Pre-Employment
Plan of Training
Sheet Metal Worker

Government of Newfoundland and Labrador
Department of Immigration, Population Growth and Skills
Apprenticeship and Trades Certification Division

March 2018

PLAN OF TRAINING

Pre-employment

Sheet Metal Worker

March 2018

Newfoundland Labrador

Government of Newfoundland and Labrador
Department of Advanced Education, Skills and Labour
Apprenticeship and Trades Certification Division

Approved by:

Chairperson, Provincial Apprenticeship and Certification Board

Date: March 09, 2018

Preface

This curriculum standard is aligned with the 2018 Level 1 Newfoundland and Labrador Curriculum Standard (NLCS) and the 2018 Red Seal Occupational Standard (RSOS) and National Harmonization sequencing and levels for the Sheet Metal Worker trade. It describes the curriculum content for the Sheet Metal Worker Pre-employment training program.

Acknowledgements

The Provincial Trade Advisory Committee (PTAC), industry representatives, instructors and apprenticeship staff provided valuable input to the development of this provincial plan of training. Without their dedication to quality apprenticeship training, this document could not have been produced.

We offer a sincere thank you.

Contact Information

Department of Immigration, Population Growth and Skills
Apprenticeship and Trades Certification Division
Tel: 709-729-2729
Toll Free: 1-877-771-3737
Email: app@gov.nl.ca
Web: www.gov.nl.ca/atcd

Document Status	Date Distributed	Mandatory Implementation Date	Comments
Approved	March 2018	September 2018	Updated to 2018 RSOS and National Harmonization
Approved	June 2020		Updated Essential Skills courses to 2019 versions. Applied accessibility formatting.

Table of Contents

A. RSOS Comparison Chart

A Red Seal Occupational Standard (RSOS) comparison chart is located in the NLCS for this trade.

B. Program Structure

For each and every course, a formal assessment is required for which 70% is the pass mark. A mark of 70% must be attained in both the theory examination and the practical project assignment, where applicable as documented on an official transcript.

The order of course delivery within each level can be determined by the educational agency, as long as pre-requisite conditions are satisfied.

Upon completion of an entry level program, individuals may be required to complete other certifications (employer or job site specific) in order to gain employment.

A Pre-employment student who becomes an apprentice will also be required to complete Levels 2, 3 & 4 in the NLCS.

Pre-Employment				
Course No.	**IPG No.**	**Course Name**	**Hours**	**Pre-Requisite(s)**
TS1510	-	OH&S	6	None
TS1520	-	WHMIS	6	None
TS1530	-	Standard First Aid	14	None
SL1101	SMW-100	Safety	6	None
SL1111	SMW-110 SMW-115 SMW-160 SMW-165	Tools and Equipment	60	TS1530, SL1101
SL1180	SMW-120	Sheet Metal Fundamentals	3	None
SL1121	SMW-205	Hoisting, Lifting and Rigging	18	SL1101
SL1131	SMW-155	Fabrication Fundamentals	30	SL1111
SL1445	SMW-120	Metallurgy	10	None
SL1151	SMW-125 SMW-145	Drafting, Pattern Development and Layout	30	None
SL1303		Air Handling Systems I	18	None

Pre-Employment				
Course No.	**IPG No.**	**Course Name**	**Hours**	**Pre-Requisite(s)**
SL1161	SMW-210	Blueprint Reading	30	None
SL1241	SMW-215	Layout and Fabrication - Parallel Lines	90	SL1131, SL1151
SL1251	SMW-220 SMW-315	Layout and Fabrication - Radial Lines I (Basic)	90	SL1131, SL1151
SL1261	SMW-225	Layout and Fabrication - Triangulation I	60	SL1131, SL1151
SL1630	SMW-320	Layout and Fabrication - Triangulation II	60	SL1261
SL1350	SMW-430	Oxy-Acetylene Welding and Cutting	30	TS1530, SL1101
SL1280	SMW-135	Plasma Arc Cutting	12	TS1530, SL1101
SL1430	SMW-425	Shielded Metal Arc Welding (SMAW)	45	TS1530, SL1101
SL1440	SMW-130	Introduction to Gas Metal Arc Welding (GMAW)	30	SL1430
SL1450	SMW-235	Introduction to Gas Tungsten Arc Welding (GTAW)	60	SL1430
SL1741	SMW-330	Air Quality Management	42	None
SL1770	SMW-140	Soldering	30	SL1350
AM1000	--	Introduction to Essential Skills	9	None
AM1101	--	Math Essentials*	42	None
AM1301	--	Sheet Metal Math Fundamentals	42	AM1101
CM2161	--	Communication Essentials	36	None
SD1761	--	Workplace Essentials	24	None
MC1062	--	Computer Essentials	15	None
AP1102		Introduction to Apprenticeship	12	None

Pre-Employment				
Course No.	**IPG No.**	**Course Name**	**Hours**	**Pre-Requisite(s)**
OT1191	-	Work Term	60	None
Total Hours			1020	

*A student who can meet the mathematics requirement through an ACUPLACER® test may be exempted from AM1101 - Math Essentials. Please check with your training institution.

Required Work Experience

Pre-Employment

TS1510 Occupational Health and Safety

Learning Outcomes:

- Demonstrate knowledge of interpreting the Occupational Health and Safety Act, laws and regulations.
- Demonstrate knowledge of understanding the designated responsibilities within the laws and regulations such as the right to refuse dangerous work; and the importance of reporting accidents.
- Demonstrate knowledge of how to prevent accidents and illnesses.
- Demonstrate knowledge of how to improve health and safety conditions in the workplace.

Duration: 6 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Interpret the Occupational Health and Safety Act laws and regulations.
   i. explain the scope of the act
      - application of the act
      - Federal/Provincial jurisdictions
      - Canada Labour Code
      - rules and regulations
      - private home application
      - conformity of the Crown by the Act

2. Explain responsibilities under the Act and Regulations.
   i. duties of employer, owner, contractors, sub-contractors, employees, and suppliers

3. Explain the purpose of joint health and safety committees.
   i. formation of committee
   ii. functions of committee
   iii. legislated rights
   iv. health and safety representation
   v. reporting endangerment to health
   vi. appropriate remedial action
   vii. investigation of endangerment
   viii. committee recommendation
   ix. employer's responsibility in taking remedial action

4. Examine right to refuse dangerous work.
   i. reasonable grounds for refusal
   ii. reporting endangerment to health
   iii. appropriate remedial action
   iv. investigation of endangerment
   v. committee recommendation
   vi. employer's responsibility to take appropriate remedial action
   vii. action taken when employee does not have reasonable grounds for refusing dangerous work
   viii. employee's rights
   ix. assigning another employee to perform duties
   x. temporary reassignment of employee to perform other duties
   xi. collective agreement influences
   xii. wages and benefits

5. State examples of work situations where one might refuse work.

6. Describe discriminatory action.
   i. definition
   ii. filing a complaint procedure
   iii. allocated period of time a complaint can be filed with the Commission
   iv. duties of an arbitrator under the Labour Relations Act
   v. order in writing inclusion
   vi. report to commission Allocated period of time to request Arbitrator to deal with the matter of the request
   vii. notice of application
   viii. failure to comply with the terms of an order
   ix. order filed in the court

7. Explain duties of commission officers.
   i. powers and duties of officers
   ii. procedure for examinations and inspections
   iii. orders given by officers orally or in writing
   iv. specifications of an order given by an officer to owner of the place of employment, employer, contractor, sub-contractor, employee, or supplier
   v. service of an order
   vi. prohibition of persons towards an officer in the exercise of his/her power or duties
   vii. rescinding of an order
   viii. posting a copy of the order
   ix. illegal removal of an order

8. Interpret appeals of others.
   i. allocated period of time for appeal of an order
   ii. person who may appeal order
   iii. action taken by Commission when person involved does not comply with the order
   iv. enforcement of the order
   v. notice of application
   vi. rules of court

9. Explain the process for reporting of accidents.
   i. application of act
   ii. report procedure
   iii. reporting notification of injury
   iv. reporting accidental explosion or exposure
   v. posting of act and regulations

Practical Requirements:

1. Conduct an interview with someone in your occupation on two or more aspects of the act and report results.

2. Conduct a safety inspection of shop area.

TS1520 Workplace Hazardous Materials Information System (WHMIS)

Learning Outcomes:

- Demonstrate knowledge of interpreting and applying the Workplace Hazardous Materials Information System (WHMIS) Regulation under the Occupational Health and Safety Act.

