or interchanges
- special equipment / tool cataloguing
- collision cataloguing

3.5.4 Perform a cataloging system maintenance routine on the following systems:

[2/4]

- application manuals, parts catalogues
- microfiche plates and viewers
- counter manuals and interchange manuals along with price lists, bulletins and other printed material used in the parts area.

Number: 3.6

Title: Inventory Control Procedures

Duration: Total Hours: 24 Theory: 12 Individual/Group Work: 0 Practical: 12

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5360.15, 5361.09, 5361.16, 5362.15, 5362.17, 5363.02, 5363.04, 5363.05, 5363.06, 5363.07, 5363.10, 5363.11, 5363.14, 5363.15, 5364.10, 5365.08

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of parts inventory control procedures.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 3.6.1 Outline the basic procedures employed in parts inventory controls.
- 3.6.2 Discuss the means of checking and recording inventory.
- 3.6.3 Discuss the material requirements of producing a computerized inventory control system.
- 3.6.4 Interpret reports issued for computerized control.
- 3.6.5 Describe the means of forecasting potential stock sales and stock requirements.
- 3.6.6 Prepare and perform a physical count of inventory for fiscal year end.
- 3.6.7 Compare the procedures followed within the parts area when handling a parts request.

LEARNING CONTENT:

3.6.1 Outline the basic procedures employed in parts inventory controls.
[2/0]

- perpetual or running
- annual or periodic
- computerized

3.6.2 Discuss the means of checking and recording inventory.
[2/0]

- definitions
 - stock keeping
 - stock control
 - stock management
- types
 - spread sheets (max sheets)
 - cardex system
 - computer

3.6.3 Discuss the material requirements of producing a computerized inventory control system.
[2/0]

- bin location
- on hand product by type
- manufacturer product lines
- locations, etc.

3.6.4 Interpret reports issued for computerized control in such situations as:
[0/6]

- increase / decrease in stock levels
- volume of sales
- slow moving items
- stock order revisions and updates.

3.6.5 Describe the means of forecasting potential stock sales and stock requirements.
[3/0]

- definition
- factors
- purpose
- categories
- types
- terminology
- guide considerations
- criteria

3.6.6 Prepare and perform a physical count of inventory for fiscal year end.
[0/6]

- verify stock lines
- stock movement
- on hand product

3.6.7 Compare the procedures followed within the parts area when handling a parts request under each of the following conditions.
[3/0]

- parts normally stocked
 - in stock
 - not in stock
- parts not normally stocked
 - company supplies
 - other suppliers
- parts for makes other than those handled by business

Number: 4

Title: Component Technology and Technical Skills

Duration: Total Hours: 96 Theory: 69 hours Practical: 27 hours

Prerequisites:

Co-requisites: None

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.

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

Number: 4.1

Title: Engine Components

Duration: Total Hours: 21 Theory: 12 Individual/Group Work: 0 Practical: 9

Prerequisites: None

Co-requisites: Level I, Section 1, 2, 3

Cross-Reference to Performance Objectives: 5361.19, 5361.26

GENERAL LEARNING OUTCOME

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

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

4.1.1 Identify and describe the components utilized in various engine systems:

LEARNING CONTENT:

4.1.1 Identify and describe the components utilized in various engine systems:

[12/9]

- types
 - internal combustion engine
 - diesel
 - two cycle
 - four cycle
 - rotary
 - solar / electric motor / hybrid / fuel cells
- cylinder head and valve train
 - valves (intake / exhaust)
 - seals
 - seats and guides
 - rocker arms and shafts
 - push rod
 - lifters
 - overhead camshaft assembly
 - bearings
 - sprockets
 - timing chains and belts
 - timing covers
- in block camshaft
 - split bushings
 - timing gears and chain
 - gaskets and seals
- block (long / short block)
- crankshaft and bearings
- pistons, pins and rings
- cylinder liners
- connecting rods and bearings
- oil pan
- oil pump assembly
- seals and gaskets
- additives and flushing chemicals
- repair cements
- gas sealers
- mounts
 - engine
 - transmission

