



MOTOR VEHICLE BODY REPAIRER (Metal and Paint)

2015

Based on the Interprovincial Program Guide
(pg. 9 for Program Structure)



Preface

This Apprenticeship Curriculum Standard is based on the 2012 edition of the Interprovincial Program Guide and the 2010 edition of the National Occupational Analysis for the Motor Vehicle Body Repairer (Metal and Paint) [MVBR] trade. The standard was developed through the cooperation of the Nova Scotia Apprenticeship Agency and the MVBR Trade Advisory Committee. It describes the curriculum content for the MVBR apprenticeship training program and outlines each of the technical training courses necessary for completion of apprenticeship.

Acknowledgements

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Additionally, various federal, provincial and territorial representatives contributed to the development of this document.

Table of Contents

Preface.....	1
Acknowledgements.....	2
User Guide	4
Glossary of Terms	6
Essential Skills Profiles.....	8
Nova Scotia Program Structure	9
NOA Comparison Table	12

PROGRAM CONTENT

Level 1.....	17
Level 2.....	40
Level 3.....	53
Level 4.....	66
Nova Scotia Document Evaluation Form.....	80

User Guide

According to the Canadian Apprenticeship Forum, the Interprovincial Program Guide (IPG) is: "a list of validated technical training outcomes, based upon those sub-tasks identified as common core in the National Occupational Analysis, and validated by industry in the provinces and territories as incorporating the essential tasks, knowledge and skills associated with a given trade."

Learning outcomes contained in the IPG represent the minimum common core content for the development of jurisdictional training standards and outlines. IPGs are developed based on the National Occupational Analyses and extensive industry consultation. The IPG is intended to assist program development staff in the design of jurisdictional plans of training. Each jurisdiction has the flexibility to add additional content.

The IPG was deliberately constructed for ease of use and flexibility of structure in order to adapt to all delivery requirements. It details units of training, unit outcomes and objectives. It does not impose a delivery model or teaching format.

Jurisdictions and/or training providers will select and develop delivery materials and techniques that accommodate a variety of learning styles and delivery patterns. The IPG does not dictate study materials, textbooks or learning activities to be used in delivery.

The IPG document includes a recommended leveling structure to facilitate mobility for apprentices moving from one jurisdiction to another. Because of difference in jurisdictional regulations and program durations, levels are offered as suggestions only.

Structure

The content of the IPG is divided into units. Unit codes are used as a means of identification and are not intended to convey the order of delivery. Prerequisites have not been detailed. Jurisdictions are free to deliver units one at a time or concurrently provided all outcomes are met.

User Guide *(continued)*

The IPG does not indicate the amount of time to be spent on a particular unit. The length of time required to deliver an outcome successfully will depend upon the learning activities and teaching methods used. Jurisdictions are encouraged to use practical demonstration and opportunities for hands-on learning whenever possible.

The unit outcomes are the specific performances that must be evaluated. Wording of outcomes, "Demonstrate knowledge of...", acknowledges the broad spectrum of ways in which knowledge can be shown. It is at the discretion of each jurisdiction to determine the manner in which outcomes are evaluated; theoretically, practically or a combination of both.

Detailed content for each objective has not been developed. Where detail is required for clarity, content has been provided. Content may be added or extended in jurisdictional training plans.

Glossary of Terms

These definitions are intended as a guide to how language is used in the document.

ADJUST	To put in good working order; regulate; bring to a proper state or position.
APPLICATION	The use to which something is put and/or the circumstance in which you would use it.
CHARACTERISTIC	A feature that helps to identify, tell apart, or describe recognizably; a distinguishing mark or trait.
COMPONENT	A part that can be separated from or attached to a system; a segment or unit.
DEFINE	To state the meaning of (a word, phrase, etc.).
DESCRIBE	To give a verbal account of; tell about in detail.
DIAGNOSE	To analyze or identify a problem or malfunction.
EXPLAIN	To make plain or clear; illustrate; rationalize.
IDENTIFY	To point out or name objectives or types.
INTERPRET	To translate information from observation, charts, tables, graphs, and written material.
MAINTAIN	To keep in a condition of good repair or efficiency.
METHOD	A means or manner of doing something that has procedures attached to it.
OPERATE	How an object works; to control or direct the functioning of.
PROCEDURE	A prescribed series of steps taken to accomplish an end.

IPG Glossary of Terms *(continued)*

PURPOSE	The reason for which something exists or is done, made or used.
SERVICE	Routine inspection and replacement of worn or deteriorating parts. An act or business function provided to a customer in the course of one's profession. (e.g., haircut).
TECHNIQUE	Within a procedure, the manner in which technical skills are applied.
TEST	v. To subject to a procedure that ascertains effectiveness, value, proper function, or other quality. n. A way of examining something to determine its characteristics or properties, or to determine whether or not it is working correctly.
TROUBLESHOOT	To follow a systematic procedure to identify and locate a problem or malfunction and its cause.

Essential Skills Profiles

Essential Skills are the skills needed for work, learning and life. They provide the foundation for learning all the other skills that enable people to evolve within their jobs and adapt to workplace change.

Over the past several years, the Government of Canada has conducted research examining the skills people use at work. From this research, Essential Skills Profiles have been developed for various occupations.

For more information regarding Essential Skills and to access Essential Skills Profiles for specific occupations, visit Human Resources and Social Development Canada's Essential Skills website at:

http://srv108.services.gc.ca/english/general/home_e.shtml

Program Structure – Nova Scotia Apprenticeship Program

The courses listed below are required technical training in the Nova Scotia Motor Vehicle Body Repairer (Metal and Paint) Apprenticeship Program.

Note: Equivalent I-CAR units need to be identified.

Nova Scotia Course No.	Nova Scotia Course Name	I-CAR Units	Duration (in days)	Practical	Interprovincial Program Guide (IPG) Content to be Covered	
New Level 1 (6 Weeks)						
MENT-1801	Integrated Milestone	N/A			MENT-1801 Workplace Mentoring I (NS Specific)	18
MVBA-0801	Shop and Safety		1.5		ABR-100 Safety	19
			0.5		ABR-105 Trade Related Documents	20
			0.5		ABR-110 Communication	21
			1.5		ABR-115 Tools and Equipment	22
			1		ABR-120 Fasteners and Adhesives	23
MVBA-1803	Vehicle Construction		2.5		ABR-125 Vehicle Construction	24
			2.5	P	ABR-210 Upholstery, Trim and Hardware	25
MVBA-1828	Metal Working		1		ABR-135 Metallurgy	27
			4		ABR-160 Metal Working I (Mild Steel)	28
MVBA-1805	Auto Body Preparation		2		ABR-165 Body Fillers and Abrasives	30
			2	P	ABR-175 Surface Preparation (Cleaning, Stripping and Masking)	31
			1	P	ABR-205 Detailing	33
MVBA-1835	Undercoats/Refinishing I		2.5	P	ABR-195 Undercoats (Primers & Surfacer)	34
			2.5	P	ABR-200 Refinishing I	36
MVBA-1836	Non-Metal Repair / Moveable Glass		2.5	P	ABR-180 Non-Metal Repair	37
			2.5	P	ABR-190 Moveable Glass and Hardware	38