Duration: 6 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Define WHMIS safety.
   - i. rational and key elements
   - ii. history and development of WHMIS
   - iii. WHMIS legislation
   - iv. WHMIS implementation program
   - v. definitions of legal and technical terms

2. Examine hazard identification and ingredient disclosure.
   - i. prohibited, restricted and controlled products
   - ii. classification and the application of WHMIS information requirements
   - iii. responsibilities for classification
     - the supplier
     - the employer
     - the worker - Classification: rules and criteria
     - information on classification
     - classes, divisions and subdivision in WHMIS
     - general rules for classification
     - class A - compressed gases
     - class B - flammable and combustible materials
     - class C - oxidizing material
     - class D - poisonous and infectious material
     - class E - corrosive material
     - class F - dangerously reactive material
   - iv. products excluded from the application of WHMIS legislation
     - consumer products
     - explosives
     - cosmetics, drugs, foods and devices
     - pest control products
     - radioactive prescribed substances
     - wood or products made of wood
     - manufactured articles

- tobacco or products of tobacco
- hazardous wastes
- products handled or transported pursuant to the Transportation of Dangerous Goods (TDG) Act

v. comparison of classification systems - WHMIS and TDG
vi. general comparison of classification categories
vii. detailed comparison of classified criteria

3. Explain labeling and other forms of warning.
   i. definition of a WHMIS label
      - supplier label
      - workplace label
      - other means of identification
   ii. responsibility for labels
      - supplier responsibility
      - employer responsibility
      - worker responsibility
   iii. introduce label content, design and location
      - supplier labels
      - workplace labels
      - other means of identification

4. Introduce material safety data sheets (MSDS).
   i. definition of a material safety data sheet
   ii. purpose of the data sheet
   iii. responsibility for the production and availability of data sheets
      - supplier responsibility
      - employer responsibility
      - workers responsibility

Practical Requirements:

1. Locate WHMIS label and interpret the information displayed.

2. Locate a MSDS sheet for a product used in the workplace and determine what personal protective equipment and other precautions are required when handling this product.

TS1530 Standard First Aid

Learning Outcomes:

- Demonstrate knowledge of recognizing situations requiring emergency action.
- Demonstrate knowledge of making appropriate decisions concerning first aid.

Duration: 14 Hours

Pre-Requisite(s): None

Practical Requirements:

1. Complete a **St. John Ambulance or Canadian Red Cross** Standard First Aid Certificate course.

SL1101 Safety

Learning Outcomes:

- Demonstrate knowledge of the procedures used to operate fire extinguishing equipment.
- Demonstrate knowledge of safe working practices.

Duration: 6 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Define terminology associated with the Sheet Metal trade.

2. Describe applicable codes and regulations.

3 Describe the classes of fire and identify their associated fire extinguishing equipment.

4. Describe WHMIS regulations.

5. Describe Occupational Health & Safety regulations.

6. Describe inspection procedures of work area for electrical hazards.

7. Describe hazards when working in confined spaces.

8. Describe proper use and maintenance of personal protective safety equipment.
   i. breathing apparatus
   ii. clothing
   iii. foot wear
   iv. eye protection
   v. hearing protection

9. Describe the procedure for selecting, tagging, and locking out mechanical equipment that requires repair or maintenance.

10. Describe the procedures used for maintaining a clean and safe work environment.

Practical Requirements:

1. Prepare a list of the extinguishers available in the sheet metal shop.

2. Demonstrate fire alarm procedures.

3. Practice the use of the various types of extinguishers available in the shop.

4. Select and use ventilation and breathing apparatus.

SL1111 Tools and Equipment

Learning Outcomes:

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

Duration: 60 Hours

Pre-Requisite(s): TS1530, SL1101

Objectives and Content:

1. Identify hazards and describe safe work practices pertaining to tools and equipment.

2. Identify types of hand tools and describe their applications and procedures for use.

3. Identify types of portable power tools and describe their applications and procedures for use.

4. Identify types of powder actuated tools and describe their applications.

5. Identify types of shop tools and equipment and describe their applications and procedures for use.

6. Identify types of Computer Numerical Control (CNC) equipment and describe their applications.
   i. plasma cutting
   ii. punches
   iii. brakes

7. Identify types of measuring and layout tools and equipment and describe their applications and procedures for use.

8. Identify types of soldering/brazing equipment and describe their applications.

9. Describe the procedures used to inspect, maintain and store tools and equipment.

10. Define terminology associated with ladders and work platforms.

11. Identify hazards and describe safe work practices pertaining to ladders and work platforms.
    i. fall protection and arrest
    ii. power lines
    iii. excess loads

12. Interpret codes and regulations pertaining to ladders and work platforms.

13. Identify types of ladders and work platforms, and describe their characteristics and applications.
    i. ladders
    ii. work platforms
        - stationary
        - portable

14. Describe the procedures used to erect and remove ladders and stationary work platforms.

15. Describe the procedures used to inspect, maintain, transport and store ladders and stationary work platforms.

Practical Requirements:

1. Produce work pieces to print specifications using the various types of power cutting equipment.

2. Use combination snips to cut to size a metal blank and circular disk.

3. Cut a circular opening in a metal blank using aviation snips.

4. Cut a piece of angle iron to size using a hack saw.

5. Cut a rectangular opening in a metal blank using a chisel.

6. Perform bending operations of ferrous and non-ferrous materials, using press brake, to specified tolerances/drawing specifications.

7. Use power shears to cut a sample piece to a given measurement and deburr.

8. Produce samples of seams and edges and check for accuracy.

9. Adjust and change punches and dies to create burr free holes.

10. Roll a work piece to a given specification.

11. Perform general maintenance according to manufacturer's specifications on hand and power tools.

12. Perform general maintenance according to manufacturer' specifications on equipment.

13. Prepare lap seams using various methods
    i. sheet metal screws
    ii. pop rivets
    iii. spot welds

SL1180 Sheet Metal Fundamentals

Learning Outcomes:

- Demonstrate knowledge of metals and their characteristics and applications.

Duration: 3 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Define terminology associated with sheet metals.

2. Describe identification systems for metals.
   i. numbering
   ii. colour coding
   iii. gauging

3. Identify types of metals and describe their applications.
   i. steel
   ii. copper
   iii. brass
   iv. aluminum
   v. cast iron
   vi. stainless steel

4. Identify types of basic surface finishes and describe their applications.
   i. mill
   ii. brushed
   iii. mirrored
   iv. dull

5. Identify methods used to work with metals.
   i. forming
   ii. cutting/shearing

iii. punching
iv. drilling
v. joining

6. Describe the procedures used to prevent or correct problems that occur when working metals.

7. Identify types of trade related documents and describe their applications.
   i. manufacturers' specifications
   ii. drawings and specifications
   iii. codes and standards
      - SMACNA
      - ASHRAE
      - National Building Code (NBC)
   iv. work orders
      - change
      - job
      - material

8. Identify types of documentation and describe the procedures used to prepare them.
   i. work orders
   ii. reports
      - hazard assessment
      - safety
      - Worker's Compensation
   iii. maintenance/service records
   iv. stock/inventory records
      - shop
      - job site vehicle

Practical Requirements:

None

SL1121 Hoisting, Lifting and Rigging

Learning Outcomes:

- Demonstrate knowledge of hoisting, lifting and rigging equipment, their applications, limitations and procedures for use.
- Demonstrate knowledge of basic hoisting, lifting and rigging techniques.
- Demonstrate knowledge of the procedures used to perform hoisting and lifting operations.

Duration: 18 Hours

Pre-Requisite(s): SL1101

Objectives and Content:

1. Define terminology associated with hoisting, lifting and rigging.

2. Identify hazards and describe safe work practices pertaining to hoisting, lifting and rigging.

3. Interpret codes and regulations pertaining to rigging, hoisting and lifting.
   i. training and certification requirements

4. Identify types of rigging equipment and accessories and describe their applications, limitations and procedures for use.
   i. rope
   ii. sling
   iii. chain
   iv. hook
   v. spreader bar
   vi. shackle

5. Identify the factors to consider when selecting rigging equipment.
   i. load characteristics
   ii. environment

iii. safety factor

6. Describe the considerations when rigging material/equipment for lifting.
   i. load characteristics
   ii. equipment and accessories
   iii. environmental factors
   iv. anchor points
   v. sling angles

7. Identify types of knots, hitches, splices and bends, and describe the procedures used to tie them.
   i. bowline
   ii. running bowline
   iii. square/reef
   iv. half-hitch

8. Identify types of hoisting and lifting equipment and accessories, and describe their applications and procedures for use.
   i. duct lift
   ii. electric overhead travelling crane
   iii. come-along
   iv. tirfor
   v. chainfall

9. Describe the procedures used to inspect, maintain and store hoisting, lifting and rigging equipment.

10. Explain sling angle when preparing for hoisting and lifting operations.

11. Describe the procedures used for attaching rigging equipment to the load.

12. Identify and interpret basic hand signals used for hoisting and lifting.

13. Identify and describe procedures used to communicate during hoisting, lifting and rigging operations.
   i. hand signals
   ii. electronic communications
   iii. audible/visual

14. Describe the procedures used to ensure the work area is safe for lifting.
    i. supervision of lift
    ii. securing work area
    iii. communication

15. Describe the procedures used to perform a lift.
    i. load determination
    ii. communication methods
    iii. pre-lift checks
    iv. placement of load
    v. post-lift inspection

16. Describe various types of scaffolding.

Practical Requirements:

1. Tie the following using fibre rope:
    i. reef knot
    ii. bowline
    iii. round turn and hitch
    iv. scaffold hitch

2. Demonstrate hand signals for crane operation.

SL1131 Fabrication Fundamentals

Learning Outcomes:

- Demonstrate knowledge of the procedures used to fabricate basic ductwork and fittings.