- engine system cooling components
 - radiator
 - radiator cap
 - belts
 - pulleys
 - fan (motor, blades, clutch, etc.)
 - thermostat
 - water pump
 - sensors
 - control units
 - coolant
 - shipping
 - packaging
 - storage
 - location
 - additives and flushing chemicals
 - glycols
 - ethylene
 - polypropylene
 - lubricate engine oil

Number: 4.2

Title: Belts, Pulleys, Lines and Fittings

Duration: Total Hours: 6 Theory: 4 Individual/Group Work: 0 Practical: 2

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5361.19, 5361.26

GENERAL LEARNING OUTCOME:

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of identifying and the operation of belts, pulleys, lines and fittings.

LEARNING OUTCOMES:

Upon successful completion, the apprentice is able to:

- 4.2.1 Describe the purpose, principles of operation, composition, types, styles and application of belts and pulleys.
- 4.2.2 Perform inspection and testing procedures.
- 4.2.3 Identify the various materials and applications for lines and fittings.

LEARNING CONTENT:

4.2.1 Describe the purpose, principles of operation, composition, types, styles and application of belts and pulleys.

[1/0]

- belts
- routing diagrams
- ratios
- pulleys
- "V"
- serpentine
- cog

4.2.2 Perform inspection and testing procedures.

[1/1]

- identification
- cracks
- wear
- deterioration
- alignment
- tension
- pulley wear
- bearings

4.2.3 Identify the various materials and applications for lines and fittings.

[2/1]

- materials
 - steel
 - copper
 - plastic / rubber
 - aluminium
 - others
- applications
 - hydraulic circuits
 - cooling applications
 - fuel handling
 - vacuum sources

- line fittings and clamps
 - inverted flare
 - compression nut
 - union and connectors
 - bushings and reducers
 - flare types
 - threaded sleeves
 - pipe fittings
 - hose clamps
 - bubble crimps
 - seals and 'O' rings

Number: 4.3

Title: Driveline Components

Duration: Total Hours: 24 Theory: 20 Individual/Group Work: 0 Practical: 4

Prerequisites: None

Co-requisites: None

Cross-Reference to Learning Outcomes: 5361.19, 5361.26

GENERAL LEARNING OUTCOME

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

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 4.3.1 Identify the components utilized in driveline systems
- 4.3.2 Define the fundamentals of fluid power systems.
- 4.3.3 Perform inspection and testing according to manufacturers' recommendations.

LEARNING CONTENT:4.3.1 Identify the components utilized in driveline systems
[12/2]

- driveline requirements
 - front wheel drive
 - rear wheel drive
 - all wheel drive
 - multiple drives
- front drive axles
 - half-shafts
 - constant velocity joints
 - bearings
 - seals
 - C.V. joint boots
 - vibration dampers
- tires
 - tread design
 - ratings
 - components
 - betterment
 - compact spares
 - floatation
 - calcium filled
 - radial / bias ply tires
 - mount and balance
- wheels
 - solid stamped
 - offset design
 - assembled
 - split rims
 - size designations
- hubs
- driving
 - front wheel
 - non-driving
 - all wheel
 - bearing assembly
 - seals
 - power train lubricants
 - hydraulic fluids

- rear wheel drive axles
 - axle shafts
 - universal joints
 - single and double cardin
 - semi-floating
 - full-floating
 - bearings
 - seals
 - propeller shafts
- differential assembly
 - case
 - shafts
 - gears
 - shims
 - limited slip
 - locking
- clutches
 - clutch control systems
 - hydraulic
 - clutch master cylinder
 - lines
- manual linkages
- discs
 - single disc
 - double disc
- pressure plate
- release bearing
- pilot bearing / bushing
- fork
- flywheel
- transmissions
 - manual transaxles and transmissions
 - case
 - shafts
 - gears
 - seals
 - synchronizers
 - final drives
 - differential