Nova Scotia Course No.	Nova Scotia Course Name	I-CAR Units	Duration (in days)	Practical	Interprovincial Program Guide (IPG) Content to be Covered		
New Level 2 (5 weeks)							
MVBA-1837	Auto Body Welding (Steel)		2	p	ABR-140	Cutting and Heating	41
	2 weeks		8	p	ABR-145	Gas Metal Arc Welding (Steel)	43
MVBR-1818	Corrosion Protection / Electrical Fundamentals		1		ABR-170	Corrosion Protection	45
			3		ABR-230	Electrical Fundamentals Fundamentals	47
			1		ABR-235	Batteries	48
MVBA-1838	Metal Working II (Aluminum)		5	p	ABR-280	Metal Working II (Aluminum)	49
MVBA-1839	Non-structural Components		5	p	ABR-225	Non-Structural Outer Body Panels	51
New Level 3 (6 Weeks)							
MVBA-1840	Autobody Welding (Aluminum)		1	p	ABR-1001	MIG Brazing	54
			2	p	ABR-155	Squeeze-type Resistance Spot Welding (RSW)	55
			2	P	ABR-1002	GMAW (Aluminum) (NS Specific)	56
MVBA-1841	Structural Components		5	P	ABR-220	Structural Components	58
MVBA-1842	Mechanical Systems		5	P	ABR-245	Mechanical Systems and Components	60
MVBA-1823	Restraints and Electrical Repairs		2.5		ABR-215	Restraint Systems	62
			2.5		ABR-240	Electrical and Electronic Repairs	63
MVBA-1843	Refinishing II 2 weeks		10	P	ABR-275	Refinishing II	64
New Level 4 (5 Weeks)							
	Integrated Milestone				MENT-1802	Workplace Mentoring II (NS Specific)	67
MVBA-1844	Damage Analysis		2.5		ABR-255	Damage Analysis of Frames and Unitized Bodies	68
			2.5		ABR-270	Damage Analysis and Estimating Costs	69
MVBA-1845	Post-Repair Vehicle Inspection / Stationary Glass		2	P	ABR-130	Post-Repair Vehicle Inspection	70
			1-2	P	ABR-185	Stationary Glass	71

Nova Scotia Course No.	Nova Scotia Course Name	I-CAR Units	Duration (in days)	Practical	Interprovincial Program Guide (IPG) Content to be Covered	
MVBA-1826	Body and Frame Repair		2.5	P (demonstration)	ABR-260 Unitized Body Repairs	73
			2.5	P (demonstration)	ABR-265 Conventional Frame Repairs	75
MVBA-1827	Steering, Suspension and Brakes		5	P	ABR-250 Steering, Suspension and Braking Systems	77
MVBA-1830	Program Review		5		MVBA-1830 Program Review (NS Specific)	79

Nova Scotia Motor Vehicle Body Repairer (Metal and Paint) Apprenticeship Program: All Courses are Required.

NOA Comparison Table

NOA Sub-task		IPG Unit	
Task 1 – Uses documentation.			
1.01	Uses manufacturer's specifications and repair procedures.	ABR-115	Tools and Equipment
		ABR-230	Electrical Fundamentals
		ABR-255	Damage Analysis of Frames and Unitized Bodies
1.02	Interprets estimates.	ABR-105	Trade Related Documents
1.03	Uses work orders.	ABR-105	Trade Related Documents
1.04	Interprets safety and environmental regulations.	ABR-100	Safety
Task 2 – Uses tools and equipment.			
2.01	Uses hand tools.	ABR-115	Tools and Equipment
2.02	Uses power tools.	ABR-115	Tools and Equipment
2.03	Uses welding equipment.	ABR-115	Tools and Equipment
		ABR-140	Cutting and Heating
		ABR-145	Gas Metal Arc Welding (GMAW) - MIG
		ABR-155	Resistance Spot Welding (RSW)
		ABR-180	Non-Metal Repair
2.04	Uses straightening equipment.	ABR-115	Tools and Equipment
		ABR-265	Conventional Frame Repairs
2.05	Uses lifting equipment.	ABR-115	Tools and Equipment
2.06	Uses measuring equipment.	ABR-115	Tools and Equipment
		ABR-255	Damage Analysis of Frames and Unitized Bodies
2.07	Uses refinishing tools and equipment.	ABR-115	Tools and Equipment
		ABR-195	Primers, Surfacer and Sealers
		ABR-200	Refinishing I
2.08	Uses personal protective equipment (PPE).	ABR-100	Safety
Task 3 – Organizes work.			
3.01	Prepares damage estimate.	ABR-105	Trade Related Documents.
		ABR-270	Damage Analysis and Estimating Costs
3.02	Orders parts and materials.	ABR-105	Trade Related Documents
3.03	Organizes parts and materials.	ABR-105	Trade Related Documents
3.04	Communicates with others.	ABR-110	Communication
		ABR-270	Damage Analysis and Estimating Costs
3.05	Prepares work area.	ABR-100	Safety
3.06	Maintains safe work environment.	ABR-100	Safety
Task 4 – Applies corrosion protection material.			
4.01	Applies weld through primer.	ABR-170	Corrosion Protection

NOA Sub-task		IPG Unit	
		ABR-195	Primers, Surfacers and Sealers
4.02	Applies corrosion protection for electrical components.	ABR-170	Corrosion Protection
4.03	Applies corrosion inhibitors.	ABR-170	Corrosion Protection
		ABR-260	Unitized Body Repairs
Task 5 – Repairs and replaces trim.			
5.01	Removes trim.	ABR-120	Fasteners and Adhesives
		ABR-210	Upholstery, Trim and Hardware
5.02	Installs trim.	ABR-120	Fasteners and Adhesives
		ABR-210	Upholstery, Trim and Hardware
5.03	Repairs trim.	ABR-210	Upholstery, Trim and Hardware
Task 6 – Performs final check.			
6.01	Inspects vehicle visually.	ABR-255	Damage Analysis of Frames and Unitized Bodies
		ABR-130	Post-Repair Vehicle Inspection
6.02	Performs operational check.	ABR-130	Post-Repair Vehicle Inspection
6.03	Conducts road test.	ABR-130	Post-Repair Vehicle Inspection
Task 7 – Repairs structural components.			
7.01	Performs vehicle setup.	ABR-260	Unitized Body Repairs
		ABR-265	Conventional Frame Repairs
7.02	Identifies extent of damage.	ABR-255	Damage Analysis of Frames and Unitized Bodies
		ABR-260	Unitized Body Repairs
		ABR-265	Conventional Frame Repairs
		ABR-130	Post-Repair Vehicle Inspection
7.03	Removes components for access.	ABR-120	Fasteners and Adhesives
		ABR-260	Unitized Body Repairs
		ABR-265	Conventional Frame Repairs
7.04	Straightens structural components.	ABR-135	Metallurgy
		ABR-260	Unitized Body Repairs
		ABR-265	Conventional Frame Repairs
7.05	Verifies measurement and fit.	ABR-260	Unitized Body Repairs
		ABR-265	Conventional Frame Repairs
7.06	Installs components.	ABR-120	Fasteners and Adhesives
		ABR-260	Unitized Body Repairs
		ABR-265	Conventional Frame Repairs
Task 8 – Replaces structural components.			
8.01	Removes structural components.	ABR-260	Unitized Body Repairs
		ABR-265	Conventional Frame Repairs
8.02	Installs structural components.	ABR-260	Unitized Body Repairs
		ABR-265	Conventional Frame Repairs
Task 9 – Repairs panels.			
9.01	Prepares panels for repair.	ABR-160	Metal Working I (Mild Steel)
		ABR-280	Metal Working II (Aluminum)
		ABR-220	Structural Components

NOA Sub-task		IPG Unit	
9.02	Reshapes panels.	ABR-225	Non-structural Components
		ABR-180	Non-Metal Repair
		ABR-160	Metal Working I (Mild Steel)
		ABR-280	Metal Working II (Aluminum)
		ABR-180	Non-Metal Repair
		ABR-220	Structural Components
9.03	Aligns panels.	ABR-220	Structural Components
		ABR-225	Non-Structural Components
9.04	Applies repair materials.	ABR-160	Metal Working I (Mild Steel)
		ABR-280	Metal Working II (Aluminum)
		ABR-165	Body Filler and Abrasives
		ABR-180	Non-Metal Repair
9.05	Shapes repair materials.	ABR-160	Metal Working I (Mild Steel)
		ABR-280	Metal Working II (Aluminum)
		ABR-165	Body Filler and Abrasives
		ABR-180	Non-Metal Repair
Task 10 – Replaces panels.			
10.01	Replaces panels.	ABR-220	Structural Components
		ABR-225	Non-Structural Components
10.02	Prepares common surfaces.	ABR-165	Body Filler and Abrasives
10.03	Test fits panels.	ABR-220	Structural Components
		ABR-225	Non-Structural Components
10.04	Installs panels.	ABR-120	Fasteners and Adhesives
		ABR-220	Structural Components
		ABR-225	Non-Structural Components
Task 11 – Replaces structural glass.			
11.01	Prepares surfaces.	ABR-185	Stationary Glass
11.02	Installs structural glass.	ABR-185	Stationary Glass
11.03	Repairs laminated glass. (NOT COMMON CORE)	ABR-185	Stationary Glass
Task 12 – Replaces non-structural glass.			
12.01	Removes non-structural glass.	ABR-120	Fasteners and Adhesives
		ABR-190	Moveable Glass and Hardware
12.02	Removes debris.	ABR-190	Moveable Glass and Hardware
12.03	Services hardware.	ABR-190	Moveable Glass and Hardware
12.04	Installs non-structural glass.	ABR-120	Fasteners and Adhesives
		ABR-190	Moveable Glass and Hardware
Task 13 – Repairs and replaces mechanical components.			
13.01	Removes mechanical components.	ABR-120	Fasteners and Adhesives
		ABR-245	Mechanical Systems and Components
		ABR-250	Steering, Suspension and Braking Systems
13.02	Cleans mechanical components.	ABR-245	Mechanical Systems and Components