Duration: 30 Hours

Pre-Requisite(s): SL1111

Objectives and Content:

1. Define terminology associated with fabrication.

2. Interpret codes and regulations pertaining to the fabrication of sheet metal components.

3. Interpret information, pertaining to the fabrication of sheet metal components, found on drawings and specifications.

4. Identify tools and equipment used to fabricate basic sheet metal components, and describe their applications and procedures for use.

5. Identify types of fastening methods used to fabricate ductwork and fittings and describe their associated procedures.
   i. mechanical
   ii. adhesives
   iii. welding

6. Identify types of seams for fabrication of ductwork and fittings and describe the procedures and connectors used to produce them.
   i. longitudinal
      - Pittsburgh Lock
      - groove seam
      - acme lock
      - snap/button lock

ii. transverse
- slip & drive
- duct mate
- TDC/TDF
- companion flanges

7. Identify types of edges for fabrication of ductwork and fittings and describe the procedures used to produce them.

8. Identify types of duct reinforcement.

Practical Requirements:

1. Layout and fabricate a basic duct system.
   i. metallic or non-metallic
   ii. gauge
   iii. joining apparatus
   iv. sealing

2. Fabricate various seams and edges.

3. Fabricate and insulate basic duct run with basic fittings and various types of cleats.

SL1445 Metallurgy

Learning Outcomes:

- Demonstrate knowledge of metals and their properties.
- Demonstrate knowledge of metallurgic principles.

Duration: 10 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Define terminology associated with metallurgy.

2. Describe the properties of metals.
   i. composition
   ii. physical

3. Describe the effects metal working has on metallurgic properties.
   i. stress
   ii. contraction
   iii. expansion
   iv. distortion
   v. work hardening
   vi. annealing
   vii. galvanic action

4. Describe the passivation process.

Practical Requirements:

None.

SL1151 Drafting Pattern Development and Layout

Learning Outcomes:

- Demonstrate knowledge of basic drafting.
- Demonstrate knowledge of basic drafting tools and equipment and their procedures for use.
- Demonstrate basic knowledge of Computer Aided Drafting (CAD) and its use.
- Demonstrate knowledge of basic geometric shapes.

Duration: 30 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Define terminology associated with drafting, pattern development and layout.

2. Identify basic drafting tools and equipment, and describe their applications and procedures for use.

3. Identify layout tools and describe their applications and procedures for use.

4. Identify basic geometric shapes and describe their characteristics.

5. Identify different views used when drafting and describe their applications.
   i. elevation
   ii. plan
   iii. section
   iv. auxiliary

6. Describe the procedures used to develop basic drawings and sketches.
   i. pictorial
   ii. orthographic

7. Identify types of computer technology used for pattern development and describe their applications.

8. Identify types of sheet metal patterns and describe the characteristics and applications.
   i. square-to-round on centre
   ii. right cone
   iii. pipe tee

Practical Requirements:

1. Perform various geometric operations.
   i. bisect a straight line or circle
   ii. construct a perpendicular
   iii. divide a line into a given number of equal parts
   iv. construct parallel lines
   v. construct tangents
   vi. construct an ellipse
   vii. construct a pentagon, octagon and hexagon

2. Layout and fabricate simple fittings.
   i. elbows
   ii. offsets
   iii. duct sections

SL1303 Air Handling Systems I

Learning Outcomes:

- Demonstrate knowledge of installation procedures for air handling systems and their components.

Duration: 18 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Define terminology associated with the installation of air handling systems and components.

2. Identify hazards and describe safe work practices pertaining to the installation of air handling systems and components.

3. Interpret information, pertaining to the installation of air handling systems, found on drawings and specifications.

4. Identify tools and equipment used for the installation of air handling systems, and describe their application, limitations and procedures for use.

5. Identify types of air handling systems, and describe their applications, principles and operation.
   i. exhaust
   ii. make-up air
   iii. supply/return air (central)

6. Identify air handling system components and describe their applications.
   i. sheet metal components
      - ductwork
      - fittings
      - hangers
   ii. system components
      - dampers
      - fire dampers
      - registers/diffusers
      - grilles
      - louvers

7. Describe the procedures used to install air handling system components.

Practical Requirements:

None

SL1161 Blueprint Reading

Learning Outcomes:

- Demonstrate knowledge of the procedures used to interpret and extract information from drawings.
- Demonstrate knowledge of drawings and specifications and their applications.

Duration: 30 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Define terminology associated with drawings.

2. Identify the types of drawings and describe their applications.
   i. civil/site
   ii. architectural
   iii. mechanical
   iv. structural
   v. electrical
   vi. shop drawings
   vii. sketches
   viii. as-built

3. Identify the views used on drawings.
   i. elevation
   ii. plan
   iii. section
   iv. detail
   v. auxiliary

4. Identify the parts of a drawing and describe their purpose and applications.
   lines
   i. lines
   ii. legend

iii. symbols and abbreviations
- duct
- welding
- electrical
- plumbing
- architectural

iv. title block
v. notes
vi. specifications

5. Identify and interpret common symbols and abbreviations found on drawings.

6. Identify the types of scales and describe their applications and procedures for use.

7. Describe metric and imperial systems of measurement.

8. Interpret and extract information from drawings.

Practical Requirements:

1. Interpret blueprints.

SL1241 Layout and Fabrication-Parallel Lines

Learning Outcomes:

- Demonstrate knowledge of the procedures used to develop, wye-branches, two piece elbows and basic branches using the parallel line method of layout.
- Demonstrate knowledge of the procedures used to layout and fabricate flat on top and flat on bottom patterns.
- Demonstrate knowledge of the procedures used to layout and fabricate round tees.
- Demonstrate knowledge of the procedures used to layout and fabricate basic gutter mitres.
- Demonstrate knowledge of the procedures used to layout and fabricate round elbows.
- Demonstrate knowledge of the procedures used to layout and fabricate flashings.
- Demonstrate knowledge of the procedures used to layout and fabricate roof jacks.

Duration: 90 Hours

Pre-Requisite(s): SL1131, SL1151

Objectives and Content:

1. Define terminology associated with parallel line development.
   - i. flat-on-top
   - ii. flat-on-bottom
   - iii. pipe
   - iv. tee
   - v. mitre line
   - vi. centerline radius
   - vii. gore
   - viii. seam lines
   - ix. end gore
   - x. symmetry of lines
   - xi. true length of lines

2. Describe procedures to layout and fabricate round tees.
   i. 90º tee with equal diameters
      - patterns for the tee
      - patterns for the hole
   ii. 90º tee with unequal diameters
      - patterns for the tee
      - patterns for the hole
   iii. centered tees at an angle
   iv. off-center tees
   v. off-center tees at an angle

3. Describe procedures used to layout and fabricate flat-on-top and flat-on-bottom patterns.
   i. determine views
   ii. locate views
      - symmetry of lines
   iii. label lines and points
   iv. prepare drawing
   v. determine true length of lines
   vi. determine types of seams, joints and edges
   vii. calculate allowances
   viii. determine stretch outs
   ix. cut pattern
   x. check pattern accuracy

4. Describe procedures used to layout and fabricate basic gutter mitres.

5. Describe the rule of elbow division.

6. Describe procedures used to layout and fabricate round and multi-piece elbows.

7. Describe procedures used to layout and fabricate roof jacks.

8. Describe procedures used to layout and fabricate wye branches.

Practical Requirements:

1. Layout and fabricate a basic roof jack as per specifications.

2. Layout and fabricate a basic two-piece elbow as per specifications.

3. Layout and fabricate a basic branch pattern as per specifications.

4. Layout and fabricate patterns as per specifications.
   i. flat-on-top
   ii. flat-on-bottom
   iii. round tee
   iv. basic gutter mitre
   v. multi-piece elbow

SL1251 Layout and Fabrication-Radial Lines I (Basic)

Learning Outcomes:

- Demonstrate knowledge of the procedures used to layout and fabricate tapers on a pitch.
- Demonstrate knowledge of the procedures used to layout and fabricate scalene and oblique cones (eccentrics).