- case automatic transaxles / transmissions
 - shafts
 - gear sets
 - simple, compound, tandem compound, Simpson, and Ravineux
- driving and holding devices
 - bands
 - clutches
 - one-way clutch
 - parking pawls
- control systems
 - main or control pressure regulator
 - manual valve
 - throttle valve
 - detent valve
 - governor valves
 - vacuum modulator diaphragm and valves
 - cushion delay and up-shift control valves
 - pumps
 - sensors
 - torque converters
 - hydraulic lockup
 - mechanical lockup

4.3.2 Define the fundamentals of fluid power systems.
[6/0]

- fundamentals of fluid power
 - advantages and disadvantages of hydraulics versus pneumatics
 - force, pressure and area
 - hydraulic and pneumatic i.e. mechanical advantage
 - Boyles, Charles and Pascal's laws relating to hydraulics and pneumatics
- hydraulic fluids and conditioners
- hydraulic actuators
- hydraulic pumps
- hydraulic control valves
- connectors, seals, pipes, tubes and hoses
- hydraulic accumulators and accessories
- hydrostatic drive components
 - variable and fixed displacement pumps and motors
- hydrostatic drive axles
- alternate hydrostatic drives
 - steering motors
 - fixed mount motors

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

- inspect driveline components for leaks and / or physical damage
- perform necessary fluid checks as specified in the operators manual
- describe the recommended oil levels, grades and operating temperatures

Number: 4.4

Title: Fuel System Components

Duration: Total Hours: 6 Theory: 4 Practical: 2

Prerequisites: None

Co-requisites: None

Cross-Reference to Learning Outcomes: 5361.19, 5361.26

GENERAL LEARNING OUTCOME

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

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

4.4.1 Describe and identify the components utilized in fuel systems.

LEARNING CONTENT:

4.4.1 Describe and identify the components utilized in fuel systems.

[4/2]

- Vehicle systems
 - North American vehicles (cars & trucks)
 - Import vehicles (cars & trucks)
 - Commercial trucks (on / off road)
 - Off-road equipment
- carburetor systems
 - fuel tanks and lines
 - filters and pumps
 - throttle bodies
 - injectors
 - pressure regulators electronic control units
 - input signals
 - output actuators
 - air cleaner
- diesel systems
 - fuel delivery pump
 - tank, lines and filters
 - water separator
 - mechanical injectors
 - injection inline pumps
 - injection distributor pumps
 - electronic unit injectors (EUI)
 - hydraulic electronic unit injectors (HEUI)
 - glow plug system
- shipping
 - packaging
- storage
 - location
 - additives / flushing

Number: 4.5

Title: Exhaust System

Duration: Total Hours: 3 Theory: 3 Individual/Group Work: 0 Practical: 0

Prerequisites: None

Co-requisites: None

Cross-Reference to Learning Outcomes: 5361.19, 5361.26

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of exhaust system components.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

4.5.1 Describe and identify the components utilized in exhaust systems.

LEARNING CONTENT:

4.5.1 Describe and identify the components utilized in exhaust systems.
[3/0]

- vehicle systems
 - North American vehicles (cars & trucks)
 - Import vehicles (cars & trucks)
 - Commercial trucks (on / off road)
 - Off-road equipment
- components
 - manifold
 - exhaust pipe
 - catalytic converter
 - intermediate pipes
 - resonators and mufflers
 - tailpipes
 - hangers, brackets and clamps
 - gaskets
 - replacement pipes, adapters and hardware
 - anti-seizing compounds

Number: 4.6

Title: Emission Systems

Duration: Total Hours: 6 Theory: 6 Individual/Group Work: 0 Practical: 0

Prerequisites: None

Co-requisites: None

Cross-Reference to Performance Objectives: 5361.19, 5361.26

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of emission control system components.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

4.6.1 Describe, locate and identify the following emission control system components.

LEARNING CONTENT:

4.6.1 Describe, locate and identify the emission control system components.
[6/0]

- manifold heating devices
- evaporative emission systems
 - carbon canister
 - sensors
 - actuators
- exhaust gas re-circulation systems
 - vacuum controlled
 - electronic controlled
 - computer controlled
- positive crankcase ventilation
- catalytic converters
- air injection systems
 - air pumps
 - turbo-chargers
 - superchargers
 - blowers
 - charged air coolers
 - intercoolers
 - after-coolers
 - air to air exchangers

Number: 4.7

Title: Braking System Components

Duration: Total Hours: 15 Theory: 11 Individual/Group Work: 0 Practical: 4

Prerequisites: None

Co-requisites: None

Cross-Reference to Learning Outcomes: 5361.19, 5361.26

GENERAL LEARNING OUTCOME

Upon successful completion of the reportable subject, the apprentice is able to demonstrate a working knowledge of braking system components.