NOA Sub-task		IPG Unit	
13.03	Straightens mechanical components. (NOT COMMON CORE)		
13.04	Installs mechanical components.	ABR-120	Fasteners and Adhesives
		ABR-245	Mechanical Systems and Components
		ABR-250	Steering, Suspension and Braking Systems
Task 14 – Repairs and replaces electrical components.			
14.01	Repairs damaged wires and exterior coverings.	ABR-230	Electrical Fundamentals
		ABR-240	Electrical and Electronic Repairs
14.02	Cleans corroded components and connections.	ABR-235	Batteries
		ABR-240	Electrical and Electronic Repairs
14.03	Removes damaged electrical components.	ABR-235	Batteries
		ABR-240	Electrical and Electronic Repairs
14.04	Installs electrical components.	ABR-235	Batteries
		ABR-230	Electrical Fundamentals
		ABR-240	Electrical and Electronic Repairs
Task 15 – Repairs and replaces interior components.			
15.01	Removes interior components.	ABR-120	Fasteners and Adhesives
		ABR-210	Upholstery, Trim and Hardware
15.02	Installs interior components.	ABR-120	Fasteners and Adhesives
		ABR-210	Upholstery, Trim and Hardware
15.03	Repairs interior components.	ABR-210	Upholstery, Trim and Hardware
Task 16 – Replaces seat belt restraint systems.			
16.01	Removes interior panels and upholstery.	ABR-120	Fasteners and Adhesives
		ABR-210	Upholstery, Trim and Hardware
16.02	Removes seat belt restraint systems.	ABR-215	Restraint Systems
16.03	Installs seat belt restraint systems.	ABR-215	Restraint Systems
16.04	Installs interior panels and upholstery.	ABR-210	Upholstery, Trim and Hardware
Task 17 – Replaces air bag systems.			
17.01	Removes air bags.	ABR-215	Restraint Systems
17.02	Removes related components.	ABR-215	Restraint Systems
17.03	Replaces related components.	ABR-215	Restraint Systems
17.04	Installs air bags.	ABR-215	Restraint Systems
Task 18 – Prepares surfaces.			
18.01	Decontaminates area.	ABR-170	Corrosion Protection
		ABR-175	Surface Preparation (Cleaning, Stripping and Masking)
		ABR-180	Non-Metal Repair
		ABR-195	Primers, Surfacer and Sealers
18.02	Sands surfaces.	ABR-165	Body Filler and Abrasives
		ABR-175	Surface Preparation (Cleaning, Stripping and Masking)
		ABR-195	Primers, Surfacer and Sealers
18.03	Cleans sanded surfaces.	ABR-175	Surface Preparation (Cleaning, Stripping and Masking)

NOA Sub-task		IPG Unit	
		ABR-195	Primers, Surfacers and Sealers
18.04	Masks off surrounding area.	ABR-195	Primers, Surfacers and Sealers
Task 19 – Prepares and applies finishing materials.			
19.01	Mixes refinishing materials.	ABR-195	Primers, Surfacers and Sealers
		ABR-275	Refinishing II
19.02	Performs final wash and tack.	ABR-195	Primers, Surfacers and Sealers
		ABR-200	Refinishing I
19.03	Applies material to surface.	ABR-195	Primers, Surfacers and Sealers
		ABR-275	Refinishing II
19.04	Removes masking.	ABR-195	Primers, Surfacers and Sealers
		ABR-175	Surface Preparation (Cleaning, Stripping and Masking)
Task 20 – Details exterior.			
20.01	Polishes vehicle.	ABR-200	Refinishing I
		ABR-205	Cleaning and Detailing
20.02	Washes vehicle.	ABR-200	Refinishing I
		ABR-205	Cleaning and Detailing
20.03	Removes overspray.	ABR-200	Refinishing I
Task 21 – Details interior.			
21.01	Cleans interior.	ABR-205	Cleaning and Detailing
21.02	Cleans hard surfaces.	ABR-205	Cleaning and Detailing

LEVEL 1

MENT-1801

Workplace Mentoring I

(Nova Scotia Unit of Instruction)

Learning Outcomes:

- Identify and explain strategies for learning workplace skills.
- Demonstrate strategies to assist in learning skills in the workplace.

Objectives and Content:

1. Describe the importance of your own experiences.
2. Identify the partners involved in apprenticeship.
3. Describe the shared responsibilities for workplace learning.
4. Determine your own learning preferences and explain how these relate to learning new skills.
5. Describe the importance of different types of skills in the workplace.
6. Describe the importance of essential skills in the trade.
7. Identify different ways of learning.
8. Identify your learning preferences.
9. Identify different learning needs and strategies to meet learning needs.
10. Identify techniques for effective communication.
11. Identify strategies to assist in learning a skill.

Resource:

- Recommended resource to use in the delivery of this unit:
www.apprenticeship.nsc.ca/mentoring/apprentice.htm

ABR-100 Safety

Learning Outcomes:

- Demonstrate knowledge of safety equipment, their applications, maintenance and procedures for use.
- Demonstrate knowledge of safe work practices.
- Demonstrate knowledge of regulatory requirements pertaining to safety.

Objectives and Content:

1. Identify types of personal protective equipment (PPE) and clothing and describe their applications and limitations.
2. Describe the procedures used to care for and maintain PPE.
3. Identify hazards and describe safe work practices.
 - i) personal
 - ii) workplace
 - ventilation/fumes
 - electrical grounding
 - fire
 - chemical/gas
 - iii) environmental
 - discharge/spills
 - iv) vehicle
 - batteries
 - keyless and key ignition systems
 - jacking
 - restraint systems
4. Identify and describe workplace safety and health regulations.
 - i) federal
 - Material Safety Data Sheets (MSDS)
 - Workplace Hazardous Material Information System (WHMIS)
 - ii) provincial/territorial
 - Occupational Health and Safety (OHS)
 - iii) municipal
5. Identify PPE and describe safe work practices for hybrid/alternate fuel vehicles.

ABR-105 Trade Related Documents

Learning Outcomes:

- Demonstrate knowledge of trade related documentation and its use.
- Demonstrate knowledge of preparing and interpreting trade documents.
- Demonstrate knowledge of organizing parts and materials.

Objectives and Content:

1. Identify sources of related information.
2. Identify and interpret information found on the vehicle.
 - i) VIN
 - ii) paint code
 - iii) production date
 - iv) make and model
3. Identify types of trade related documentation and describe their purpose, applications and procedures for use.
 - i) manufacturers' specifications
 - ii) codes and standards
 - iii) work orders
 - iv) equipment maintenance schedules
 - v) equipment maintenance records
 - vi) safety manuals and bulletins
 - vii) service information
4. Identify types of written reporting and describe their purpose and applications.
 - i) time and material records
 - ii) apprentice training logs
 - iii) estimates
5. Describe procedures for organizing/storing replacement parts and materials.

ABR-110 Communication

Learning Outcomes:

- Demonstrate knowledge of effective communication practices.
- Demonstrate knowledge of communication devices, their purpose and operation.

Objectives and Content:

1. Describe the importance of effective verbal and non-verbal communication.
 - i) apprentices
 - ii) other tradespersons
 - iii) colleagues
 - iv) supervisors
 - v) customers
 - vi) suppliers/manufacturers
2. Identify types of communication devices and describe their purpose and operation.