Duration: 90 Hours

Pre-Requisite(s): SL1131, SL1151

Objectives and Content:

1. Define terminology associated with radial line pattern development.
   - i. apex
   - ii. frustum of a cone
   - iii. truncated cones
   - iv. right cones
   - v. true length lines
   - vi. eccentrics

2. Identify and describe the types of fittings that require the radial line method of layout.
   - i. funnel
   - ii. tapers
   - iii. branches

3. Describe procedures to layout patterns and fabricate tapered fittings.
   - i. determine views
   - ii. locate views
     - symmetry of lines
   - iii. label lines and points
   - iv. prepare drawing
   - v. determine true length of lines
   - vi. determine types of seams, joints and edges
   - vii. calculate allowances

viii. determine stretch outs
ix. check pattern accuracy
x. cut pattern

Practical Requirements:

1. Layout basic patterns and fabricate tapered fittings as per specifications.
   i. basic frustum
   ii. basic truncated cone

2. Layout pattern and fabricate fittings as per specifications.
   i. tapers on a pitch
   ii. scalene or oblique cones (eccentrics)

SL1261 Layout and Fabrication-Triangulation I

Learning Outcomes:

- Demonstrate knowledge of the procedures used to layout and fabricate basic square-to-rounds. using the triangulation method.
- Demonstrate knowledge of the procedures used to develop basic transitions using the triangulation method.

Duration: 60 Hours

Pre-Requisite(s): SL1131, SL1151

Objectives and Content:

1. Define terminology associated with triangulation.
   i. true length of lines
   ii. lines of symmetry
   iii. square-to-rounds (e.g., change in shape)
   iv. transitions (e.g., change in size)

2. Identify and describe the types of patterns and fittings that require the triangulation method.
   i. square-to-rounds
   ii. transitions

3. Describe two methods of finding true length of lines.
   i. separate
   ii. superimposed

4. Describe procedures to layout and fabricate patterns for basic transitions and square-to-rounds.
   i. determine views
   ii. locate views
      - symmetry of lines
   iii. label lines and points
   iv. prepare drawing

v. determine true length of lines
vi. determine types of seams, joints, and edges
vii. calculate allowances
viii. determine stretch outs
ix. check pattern accuracy
x. cut pattern

Practical Requirements:

1. Layout and fabricate basic transitions.

2. Layout and fabricate basic square-to-rounds.

SL1630 Layout and Fabrication-Triangulation II

Learning Outcomes:

- Demonstrate knowledge of the procedures used to layout and fabricate basic drop cheek elbows and rolling offsets.
- Demonstrate knowledge of the procedures used to layout and fabricate basic wye-branches.
- Demonstrate knowledge of the procedures used to layout and fabricate basic tapered elbows.

Duration: 60 Hours

Pre-Requisite(s): SL1261

Objectives and Content:

1 Describe procedures used to layout patterns and fabricate basic cylindrical rolling offsets.
   i. determine views
   ii. locate views
      - symmetry of lines
   iii. label lines and points
   iv. prepare drawing
   v. determine true length of lines
   vi. determine types of seams, joints, and edges
   vii. calculate allowances
   viii. determine stretch outs
   ix. check pattern accuracy
   x. cut pattern

2. Describe procedures used to layout patterns and fabricate square or rectangular basic drop cheek elbows and offsets.
   i. determine views
   ii. locate views

- symmetry of lines

iii. label lines and points
iv. prepare drawing
v. determine true length of lines
vi. determine types of seams, joints, and edges
vii. calculate allowances
viii. determine stretch outs
ix. check pattern accuracy
x. cut pattern

3. Describe procedures used to layout patterns and fabricate basic wye-branches and tapered elbows.
   i. determine views
   ii. locate views
      - symmetry of lines

   iii. label lines and points
   iv. prepare drawing
   v. determine true length of lines
   vi. determine types of seams, joints, and edges
   vii. calculate allowances
   viii. determine stretch outs
   ix. check pattern accuracy
   x. cut pattern

Practical Requirements:

1. Layout and fabricate basic cylindrical rolling offsets as per specifications.

2. Layout and fabricate rectangular or square basic drop cheek elbows and offsets as per specifications.

3. Layout and fabricate basic wye-branches and tapered elbows as per specifications.

SL1350 Oxy-Acetylene Welding and Cutting

Learning Outcomes:

- Demonstrate knowledge of the procedures to use oxy-fuel equipment to perform basic welding, cutting and brazing.

Duration: 30 Hours

Pre-Requisite(s): TS1530, SL1101

Objectives and Content:

1. Identify and describe oxy-fuel equipment, its characteristics and applications.

2. Describe the safe operation of oxy-fuel equipment.
   i. cleaning
   ii. threads
   iii. pressure
   iv. fuel gas
   v. oxygen
   vi. set up procedures
   vii. lighting procedures
   viii. flame adjustment
   ix. shut down procedures

3. Identify the metals that can be cut by oxy-fuel equipment.

4. Describe the types of flames, pressure and tip sizes and the application of each.

5. Describe the various types of torches and their applications.

6. Describe the principles of the oxy-fuel welding process.
   i. flame adjustment
   ii. filler metals
      - brazing rod
      - silver / phosphorous

Practical Requirements:

1. Set up and use cutting equipment.
2. Set up and use welding equipment.
3. Fusion weld in the flat position.
4. Braze weld in the horizontal position.
5. Shut down oxy-fuel equipment.

SL1280 Plasma Arc Cutting

Learning Outcomes:

- Demonstrate knowledge of plasma arc equipment and accessories.
- Demonstrate knowledge of the procedures used to cut with plasma arc equipment.

Duration: 12 Hours

Pre-Requisite(s): TS1530, SL1101

Objectives and Content:

1, Define terminology associated with plasma arc cutting.

2. Identify hazards and describe safe work practices pertaining to the use of plasma arc cutting equipment.
   i. personal
   ii. shop/facility
   iii. equipment
   iv. ventilation

3. Describe the plasma arc process.
   i. general precautions
   ii. equipment and accessories
      - types of torches
      - electrodes and tips
   iii. types of arcs
   iv. gases
   v. power source
   vi. procedures to set-up equipment and check its operation

4. Describe the procedures used to set-up, adjust and shut down plasma arc equipment.

5. Describe the procedures used to inspect and maintain plasma arc equipment.

6. Describe the procedures used to cut using plasma arc equipment.

Practical Requirements:

1. Perform plasma arc cutting operations.

SL1430 SMAW (Shielded Metal Arc Welding)

Learning Outcomes:

- Demonstrate knowledge of shielded metal arc welding (SMAW) welding equipment, consumables and accessories.
- Demonstrate knowledge of the procedures used to set - up, adjust, operate, inspect and maintain SMAW welding equipment.
- Demonstrate knowledge of the procedures used to deposit a weld bead using SMAW welding equipment.

Duration: 45 Hours

Pre-Requisite(s): TS1530, SL1101

Objectives and Content:

1. Describe the purpose, applications and advantages of SMAW.

2. Define terminology associated with SMAW welding.
   - i. mild steel and low alloy steel electrodes
   - ii. AC (Alternating Current)
   - iii. DC (Direct Current) (polarity)
   - iv. arc blow
   - v. duty cycle
   - vi. rated amperage
   - vii. general precautions
   - viii. electrodes
   - ix. equipment and accessories
     - personal protective equipment
     - ground clamps
     - terminal lugs
     - electrode holders

3. Identify hazards and describe safe work practices pertaining to SMAW welding.
   i. personal
   ii. shop/facility
   iii. fire and explosion
   iv. equipment
   v. ventilation/fumes
   vi. storage/handling

4. Identify codes and standards and symbols pertaining to SMAW welding.
   i. Canadian Standards Association (CSA)
   ii. American Society of Mechanical Engineers (ASME)
   iii. American Welding Society (AWS)

5. Identify SMAW welding equipment, consumables and accessories and describe their applications.

6. Describe the procedures used to set- up and adjust SMAW welding equipment.

7. Describe the procedures used to strike and maintain an arc using SMAW welding equipment.

8. Describe the procedures and techniques used to deposit a weld bead using SMAW welding equipment.
   i. arc length
   ii. travel speed
   iii. work and travel angles
   iv. visual inspection

9. Describe the procedures used to inspect and maintain SMAW welding equipment.

Practical Requirements.

1. Set-up welding equipment check the various external components.

2. Tack weld with (6011) 4311 and (7018) 4918 electrodes.

3. Deposit stringer and weave beads with (6011) 4311 and (7018) 4918 electrodes.

4. Perform padding with 4311 and 4918 electrodes.

5. Perform fillet welds.
   i. T-joint
   ii. butt Joint

SL1440 Introduction to Gas Metal Arc Welding (GMAW)

Learning Outcomes:

- Demonstrate knowledge of gas metal arc welding (GMAW) welding equipment, consumables and accessories.
- Demonstrate knowledge of the procedures used to set-up, adjust, operate, inspect and maintain GMAW welding equipment.
- Demonstrate knowledge of the procedures used to deposit a weld bead using GMAW welding equipment.

