PROVINCIAL PLAN OF TRAINING

FOR THE

SHEET METAL WORKER

OCCUPATION

Document Status	Date Distributed	Mandatory Implementation Date	Comments
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Preface

This Provincial Plan of Training derived from the Atlantic Training Standard is based upon the 1997 edition of the National Occupational Analysis for the Sheet Metal Worker trade. It was developed through the cooperative efforts of the Atlantic Apprenticeship Council, which consists of both the Atlantic Directors of Apprenticeship and Apprenticeship Board Chairs. This document describes the curriculum content for the Sheet Metal Worker apprenticeship training program and outlines each of the courses necessary for completion of apprenticeship.

Acknowledgment

Advisory committees, industry representatives, instructors and apprenticeship staff provided valuable input into the development of this Provincial Plan of Training. Their dedication to quality apprenticeship will benefit institutional training for apprentices in this trade.

Apprenticeship Plan of Training Evaluation Form

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

- course division and organization
- relevancy of the content
- errors or omissions
- other suggestions for improvement and consideration

Overall comments are to be entered on this evaluation form and specific changes are to be entered directly on the document in the relevant area(s). When all feedback has been recorded, return this evaluation form along with the revised Plan of Training to the Apprenticeship Office noted at the bottom of the page.

(PLEASE PRINT)

Trade: Sheet Metal Worker

Full Name: _____

Type of Position: (Trade Practitioner, Instructor, etc.): _____

Company: _____

Address: _____

Telephone: _____

Comments: (Use a separate sheet of paper if necessary)

_____

_____

_____

_____

_____

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_____

Return Evaluation Form and Plan of Training to:

Manager, Industrial Training
Division of Institutional and Industrial Education
Department of Education
P.O. Box 8700
St. John's, NF
A1B 4J6

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CONDITIONS GOVERNING APPRENTICESHIP TRAINING

1.0 GENERAL

The following general conditions will apply to all apprenticeship training programs approved by the Provincial Apprenticeship and Certification Board in accordance with the Apprenticeship Training and Certification Act. Where an occupation requires additional conditions, these will be noted in the specific plan of training for that occupation. In no case should there be a conflict between these conditions and the additional requirements specified in certain plans of training.

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 this 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 particular plans of training. Mature students, at the discretion of the Director of Institutional and Industrial Education, 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 Institutional and Industrial Education, credit towards the apprenticeship program may be awarded to an apprentice for previous work experience and/or training as validated through prior learning assessment.

2.4 A Registration for Apprenticeship form must be duly completed.

3.0 PROBATIONARY PERIOD

The probationary period for each memorandum of understanding will be six months. Within that period the memorandum may be terminated by either party upon giving the other party and the Provincial Apprenticeship and Certification Board one week notice in writing.

4.0 TERMINATION OF A MEMORANDUM OF UNDERSTANDING

After the probationary period referred to in Section 3.0 herein, the memorandum of understanding may be terminated by the Board by mutual consent of the parties thereto or cancelled by the Board for proper and sufficient cause in the opinion of the Board.

5.0 APPRENTICESHIP PROGRESSION SCHEDULE AND WAGE RATES

5.1 Progression Schedule

7200 Hour Programs	**Requirements for Progression**	**Progress To**
First Year Apprentice	Completion of entry level (Block 1) courses, plus relevant work experience totaling a minimum of 1800 hours *	Second Year
Second Year Apprentice	Completion of advanced level (Block 2) courses, plus relevant work experience totaling a minimum of 3600 hours	Third Year
Third Year Apprentice	Completion of advanced level (Block 3) courses, plus relevant work experience totaling a minimum of 5400 hours	Fourth Year
Fourth Year Apprentice	Completion of advanced level (Block 4) courses and (Block 5) *if applicable,* plus sign-off of workplace skills required for certification totaling a minimum of 7200 hours**	Write Certification Examination
5400 Hour Programs	**Requirements for Progression**	**Progress To**
First Year Apprentice	Completion of entry level (Block 1) courses, plus relevant work experience totaling a minimum of 1800 hours *	Second Year
Second Year Apprentice	Completion of advanced level (Block 2) courses, plus relevant work experience totaling a minimum of 3600 hours	Third Year
Third Year Apprentice	Completion of advanced level (Block 3) courses, plus sign-off of workplace skills required for certification totaling a minimum of 5400 hours	Write Certification Examination
4800 Hour Programs	**Requirements for Progression**	**Progress To**

First Year Apprentice	Completion of entry level courses (Block 1), plus relevant work experience totaling a minimum of 1600 hours *	Second Year
Second Year Apprentice	Completion of advanced level (Block 2) courses, plus relevant work experience totaling a minimum of 3200 hours	Third Year
Third Year Apprentice	Completion of advanced level (Block 3) courses, plus sign-off of workplace skills required for certification totaling a minimum of 4800 hours	Write Certification Examination

* All direct entry apprentices must meet the **Requirements for Progression** either through Prior Learning Assessment and Recognition or course completion before advancing to the next year.

** Apprentices in a 7200 hour program which incorporates more than four blocks of training are considered fourth year apprentices pending completion of 100% course credits and workplace skills requirements.

5.2 For the duration of each Apprenticeship Training Period, the apprentice, who is not covered by a collective agreement, shall be paid a progressively increased schedule of wages which shall not be less than:

Program Duration	**Wage Rates**		**Comments**
7200 Hours	1st Year	55%	These wage rates are percentages of the prevailing journeyperson's wage rate in the place of employment of the apprentice. No apprentice shall be paid less than the wage rate established by the Labour Standards Act (1988), as now in force or as hereafter amended, or by other Order, as amended from time to time replacing the first mentioned Order.
	2nd Year	65%	
	3rd Year	75%	
	4th Year	90%	
5400 Hours and 4800 Hours	1st Year	55%	
	2nd Year	70%	
	3rd Year	85%	
4000 Hours			(Hairstylist Program) - The apprentice shall be paid no less than the minimum wage for hours worked and a commission agreed upon between the apprentice and the employer.

6.0 TOOLS

Apprentices shall be required to obtain hand tools as and when specified by the Board.

7.0 PERIODIC EXAMINATIONS AND EVALUATION

7.1 Every apprentice shall submit to such occupational tests and examinations as the Board shall direct. If after such occupational tests and examinations the apprentice is found to be making unsatisfactory progress, his/her rate of wage shall not be advanced as provided in Section 5 until his/her progress is satisfactory to the Director of Institutional and Industrial Education 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 Board 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. At the discretion of the instructor, the summative mark may be for completion of a theory examination or a combination of the theory examination and an assigned practical project.

8.0 GRANTING OF CERTIFICATES OF APPRENTICESHIP

Upon the successful completion of apprenticeship, the Board 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 Institutional and Industrial Education shall provide copies of the Registration for Apprenticeship form to all signatories to the document.

11.0 RATIO OF APPRENTICES TO JOURNEYPERSONS

The ratio of Apprentices to Journeypersons normally shall not exceed one apprentice to every one journeyperson employed. Exceptions for specific occupations may occur with the approval of the Provincial Apprenticeship and Certification Board.

12.0 RELATIONSHIP OF THE PLAN OF TRAINING TO A COLLECTIVE BARGAINING AGREEMENT

Collective agreements take precedence over the conditions outlined in the plan of training.

13.0 AMENDMENTS TO A PLAN OF APPRENTICESHIP TRAINING

A plan of training may be amended at any time by the Provincial Apprenticeship and Certification Board.

14.0 EMPLOYMENT, RE-EMPLOYMENT AND TRAINING REQUIREMENTS

14.1 The plan of training requires Apprentices to attend regularly their place of employment.

14.2 The plan of training requires Apprentices to regularly attend training programs for that occupation as prescribed by The Provincial Apprenticeship and Certification Board.

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 M.O.U.'s reinstated by the Provincial Apprenticeship and Certification Board 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 registering as a Trade Qualifier.

14.5 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 opportunity to be re-employed before another is hired.

14.6 The employer will permit each apprentice to attend regularly training programs as prescribed by the Provincial Apprenticeship and Certification

Board.