ABR-115 Tools and Equipment

Learning Outcomes:

- Demonstrate knowledge of tools and equipment, their applications, maintenance and procedures for use.

Objectives and Content:

1. Identify types of hand tools and describe their applications and procedures for use.
 - i) basic
 - ii) trade specific
2. Identify types of basic measuring equipment and describe their applications and procedures for use.
3. Identify types of specialized measuring equipment and describe their applications.
4. Identify types of testing/diagnostic equipment and describe their applications.
5. Identify types of power tools and describe their applications and procedures for use.
 - i) electric
 - ii) hydraulic
 - iii) pneumatic
6. Identify types of shop equipment and describe their applications.
 - i) cleaning
 - ii) lifting
7. Identify types of welding and cutting equipment and describe their applications.
8. Identify types of straightening equipment and describe their applications.
9. Identify types of refinishing and detailing tools and equipment and describe their applications.
10. Describe the procedures used to inspect and maintain tools and equipment.

ABR-120 Fasteners and Adhesives

Learning Outcomes:

- Demonstrate knowledge of fasteners and adhesives, their applications, procedures for use and safety considerations.

Objectives and Content:

1. Define terminology associated with fasteners and adhesives.
2. Identify hazards and describe safe work practices pertaining to fasteners and adhesives.
 - i) personal
 - ii) vehicle
3. Identify types of fasteners and describe their applications.
4. Describe the procedures to remove and install fasteners.
5. Identify types of adhesives used in fastening applications and describe their characteristics.
6. Identify the considerations when applying and removing adhesives.

ABR-125 Vehicle Construction

Learning Outcomes:

- Demonstrate knowledge of vehicle construction.
- Demonstrate knowledge of vehicle components.

Objectives and Content:

1. Define terminology associated with vehicle construction.
2. Identify types of vehicle construction and describe their characteristics.
 - i) conventional frames
 - ii) unitized bodies
3. Identify body sections and describe their components.
4. Identify structural and non-structural components and describe their characteristics and applications.
5. Identify types of materials used in vehicle construction and describe their characteristics and applications.

ABR-210

Upholstery, Trim and Hardware

Learning Outcomes:

- Demonstrate knowledge of types of trim, their applications and characteristics.
- Demonstrate knowledge of procedures to repair and replace upholstery, trim and hardware.
- Demonstrate knowledge of procedures to detect and repair noises and leaks attributed to trim and hardware.

Objectives and Content:

1. Define terminology associated with upholstery, trim and hardware.
2. Identify hazards and describe safe work practices pertaining to upholstery, trim and hardware.
3. Identify exterior trim and hardware and describe its characteristics.
4. Identify interior upholstery, trim and hardware and describe its characteristics.
5. Describe fasteners and adhesives relating to upholstery, trim and hardware.
6. Describe the procedures used to repair or replace exterior trim.
7. Describe the procedures used to remove and apply pin stripes and decals.
8. Describe the procedures used to inspect interior upholstery, trim and hardware for collision related damage.
9. Describe the procedures used to repair or replace interior trim.
10. Describe the procedures used to repair or replace upholstery.
11. Describe the procedures used to locate/detect and repair leaks and noises related to trim and hardware.

Practical Objectives:

1. Remove and install interior and exterior trim and hardware.

2. Remove and install pin stripes and decals.

ABR-135 Metallurgy

Learning Outcomes:

- Demonstrate knowledge of metals and their characteristics.
- Demonstrate knowledge of metallurgic principles and their applications to control expansion, contraction and distortion.

Objectives and Content:

1. Define terminology associated with metallurgy.
2. Identify hazards and describe safe work practices pertaining to working metals.
3. Identify types of metals and describe their characteristics.
4. Identify procedures associated with working metals and describe their applications.
 - i) forming
 - ii) shearing
 - iii) punching
 - iv) drilling
 - v) cutting
 - vi) welding
 - vii) heating
 - viii) shrinking
5. Describe the effects metal working has on metallurgic properties.
 - i) stress
 - ii) contraction
 - iii) expansion
 - iv) distortion
 - v) work hardening
 - vi) shrinking
6. Describe the procedures to prevent or correct problems that occur when working metals.

ABR-160 Metal Working I (Mild Steel)

Learning Outcomes:

- Demonstrate knowledge of metal working procedures for sheet metal repair.

Objectives and Content:

1. Define terminology associated with working mild steel sheet metal.
2. Identify hazards and describe safe work practices pertaining to working mild steel sheet metal.
 - i) personal
 - ii) equipment
 - iii) vehicle
 - iv) shop/facility
3. Identify types of automotive sheet metal.
4. Identify types of damage to mild steel sheet metal.
 - i) direct
 - ii) indirect
5. Identify the considerations and requirements for performing metal work on mild steel sheet metal.
 - i) tool selection
 - ii) repair sequence
 - iii) protection of adjacent panels
 - iv) panel preparation
 - v) corrosion protection
6. Identify types of panels and describe their associated repair procedures.
 - i) accessible
 - hammer and dolly
 - shrinking (hot or cold)
 - ii) limited access
 - prybar
 - pick
 - dent puller
 - pin-welder

7. Identify alternative methods of body panel repair.
 - i) paintless dent repair
8. Describe the methods used to detect surface irregularities.
9. Describe the procedures used to rough out and align damaged mild steel sheet metal.
10. Describe the procedures used to prepare mild steel sheet metal for finishing.

ABR-165 Body Fillers and Abrasives

Learning Outcomes:

- Demonstrate knowledge of abrasives, their applications and procedures for use.
- Demonstrate knowledge of types of body fillers, their applications and procedures for use.

Objectives and Content:

1. Define terminology associated with body fillers and abrasives.
2. Identify hazards and describe safe work practices pertaining to body fillers and abrasives.
3. Identify types of abrasives and describe their characteristics and applications.
 - i) metal repair
 - ii) non-metal repair
4. Describe the procedures and techniques for using abrasives.
5. Identify types of body fillers and describe their characteristics and applications.
 - i) metal repair
 - ii) non-metal repair
6. Identify tools and equipment relating to body fillers and abrasives and describe their applications and procedures for use.
7. Describe the procedures used to mix body fillers.
8. Describe the procedures used to apply body fillers.
9. Describe the procedures and techniques for shaping and finishing body fillers.
 - i) grit selection
 - ii) tool selection
 - iii) sanding techniques
 - iv) detect surface irregularities
 - visual
 - guide coat
 - tactile (touch)

Learning Outcomes:

- Demonstrate knowledge of surface cleaning procedures.
- Demonstrate knowledge of surface preparation using abrasives.
- Demonstrate knowledge of stripping equipment and products, their applications, safety precautions and procedures for use.
- Demonstrate knowledge of masking techniques.

Objectives and Content:

1. Define terminology associated with surface preparation.
2. Identify hazards and describe safe work practices pertaining to surface preparation.
 - i) personal
 - ii) shop/facility
 - iii) equipment
 - iv) environmental
3. Identify products used to clean surfaces and describe their applications and procedures for use.
4. Identify substrate types and describe the procedures and considerations for evaluating their condition.
5. Identify topcoats and undercoats and describe the procedures and considerations for evaluating their condition.
6. Identify the methods used to strip topcoats and undercoats and describe their applications and associated safety or environmental considerations.
 - i) chemical strippers
 - ii) media blasting
 - iii) mechanical
7. Describe the procedures used to strip paint.
8. Describe the procedures used to prepare surfaces using abrasives.

9. Identify the materials used in masking and describe their applications.
10. Describe the procedures and techniques used to mask surfaces.
11. Describe the procedures and techniques used to remove masking from surfaces.

Practical Objectives:

1. Strip paint.
2. Prepare surfaces using abrasives.
3. Mask surfaces.
4. Remove masking from surfaces.

ABR-205 Detailing

Learning Outcomes:

- Demonstrate knowledge of detailing equipment and products.
- Demonstrate knowledge of detailing practices and procedures.

Objectives and Content:

1. Define terminology associated with detailing.
2. Identify hazards and describe safe work practices pertaining to detailing.
3. Identify equipment used in detailing vehicle surfaces (interior) and describe their applications and procedures for use.
4. Identify products used in vehicle detailing and describe their related safety considerations.
5. Identify types of topcoat defects and describe their characteristics.
6. Describe the procedures used to remove overspray.
7. Describe the procedures used to clean vehicle interior surfaces.
8. Describe the procedures used to wash vehicle exterior.
9. Describe the procedures used to clean un-painted plastic exterior components.