Duration: 30 Hours

Pre-Requisite(s): SL1430

Objectives and Content:

1. Describe the purpose, applications and advantages of GMAW.

2. Identify hazards and describe safe work practices pertaining to the use of GMAW equipment.
   i. personal
   ii. shop/facility
   iii. equipment
   iv. ventilation

3. Define terminology associated with GMAW welding.
   i. general precautions
   ii. equipment and accessories
      - shielding gas and regulators
      - electrode wire
      - gun
      - feeder
      - power source
      - nozzle
      - cable connections

- cables
- pulsed arc machines

iii. metal transfers
iv. polarity
v. arc voltage
vi. slope and adjustment
vii. inductance
viii. travel speed
ix. wire feed speed
x. penetration
xi. travel and work angles
xii. manipulation
xiii. guide tubes
xiv. contact tips
xv. liners

4. Identify codes, standards and symbols pertaining to GMAW welding.
   i. Canadian Standards Association (CSA)
   ii. American Society of Mechanical Engineers (ASME)
   iii. American Welding Society (AWS)

5. Identify GMAW welding equipment, consumables and accessories and describe their applications.

6. Describe the procedures used to assemble and disassemble GMAW welding equipment.

7 Describe the procedures used to establish and maintain an arc using GMAW welding equipment.
   i. starting and stopping the weld
      - finishing end of the joint
   ii. filler metal
   iii. adjustment
   iv. shielding gases (pre and post weld)
   v. drive rolls
   vi. gun
   vii. stick-out
   vii. speed

8. Identify the modes of transfer relating to GMAW welding and describe their characteristics and applications.
   i. short circuiting
   ii. globular
   iii. spray
   iv. pulse

9. Describe the procedures and techniques used to deposit a weld bead using GMAW welding equipment.
   i. electrode extension
   ii. travel speed
   iii. work and travel angles
   iv. flow rates
   v. stringer
   vi. weave
   vii. stick-out
   viii. travel speed
   ix. work and travel angles
   x. visual inspection

10. Describe the procedures used to inspect, maintain and troubleshoot GMAW welding equipment

Practical Requirements:

1. Set-up GMAW equipment.

2. Change electrode wire guide.

3. Adjust and check flow meter.

4. Deposit fillet welds on mild steel, various thickness.

SL1450 Introduction to Gas Tungsten Arc Welding (GTAW)

Learning Outcomes:

- Demonstrate knowledge of gas tungsten arc welding (GTAW) equipment, consumables and accessories.
- Demonstrate knowledge of the procedures used to set-up, adjust, operate, inspect and maintain GTAW welding equipment.
- Demonstrate knowledge of the procedures used to deposit a weld bead using GTAW equipment.

Duration: 60 Hours

Pre-Requisite(s): SL1430

Objectives and Content:

1. Describe the purpose, applications and advantages of GTAW.

2. Define terminology associated with GTAW welding.
   - i. equipment and accessories
     - power sources
     - air-cooled torches
     - water-cooled torches
     - flow meters
   - ii. tungsten electrodes
   - iii. current requirement
   - iv. shielding gases
   - v. travel and work angles
   - vi. filler rods
   - vii. collet
   - viii. collet body
   - ix. cup
   - x. high frequency

3. Identify hazards and describe safe work practices pertaining to the use of GTAW equipment.
   i. personal
   ii. shop/facility
   iii. equipment
   iv. ventilation

4. Interpret codes and regulations pertaining to the use of GTAW equipment for welding mild steel.

5. Identify GTAW welding equipment, consumables and accessories and describe their applications.

6. Describe the procedures used to assemble and disassemble GTAW welding equipment.

7. Describe the procedures used to establish and maintain an arc using GTAW welding equipment.

8. Describe the procedures and techniques used to deposit a weld bead using GTAW welding equipment.
   i. with filler metal
   ii. without filler metal

9. Describe the procedures used to inspect, maintain and troubleshoot GTAW welding equipment.

Practical Requirements:

1. Set-up GTAW equipment.

2. Run beads on mild steel plate.

3. Shut-down equipment.

SL1741 Air Quality Management

Learning Outcomes:

- Demonstrate knowledge of air quality management.

Duration: 42 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Define terminology associated with air quality management.

2. Identify hazards and describe safe work practices pertaining to air quality management.

3. Interpret codes and regulations pertaining to air quality management.

4. Describe considerations and requirements associated with air quality management.
   i. environmental conditions
   ii. intake locations
   iii. exhaust locations

5. Describe the importance of indoor air quality.

6. Identify methods of improving or correcting problems with air quality.
   i. heating/cooling
   ii. ventilation
   iii. conditioning
      - filtration
      - sterilization
      - purification
      - humidification/dehumidification

7. Identify areas requiring special air quality ventilation.
   i. clean/sterile rooms
   ii. industrial/commercial settings

8. Identify the methods used to determine air quality relating to humidity and temperature.

9. Identify air quality problems and describe the procedures used to prevent or correct them.
   i. contamination
   ii. humidity
   iii. temperature (hot/cold zones)
   iv. air motion

10. Describe the impact improper system or component installation can have on air quality.

Practical Requirements:

None

SL1770 Soldering

Learning Outcomes:

- Demonstrate knowledge of equipment used for soldering.
- Demonstrate knowledge of the procedures used to solder various materials.

Duration: 30 Hours

Pre-Requisite(s): SL1350

Objectives and Content:

1. Identify and describe the various types of soldering equipment, its characteristics and applications.
   i. types of soldering irons (copper)
   ii. types of soldering furnaces

2. Describe the safe operation of gas fired furnaces.
   i. leaks
   ii. ventilation
   iii. cleaning
   iv. lighting procedure
   v. shut down procedure

3. Describe the proper method of forging and tinning an iron.

4. Describe the various fluxes used in soldering and their preparation.
   i. corrosive and non-corrosive
   ii. safe handling of acids
   iii. ventilation

5. Describe the various types of solder and their advantages and disadvantages.
   i. Composition
   ii. grading (50/50, 60/40)
   iii. bar solder
   iv. wire solder

v. flux core
vi. beads

6. Describe various soldering methods.
   i. flame color
   ii. sweating a joint
   iii. skimming
   iv. pointing up
   v. capillary action
   vi. seam preparation
   vii. flux removal
   viii. test for leakage

Practical Requirements:

1. Forge and tin a soldering iron.

2. Light and shut down a propane furnace.

3. Solder container having both vertical and horizontal seams.

4. Test for leaks.

AM1000 Introduction to Essential Skills

Learning Outcomes:

- Demonstrate knowledge of the nine nationally recognized essential skills.
- Demonstrate knowledge of the essential skills levels of complexity.
- Demonstrate knowledge of the essential skills required for the learners chosen trade.
- Demonstrate an awareness of essential skills assessments.

Duration: 9 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Identify and describe the essential skills recognized by the Government of Canada through the Office of Literacy and Essential Skills (OLES).
   i. reading
   ii. document use
   iii. numeracy
   iv. writing
   v. oral communication
   vi. working with others
   vii. thinking
   viii. computer use
   ix. continuous learning

2. Describe the Levels of Complexity measurement assigned to essential skills.

3. Identify the essential skills, along with their complexity level, identified as necessary for the learner's trade.
   i. RSOS / NOA content[1]
   ii. OLES Essential Skills Profiles[2]
   iii. OLES tools and support for apprentices and tradespersons[3]

4. Describe the nature and purpose of essential skills assessment.
   i. self-assessment & formal assessment tools
   ii. indicators of deficiencies
   iii. suggestions for improvement

5. Describe the benefits of essential skills improvement.
   i. confidence at work
   ii. employability

iii. success in apprenticeship
iv. wage & job advancement

Practical Requirements:

1. Complete an essential skills self-assessment addressing numeracy, document use and reading. The online Government of Canada Essential Skills Indicator[4] and Essential Skills Self-Assessment for the Trades[5] are to be used unless the instructor provides a similar assessment tool or tools.

2. Participate in a group discussion about the impact of gaps in essential skills that may be revealed by the self-assessments completed, and the value of improving essential skills.

Students are graded complete or incomplete on this practical work, no grade is permitted for self-assessment performance. However, completion of the practical requirements is mandatory for completion of this unit.

Resources:

All footnotes are in the companion document, Resources for Introduction to Essential Skills, which is available online from Apprenticeship and Trades Certification.

AM1101 Math Essentials

Note: It is recommended that AM1100 be delivered in the first semester of the Pre-employment program.

Learning Outcomes:

- Demonstrate knowledge of essential numeracy skills.
- Demonstrate knowledge of mathematics as a critical element of the trade environment.
- Demonstrate knowledge of mathematical principles in trade problem solving situations.
- Demonstrate the ability to solve simple mathematical word problems.

Duration: 42 Hours

Pre-Requisite(s): None

Objectives and Content:

Wherever possible, the instructor is expected to use trade specific examples to reinforce the course objectives.