14.7 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 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 Education within 30 days of the decision.

REQUIREMENTS FOR RED SEAL CERTIFICATION

1. Evidence that the required work experiences outlined in this plan of training have been obtained. This evidence must be in a format that clearly outlines 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 program.

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

   OR

   A total of 9000 hours of suitable work experience in the occupation accompanied by sign-off of required work competencies.

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

5. Payment of the appropriate examination fee.

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 captures, in a broad sense, these roles and the responsibilities that result from them.

The Apprentice

- to complete all required technical training courses as approved by the Provincial Apprenticeship and Certification Board.
- to find appropriate employment.
- to complete all required work experiences in combination with the required hours.
- to ensure that the work experiences are well documented.
- to approach apprenticeship training with an attitude and commitment that fosters the qualities necessary for a successful career as a qualified journeyperson.
- to obtain the required hand tools as specified by the Board for each period of training of the apprenticeship program.

The Employer

- to provide high quality work experiences in an environment that is conducive to learning.
- to remunerate apprentices as set out in this Plan of Training or Collective Agreements.
- to provide feedback to Training Institutions, Industrial Training Division and Apprentices in an effort to establish a process of continuous quality improvement.
- where appropriate, to release apprentices for the purpose of returning to a training institution to complete the necessary technical courses.
- to ensure that work experiences of the apprentices are documented.

The Training Institution

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

The Industrial Training Division

- to establish and maintain program advisory committees under the direction of the Provincial Apprenticeship and Certification Board.
- to promote apprenticeship training as a viable career option to prospective apprentices and other appropriate persons involved, such as career guidance counsellors, teachers, parents, etc.
- to establish and maintain a protocol with training institutions, employers and other appropriate stakeholders to ensure the quality of apprenticeship training programs.
- to ensure that all apprentices are appropriately registered and records are maintained as required.
- to schedule all necessary technical training periods for apprentices to complete requirements for certification.
- to administer provincial/interprovincial examinations.

The Provincial Apprenticeship and Certification Board

- to set policies to ensure that the provisions of the Apprenticeship Training and Certification Act are implemented.
- to ensure that advisory and examination committees are established and maintained.
- to accredit institutions to deliver apprenticeship training programs.
- to designate occupations for apprenticeship training and/or certification.

Program Outcomes

Upon completion of the Sheet Metal Worker Apprenticeship Program, apprentices will have demonstrated the knowledge and skills required to perform the following tasks:

Task 1 Demonstrates safety awareness.
Task 2 Maintains a safe workplace environment.
Task 3 Performs safety inspection.
Task 4 Wears personal protective clothing and equipment.
Task 5 Handles dangerous products safely.
Task 6 Responds to emergency situations.
Task 7 Uses common trade-related tools, machines and equipment safely.
Task 8 Uses scaffolds, hoists, slings and ladders safely.
Task 9 Determines project requirements.
Task 10 Estimates materials, tools and equipment requirements.
Task 11 Estimates labour requirements.
Task 12 Plans work activities for product.
Task 13 Lays out simple sheet metal parts.
Task 14 Develops patterns using parallel line development.
Task 15 Develops patterns using triangulation method.
Task 16 Develops patterns using radial line development.
Task 17 Develops patterns using computer technology.
Task 18 Designs ductwork.
Task 19 Installs material and personnel handling devices.
Task 20 Removes material and personnel handling devices.
Task 21 Cuts metal parts using computerized plasma arc.
Task 22 Joins materials using spot welding equipment.
Task 23 Welds parts and components using oxy-acetylene welding equipment.
Task 24 Welds metal parts using arc welding equipment.
Task 25 Welds parts and components using TIG welding.
Task 26 Welds parts and components using MIG welding process.
Task 27 Solders parts and components using gas fired equipment.
Task 28 Brazes parts and components.
Task 29 Joins plastic materials using hot air plastic welding equipment.
Task 30 Fabricates parts to size using hand tools.
Task 31 Fabricates parts using power tools.
Task 32 Fabricates parts to specifications using power operated equipment.
Task 33 Shapes materials using hand operated equipment.
Task 34 Forms parts using power operated equipment.
Task 35 Joins parts and components using standard sheet metal seams.
Task 36 Secures materials using mechanical fasteners.
Task 37 Secures or seals components using various cementing, gluing or sealing agents.
Task 38 Fabricates ducts.
Task 39 Fabricates architectural/roofing sheet metal products.

Task 40 Fabricates materials handling systems.
Task 41 Fabricates metal base for equipment.
Task 42 Fabricates air handling units.
Task 43 Fabricates food services equipment.
Task 44 Fabricates specialty products.
Task 45 Assembles ductwork and equipment for HVAC or dust and fume collecting systems.
Task 46 Installs HVAC systems, components or dust and fumes collecting systems.
Task 47 Installs vacuum systems.
Task 48 Installs material handling systems.
Task 49 Installs sheet metal roofing.
Task 50 Installs capping and flashing.
Task 51 Installs architectural eaves trough.
Task 52 Installs breeching.
Task 53 Installs lagging.
Task 54 Installs specialty products.
Task 55 Repairs system controls.
Task 56 Repair air handling, conditioning and distribution equipment.
Task 57 Balances air flow in duct systems.

Program Structure

Entry Level Courses (Block 1)					
NL Course No.	**Atlantic Course No.**	**Course Name**	**Hours**	**Prerequisites**	**Page No.**
TS-1510		Occupational Health & Safety	6		15
TS-1520		WHMIS	6		18
TS-1530		First Aid	14		21
SL-1100	SMW-0100	Safety	7		22
SL-1110	SMW-1105	Tools and Equipment	45	SL-1100	24
SL-1120	SMW-1185	Material Handling and Rigging	20	SL-1110	26
SL-1130	SMW-1020	Fabrication	45	SL-1110	29
SL-1140	SMW-1175	Metallurgy	20	SL-1360	32
SL-1150	SMW-0105	Basic Drawing and Layout	30		34
SL-1160	SMW-0115	Blueprint Reading I (Basic)	15		36
SL-1170	SMW-1055	Blueprint Reading II (Advanced)	90	MC-1050	38
SL-1240	SMW-1005	Layout and Fabrication - Parallel Lines I	45	SL-1150	40
SL-1250	SMW-1010	Layout and Fabrication - Radial Lines I	45	SL-1150	42
SL-1260	SMW-1015	Layout and Fabrication - Triangulation I	45	SL-1150	44
SL-1350	SMW-0110	Oxy-Acetylene Welding and Cutting	30		46
SL-1360	SMW-0120	Shielded Metal Arc Welding (SMAW)	90		48
SL-1610	SMW-1035	Layout and Fabrication - Parallel Lines II	60	SL-1240	59
SL-1620	SMW-1040	Layout and Fabrication - Radial Lines II	60	SL-1250	61
SL-1630	SMW-1045	Layout and Fabrication - Triangulation II	60	SL-1260	62
SL-1740	SMW-0125	Air Quality Management	60		69
OT-1190		Work Term	60		-
*MA-1060		Math	60		76
CM-2150		Workplace Communications	45		79
MR-1220		Customer Service	30		81

Entry Level Courses (Block 1)					
NL Course No.	**Atlantic Course No.**	**Course Name**	**Hours**	**Prerequisites**	**Page No.**
SP-2330		Quality Assurance/Quality Control	30		83
MC-1050		Introduction to Computers	30		85
SD-1700		Workplace Skills	30		90
SD-1710		Job Search Techniques	20		92
SD-1720		Entrepreneurial Awareness	15		93
Total Hours			**1113**		

Required Work Experience

Block 2					
NL Course No.	**Atlantic Course No.**	**Course Name**	**Hours**	**Prerequisites**	**Page No.**
SL-1370	SMW-1060	Gas Metal Arc Welding (GMAW)	30	SL-1100; SL-1360	51
SL-1700	SMW-1065	Layout and Fabrication - Parallel Lines III	90	SL-1610	64
SL-1710	SMW-1070	Layout and Fabrication - Radial Lines III	90	SL-1620	65
SL-1770	SMW-1095	Soldering	30	SL-1240	74
Total Hours			**240**		