Practical Objectives:

1. Remove overspray.
2. Clean vehicle interior surfaces.
3. Wash vehicle exterior.
4. Clean un-painted plastic exterior components.

Learning Outcomes:

- Demonstrate knowledge of undercoats, their applications, and procedures for use.
- Demonstrate knowledge of undercoat materials, their characteristics and mixing procedures.
- Demonstrate knowledge of equipment used in applying undercoats, their set-up, maintenance and procedures for use.

Objectives and Content:

1. Define terminology associated with undercoats.
2. Identify hazards and describe safe work practices pertaining to undercoats.
 - i) personal
 - ii) shop/facility
 - iii) environmental
3. Interpret codes and regulations pertaining to the use of undercoats.
4. Identify types of undercoats, and describe their characteristics and applications.
 - i) primer
 - ii) self-etching primer
 - iii) epoxy primer
 - iv) primer surfacer
 - v) primer sealer
 - vi) water borne primer
 - vii) chip resistant coatings
5. Identify tools and equipment relating to undercoats and describe their applications and procedures for use.
6. Describe the procedures used to set-up, adjust, care for and maintain equipment used in applying undercoats.
7. Describe the procedures used to prepare substrate prior to applying undercoats.
 - i) cleaning the surface
 - ii) plastic adhesion promoter

8. Describe the procedures used to mix undercoats.
 - i) determine required undercoats
 - ii) interpret manufacturer's specifications
 - iii) intermix required components
 - iv) mix combined ingredients
9. Identify undercoat application techniques.
10. Describe the procedures used to apply undercoats.
 - i) interpret manufacturer's specifications
 - ii) select equipment and accessories
 - iii) apply per specifications
11. Identify undercoat defects and describe their causes and the procedures used to prevent or correct them.
12. Describe the procedures used to prepare undercoats for topcoat.

Practical Objectives:

1. Set-up, adjust, care for and maintain equipment used in applying undercoats.
2. Prepare substrate prior to applying undercoats.
3. Mix and apply undercoats.
4. Prepare undercoats for topcoat.

ABR-200 Refinishing I

Learning Outcomes:

- Demonstrate knowledge of refinishing materials and their characteristics.
- Demonstrate knowledge of refinishing equipment, its applications, maintenance and procedures for use.

Objectives and Content:

1. Define terminology associated with refinishing.
2. Identify hazards and describe safe work practices pertaining to refinishing.
 - i) personal
 - ii) shop/facility
 - iii) environment
3. Describe the surface preparation procedures used for refinishing.
4. Identify refinishing tools and equipment and describe their applications.
5. Describe the procedures used to set-up, operate, adjust, care for and maintain refinishing equipment.
6. Identify types of topcoat finishes and describe their characteristics.
 - i) single-stage
 - ii) multi-stage
 - solvent
 - water
 - iii) clear

Practical Objectives:

1. Set-up, operate, adjust, care for and maintain refinishing equipment.

ABR-180 Non-Metal Repair

Learning Outcomes:

- Demonstrate knowledge of non-metal materials and their applications.
- Demonstrate knowledge of non-metal repair procedures.

Objectives and Content:

1. Define terminology associated with non-metal repair.
2. Identify hazards and describe safe work practices pertaining to non-metal repairs.
3. Identify non-metal materials and describe their characteristics and applications.
 - i) plastics
 - ii) composites
4. Identify products and materials used in non-metal repair.
 - i) ISO codes (International Organization for Standardization)
 - ii) adhesives
 - iii) back pads
 - iv) plastic adhesion promoters
5. Describe the procedures used for non-metal repairs.
 - i) plastics
 - ii) composites
6. Identify plastic welding equipment and describe their associated set-up and shut-down procedures.

Practical Objectives:

1. Perform adhesive repairs.

Learning Outcomes:

- Demonstrate knowledge of moveable glass and their characteristics.
- Demonstrate knowledge of hardware and attachments associated with moveable glass.
- Demonstrate knowledge of procedures to replace moveable glass and repair or replace its associated hardware and attachments.

Objectives and Content:

1. Define terminology associated with moveable glass and hardware.
2. Identify hazards and describe safe work practices pertaining to moveable glass and hardware.
3. Identify tools and equipment relating to moveable glass and describe their applications and procedures for use.
4. Identify types of moveable glass and describe their characteristics.
5. Identify moveable glass related hardware and describe their applications.
 - i) motors
 - ii) regulators
 - iii) channels
6. Identify fastening methods for moveable glass and their associated components.
 - i) mechanical
 - ii) pressure fitted
 - iii) bonded
7. Describe the procedures and considerations for inspecting moveable glass and its associated hardware.
8. Describe the procedures used to remove and install moveable glass.
9. Describe the procedures used to service and adjust moveable glass.
10. Identify the types of leaks associated with moveable glass and describe the procedures used to detect and repair them.

- i) wind
- ii) water
- iii) dust

Practical Objectives:

1. Inspect moveable glass and its associated hardware.
2. Remove and install moveable glass.
3. Service and adjust moveable glass.

LEVEL 2

ABR-140 Cutting and Heating

Learning Outcomes:

- Demonstrate knowledge of cutting and heating equipment, their applications, maintenance and procedures for use.

Objectives and Content:

1. Define terminology associated with cutting and heating.
2. Identify hazards and describe safe work practices pertaining to cutting and heating.
 - i) personal
 - ii) shop/facility
 - iii) equipment
 - iv) vehicle
3. Identify cutting and heating processes and describe their applications.
4. Identify equipment, components and accessories relating to cutting and heating processes and describe their characteristics and applications.
 - i) oxy-fuel
 - ii) plasma arc
 - iii) induction heaters
5. Describe the procedures to set-up, maintain, and shut-down oxy-fuel equipment.
6. Describe the procedures to set-up, maintain, and shut-down plasma arc cutting equipment.
7. Describe the procedures used to cut with oxy-fuel equipment.
8. Describe the procedures used to cut with plasma arc cutting equipment.
9. Describe the procedures used to heat with oxy-fuel equipment.

Practical Objectives:

1. Set-up, maintain, and shut-down oxy-fuel equipment.
2. Set-up, maintain and shut-down plasma arc cutting equipment.
3. Cut with oxy-fuel equipment.
4. Cut with plasma arc cutting equipment.
5. Heat with oxy-fuel equipment.

ABR-145 Gas Metal Arc Welding (Steel)

Learning Outcomes:

- Demonstrate knowledge of gas metal arc welding equipment, its applications, maintenance and procedures for use.
- Demonstrate knowledge of weld defects, their causes and the procedures to prevent and correct them.

Objectives and Content:

1. Define terminology associated with gas metal arc welding.
2. Identify hazards and describe safe work practices pertaining to gas metal arc welding.
 - i) personal
 - ii) equipment
 - iii) vehicle
 - iv) shop/facility
3. Describe gas metal arc welding and its applications.
4. Identify gas metal arc welding equipment and accessories and describe their characteristics and applications.
5. Describe the procedures to set-up, operate and shut-down gas metal arc welding equipment.
6. Describe the procedures used to perform basic maintenance and troubleshooting of gas metal arc welding equipment.
7. Identify types of welds performed using gas metal arc welding equipment.
 - i) plug
 - ii) continuous (fillet)
 - iii) stitch
 - iv) tack

8. Identify types of joint assembly and describe their characteristics and applications.
 - i) lap joint
 - ii) butt joint
9. Describe the procedures used to weld mild steel sheet metal using the gas metal arc welding process.
10. Identify types of weld defects and describe their causes.
 - i) porosity
 - ii) burn through
 - iii) overlap
 - iv) excess weld splatter
11. Describe the procedures used to prevent and correct weld defects.
 - i) proper penetration of metal
 - ii) appropriate penetration of the weld

Practical Objectives:

1. Set-up, operate and shut-down gas metal arc welding equipment.
2. Perform basic maintenance and troubleshooting of gas metal arc welding equipment.
3. Weld steel sheet metal using the gas metal arc welding process.
4. Prevent and correct weld defects.