1. Describe whole number operations.
   i. read, write, count, round off, add, subtract, multiply and divide whole numbers

2. Describe the application of the order of operations in math problems.

3. Describe fraction and mixed number operations.
   i. read, write, add, subtract, multiply and divide fractions

4. Describe decimal operations.
   i. read, write, round off, add, subtract, multiply and divide decimals

5. Describe percent/decimal/fraction conversion and comparison.
   i. convert between fractions, decimals and percents

6. Identify percentage operations.
   i. read and write percentages
   ii. calculate base, rates and percentages

7. Identify ratio and proportion operations.
   i. use a ratio comparing two quantities with the same units
   ii. use a proportion comparing two ratios

8. Describe the use of the imperial measurement system in math problems.
   i. identify units of measurement
      - length
      - mass
      - area
      - volume
      - capacity

9. Describe the use of the metric measurement system in math problems.
   i. identify units of measurement
      - length
      - mass
      - area
      - volume
      - capacity

10. Identify angles, lines and geometric shapes.
   i. use a protractor to measure angles
   ii. determine whether an angle is right, acute or obtuse
   iii. identify parallel, perpendicular, horizontal and vertical lines
   iv. identify types of triangles, quadrilaterals, and 3-dimensional shapes

11. Describe estimation strategies.
   i. estimate a linear measure using a referent
   ii. estimate length, area and volume of objects in metric and imperial systems

12. Describe problem solving that involves linear measurement using instruments such as rulers or tape measures, in the metric and imperial systems.

Practical Requirements:

1. To emphasize or further develop specific knowledge objectives, students will be required to complete practical demonstrations which confirm proper application of mathematical theory to job skills.

AM1301 Sheet Metal Math Fundamentals

Learning Outcomes:

- Demonstrate knowledge of mathematical concepts in the performance of trade practices.
- Demonstrate knowledge of mathematics as a critical element of the trade environment.
- Solve mathematical word problems.
- Demonstrate knowledge of mathematical principles for the purposes of problem solving, job and materials estimation, measurement, calculation, system conversion, diagram interpretation and scale conversions, formulae calculations, and geometric applications.

Duration: 42 Hours

Pre-Requisite(s): AM1101

Objectives and Content:

The instructor is required to use trade specific examples to reinforce the course objectives.

1. Describe percent/decimal/fraction conversions and comparisons in trade specific situations.

2. Describe ratios and proportions as they relate to trade specific problems.

3. Describe the use of the Imperial and Metric measurement systems in trade specific applications.

4. Describe Imperial and Metric conversions in trade specific situations.
   i. convert between imperial and metric measurements
   ii. convert to another unit within the same measurement system

5. Describe how to manipulate formulas using cross multiplication, dividing throughout, elimination, and substitution to solve trade specific problems.
   i. right angle triangles
   ii. area
   iii. volume
   iv. perimeter
   v. density

6. Identify calculations involving geometry that are relevant to the trade.
   i. angle calculations

ii. circle calculations

7. Identify math processes used to complete administrative trade tasks.
   i. material estimation
   ii. material costing
   iii. time & labour estimates
   iv. taxes & surcharges
   v. markup & projecting revenue

Practical Requirements:

1. To emphasize or further develop specific knowledge objectives, students will be asked to complete practical demonstrations which confirm proper application of mathematical theory to job skills.

Note: This course is NON-TRANSFERABLE to other trades programs, and NOT ELIGIBLE FOR PRIOR LEARNING ASSESSMENT. Students completing training in this trade program are required to complete this math course. Apprentice transfers under Provincial / Territorial Mobility agreements may be exempt from this requirement.

CM2161 Communication Essentials

Learning Outcomes:

- Demonstrate knowledge of the importance of well-developed writing and oral communication skills in the workplace.
- Demonstrate knowledge of the principles of effective workplace writing.
- Demonstrate knowledge of the purpose of various types of workplace documentation and workplace meetings.
- Demonstrate knowledge of the importance of effective interpersonal skills in the workplace.
- Demonstrate knowledge of effective job search techniques.

Duration: 36 Hours

Pre-Requisite(s): None

Objectives and Content:

Wherever possible, the instructor is expected to use trade specific examples to reinforce the course objectives.

1. Define communications terminology used in the trade.

2. Identify the principles of effective workplace writing.
   i. grammar, punctuation, mechanics
   ii. sentence and paragraph construction
   iii. tone, language, and word choice
   iv. the writing process
      - planning
      - writing
      - editing/revising

3. Identify sources of information used to communicate in the workplace.
   i. regulations
   ii. codes
   iii. OH&S requirements
   iv. prints, drawings and specifications
   v. company and client documentation

4. Identify types and purposes of informal workplace documents.
   i. reports
      - incident
      - process
      - progress
   ii. common trade specific forms
   iii. primary and secondary methods of information gathering
   iv. accuracy and completeness in reports and forms

5. Demonstrate an understanding of interpersonal communications in the workplace.
   i. recognize group dynamics
   ii. contribute information and expertise
   iii. individual learning styles
      - audible
      - visual
      - experiential
      - theoretical
   iv. recognize respectful and open communication
   v. accept and provide feedback
   vi. interpret non-verbal communication cues
      - body language
      - signals

6. Demonstrate an understanding of effective oral communication skills.
   i. listening
      - receiving, understanding, remembering, reflecting, evaluating, paraphrasing, and responding
   ii. speaking
      - using clear and proper words
      - tone, style, and vocabulary
      - brevity
   iii. common workplace oral communication situations
      - introducing self and others
      - telephone conversations
      - tool box/safety talks
      - face-to-face conversations
      - communicating with co-workers, supervisors, clients, and other trades people

7. Identify common practices related to workplace meetings.
   i. meeting formats
   ii. meeting preparation
   iii. agendas and minutes
   iv. roles, responsibilities, and etiquette of meeting participants
8. Identify acceptable workplace use of communication technologies.

i. cell / smart phone etiquette
ii. voice mail
iii. e-mail
iv. texting / messaging through social media
v. teleconferencing / videoconferencing for meetings and interviews
vi. social networking
vii. other emerging technologies

9. Demonstrate an understanding of effective job search techniques.
   i. employment trends, opportunities, and sources of employment
   ii. job ads and the importance of fitting qualifications to job requirements
   iii. resumes
      - characteristics of effective resumes
      - types of resumes
      - principles of resume formatting
   iv. effective cover letters
   v. job interview process
      - pre-interview preparation
      - interview conduct
      - post-interview follow up

Practical Requirements:

1. Write a well-developed, coherent, unified paragraph.

2. Complete a trade-related form.

3. Prepare an agenda for a toolbox safety talk.

4. Participate in a simulated oral workplace communication situation.

5. Prepare a resume.

SD1761 Workplace Essentials

Note: It is recommended that SD1760 be delivered in the second half of Pre-employment training.

Learning Outcomes:

- Demonstrate knowledge of workplace requirements in the areas of personal responsibility, unions, workers compensation, workers' rights, and human rights.
- Demonstrate knowledge of quality customer service.

Duration: 24 Hours

Pre-Requisite(s): None

Objectives and Content:

Wherever possible, the instructor is expected to use trade specific examples to reinforce the course objectives.

1. Identify personal responsibilities and attitudes that contribute to on-the-job success.
   i. asking questions
   ii. working safely
   iii. accepting constructive feedback
   iv. time management & punctuality
   v. respect for authority
   vi. stewardship of materials, tools and properties

2. Define unions and identify their role in the workplace.
   i. purpose of unions
   ii. common union structure
   iii. unions in this trade

3. Demonstrate an understanding of the Worker's Compensation process.
   i. aims, objectives, and benefits of the Workplace Health, Safety and Compensation Commission
   ii. role of the workers advisor
   iii. internal review process

4. Demonstrate an understanding of worker's rights.
   i. labour standards
   ii. regulations, including:
      - hours of work & overtime
      - termination of employment
      - minimum wages & allowable deductions
      - statutory holidays, vacation time, and vacation pay

5. Demonstrate an understanding of human rights issues.
   i. awareness of the Human Rights Code and the role of the Human Rights Commission
   ii. categories of discrimination and strategies for prevention
      - direct
      - systemic
      - adverse effect
   iii. types of discrimination
      - race
      - ethnic origin
      - colour
      - religion
      - age
      - gender identify
      - sexual orientation
      - marital status
      - family status
      - disability
      - criminal conviction that has been pardoned
   iv. conduct that constitutes harassment and discrimination
      - objectionable conduct
      - comments or displays made either on a one-time or continuous basis that demeans, belittles, or causes personal humiliation or embarrassment to the recipient
   v. the value of diversity in the workplace
      - culture
      - gender identify
      - sexual orientation

6. Demonstrate an understanding of quality customer service.
   i. importance of quality service
   ii. barriers to quality service
      - physical and physiological
      - cultural
      - technological

iii. customer needs & common methods for meeting them
iv. characteristics & importance of a positive attitude
v. interactions with challenging customers
vi. addressing complaints and resolve conflict

Practical Requirements:

None

MC1062 Computer Essentials

Learning Outcomes:

- Demonstrate knowledge of desktop/laptop and mobile computers and their operation.
- Demonstrate knowledge of word processing and spreadsheet software, internet browsers and their applications.
- Demonstrate knowledge of e-mail applications and procedures.
- Demonstrate an awareness of security issues related to computers.
- Demonstrate an awareness of online learning using computers.