Required Work Experience

Block 3					
NL Course No.	**Atlantic Course No.**	**Course Name**	**Hours**	**Prerequisites**	**Page No.**
SL-1540	SMW-1030	Installation	60	SL-1110; SL-1160	55
SL-1550	SMW-1050	HVAC Systems	90	SL-1160; SL-1540	57
SL-1750	SMW-1085	Gas Tungsten Arc Welding (GTAW)	90	SL-1130; SL-1360	70
Total Hours			**240**		

Required Work Experience

Block 4					
NL Course No.	**Atlantic Course No.**	**Course Name**	**Hours**	**Prerequisites**	**Page No.**
SL-1530	SMW-1025	Cost Estimation	45		54
SL-1720	SMW-1075	Advanced Layout and Fabrication	90	SL-1630; SL-1700; SL-1710	67
SL-1730	SMW-1080	Automatic Controls, Instruments and Testing	45	SL-1550; SL-1170	68
SL-1760	SMW-1090	Fabricates and Installs Architectural Sheet Metal Products	60	SL-1110; SL-1140	72
Total Hours			**240**		

- **A student who can meet the Mathematics requirement through an ACUPLACER online test may be exempted from Mathematics 1060.**

TS-1510 OCCUPATIONAL HEALTH AND SAFETY

Description:

This course is designed to give participants the knowledge and skills necessary to interpret the Occupational Health and Safety Act, laws and regulations; understand the designated responsibilities within the laws and regulations; the right to refuse dangerous work; and the importance of reporting accidents.

Course Outcomes:

Upon successful completion of this unit, the apprentice will be able to:
- prevent accidents and illnesses
- improve health and safety conditions in the workplace

Theory:

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 & 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
   - x) Reasonable grounds for refusal
   - xi) Reporting endangerment to health
   - xii) Appropriate remedial action

xiii) Investigation of endangerment
xiv) Committee recommendation
xv) Employer's responsibility to take appropriate remedial action
xvi) Action taken when employee does not have reasonable grounds for refusing dangerous work
xvii) Employee's rights
xviii) Assigning another employee to perform duties
xix) Temporary reassignment of employee to perform other duties
xx) Collective agreement influences
xxi) Wages and benefits

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

6. Describe discriminatory action
xxii) Definition
xxiii) Filing a complaint procedure
xxiv) Allocated period of time a complaint can be filed with the Commission
xxv) Duties of an arbitrator under the Industrial Relations Act
xxvi) Order in writing inclusion
xxvii) Report to commission Allocated period of time to request Arbitrator to deal with the matter of the request
xxviii) Notice of application
xxix) Failure to comply with the terms of an order
xxx) Order filed in the court

7. Explain duties of commission officers
xxxi) Powers and duties of officers
xxxii) Procedure for examinations and inspections
xxxiii) Orders given by officers orally or in writing
xxxiv) Specifications of an order given by an officer to owner of the place of employment, employer, contractor, sub-contractor, employee, or supplier
xxxv) Service of an order
xxxvi) Prohibition of persons towards an officer in the exercise of his/her power or duties
xxxvii) Rescinding of an order
xxxviii) Posting a copy of the order
xxxix) Illegal removal of an order

8. Interpret appeals of others
xl) Allocated period of time for appeal of an order
xli) Person who may appeal order
xlii) Action taken by Commission when person involved does not comply with the order
xliii) Enforcement of the order
xliv) Notice of application
xlv) Rules of court

9. Explain the process for reporting of accidents
   - xlvi) Application of act
   - xlvii) Report procedure
   - xlviii) Reporting notification of injury
   - xlix) Reporting accidental explosion or exposure
   - l) Posting of act and regulations

Practical:

Practical skills enhance the apprentices' ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

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

52. Conduct a safety inspection of shop area.

TS-1520 WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

Description:

This course is designed to give participants the knowledge and skills necessary to define WHMIS, examine hazard identification and ingredient disclosure, explain labeling and other forms of warning, and introduce material safety data sheets (MSDS).

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

– interpret and apply the Workplace Hazardous Materials Information System (WHMIS) Regulation under the Occupational Health & Safety Act.

Required Knowledge and Skills:

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
   - iv) the supplier
   - v) the employer
   - vi) the worker - Classification: rules and criteria
   - vii) information on classification
   - viii) classes, divisions and subdivision in WHMIS
   - ix) general rules for classification
   - x) class A - compressed gases
   - xi) class B - flammable and combustible materials
   - xii) class C - oxidizing material
   - xiii) class D - poisonous and infectious material
   - xiv) class E - corrosive material
   - xv) class F - dangerously reactive material
   - xvi) Products excluded form 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
- Comparison of classification systems - WHMIS and TDG
- General comparison of classification categories
- 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:

Practical skills enhance the apprentices' ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

53. Locate WHMIS label and interpret the information displayed.

54. 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.

SUGGESTED RESOURCES:

1. WHMIS Regulation

2. Sample MSDS sheets

TS-1530 FIRST AID

Description:

This course is designed to give the apprentice the ability to recognize situations requiring emergency action and to make appropriate decisions concerning first aid.

Complete a **St. John Ambulance** Standard First Aid Certificate course.

SL-1100 SAFETY

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 1, 2, 3, 4, 5, 6, 7 and 8.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– demonstrate knowledge of operation of fire extinguishing equipment
– demonstrate knowledge of safe working practices

Theory:

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.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Prepare a list of the extinguishers available in the sheet metal shop.
2. Demonstrate fire alarm procedures.
3. Explain the use of the various types of extinguishers available in the shop.
4. Demonstrate understanding of the regulation for working in confined spaces.
5. Select and use ventilation and breathing apparatus.
6. Demonstrate a clean work environment.

SL-1110 TOOLS AND EQUIPMENT

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 7, 21, 22, 27, 30, 31, 32, 33 and 34.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– select, use and maintain hand and power tools safely
– select, use and maintain equipment safely

Theory:

1. Identify types of common hand tools and describe their characteristics, applications and procedures for safe use.
   i) layout
   ii) cutting
   iii) forming
   iv) joining

2. Identify types of common portable power tools and describe their characteristics, applications and procedures for safe use.
   i) pneumatic
   ii) hydraulic
   iii) electrical
   iv) gas powered

3. Identify types of common powder actuated tools and describe their characteristics, applications and procedures for safe use.
   i) low velocity
   ii) high velocity

4. Identify types of common machines and equipment and describe their characteristics, applications and procedures for safe use.
   i) rotary machines
   ii) shop tools and equipment
   iii) stationary equipment

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

55. Produce workpieces to print specifications using the various types of power cutting equipment.

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

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

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

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

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

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

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

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

64. Roll a work piece to a given specification.

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

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

SL-1120 MATERIAL HANDLING AND RIGGING

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 1, 2, 3, 8, 19, 20.

Course Outcomes:

Upon successful completion of this course the apprentice will be able to:
- use safe and efficient material handling practices using both manual and mechanical means
- identify the limitations of equipment used for rigging
- operate slings, cables and overhead shop cranes
- select appropriate equipment for the job, using rigging charts and manuals as well as rule of thumb methods

Theory:

1. Describe simple machines, their operation and applications.
   - i) lever
   - ii) pulley
   - iii) wedge

2. Describe the principles of mechanical advantage.

3. Describe hoisting.
   - i) weight of objects
   - ii) object configuration
   - iii) materials
   - iv) methods of hoisting (use of chains, slings, wire rope, etc.)
   - v) applicable safety
   - vi) materials for blocking

4. Describe wire rope, chains and slings.
   - i) recognition of condition
     - cable
     - wire rope
     - chain
     - cable clamps
       - methods of placement
     - slings
     - nylon slings

5. Describe lifting clamps.
   - i) knowledge of use
   - ii) acceptable method of applying hooks

iii) safe practices

6. Describe come-alongs, rope and chain falls.
   i) types
   ii) operation
   iii) safe practices

7. Describe stacking and blocking.
   i) structural shapes
   ii) jacking (hydraulic, screw, ratchet)
   iii) safety practices