Learning Outcomes:

- Demonstrate knowledge of corrosion, its causes and effects.
- Demonstrate knowledge of types of corrosion protection, their characteristics and applications.
- Demonstrate knowledge of the procedures used to restore corrosion protection.

Objectives and Content:

1. Define terminology associated with corrosion.
2. Interpret documentation pertaining to corrosion protection.
 - i) OEM specifications
3. Identify hazards and describe safe work practices pertaining to corrosion and corrosion protection.
4. Identify the types of corrosion and describe their causes.
 - i) oxidation
 - ii) galvanic action
5. Identify environmental and atmospheric conditions that influence the rate of corrosion.
6. Identify the tools and equipment relating to corrosion protection and describe their applications and procedures for use.
7. Identify types of corrosion protection and describe their characteristics and applications.
 - i) OEM application
 - ii) undercoats and topcoats
 - iii) anti-corrosion compounds
8. Identify corrosion protection materials used during repair procedures.
 - i) undercoats (primers)
 - ii) seam sealers
 - iii) anti-corrosion compounds
 - iv) fastener isolators

9. Describe the procedures used to inspect for corrosion related damage.
10. Describe the procedures used to restore corrosion protection to original equipment manufacturer (OEM) specifications.

Learning Outcomes:

- Demonstrate knowledge of electrical theory and its applications.
- Demonstrate knowledge of equipment and procedures used to test electrical and electronic components.
- Demonstrate knowledge of electrical schematics, their applications and interpretation.

Objectives and Content:

1. Explain basic electrical theory.
2. Define terminology associated with electrical and electronic components.
3. Identify hazards and describe safe work practices pertaining to electrical and electronic components.
 - i) personal
 - ii) vehicle
 - hybrid/alternate fuel
4. Identify basic electrical and electronic components and describe their applications and operation.
5. Identify instruments used to test electrical and electronic circuits and components and describe their applications and procedures for use.
6. Identify electrical schematics and describe their purpose and applications.
7. Describe the procedures used to interpret electrical schematics in the repair of electrical systems and electronic components.
 - i) OEM specifications
8. Describe the procedures used to test electrical and electronic circuits and components.

ABR-235 Batteries

Learning Outcomes:

- Demonstrate knowledge of batteries, their applications and operation.
- Demonstrate knowledge of procedures to test and charge batteries.
- Demonstrate knowledge of procedures to remove and replace batteries.

Objectives and Content:

1. Define terminology associated with batteries.
2. Identify hazards and describe safe work practices pertaining to batteries.
 - i) PPE
 - ii) conventional
 - handling
 - storage
 - disposal and recycling
 - iii) hybrid/alternate fuel
3. Identify types of batteries and describe their purpose, location, construction, operation and ratings.
 - i) lead acid
 - ii) hybrid/alternate fuel
4. Describe the procedures used to test batteries.
5. Describe the procedures used to charge batteries.
6. Describe the procedures used to remove and replace batteries.
7. Identify the considerations relating to the removal and replacement of battery packs in hybrid/alternate fuel vehicles.
 - i) OEM specifications
 - ii) training/certification requirements

Learning Outcomes:

- Demonstrate knowledge of metal working procedures for aluminum panel repair.

Objectives and Content:

1. Define terminology associated with aluminum panel repair.
2. Identify hazards and describe safe work practices pertaining to aluminum panel repair.
 - i) personal
 - ii) equipment
 - iii) vehicle
 - iv) shop/facility
3. Identify the series of aluminum.
4. Identify types of damage to aluminum panels.
 - i) direct
 - ii) indirect
5. Identify considerations and requirements for performing metal work on aluminum panels.
 - i) tool selection
 - ii) repair sequence
 - iii) protection of adjacent panels
 - iv) panel preparation
 - v) corrosion protection
6. Identify types of panels and describe their associated repair procedures.
 - i) accessible
 - hammer and dolly
 - shrinking (hot or cold)
 - ii) limited access
 - prybar
 - pick
 - dent puller

7. Describe the procedures used to rough out and align damaged aluminum panels.
8. Describe the procedures used to prepare aluminum panels for finishing.

Practical Objectives:

2. Rough out and align damaged aluminum panels.
3. Prepare aluminum panels for finishing.
4. Remove and re-install non-structural outer body panels.
5. Replace non-structural outer body panels.

ABR-225

Non-Structural Outer Body Panels

Learning Outcomes:

- Demonstrate knowledge of non-structural outer body panel repair and replacement procedures.
- Demonstrate knowledge of procedures used to align and adjust non-structural outer body panels.

Objectives and Content:

1. Define terminology associated with non-structural outer body panels.
2. Identify hazards and describe safe work practices pertaining to repairing and replacing non-structural outer body panels.
3. Identify non-structural outer body panels and their characteristics.
4. Identify tools and equipment relating to non-structural outer body panels and describe their applications and the procedures used to repair or replace them.
5. Describe the procedures used to repair non-structural outer body panels.
 - i) OEM specifications
 - ii) industry accepted standards
6. Describe the procedures used to remove and re-install non-structural outer body panels.
7. Describe the procedures used to replace non-structural outer body panels.
 - i) full replacement
 - ii) sectioning
8. Describe the procedures used to adjust and align non-structural outer body panels.
 - i) fit
 - ii) function

9. Describe the procedures and techniques used to protect electrical and electronic systems and components during repair.
 - i) hybrid/alternate fuel vehicles
 - ii) conventional vehicles

Practical Objectives:

1. Repair non-structural outer body panels.
2. Remove and re-install non-structural outer body panels.
3. Replace non-structural outer body panels.
4. Adjust and align non-structural outer body panels.
5. Protect electrical and electronic systems and components during repair.

LEVEL 3

ABR-XXX MIG Brazing (NS Specific)

Learning Outcomes:

- Demonstrate knowledge of MIG brazing and its applications.
- Demonstrate knowledge of MIG brazing procedures.

Objectives and Content:

1. Define terminology associated with MIG brazing.
2. Identify hazards and describe safe work practices pertaining to MIG brazing.
 - i) personal
 - ii) equipment
 - iii) vehicle
 - iv) shop/facility
3. Describe MIG brazing and its applications.
4. Describe the procedures used to perform MIG brazing.

Practical Objectives:

1. Perform MIG brazing.

ABR-155 Squeeze-Type Resistance Spot Welding (RSW)

Learning Outcomes:

- Demonstrate knowledge of squeeze-type resistance spot welding and its applications.
- Demonstrate knowledge of squeeze-type resistance spot welding procedures.

Objectives and Content:

1. Define terminology associated with squeeze- type resistance spot welding (STRSW).
2. Identify hazards and describe safe work practices pertaining to squeeze-type resistance spot welding.
 - i) personal
 - ii) equipment
 - iii) vehicle
 - iv) shop/facility
3. Describe squeeze-type resistance spot welding and its applications.
4. Describe the procedures used to perform squeeze-type resistance spot welding.

Practical Objectives:

1. Perform squeeze-type resistance spot welding.

ABR-XXX Gas Metal Arc Welding (Aluminum) (NS Specific)

Learning Outcomes:

- Demonstrate knowledge of the procedures to weld aluminum using the Gas Metal Arc Welding process.
- Demonstrate knowledge of weld defects, their causes and the procedures to prevent and correct them.

Objectives and Content:

5. Define terminology associated with gas metal arc welding.
6. Identify hazards and describe safe work practices pertaining to gas metal arc welding.
 - i) personal
 - ii) equipment
 - iii) vehicle
 - iv) shop/facility
3. Describe gas metal arc welding and its applications.
4. Identify gas metal arc welding equipment and accessories and describe their characteristics and applications.
5. Describe the procedures used to set-up, operate and shut-down gas metal arc welding equipment.
6. Describe the procedures used to perform basic maintenance and troubleshooting of gas metal arc welding equipment.
7. Identify types of welds performed using gas metal arc welding equipment.
 - i) plug
 - ii) continuous (fillet)
 - iii) stitch
 - iv) tack

8. Identify types of joint assembly and describe their characteristics and applications.
 - i) lap joint
 - ii) butt joint

9. Describe the procedures used to weld aluminum using the gas metal arc welding process.

10. Identify types of weld defects and describe their causes.
 - i) porosity
 - ii) burn through
 - iii) overlap
 - iv) excess weld splatter

11. Describe the procedures used to prevent and correct weld defects.
 - i) proper penetration of metal
 - ii) appropriate penetration of the weld

Practical Objectives:

1. Prevent and correct weld defects.
2. Weld aluminum using the gas metal arc welding process.

ABR-220 Structural Components

Learning Outcomes:

- Demonstrate knowledge of the procedures and techniques used to repair and replace structural components.
- Demonstrate knowledge of procedures and techniques used to adjust and align structural components.