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

4.7.1 Identify the components utilized in braking systems.

4.7.2 Perform inspection and testing according to manufacturers' recommendations.

LEARNING CONTENT:

4.7.1 Identify the components utilized in braking systems.

[9/0]

- braking systems for mechanical, hydraulic and air applications
 - domestic and import cars
 - light-duty, medium and heavy-duty trucks
 - mobile equipment on and off road
- mechanical brake components
 - levers
 - cables
 - bell cranks
 - cleaves pins
 - hand and parking brakes
- hydraulic brake components
 - brake lines, hoses and fittings
 - master cylinder
 - wheel cylinders
 - disc brake calipers
 - drums and rotors
 - brake shoes and pads
 - backing plate and shields
 - control and metering devices
 - metering valves
 - combination valves
 - height or load sensing
 - pressure differential
 - self adjusting devices
 - hardware
 - parking brake mechanism and cables
- air brake components
 - slack adjusters
 - air brake chambers
 - spring brake chambers
 - control valves
 - line and hoses
- power assist brakes
 - vacuum
 - hydraulic / air
 - additives

- anti-lock brake / traction control components
 - designs
 - integral antilock
 - non-integral antilock
 - types
 - four-wheel anti-lock
 - rear-wheel anti-lock
 - two channel
 - three channel
 - four channel
- anti-lock brake / traction control components
 - components
 - power booster and master cylinder
 - electronic controller
 - wheel speed sensors
 - lateral accelerometer
 - warning system
 - modulator valves
 - electric pump and accumulator
 - control valves

4.7.2 Perform inspection and testing according to manufacturers' recommendations.
[2/4]

- demonstrate visual brake system inspection
- removal and installation procedures for drums, discs, pads and shoes
- determine brake adjustment intervals in the service manual
- observe disc and drum machining procedures
- perform hydraulic fluid checks i.e. level, condition and type
- observe a hydraulic brake bleeding procedure

Number: 4.8

Title: Steering Components

Duration: Total Hours: 15 Theory: 9 Individual/Group Work: 0 Practical: 6

Prerequisites: None

Co-requisites: None

Cross-Reference to Learning Outcomes: 5361.19, 5361.26

GENERAL LEARNING OUTCOME

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

LEARNING OUTCOMES

Upon successful completion, the apprentice is able to:

- 4.8.1 Identify the components utilized in steering systems handled by a parts person.
- 4.8.2 Perform inspection and testing according to manufacturers' recommendations.

LEARNING CONTENT:

4.8.1 Identify the components utilized in steering systems handled by a parts person.
[7/0]

- steering systems
 - domestic and import cars
 - light-duty, medium and heavy-duty trucks
 - mobile equipment on and off road
 - 4 wheel steering
- types
 - manual
 - power assist
 - wheel steering
 - hydrostatic articulated
 - emergency steering
 - rack and pinion
 - steering box
- power steering pump
 - vanes
 - control valves
 - pressure relief
 - flow control
 - rotary spool directional control valve
 - axial spool directional control valve
- power steering lines
- power steering hoses
- coolers
- reservoirs
- power rack and pinion
 - rotary valves
 - spool valves
- power box
 - power integral gear box
 - power non- integral gear box

- steering linkage
 - idler arm
 - link rods
 - tie rods and sleeves
 - steering arms
 - pitman arms
 - centre link
 - steering knuckle

- steering columns
 - collapsible / telescoping
 - tilting

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

- perform steering system visual inspections
- measure various steering linkage components for wear
- perform necessary fluid checks as specified in operators manual

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