8. Describe safe practices for the use of rope and wire rope slings.

9. Describe safe practices for the use of hooks and shackles.

10. Describe lines or rope.
    i) sizes
    ii) safe use
    iii) care
    iv) knots
        bowline and a bight
        – square or reef
        – round turn and two half hitches
        – scaffold hitch
        – whipping ends and eyes

11. Describe safe practices for use of chokers and tag lines.

12. Describe spooling of line on drums.
    i) overwind
    ii) underwind
    iii) left and right hand lay lines

13. Describe practices for use of block and tackle.
    i) safety factors of line
    ii) reeving practices

14. Describe other hoisting practices.
    i) overhead cranes
    ii) jib cranes

15. Describe manual lifting practices.
    i) correct body position
    ii) necessity of obtaining assistance

16. Describe standard hand signals.

17. List the Occupational Health and Safety Regulations for rigging, life line and safety belts.
    i) responsibilities and liabilities of using rigging, lifting and hoisting equipment.
    ii) different types of scaffolds (tube and clamp, manufactured platforms and scaffolding and suspended scaffolding).
    iii) safety rules for erecting and working on scaffolding (kickplates, braces, ties, planking, permits and tagging)
    iv) problems of rolling and suspended scaffolding and safety guidelines for their use.
    v) types of ladders, their applications and safety factors to be considered when using ladders.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Using fibre rope tie:
    i) reef knot
    ii) bowline
    iii) round turn and hitch
    iv) scaffold hitch

2. Demonstrate hand signals for crane operation.

3. Identify appropriate scaffold for various job situations.

4. Operate genie lift.

SL-1130 FABRICATION

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 30-44.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
- plan and organize work
- Identify and select materials
- fabricate basic seams and edges
- fabricate and insulate ducts
- fabricate speciality systems (such as ductmate)

Theory:

1. Describe procedures to organize and plan work in the field.
   - i) tools and equipment required
   - ii) scheduling labour
   - iii) shop tickets (work order)
   - iv) time schedule
   - v) coordination with other trades
   - vi) onsite delivery and storage of materials

2. Identify and describe the use of tools, equipment and fasteners for the installation of systems hardware and components.

3. Describe factors to consider when selecting and applying surface finishes.
   - i) methods
   - ii) condition of material
   - iii) interior versus exterior use
   - iv) types of surface finish
   - v) corrosion protection

4. Describe procedures used to select and apply finishing materials.
   - i) flap wheels
   - ii) grinding wheels
   - iii) buffing compounds
   - iv) paint types
   - v) sanding disks
   - vi) buffing wheels
   - vii) abrasive pads

5. Describe the purpose of alignment devices and their use.
   - i) jigs
   - ii) bench plates
   - iii) fixtures

6. Identify and apply formulas to calculate allowance for the following.
   - i) bends
   - ii) seams
   - iii) rolling stretchouts
   - iv) metal thickness

7. Describe methods of metal manipulation.
   - i) shrinking
   - ii) stretching
   - iii) dishing
   - iv) flattening
   - v) forming
   - vi) shaping
   - vii) planishing

8. Describe procedures to insulate ducts for sound.

9. Identify joining apparatus and describe their applications.
   - i) locks
   - ii) seams
   - iii) cleats
   - iv) rivets
   - v) fasteners
   - vi) flanges
   - vii) clips
   - viii) gaskets

10. Describe materials, equipment and procedures used to seal ducts and fittings.
    - i) sealant
    - ii) tape
    - iii) gaskets
    - iv) visual inspection
    - v) clean up of applicator and tools

11. Describe the special requirements and governing legislation for food service equipment.

67. Describe the process of layout, fabrication, welding and finishing of food service equipment.

13. Describe the work of a sign builder and the basic procedures for building a sign.

14. Describe typical material handling systems such as the blowpipe system and the basic procedures for building them.

68. Describe the purpose of and the basic procedures for building a boiler breeching system.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

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

2. Fabricate various types of seams and edges.

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

SL-1140 METALLURGY

NOA Reference:

This material covered satisfies in whole or in part, the requirements of National Occupational Analysis.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– demonstrate understanding of basic metallurgy principles.

Theory:

1. Describe mechanical and physical properties.
   tensile strength
   i) yield strength
   ii) elasticity
   iii) ductility
   iv) hardness
   v) compressive strength
   vi) fatigue strength
   vii) impact strength
   viii) toughness
   ix) density
   x) melting point
   xi) specific heat
   xii) heat of fusion
   xiii) thermal conductivity
   xiv) electrical conductivity and resistance
   xv) corrosion resistance
   xvi) brittleness
   xvii) malleability
   xviii) plasticity

2. Identify and describe the ferrous and non-ferrous metals used in the trade.
   i) ferrous
   ii) non-ferrous
   iii) alloys

3. Identify the types of non-metallic materials used in the trade and describe their characteristics and applications.
   i) fibrous duct board
   ii) plastics (eg, PVC, ABS)
   iii) reinforced fibre glass

iv) PVC coated metals
v) accoustic duct liner

4. Describe heat treatment and stress relieving techniques.

5. Describe the effects on properties when:
   i) forming
   ii) punching
   iii) drilling
   iv) cutting

6. Describe SAE, AISI, and ASTMS number system (introduction only).
   i) ferrous metals

7. Describe colour coding of materials (introduction only).
   i) ferrous metals

8. Describe expansion and contraction of metals.
   i) heating compared with cooling.

9. Describe methods of weather proofing, rust proofing and painting.

10. Describe galvanic action.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

SL-1150 BASIC DRAWING AND LAYOUT

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 13.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– perform basic sketches and drawings
– perform basic layout procedures

Theory:

1. Define terminology associated with basic drawing and layout.
   - i) stretchout
   - ii) fitting and seam allowances
   - iii) bisection
   - iv) perpendicular
   - v) angle trisection
   - vi) tangent

2. Describe the construction of basic geometric shapes.
   - i) pentagon
   - ii) hexagon
   - iii) octagon
   - iv) ellipse

3. Describe sketching techniques.
   - i) Pencil technique

4. Describe different views and their uses.
   - i) front
   - ii) right side
   - iii) left side
   - iv) top
   - v) bottom
   - vi) rear

7. Describe the procedures used to calculate:
   - i) stretchout
   - ii) allowance requirements
   - iii) blanking

4. Describe the two main methods of developing stretchouts.
   - i) projection method
   - ii) step-off method

3. Describe orthographic projection.
   - i) glass box technique

4. Describe views required to complete layout.
   - i) front
   - ii) plan
   - iii) auxiliary

9. Describe layout tools and instruments, their applications and use.
   - i) t-square
   - ii) set square
   - iii) compass
   - iv) dividers
   - v) scale

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Perform various geometric operations.
   - i) bisect a straight line or a circle
   - ii) erect 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) elbow's
   - ii) off-sets
   - iii) duct sections

SL-1160 BLUEPRINT READING I (BASIC)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 9-12.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– interpret basic blueprints as they relate to sheet metal work

Theory:

1. Describe the various types of lines used on blueprints.
   - iv) centre
   - v) hidden
   - vi) dimension
   - vii) extension
   - viii) object
   - ix) break
     - long
     - short

2. Describe types of blueprints.
   - i) architectural
   - ii) mechanical
   - iii) shop drawing
   - iv) structural
   - v) electrical

3. Describe the various views used on blueprints.
   - i) evaluation
   - ii) plan
   - iii) section
   - iv) details
   - v) auxiliary

4. Describe notes and specifications.
   - i) parts and objects
   - ii) drawing titles
   - iii) revisions
   - iv) drawing numbers

5. Identify and interpret common blueprint symbols and abbreviations.
   - i) location
   - ii) supplementary symbols
   - iii) outdated and preferred symbols
   - iv) references (gridlines)
   - v) location of symbols on drawings

6. Describe the different types of scales and their uses.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Interpret basic HVAC blueprints.