Objectives and Content:

1. Define terminology associated with structural components.
2. Identify hazards and describe safe work practices pertaining to repairing or replacing structural components.
3. Identify structural components and describe their characteristics.
4. Describe the procedures used to inspect and maintain structural components.
 - i) corrosion
 - ii) collision
5. Identify tools and equipment relating to structural components and describe their applications and procedures for use.
6. Describe the procedures and techniques used to repair structural components.
 - i) OEM specifications
 - ii) industry accepted standards
7. Describe the procedures used to remove and re-install structural components.
8. Describe the procedures used to replace structural components.
 - i) full replacement
 - ii) sectioning
9. Describe the procedures used to adjust and align structural components.

10. Describe the procedures and techniques used to protect electrical and electronic systems and components during repair.
 - i) hybrid/alternate fuel vehicles
 - ii) conventional vehicles

Practical Objectives:

1. Repair structural components.
2. Remove and re-install structural components.
3. Replace structural components.
4. Adjust and align structural components.
5. Protect electrical and electronic systems and components during repair.

Learning Outcomes:

- Demonstrate knowledge of procedures used for inspecting mechanical systems and components.
- Demonstrate knowledge of procedures used to determine damage to mechanical systems and components.
- Demonstrate knowledge of procedures used to repair and replace mechanical systems and components.

Objectives and Content:

1. Define terminology associated with mechanical systems and components.
2. Identify hazards and describe safe work practices pertaining to servicing mechanical systems and components.
 - i) personal
 - ii) shop/facility
 - iii) equipment
 - iv) environmental
3. Identify mechanical components.
 - i) drive train
 - ii) exhaust system
 - iii) fuel system
 - iv) heating/cooling system
4. Interpret regulations and documentation relating to servicing mechanical systems.
 - i) jurisdictional regulations
 - ii) federal regulations
5. Identify tools and equipment relating to mechanical systems and components and describe their applications and procedures for use.
6. Describe the procedures used to inspect mechanical systems for collision related damage.

7. Describe the procedures used to remove and re-install mechanical components in order to perform collision repairs.
8. Describe the procedures used to clean, repair and replace mechanical system components.
9. Describe the procedures used to perform operational check of mechanical systems and components.

Practical Objectives:

1. Inspect mechanical systems for collision-related damage.
2. Remove and re-install mechanical components in order to perform collision repairs.
3. Clean, repair and replace mechanical system components.
4. Perform operational check of mechanical systems and components.

ABR-215 Restraint Systems

Learning Outcomes:

- Demonstrate knowledge of restraint systems, their components and operation.
- Demonstrate knowledge of procedures used to replace restraint systems.

Objectives and Content:

1. Define terminology associated with restraint systems.
2. Identify hazards and describe safe work practices pertaining to restraint systems.
 - i) handling
 - ii) storage
 - iii) disposal
3. Identify types of restraint systems and describe their location, components and operation.
 - i) active
 - ii) passive
4. Interpret documentation pertaining to restraint systems.
 - i) service manuals
 - ii) OEM specifications
5. Describe the procedures used to install, inspect, and remove seat belt restraint systems and their related components.
6. Describe the procedures used to install, inspect, and remove air bags and their related components.
7. Describe the procedures used to perform operational check of restraint systems.

Learning Outcomes:

- Demonstrate knowledge of procedures to determine damage to electrical and electronic systems and components.
- Demonstrate knowledge of procedures for diagnosing electrical and electronic systems and components.
- Demonstrate knowledge of procedures to repair and replace electrical and electronic components.
- Demonstrate knowledge of safety procedures while diagnosing and repairing electrical and electronic components.

Objectives and Content:

1. Identify electrical systems, electronic systems and accessories.
 - i) vehicle management systems
 - ii) electrical generation and distribution systems
 - iii) lighting systems
 - iv) personal comfort systems
 - v) hybrid/electric propulsion systems
2. Identify tools and equipment relating to electrical and electronic repairs and adjustments and describe their applications and procedures for use.
3. Describe the procedures used to protect electrical and electronic systems during repairs.
 - i) hybrid/alternate fuel vehicles
 - ii) conventional vehicles
4. Describe electrical and electronic damage associated with collisions.
5. Describe the procedures used to diagnose electrical or electronic systems and their associated components.
6. Identify the procedures used to repair, adjust and replace electrical and electronic systems and components.
7. Describe the procedures used to restore corrosion protection to electrical components.

Learning Outcomes:

- Demonstrate knowledge of refinishing materials, their characteristics and applications.
- Demonstrate knowledge of the procedures used for mixing and applying topcoats.

Objectives and Content:

1. Explain colour theory.
2. Describe the procedures used for colour matching.
3. Identify the types of refinishing and describe their characteristics and applications.
 - i) blend
 - ii) panel
 - iii) complete
4. Review types of topcoat finishes and describe their characteristics.
 - i) single-stage
 - ii) multi-stage
 - solvent
 - water
 - iii) clear
4. Describe the procedures used to mix topcoats.
 - i) determine required colour
 - ii) interpret manufacturers' specifications
 - iii) intermix required components
 - iv) mix combined ingredients
 - v) verify correct colour and consistency is achieved
5. Describe the procedures used to apply topcoats.
 - i) interpret manufacturers' specifications
 - ii) select equipment and accessories
 - iii) apply topcoat per specifications

6. Describe the procedures used to refinish plastic parts.
 - i) interior
 - ii) exterior
7. Identify topcoat defects that occur during application and describe the procedures used to prevent and correct them.
8. Describe the procedures used to polish vehicle exterior.
9. Describe the procedures used to correct topcoat defects.
 - i) colour sanding
 - ii) buffing

Practical Objectives:

1. Mix and apply topcoats.
2. Refinish plastic parts.
3. Polish vehicle exterior.
4. Correct topcoat defects.

LEVEL 4

MENT-1802

Workplace Mentoring II (Nova Scotia Unit of Instruction)

Learning Outcomes:

- Identify and explain strategies for teaching workplace skills.
- Demonstrate strategies to assist in teaching skills in the workplace

Objectives and Content:

1. Describe the impact of your own experiences in teaching skills.
2. Identify the different roles played by a workplace mentor.
3. Describe the six-step approach to teaching skills.
4. Explain the importance of identifying the point of the lesson.
5. Identify how to choose a good time to present a lesson.
6. Explain the importance of linking the lessons.
7. Identify the components of the skill (the context).
8. Describe considerations for demonstrating a skill.
9. Identify types of skill practice.
10. Describe considerations in setting up opportunities for skill practice.
11. Explain the importance of providing feedback.
12. Identify techniques for giving effective feedback.
13. Describe a skill assessment.
14. Identify methods of assessing progress.
15. Explain how to adjust a lesson to different situations.

Resources:

- Recommended resource to use in the delivery of this unit:
www.apprenticeship.nsc.ca/mentoring/apprentice.htm

ABR-255 Damage Analysis of Conventional Frames and Unitized Bodies

Learning Outcomes:

- Demonstrate knowledge of procedures used to analyze damage to conventional frames and unitized bodies.

Objectives and Content:

1. Define terminology associated with the damage analysis of conventional frames and unitized bodies.
2. Identify hazards and describe safe work practices pertaining to the damage analysis of conventional frames and unitized bodies.
3. Identify energy management zones in conventional frames and unitized bodies.
4. Identify tools and equipment relating to damage analysis of conventional frames and unitized bodies and describe their applications and procedures for use.
5. Describe the procedures and considerations used for analyzing damage to unitized bodies.
6. Describe the procedures and considerations used for analyzing damage to conventional frames.