Duration: 15 Hours

Pre-Requisite(s): None

Objectives and Content:

When possible, the instructor is expected to use trade specific examples to reinforce the course objectives.

1. Identify computer types used in the workplace, and the characteristics of each.
   i. desktop/laptop computers
   ii. tablets
   iii. smartphones

2. Identify common desktop and mobile operating systems.
   i. Windows
   ii. Mac OS
   iii. iOS
   iv. Android

3. Describe the use of Windows operating system software.
   i. start and end a program
   ii. use the help function
   iii. use the find function
   iv. maximize and minimize a window
   v. open and scroll through multiple windows
   vi. use the task bar
   vii. adjust desktop settings such as screen savers, screen resolution, and backgrounds
   viii. shut down a computer

4. Identify the skills necessary to perform file management commands.
   i. create folders
   ii. copy files and folders
   iii. move files and folders
   iv. rename files and folders
   v. delete files and folders

5. Describe the use of word processing software to create documents.
   i. enter & edit text
   ii. indent and tab text
   iii. change text attributes
      - bold
      - underline
      - font
   iv. change layout format
      - margins
      - alignment
      - line spacing
   v. spell check and proofread
   vi. save, close & reopen a document
   vii. print document

6. Describe the use of spreadsheet software to create documents.
   i. enter data in cells
   ii. format data in cells
   iii. create formulas to add, subtract, multiply and divide
   iv. save, close & reopen a spreadsheet
   v. print spreadsheet

7. Describe the use of the internet in the workplace.
   i. web browsers
   ii. search engines
   iii. security issues
   iv. personal responsibility for internet use at work

8. Describe the role of e-mail.
   i. e-mail etiquette
      - grammar and punctuation
      - privacy issues when sharing and forwarding e-mail
      - work appropriate content
      - awareness of employer policies
   ii. managing e-mail
      - using folders
      - deleting, forwarding, replying
   iii. adding attachments to e-mail
   iv. view e-mail attachments

v. printing e-mail

9. Describe computer use for online learning.
   i. online training
   ii. level exams
   iii. study guides
   iv. practice exams

Practical requirements:

1. Create, save and print a document using word processing software.

2. Create, save and print a document using spreadsheet software.

3. Send and receive an e-mail with an attachment.

AP1102 Introduction to Apprenticeship

Learning Outcomes:

- Demonstrate knowledge of how to become a registered apprentice.
- Demonstrate knowledge of the steps to complete an apprenticeship program.
- Demonstrate knowledge of various stakeholders in the apprenticeship process.
- Demonstrate knowledge of the Red Seal Program.

Duration: 12 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Define terminology associated with apprenticeship.
   - i. apprentice
   - ii. registered apprentice
   - iii. trade qualifier
   - iv. journeyperson
   - v. certified journeyperson
   - vi. Certificate of Apprenticeship
   - vii. Certificate of Qualification
   - viii. dual certification
   - ix. compulsory trades

2. Explain the roles and responsibilities of those involved in the apprenticeship system in Newfoundland and Labrador.
   - i. registered apprentice
   - ii. training institution
   - iii. employer
   - iv. journeyperson
   - v. mentor
   - vi. Department of Immigration, Population Growth and Skills
     - Industrial Training section
     - Standards and Curriculum section
   - vii. Provincial Trade Advisory Committees (PTAC)
   - viii. Provincial Apprenticeship and Certification Board (PACB)

3. Describe the training components of an apprenticeship.
   - i. in-school
     - Pre-employment / Level 1
     - advanced levels
   - ii. workplace experience

4. Explain the steps in the registered apprenticeship process.
   - i. meet entrance requirements
     - education
     - employment
     - Recognition of Prior Learning (RPL) - if applicable
   - ii. complete the registration process
     - application
     - required documents
   - iii. complete the Memorandum of Understanding (MOU)
     - contract responsibilities
     - probation period
     - cancellation
   - iv. maintain Record of Occupational Progress (Logbook)
     - sign off skills
     - record hours
     - update Apprenticeship Program Officer (APO) on progress
   - v. class calls
     - hour requirements
     - EI eligibility
     - training schedule
   - vi. level examinations - if applicable
   - vii. progression schedule
     - apprenticeship level
     - wage rates
   - viii. certification examinations
     - Provincial
     - Interprovincial
       - written
       - practical - if applicable
   - ix. certification
     - Certificate of Apprenticeship
     - Certificate of Qualification
     - Provincial journeyperson - Blue Seal
     - Interprovincial journeyperson - Red Seal endorsement (RSE)

5. Identify the Conditions Governing Apprenticeship.

6. Discuss cancellation of apprenticeship.
   - i. failure to notify of address change
   - ii. extended periods of unemployment
   - iii. lack of contact with an APO for an extended period
   - iv. failure to respond to class calls
   - v. declining of multiple class calls

7. Explain the Interprovincial Standards Red Seal program.
   i. designated Red Seal trades
   ii. the Red Seal Occupational Standard (RSOS)
   iii. relationship of RSOS to IP examination
   iv. national qualification recognition and mobility

8. Identify the current financial incentives available to apprentices.
   i. Federal
   ii. Provincial

9. Explain the Provincial / Territorial Apprentice Mobility Guidelines.
   i. temporary mobility
   ii. permanent mobility

10. Describe Atlantic and National Harmonization initiatives.

Practical Requirements:

1. Use the Provincial Apprenticeship and Trades Certification website at www.gov.nl.ca/atcd
   i. locate, download, and complete the Application for Apprenticeship and Memorandum of Understanding (MOU)
   ii. locate the address of the Industrial Training office closest to this campus
   iii. locate the training schedule and identify the start date of the next class call for this trade
   iv. locate and review the learning resources applicable to this trade
      - Study Guide
      - Exam Preparation Guide
      - Plan of Training

2. Use the Plan of Training applicable to this trade.
   i. locate the hours for the trade
      - total in-school
      - total required for certification
   ii. locate the number of levels
   iii. locate the courses in each level
   iv. locate the hours required for progression to a Level 2 apprentice and the wage percentage of that level

OT1191 Work Term

Learning Outcomes:

- Demonstrate knowledge of theory and practical applications of trade skills, safe work practices, appropriate workplace behaviour, and time management through exposure to the trade in an authentic work environment.

NOTE: The pre-apprentice must be supervised at the workplace. Supervision staff must be appropriately qualified to undertake that role – preferably a certified Journeyperson for the trade.

Duration: 60 Hours

Pre-Requisite(s): None

C. Conditions Governing Apprenticeship Training

1.0 General

The following general conditions apply to all apprenticeship training programs approved by the Provincial Apprenticeship and Certification Board (PACB) in accordance with the *Apprenticeship Training and Certification Act (1999)*. If an occupation requires additional conditions, these will be noted in the specific Plan of Training for the occupation. In no case should there be a conflict between these conditions and the additional requirements specified in a certain Plan of Training. All references to Memorandum of Understanding will also apply to Letter of Understanding (LOU) agreements.

2.0 Entrance Requirements

2.1 Entry into the occupation as an apprentice requires:

Indenturing into the occupation by an employer who agrees to provide the appropriate training and work experiences as outlined in the Plan of Training.

2.2 Notwithstanding the above, each candidate must have successfully completed a high school program or equivalent, and in addition may be required to have completed certain academic subjects as specified in a particular Plan of Training. Mature students, at the discretion of the Director of Apprenticeship and Trades Certification, may be registered. A mature student is defined as one who has reached the age of 19 and who can demonstrate the ability and the interest to complete the requirements for certification.

2.3 At the discretion of the Director of Apprenticeship and Trades Certification, credit toward the apprenticeship program may be awarded to an apprentice for previous work experience and/or training as validated through prior learning assessment.

2.4 An Application for Apprenticeship form must be duly completed along with a Memorandum of Understanding as applicable to be indentured into an Apprenticeship. The Memorandum of Understanding must contain signatures of an authorized employer representative, the apprentice and an official representing the Provincial Apprenticeship and Certification Board to be valid.

2.5 A new Memorandum of Understanding must be completed for each change in an employer during the apprenticeship term.

3.0 Probationary Period

The probationary period for each Memorandum of Understanding will be six months or 900 employment credit hours. Within that period the memorandum may be terminated by either party upon giving the other party and the PACB one week notice in writing.

4.0 Termination of a Memorandum of Understanding

After the probationary period referred to in Section 3.0, the Memorandum of Understanding may be terminated by the PACB by mutual consent of the parties involved, or cancelled by the PACB for proper and sufficient cause in the opinion of the PACB, such as that stated inSection14.