SL-1170 BLUEPRINT READING II (ADVANCED)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 9-12.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
- interpret blueprints
- prepare shop drawings (sketches)
- prepare materials take-off list

Theory:

1. Identify and interpret contract documents, symbols and abbreviations.

2. Describe the purpose and organization of specifications.

3. Describe the purpose for shop drawings.

4. Interpret various types of drawings.
   - i) architectural
   - ii) HVAC
   - iii) electrical
   - iv) plumbing
   - v) shop

6. Interpret a materials take-off list.
   - i) fabrication requirements
   - ii) materials, tools and equipment
   - iii) purchase requirements

7. Describe the procedures used to take field measurements.

8. Describe the computer aided drafting (CAD) and computer aided manufacturing (CAM) processes for materials take-off, laying out patterns, reference points and dimensions on material for various fabrication or assembly procedures.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Use SMACNA specifications to determine job requirements.

2. Interpret all blueprints.

3. Using CAD, develop patterns for fittings.

SL-1240 LAYOUT AND FABRICATION - PARALLEL LINES I

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 14.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

– develop roof jacks, two piece elbows and basic branches using the parallel line method of layout.

Theory:

1. Define terminology associated with parallel line pattern development.

2. Describe the types of patterns and fittings that require parallel line development.
   - i) elbows
     - – types
     - – uses
   - ii) tees
     - – types
     - – uses
   - iii) wye-branches
     - – types
     - – uses
   - iv) architectural designs
     - – basic flashings

3. Describe the procedures used to develop patterns and fabricate 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 stretchouts
   - ix) check pattern accuracy
   - x) cut pattern

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

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.

SL-1250 LAYOUT AND FABRICATION - RADIAL LINES I

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 16.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– layout patterns and fabricate tapered fittings

Theory:

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

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

4. 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 stretchouts
   - ix) check pattern accuracy
   - x) cut pattern

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

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

SL-1260 LAYOUT AND FABRICATION - TRIANGULATION I

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 15.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– develop basic transformers using the triangulation method.

Theory:

1. Define terminology associated with triangulation.
   - i) true length of lines
   - ii) lines of symmetry
   - iii) transformers (eg, change in shape)
   - iv) transitions (eg, change in size)

2. Identify and describe the types of patterns and fittings that require the triangulation method.
   - v) transformers
   - vi) transitions

3. Describe two methods of finding true length of lines.
   - vii) separate
   - viii) superimposed

4. Describe procedures to layout and fabricate patterns for basic transitions and transformers.
   - ix) determine views
   - x) locate views
     - symmetry of lines
   - xi) label lines and points
   - xii) prepare drawing
   - xiii) determine true length of lines
   - xiv) determine types of seams, joints, and edges
   - xv) calculate allowances
   - xvi) determine stretchouts
   - xvii) check pattern accuracy
   - xviii) cut pattern

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Layout and fabricate basic transitions.

2. Layout and fabricate basic transformers.

SL-1350 OXY-ACETYLENE WELDING AND CUTTING

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 23 and 28.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– use oxy-fuel equipment to perform basic welding, cutting and brazing

Theory:

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.
   - x) flame adjustment
   - xi) filler metals

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

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.

SL-1360 SHIELDED METAL ARC WELDING (SMAW)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 24.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– use SMAW equipment to perform welding

Theory:

1. Describe safe practices used in SMAW welding.
   - i) personal protective equipment
   - ii) protective devices
   - iii) fire precautions

2. Describe procedures to set up, use and shut down welding equipment.
   - iv) locate ground clamp
   - v) establish polarity
   - vi) set amperage
   - vii) set voltage
   - viii) select electrode

3. Describe factors to consider when striking and maintaining an electric arc.
   - ix) control
   - x) stop
   - xi) restart
   - xii) length
   - xiii) travel

4. Describe factors to consider when depositing a stringer and weave weld bead.
   - xiv) speed
   - xv) spatter
   - xvi) electrode stud
   - xvii) type of electrode
   - xviii) angle
   - xix) appearance
   - xx) lack of fusion

5. Describe the purpose of a tack weld.
6. Describe procedures used to fillet weld in the semi-vertical position using downward travel.

7 Describe procedures used to weld an outside corner joint.

8. Describe procedures used to fillet weld a Tee joint in the semi-vertical position.

9. Describe procedures used to weld a square butt joint in the semi-vertical position.

10. Describe pre-heat and post-heat.
    - i) purpose
    - ii) when necessary
    - iii) temperature

11. Describe common problems in welding high carbon steel.

12. Describe control of shrinkage in weldments.
    - i) fitup
    - ii) welding sequence
        - back step and skid back step
        - staggered
        - intermittent
    - iii) weld size and number of passes
    - iv) balancing of shrinkage and other forces
    - v) pre-heat requirements

13. Describe stress relief.
    - i) purpose
    - ii) methods
        - heating
        - peening
        - aging

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

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

2. Strike and maintain an electric arc.

3. Tack weld with E41011 (E6011) and E48018 (E7018) electrodes.

4. Deposit stringer and weave beads and welds with E41010 (E6010) or E41011 (E6011) and E48018 (E7018) electrodes.

5. Weld a t-joint and butt joint in four positions.

6. Weld an outside corner.

7. Fillet weld a t-joint in the four positions.

8. Fillet a square butt joint in four positions.

SL-1370 GAS METAL ARC WELDING (GMAW)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 7.

Course Outcomes:

Upon successful completion of this course the apprentice will be able to:
– set-up equipment, and strike and maintain an arc using the GMAW process
– fillet weld in four positions using the GMAW process

Theory:

1. Describe safe practices used in GMAW welding.
   - i) personal protective equipment
   - ii) protective devices
   - iii) fire precautions

2. Describe the GMAW process.
   - i) metal transfer
   - ii) power source
   - iii) polarity
   - iv) arc voltage
   - v) slope and adjustment
   - vi) inductance
   - vii) shielding gas and regulators
   - viii) electrode wire
   - ix) assembly of equipment
   - x) gun
   - xi) feeder
   - xii) welding variables and effects
   - xiii) electrode extension
   - xiv) welding voltage and current
   - xv) travel speed
   - xvi) penetration
   - xvii) travel and work angles
   - xviii) manipulation
   - xix) maintenance of tube
   - xx) nozzle
   - xxi) cable

xxii) pulsed arc machines
xxiii) chill bars
xxiv) purging stainless steel
xxv) temperature control paste

3. Describe disassembly and reassembly of GMAW welding systems.

4. Describe factors to consider in establishing and maintaining an arc.
   i) starting and stopping the weld
      – finishing end of the joint
   ii) power source
   iii) filler metal
   iv) adjustment
   v) shielded gases
      – pre and post weld
   vi) feed rolls
   vii) gun
   viii) variables
   ix) stick-out
   x) speed
   xi) maintenance
   xii) common faults

5. Describe factors to consider and procedures used to fillet weld in the flat position using the GMAW process.
   i) conventional and pulse
   ii) shielding gas selection
      – drift and mixtures for steel
   iii) addition of carbon dioxide
   iv) electrode wires
   v) wires for carbon steel
   vi) operating problems
   vii) work and travel angles
   viii) gun manipulation

6. Describe factors to consider and procedures used to fillet weld in the vertical position using the GMAW process.
   i) conventional and pulse
   ii) Tee joint
   iii) lap joint
   iv) running stringer beads

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Set up GMAW equipment.

2. Change the electrode wire guide.

3. Adjust and check the flow metre.

4. Deposit fillet welds on aluminum plates of various thicknesses using the GMAW process in four positions.

5. Deposit fillet welds on mild steel using GMAW process in the flat and horizontal positions (conventional and pulse).

SL-1530 COST ESTIMATION

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 10 and 11.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– prepare cost estimates

Theory:

1. Describe the components of cost estimating.
   - i) labour
   - ii) materials
   - iii) transportation
   - iv) permits
   - v) tools and equipment
   - vi) subcontracting

2. Describe the procedures used to price materials from take-off lists.

3. Describe the procedure to arrive at the final price.
   - i) overhead
   - ii) mark-up
   - iii) profit

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Using a blue print prepare a cost estimate for a small heating system.