Learning Outcomes:

- Demonstrate knowledge of the procedures used to perform damage analysis.
- Demonstrate knowledge of the procedures used to prepare estimate documentation.

Objectives and Content:

1. Define terminology associated with damage analysis and estimate documentation.
2. Describe the importance of effective communication relating to preparing estimates.
 - i) customers
 - ii) co-workers
 - iii) appraisers
 - iv) insurance adjusters
3. Identify the sources of information used in the preparation of estimates.
4. Describe the procedures used to perform damage analysis.
5. Describe the procedures used to prepare estimate documentation.

ABR-130 Post-Repair Vehicle Inspection

Learning Outcomes:

- Demonstrate knowledge of the procedures used to perform a visual inspection.
- Demonstrate knowledge of vehicle component operation.

Objectives and Content:

1. Define terminology associated with post-repair vehicle inspection.
2. Identify hazards and describe safe work practices pertaining to post-repair vehicle inspection.
3. Identify the procedures used to perform a visual inspection of the vehicle.
4. Identify vehicle components requiring operational checks.
5. Describe the procedures used to perform vehicle component operational checks.
6. Identify the purpose and procedures for conducting a vehicle road test.

Practical Objectives:

1. Perform vehicle component operational checks.

ABR-185 Stationary Glass

Learning Outcomes:

- Demonstrate knowledge of stationary glass, its characteristics and importance to vehicle structure.
- Demonstrate knowledge of the procedures to replace stationary glass to OEM standards.

Objectives and Content:

1. Define terminology associated with stationary glass.
2. Identify hazards and describe safe work practices pertaining to stationary glass.
3. Identify tools and equipment relating to stationary glass and describe their applications and procedures for use.
4. Explain the importance of stationary glass to the vehicle structure/integrity.
5. Identify types of stationary glass and describe their characteristics.
6. Identify stationary glass components and accessories and describe their purpose and applications.
7. Identify fastening methods for stationary glass and their associated components.
 - i) mechanical
 - ii) gasket mounted
 - iii) bonded
8. Identify materials used for stationary glass replacement and describe their characteristics and procedures for use.
9. Describe the procedures used to determine if stationary glass can be repaired or if replacement is necessary.
10. Describe the procedures used to remove and install stationary glass and its related components

11. Identify the types of leaks associated with stationary glass and describe the procedures used to detect and repair them.
 - i) wind
 - ii) water

Practical Objectives:

1. Inspect vehicle for water leaks and wind noise.
2. Prepare vehicle for installation of stationary glass.
 - i) fit
 - ii) finish

ABR-260

Unitized Body Repairs

Learning Outcomes:

- Demonstrate knowledge of equipment used to repair unitized bodies, their applications and procedures for use.
- Demonstrate knowledge of procedures used to repair unitized bodies.
- Demonstrate knowledge of anchoring and pulling techniques and procedures.
- Demonstrate knowledge of sectioning procedures for unitized bodies.

Objectives and Content:

1. Define terminology relating to repairing unitized bodies.
2. Identify hazards and describe safe work practices pertaining to straightening and repairing unitized bodies.
 - i) personal
 - ii) shop/facility
 - iii) vehicle
3. Identify types of measuring equipment and describe their applications and procedures for use.
4. Identify types of damage and determine the appropriate repair procedures.
5. Identify types of welding equipment and accessories used for unitized body repairs and describe their applications and procedures for use.
6. Identify straightening equipment and describe their applications and procedures for use.
7. Identify anchoring and pulling techniques used for unitized body repair and describe their applications and procedures for use.
8. Describe the procedures used to repair unitized bodies.
 - i) OEM specifications
 - ii) industry accepted standards

- iii) welding
 - steel
 - aluminum
 - iv) adhesive bonding
 - v) weld bonding
9. Explain technician liability and responsibility for proper repair.
10. Describe the procedures used to section unitized bodies.
- i) OEM specifications
 - ii) industry accepted standards

Practical Objectives:

1. Repair and section unitized bodies (demonstration only).

Learning Outcomes:

- Demonstrate knowledge of equipment used to repair and align frames, their applications and procedures for use.
- Demonstrate knowledge of procedures used to repair and align frames.
- Demonstrate knowledge of sectioning procedures for frames.
- Demonstrate knowledge of anchoring and pulling techniques and procedures.

Objectives and Content:

1. Define terminology relating to repairing conventional frames.
2. Identify hazards and describe safe work practices pertaining to repairing and aligning conventional frames.
 - i) personal
 - ii) shop/facility
 - iii) vehicle
3. Identify types of conventional frame construction and describe their characteristics.
4. Identify types of welding equipment and accessories used for conventional frame repair and describe their applications and procedures for use.
5. Identify types of measuring equipment and describe their applications and procedures for use.
6. Identify types of damage and determine the appropriate repair procedures.
7. Identify straightening equipment and describe its applications and procedures for use.
8. Identify anchoring techniques used for conventional frame repair and describe their applications and procedures for use.

9. Describe the procedures used to repair conventional frames.
 - i) OEM specifications
 - ii) industry accepted standards
 - iii) welding
 - steel
 - aluminum

10. Describe the procedures used to section a conventional frame.
 - i) OEM specifications
 - ii) industry accepted standards

11. Explain technician liability and responsibility for proper repair.

12. Identify anchoring and pulling techniques used for conventional frame repair and describe their applications and procedures for use.

Practical Objectives:

1. Repair and section conventional frame (demonstration only).

Learning Outcomes:

- Demonstrate knowledge of the procedures for inspecting steering, suspension and braking systems and components.
- Demonstrate knowledge of the procedures used to determine damage to steering, suspension and braking systems and components.
- Demonstrate knowledge of the procedures used to repair and replace steering, suspension and braking systems and components.

Objectives and Content:

1. Define terminology associated with steering, suspension and braking systems and their components.
2. Identify hazards and describe safe work practices pertaining to servicing steering, suspension and braking systems and their components.
 - i) personal
 - ii) shop/facility
 - iii) environment
 - iv) liability
3. Identify types of steering and suspension systems and their components.
4. Identify types of braking systems and their components.
5. Interpret regulations and documentation pertaining to servicing steering, suspension and braking systems.
 - i) OEM specifications
6. Identify tools and equipment relating to steering, suspension and braking systems and describe their applications and procedures for use.
7. Describe the procedures used to identify damaged or worn steering and suspension system components.
7. Describe the procedures used to remove and re-install steering, suspension and braking components in order to perform collision repairs.

8. Describe the procedures used to service steering and suspension components.
9. Identify the alignment process and describe its importance in the repair of steering and suspension system components.
10. Describe the procedures used to analyze and replace braking system components.
11. Describe the procedures used to perform operational check of steering, suspension and braking system and components.

Practical Objectives:

1. Identify damaged or worn steering, suspension and braking system components.
2. Remove and install steering, suspension and braking components.
3. Perform operational check of steering, suspension and braking system and components.

MVBA-1830

Program Review

(Nova Scotia Unit of Instruction)

Learning Outcomes:

- Upon successful completion of this unit, the apprentice will complete a study plan based on the National Occupational Analysis.

Objectives and Content:

1. Identify areas of the program where knowledge of theory is weakest.
2. Identify areas where workplace experience is lacking or weak.
3. Identify resources necessary to address areas of shortfall.
4. Identify timelines to address areas of weakness.

Suggested Learning Activities:

1. Conduct a mock certification exam to be used for diagnostic purposes.
2. Review the National Occupational Analysis.
3. Review the Apprentice Logbook.
4. Review the Exam Preparation information found at www.nsapprenticeship.ca under Quick Links, Exam Preparation.
5. Conduct a final mock certification exam.

Resources:

These are the recommended resources to use in the delivery of this unit:

- Exam Preparation information, including videos, occupational analyses, exam counseling sheets, practice exams and sample questions, and other study materials and resources, can be found at www.nsapprenticeship.ca under Quick Links, Exam Preparation.
- Apprentice's personal logbook
- Applicable codes and regulations
- Program texts

Evaluation: pass/fail

Nova Scotia Document Evaluation Form

Thank you for your interest in the development and revision of this document. Upon review of the document, please record your feedback in relation to the following items:

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