5.0 Apprenticeship Progression Schedule, Wage Rates and Advanced Training Criteria

Progression Schedule

Sheet Metal Worker - 7200 Hours			
Apprenticeship Level and Wages			
Level	Wage Rate	Requirements for Progression to Next Level	Next Level
1	60%	▪ Completion of Pre-employment training ▪ Registration as an apprentice ▪ Minimum 1800 hours of combined relevant work experience and training	2nd Year
2	70%	▪ Completion of Level 2 training ▪ Pass Level 2 exam* ▪ Minimum 3600 hours of combined relevant work experience and training	3rd Year
3	80%	▪ Completion of Level 2 training ▪ Pass Level 2 exam* ▪ Minimum 5400 hours of combined relevant work experience and training	4th Year
4	90%	▪ Completion of Level 4 training ▪ Pass Level 4 exam* ▪ Minimum 7200 hours of combined relevant work experience and training ▪ Sign-off of all workplace skills in apprentice logbook ▪ Pass certification exam	Journeyperson Certification

Wage Rates

- Rates are percentages of the prevailing journeyperson's wage rate in the place of employment of the apprentice.
- Rates must not be less than the wage rate established by the Labour Standards Act (1990), as now in force or as hereafter amended, or by other order, as amended from time to time replacing the first mentioned order.
- Rates must not be less than the wage rate established by any collective agreement which may be in force at the apprentice's workplace.
- Employers are free to pay wage rates above the minimums specified.

Level Exams

- This program may **not** currently contain Level Exams, in which case this requirement will be waived until such time as Level Exams are available.

Sheet Metal Worker – 7200 Hours		
Class Calls (After Apprenticeship Registration)		
Call Level	Requirements for Class Call	Hours awarded for In-School Training
Direct Entry Level 1	▪ Minimum of 1800 hours of relevant work experience ▪ Prior Learning Assessment (PLA) at designated college (if applicable)	480
Level 2	▪ Minimum of 3000 hours of relevant work experience and training	240
Level 3	▪ Minimum of 5000 hours of relevant work experience and training	240
Level 4	▪ Minimum of 7000 hours of relevant work experience and training	240

Class Calls at Minimum Hours

- Class calls may not always occur at the minimum hours indicated. Some variation is permitted to allow for the availability of training resources and apprentices.

6.0 Tools

Apprentices shall be required to obtain their own hand tools applicable for the designated occupation of registration or tools as specified by the PACB.

7.0 Periodic Examinations and Evaluation

7.1 Every apprentice shall submit to such occupational tests and examinations as the PACB shall direct. If after such occupational tests and examinations the apprentice is found to be making unsatisfactory progress, his/her apprenticeship level and rate of wage shall not be advanced as provided in Section 5 until his/her progress is satisfactory to the Director of Apprenticeship and Trades Certification and his/her date of completion shall be deferred accordingly. Persistent failure to pass required tests shall be a cause for revocation of his/her Memorandum of Understanding.

7.2 Upon receipt of reports of accelerated progress of the apprentice, the PACB may shorten the term of apprenticeship and advance the date of completion accordingly.

7.3 For each and every course, a formal assessment is required for which 70% is the pass mark. A mark of 70% must be attained in both the theory examination and the practical project assignment, where applicable as documented on an official transcript.

7.4 Course credits may be granted through the use of a PACB approved matrix which identifies course equivalencies between designated trades and between current and historical Plans of Training for the same trade.

8.0 Granting of Certificates of Apprenticeship

Upon the successful completion of apprenticeship, the PACB shall issue a Certificate of Apprenticeship.

9.0 Hours of Work

Any hours employed in the performance of duties related to the designated occupation will be credited towards the completion of the term of apprenticeship. Appropriate documentation of these hours must be provided.

10.0 Copies of the Registration for Apprenticeship

The Director of Apprenticeship and Trades Certification shall provide copies of the Registration for Apprenticeship form to all signatories to the document.

11.0 Ratio of Apprentices to Journeypersons

Under normal practice, the ratio of apprentices to journeypersons shall not exceed two apprentices to every one journeyperson employed. Other ratio arrangements would be determined and approved by the PACB.

12.0 Relationship to a Collective Bargaining Agreement

Where applicable in Section 5 of these conditions, Collective Agreements take precedence.

13.0 Amendments to a Plan of Apprenticeship Training

A Plan of Training may be amended at any time by the PACB.

14.0 Employment, Re-Employment and Training Requirements

14.1 The Plan of Training requires apprentices to regularly attend their place of employment.

14.2 The Plan of Training requires apprentices to attend training for that occupation as prescribed by the PACB.

14.3 Failure to comply with Sections 14.1 and/or 14.2 will result in cancellation of the Memorandum of Understanding. Apprentices may have their MOUs reinstated by the PACB but would be subject to a commitment to complete the entire program as outlined in the General Conditions of Apprenticeship. Permanent cancellation in the said occupation is the result of non-compliance.

14.4 Cancellation of the Memorandum of Understanding to challenge journeyperson examinations, if unsuccessful, would require an apprentice to serve a time penalty of two (2) years before reinstatement as an apprentice or qualifying to receive a class call to training as a registered Trade Qualifier. Cancellation must be mutually agreed upon by the employer and the apprentice.

14.5 An employer shall ensure that each apprentice is under the direct supervision of an approved journeyperson supervisor who is located at the same worksite as the apprentice, and that the apprentice is able to communicate with the journeyperson with respect to the task, activity or function that is being supervised.

14.6 Under the Plan of Training the employer is required to keep each apprentice employed as long as work is available, and if the apprentice is laid off due to lack of work, to give first opportunity to be hired before another is hired.

14.7 The employer will permit each apprentice to attend training programs as prescribed by the PACB.

14.8 Apprentices who cannot acquire all the workplace skills at their place of employment will have to be evaluated in a simulated work environment at a PACB authorized training institution and have sign-off done by instructors to meet the requirements for certification.

15.0 Appeals to Decisions Based on Conditions Governing Apprenticeship Training

Persons wishing to appeal any decisions based on the above conditions must do so in writing to the Minister of Immigration, Population Growth and Skills within 30 days of the decision.

D. Requirements for Red Seal Endorsement

1. Evidence the required work experiences outlined in this Plan of Training have been obtained. This evidence must be in a format clearly outlining the experiences and must be signed by an appropriate person or persons attesting that these experiences have been obtained to the level required.

2. Successful completion of all required courses in the program.

3. A combination of training from an approved training program and suitable work experience totaling 7200 hours.

   Or

   A total of 10800 hours of suitable work experience.

4. Completion of a National Red Seal examination, to be set at a place and time determined by the Apprenticeship and Trades Certification Division.

E. Roles and Responsibilities of Stakeholders in the Apprenticeship Process

The apprenticeship process involves a number of stakeholders playing significant roles in the training of apprentices. This section outlines these roles and the responsibilities resulting from them.

The Apprentice:

- completes all required technical training courses as approved by the PACB.
- finds appropriate employment.
- completes all required work experiences in combination with the required hours.
- ensures work experiences are well documented.
- approaches apprenticeship training with an attitude and commitment that fosters the qualities necessary for a successful career as a qualified journeyperson.
- obtains the required hand tools as specified by the PACB for each period of training of the apprenticeship program.

The Employer:

- provides high quality work experiences in an environment conducive to learning.
- remunerates apprentices as set out in the Plan of Training or Collective Agreements.
- provides feedback to training institutions, Apprenticeship and Trades Certification Division and apprentices in an effort to establish a process of continuous quality improvement.
- where appropriate, releases apprentices for the purpose of returning to a training institution to complete the necessary technical courses.
- ensures work experiences of the apprentice are documented.
- ensures a certified journeyperson is currently on staff in the same trade area as the apprentice and whose certification is recognized by the NL Department of Immigration, Population Growth and Skills.

The Training Institution:

- provides a high quality learning environment.
- provides the necessary student support services that will enhance an apprentice's ability to be successful.
- participates with other stakeholders in the continual updating of programs.

The Apprenticeship and Trades Certification Division:

- establishes and maintains program advisory committees under the direction of the PACB.
- promotes apprenticeship training as a viable career option to prospective apprentices and other appropriate persons involved, such as career guidance counsellors, teachers, parents, etc.
- establishes and maintains a protocol with training institutions, employers and other appropriate stakeholders to ensure the quality of apprenticeship training programs.
- ensures all apprentices are appropriately registered and records are maintained as required.
- schedules all necessary technical training periods for apprentices to complete requirements for certification.
- administers level, provincial and interprovincial examinations.

The Provincial Apprenticeship and Certification Board:

- sets policies to ensure the provisions of the *Apprenticeship and Certification Act (1999)* are implemented.
- ensures advisory and examination committees are established and maintained.
- accredits institutions to deliver apprenticeship training programs.
- designates occupations for apprenticeship training and/or certification.