2. Prepare cost estimate using computer software.

SL-1540 INSTALLATION

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 45-54.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– install duct runs according to plan and specifications
– understand installation processes for speciality systems

Theory:

1. Describe the six planning steps for field installation.
   i) staging (storing material)
   ii) planning
   iii) distributing of material to installation area
   iv) sectioning (pre-assembling on site)
   v) erecting
   vi) completing (sealing, levelling, etc)

2. Describe procedures to plan and mark penetrations.

3. Describe procedures to establish duct elevations and clearances.

4. Describe procedures to locate and install hangers and anchors.

5. Describe procedures to preassemble duct work in sections.

6. Describe procedures to install duct work.
   i) blowpipe systems
   ii) boiler breechings
   iii) lagging / cladding

7. Describe the operation and installation of fire and smoke dampers.
   i) fusible link

8. Describe procedures to install related equipment, including the following:
   i) dampers
   ii) diffusers

iii) sleeves
iv) registers

9. Describe the purpose of lagging / cladding.
   i) uses

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Install duct run and various components to plan and specifications.

SL-1550 HVAC SYSTEMS

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 41, 42, 45 and 46.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– describe the air pattern of a typical HVAC system.

Theory:

1. Describe the purpose and operation of an HVAC system.

2. Describe the basic properties of air.
   i) psychometric chart

3. Describe air patterns and their impact on the operation of a typical HVAC system.
   i) air velocity (FPM)
   ii) air volume (CFM)
   iii) duct pressure
      – static pressure (SP)
      – velocity pressure (VP)
      – total pressure (TP)
   iv) resistance
      – friction loss
      – dynamic loss

4. Describe ventilation.
   v) purpose
   vi) positive and negative building pressure
   vii) sources of infiltration and exfiltration
   viii) methods of measuring

5. Describe the basic principles of heating and cooling air.

6. Identify the types of fans.
   i) axial
      – propeller
      – tubeaxial

- vaneaxial

ii) centrifugal
- straight blade
- forward curved blade (squirrel cage)
- backward inclined

7. Describe the four basic duct systems and their design principles.
   ix) single zone
   x) variable air volume (VAV)
   xi) multi-zone
   xii) double-duct (dual)

8. Describe the installation of HVAC equipment.
   xiii) regulations (SMACNA)
   xiv) procedures
   xv) practices
   xvi) principles

9. Describe the types of package units.
   xvii) gas-electric
   xviii) gas-gas
   xix) electric-electric
   xx) heat pump

10. Describe procedures used to install package units.
    xxi) roof top systems
    xxii) split systems
    - indoor
    - outdoor

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

SL-1610 LAYOUT AND FABRICATION - PARALLEL LINES II

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 14.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
- layout and fabricate flat on top and flat on bottom patterns
- layout and fabricate round Tees
- layout and fabricate basic gutter mitres
- layout and fabricate round elbows

Theory:

1. Define terminology associated with parallel line development.
   - xxiii) flat-on-top
   - xxiv) flat-on-bottom
   - xxv) pipe
   - xxvi) tee
   - xxvii) mitre line
   - xxviii) centerline radius
   - xxix) gore
   - xxx) seam lines
   - xxxi) end gore
   - xxxii) symmetry of lines
   - xxxiii) true length of lines

2. Describe procedures to layout and fabricate round Tees.
   - xxxiv) 90^{o} Tee with equal diameters
     - patterns for the Tee
     - patterns for the hole
   - xxxv) 90^{o} Tee with unequal diameters
     - patterns for the Tee
     - patterns for the hole
   - xxxvi) centered Tees at an angle
   - xxxvii) off-center Tees
   - xxxviii) off-center Tees at an angle

3. Describe procedures used to layout and fabricate flat-on-top and flat-on-bottom patterns.
   xxxix) determine views
   xl) locate views
   – symmetry of lines
   xli) label lines and points
   xlii) prepare drawing
   xliii) determine true length of lines
   xliv) determine types of seams, joints and edges
   xlv) calculate allowances
   xlvi) determine stretchouts
   xlvii) cut pattern
   xlviii) 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.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Layout and fabricate patterns as per specifications.
   - flat-on-top
   - flat-on-bottom
   - round tee
   - basic gutter mitre
   - multi-piece elbow

SL-1620 LAYOUT AND FABRICATION - RADIAL LINES II

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 16.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– layout and fabricate tapers on a pitch
– layout and fabricate scalene and oblique cones (eccentrics)

Theory:

1. Define terminology associated with tapered fittings.
   iv) true length of lines
   v) eccentrics

2. Describe procedures to layout and fabricate tapers on a pitch and scalene or oblique cones.
   ii) determine views
   iii) locate views
      – symmetry of lines
   iv) label lines and points
   v) prepare drawing
   vi) determine true length of lines
   vii) determine types of seams, joints and edges
   viii) calculate allowances
   ix) determine stretchouts
   x) cut pattern
   xi) check pattern accuracy

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

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

SL-1630 LAYOUT AND FABRICATION - TRIANGULATION II

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 15.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
- layout and fabricate complex transitions and transformers
- layout and fabricate complex drop cheek elbows and rolling offsets
- layout and fabricate wye-branches
- layout and fabricate tapered elbows

Theory:

5. Describe procedures used to layout patterns and fabricate cylindrical rolling offsets.
   - xii) determine views
   - xiii) locate views
     - symmetry of lines
   - xiv) label lines and points
   - xv) prepare drawing
   - xvi) determine true length of lines
   - xvii) determine types of seams, joints, and edges
   - xviii) calculate allowances
   - xix) determine stretchouts
   - xx) check pattern accuracy
   - xxi) cut pattern

2. Describe procedures used to layout patterns and fabricate square or rectangular drop cheek elbows and offsets.
   - xxii) determine views
   - xxiii) locate views
     - symmetry of lines
   - xxiv) label lines and points
   - xxv) prepare drawing
   - xxvi) determine true length of lines
   - xxvii) determine types of seams, joints, and edges
   - xxviii) calculate allowances
   - xxix) determine stretchouts
   - xxx) check pattern accuracy
   - xxxi) cut pattern

3. Describe procedures used to layout patterns and fabricate wye-branches and tapered elbows.
   xxxii) determine views
   xxxiii) locate views
   – symmetry of lines
   xxxiv) label lines and points
   xxxv) prepare drawing
   xxxvi) determine true length of lines
   xxxvii) determine types of seams, joints, and edges
   xxxviii) calculate allowances
   xxxix) determine stretchouts
   xl) check pattern accuracy
   xli) cut pattern

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

36. Layout and fabricate cylindrical rolling offsets as per specifications.

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

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

SL-1700 LAYOUT AND FABRICATION - PARALLEL LINES III

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 14.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– layout and fabricate complex gutter mitres
– layout and fabricate basic cornice work

Theory:

38. Describe procedures used to layout and fabricate complex gutter mitres.

39. Describe procedures used to layout and fabricate basic cornice work.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are mandatory in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Layout and fabricate patterns as per specifications.
   i) complex gutter mitres
   ii) basic cornice work

SL-1710 LAYOUT AND FABRICATION - RADIAL LINES III

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis for the Sheet Metal Worker occupation task # 16.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
- layout and fabricate tapered elbows
- layout and fabricate wye-branch using scalene cones
- layout and fabricate intersections

Theory:

1. Define terminology associated with tapered fittings.
   - i) tapered elbows
   - ii) wye-branch
   - iii) intersections

2. Describe procedures used to layout and fabricate tapered elbows, wye-branch and intersections.
   - iv) determine views
   - v) locate views
     - symmetry of lines
   - vi) label lines and points
   - vii) prepare drawing
   - viii) determine true length of lines
   - ix) determine types of seams, joints and edges
   - x) calculate allowances
   - xi) determine stretchouts
   - xii) check pattern accuracy
   - xiii) cut pattern

3. Describe plastic welding.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Layout and fabricate the following, as per specifications.
   - i) tapered elbows

ii) wye-branch using scalene cones
iii) intersections

SL-1720 ADVANCED LAYOUT AND FABRICATION

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 15 and 29.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– layout and fabricate composite components using a combination of methods

Theory:

1. Describe procedures used to layout and fabricate composite components using a combination of methods.
   - iv) identify shapes
   - v) determine layout methods
   - vi) determine views
   - vii) locate views
     - symmetry of lines
   - viii) label lines and points
   - ix) prepare drawing
   - x) determine true length of lines
   - xi) determine types of seams, joints and edges
   - xii) calculate allowances
   - xiii) determine stretchouts
   - xiv) check pattern accuracy
   - xv) cut pattern

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Layout and fabricate composite components using a combination of layout methods as per specifications.

SL-1730 AUTOMATIC CONTROLS, INSTRUMENTS AND TESTING

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 55, 56, and 57.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– describe the procedure to seal and test duct systems

Theory:

16. Describe the purpose of automatic controls and their use.

17. Describe the purpose of duct leakage testing.

18. Identify instruments for testing, adjusting and balancing and describe their procedures for use.

19. Describe the difference between proportional air balancing and sequential air balancing.

20. Describe the basic operation of an hydronic system.

21. Describe commissioning procedures.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

SL-1740 AIR QUALITY MANAGEMENT

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 45, 46, 55, 56 and 57.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– demonstrate knowledge of basic air quality management principles

Theory:

1. Describe applicable codes and regulations.

2. Describe the principles of and need for energy management.

3. Describe the importance of good indoor air quality.

4. Describe types of filters and their uses.

5. Describe areas that have special ventilation needs.
   i) clean rooms
   ii) industrial settings
   iii) commercial

6. Describe the air quality problems with using rigid fibrous duct.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

SL-1750 GAS TUNGSTEN ARC WELDING (GTAW)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis task 25.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:
– use GTAW equipment to perform welding

Theory:

1. Describe safe practices used in GTAW welding.
   - i) personal protective equipment
   - ii) protective devices
   - iii) fire precautions

2. Describe the GTAW process.
   - iv) welding machine requirements
   - v) current requirement
   - vi) shielding gases
   - vii) GTAW torch
   - viii) electrodes
     - gas cups
   - ix) conditioning of the thoriated electrode
   - x) travel and work angles
   - xi) filler rods
   - xii) pulsed arc machines
   - xiii) edge preparations

3. Describe procedures to set up GTAW equipment.

4. Describe the disassemble and reassemble of GTAW equipment.

5. Describe basic joint preparation.
   - i) butt
   - ii) lap
   - iii) corner
   - iv) tee

5. Describe procedures to deposit welds on butt, lap, tee and corner joints.

6. Describe procedures used to test welds.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Set-up and adjust GTAW welding equipment.

2. Carry puddle without filler metal on 16 gauge mild steel.

3. Carry puddle with filler metal on 16 gauge mild steel.

4. Weld corner, lap, tee and butt joints on mild and stainless steel.

5. Fillet weld aluminum sheet in flat and horizontal positions.

6. Apply finishing methods to welds.

SL-1760 FABRICATES AND INSTALLS ARCHITECTURAL SHEET METAL PRODUCTS

NOA Reference:

The material covered satisfies in whole or in part the requirements of the National Occupational Analysis tasks 39, 49 - 51.

Course Outcomes:

Upon the successful completion of this course, the apprentice will be able to:
- plan and organize work.
- identify and select material.
- fabricate basic architectural components.
- install basic architectural components.

Theory:

1. Identify and describe various roof types.
   - v) saw tooth
   - vi) gamble
   - vii) hip
   - viii) shed
   - ix) mansard

2. Identify and describe various seams, locks and cleats associated with architectural sheet metal.

3. Identify and describe the characteristics of:
   - x) capillary action
   - xi) expansion and contraction
   - xii) electrolysis

4. Identify and describe the characteristics of various roof drainage systems.
   - xiii) gutter types and styles
   - xiv) expansion joints
   - xv) various fastening methods
   - xvi) scuppers and conductor heads

5. Identify and describe the characteristics of various roof flashing systems.
   - xvii) valley flashing
   - xviii) ridge flashing
   - xix) hip flashing
   - xx) eaves flashing

xxi) roof penetrations
- round pipe
- chimney
- roof curbs

xxii) copings
xxiii) fascia and gravel stop
xxiv) soffits
xxv) wall flashings

6. Identify and describe the characteristics of various roofing systems.
   xxvi) standing seam
   xxvii) batten seam
   xxviii) flat seam
   xxix) commercial

7. Identify and describe the various louvers and ventilators.
   xxx) gravity
   xxxi) power

8. Identify and describe various types of cornice work.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Layout and fabricate gutter miters.

2. Layout and fabricate samples of various roof flashings.

3. Layout and fabricate louver.

SL-1770 SOLDERING

NOA Reference:

The material covered satisfies in whole or in part the requirements of the National Occupational Analysis task 27.

Course Outcomes:

Upon the successful completion of this course, the apprentice will be able to:
– use soldering equipment to successfully solder seams and joints.

Theory:

1. Identify and describe the various types of soldering equipment, its characteristics and applications.
   xxxii) types of soldering irons (copper)
   xxxiii) 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.
   vi) corrosive and non-corrosive
   vii) safe handling of acids
   viii) ventilation

5. Describe the various types of solder and their advantages and disadvantages.
   ix) composition
   x) grading (50/50, 60/40)
   xi) bar solder
   xii) wire solder
   xiii) flux core
   xiv) beads

6. Describe various soldering methods.
   xv) flame color
   xvi) sweating a joint

xvii) skimming
xviii) pointing up
xix) capillary action
xx) seam preparation
xxi) flux removal
xxii) test for leakage

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Forge and tin a soldering iron from drawings.

2. Light and shut down a propane furnace.

3. Solder container having both vertical and horizontal seams.

4. Test for leaks.

MA-1060 BASIC MATH

Description:

This course in Basic Math requires knowledge of general mathematical concepts and processes to enable trades persons to function in the institutional setting by developing numeracy skills required for technical courses. This math course should also provide a foundation for experiential learning through a knowledge of math relating to on-the-job skills and practices.

Course Outcomes:

31. To develop numeracy skills and knowledge required for institutional and on-the-job learning.

32. To develop the capability to apply mathematical concepts in the performance of trade practices.

33. To develop an appreciation for mathematics as a critical element of the learning environment

34. To use mathematical principles accurately for the purposes of problem solving, job and materials estimation, measurement, calculation, system conversion, diagram interpretation and scale conversions, formulae calculations, and geometric applications.

Prerequisites:

Course Duration: 60 hrs.

Course Objectives (Knowledge):

1. Define and calculate using whole number operations

2. Define and demonstrate use of correct orders of operations

3. Demonstrate examples of operations with fractions and mixed numbers

4. Demonstrate examples of operations with decimals

5. Demonstrate examples of operations with percentages

6. Employ percent/decimal/fraction conversion and comparison

7. Define and calculate with ratios and proportions

8. Use the Imperial Measurement system in relevant trade applications

9. Use the Metric Measurement system in relevant trade applications

10. Perform Imperial/Metric conversions

11. Define and demonstrate the formulation of variables

12. Demonstrate and define the various properties of angles and make relevant calculations

Major Tasks/Sub-tasks (Skills):

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

REQUIRED RELATED COURSES

CM-2150 WORKPLACE COMMUNICATIONS

Description:

This course is designed to introduce students to the principles of effective communication including letters, memos, short report writing, oral presentations and interpersonal communications.

Course Outcomes:

Upon completion of the course, students will be able to:

- understand and apply communication skills as outlined in the Employability Skills 2000, Conference Board of Canada
- understand the importance of well-developed writing skills in business and in career development.
- understand the purpose of the various types of business correspondence.
- examine the principles of effective business writing.
- examine the standard formats for letters and memos.
- write effective letters and memos.
- examine the fundamentals of informal reports and the report writing procedure.
- produce and orally present an informal report
- examine effective listening skills and body language in communication

Objectives and Content:

1. Apply rules and principles for writing clear, concise, complete sentences which adhere to the conventions of grammar, punctuation, and mechanics.

2. Explain the rules of subject-verb agreement.

3. Define and describe the major characteristics of an effective paragraph

4. Examine the Value of Business Writing Skills
   xxxiv) Describe the importance of effective writing skills in business
   xxxv) Describe the value of well-developed writing skills to career success as referenced in the Employability Skills

5. Examine Principles of Effective Business Writing
   i) Discuss the rationale and techniques for fostering goodwill in business communication, regardless of the circumstances
   ii) Review the importance of revising and proofreading
   iii) Differentiate between letter and memo applications in the workplace & review samples
   iv) Identify the parts of a business letter and memo

v) Review the standard formats for business letters and memos
vi) Examine samples of well-written and poorly written letters and memos
vii) Examine guidelines for writing sample letters and memos which convey: acknowledgment, routine request, routine response, complaint, refusal, persuasive request and letters of appeal.

6. Examine the Fundamentals of Informal Business Reports
   i) Identify the purpose of the informal report
   ii) Identify the parts and formats of an informal report
   iii) Identify methods of information gathering
   iv) Describe the methods of referencing documents
   v) Review the importance of proof reading and editing

7. Examine types of presentations
   vii) Review & discuss components of an effective presentation
   viii) Review & discuss delivery techniques
   ix) Review & discuss preparation & use of audio/visual aids
   x) Discuss & participate in confidence building exercises used to prepare for giving presentations

8. Interpersonal Communications
   i) Examine and apply listening techniques
   ii) Discuss the importance of body language

Practical:

1. Write well-developed, coherent, unified paragraphs which illustrate the following: A variety of sentence arrangements; conciseness and clarity; and adherence to correct and appropriate sentence structure, grammar, punctuation, and mechanics.

2. Write sample letters and memos which convey: acknowledgment, routine request, routine response, complaint, refusal, persuasive request and letters of appeal.

3. Gather pertinent information, organize information into an appropriate outline & write an

informal report with documented resources.

i) Edit, proofread, and revise the draft to create an effective informal report and present orally using visual aids

ii) Participate in confidence building exercises

4. Present an effective presentation.

5. Evaluate presentations.

MR-1220 CUSTOMER SERVICE

Description:

This course focuses on the role of providing quality customer service. It is important to have a positive attitude and the necessary skills to effectively listen and interpret customer concerns about a product, resolve customer problems, and determine customer wants and needs. Students will be able to use the skills and knowledge gained in this course to effectively provide a consistently high level of service to the customer.

Course Outcomes:

Upon successful completion of this course, students will be able to:
- define customer service
- explain why service is important
- describe the relationship between "service" and "sales"
- demonstrate an understanding of the importance of a positive attitude
- demonstrate methods of resolving customer complaints

Objectives and Content:

1. Define quality service
   - iii) Identify and discuss elements of customer service
   - iv) Explain the difference between Service vs. Sales or Selling
   - v) Explain why quality service is important
   - vi) Identify the various types of customers & challenges they may present
   - vii) Describe customer loyalty
   - viii) Examine barriers to quality Customer Service

2. Explain how to determine customers wants and needs
   - ix) Identify customer needs
   - x) Explain the difference between customer wants and needs
   - xi) Identify ways to ensure repeat business

3. Demonstrate an understanding of the importance of having a positive attitude
   - xii) Identify & discuss the characteristics of a positive attitude
   - xiii) Explain why it is important to have a positive attitude
   - xiv) Explain how a positive attitude can improve a customer's satisfaction
   - xv) Define perception and explain how perception can alter us and customers
   - xvi) Describe methods of dealing with perception

4. Communicating effectively with customers
   - xvii) Describe the main elements in the communication process
   - xviii) Identify some barriers to effective communication
   - xix) Explain why body language is important
   - xx) Define active listening and state why it is important
   - xxi) Identify and discuss the steps of the listening process
   - xxii) Identify and discuss questioning techniques

5. Demonstrate using the telephone effectively
   - xxiii) Explain why telephone skills are important
   - xxiv) Describe the qualities of a professional telephone interaction

6. Demonstrate an understanding of the importance of asserting oneself
   - xxv) Define assertiveness
   - xxvi) Discuss assertive techniques
   - xxvii) Explain the use of assertiveness when dealing with multiple customers

7. Demonstrate techniques for interacting with challenging customers in addressing complaints & resolving conflict
   - xxviii) Examine & discuss ways to control feelings
   - xxix) Examine & discuss ways to interact with an upset customer
   - xxx) Examine & discuss ways to resolve conflict/customer criticism
   - xxxi) Examine & discuss ways to prevent unnecessary conflict with customers

Practical:

35. Participate in activities to demonstrate knowledge of the course objectives.

SP-2330 QUALITY ASSURANCE/QUALITY CONTROL

Description:

This course is designed to give students an understanding of the concepts and requirements of QA/QC such as, interpreting standards, controlling the acceptance of raw materials, controlling quality variables and documenting the process. It includes information on quality concepts, codes and standards, documentation, communications, human resources, company structure and policy, teamwork and responsibilities.

Course Outcomes:

Upon completion of this course, students will be able to:
- develop the skills and knowledge required to apply quality assurance/quality control procedures as related to the trade
- develop an awareness of quality principles and processes
- apply quality assurance/quality control procedures in a shop project

Objectives & Content:

36. Describe the reasons for quality assurance and quality plans.

2. Explain the relationship between quality assurance and quality control.

3. Describe quality control procedures as applied to the production and checking of specifications and processes in applicable occupations.

4. Describe quality control procedures as applied to the acceptance and checking of raw materials.

5. Explain the role of communications in a quality environment.

6. Explain why it is important for all employees to understand the structure of the company and its production processes.

7. Explain how human resource effectiveness is maximized in a quality managed organization.

8. Explain the role of company policy in quality management.

9. Explain the purpose of codes and standards in various occupations.

10. Explain the concepts of quality
    i) cost of quality
    ii) measurement of quality

iii) elements of quality
iv) elements of the quality audit
v) quality standards
vi) role expectations and responsibilities

11. Explain the structure of quality assurance and quality control
    i) Describe organizational charts
    ii) Identify the elements of a quality assurance system such as ISO, CSA, WHMIS, Sanitation Safety Code (SSC)
    iii) Explain the purpose of the quality assurance manual
    iv) Describe quality assurance procedures

12. Examine quality assurance/quality control documentation
    i) Describe methods of recording reports in industry
    ii) Describe procedures of traceability (manual and computer-based recording)
    iii) Identify needs for quality control procedures

Practical:

1. Apply quality control to a project
    i) Follow QA/QC procedures for drawings, plans and specifications in applicable occupations.
    ii) Calibrate measuring instruments and devices in applicable occupations.
    iii) Interpret required standards
    iv) Follow QA/QC procedures for accepting raw materials
    v) Carry out the project
    vi) Control the quality elements (variables)
    vii) Complete QA/QC reports

MC-1050 INTRODUCTION TO COMPUTERS

Description:

This course is designed to give the student an introduction to computer systems. Particular emphasis is given to word processing, spreadsheet, e-mail and the Internet and security issues.

Course Outcomes:

Upon completion of this course, students will have a basic understanding of:
– computer systems and their operation.
– popular software packages, their applications
– security issues of Computers

Objectives & Content:

1. Identify the major components of microcomputer system hardware and software system.

2. Describe the functions of the microprocessor.
   i) Describe and give examples of I/O DEVICES.
   ii) Describe primary storage (RAM, ROM, Cache).
   iii) Define bit, byte, code and the prefixes k.m. and g.
   iv) Describe secondary storage (diskettes and hard disks, CD ROMS, Zip Drives etc).
   v) Describe how to care for a computer and its accessories.

3. Describe microcomputer software
   i) Define software.
   ii) Describe types of operational and application software
   iii) Define file and give the rules for filenames and file extensions.

4. Describe windows software
   i) Start and quit a Program
   ii) Demonstrate how to use the help function
   iii) Locate a specific file using the **find** function
   iv) Identify system settings:wall paper, screen saver, screen resolution, background
   v) Start a program by using the Run Command
   vi) Shutting down your computer

5. Identify File Management commands
   - i) Demonstrate how to view directory structure and folder content
   - ii) Organize files and folders
   - iii) Copy, delete, and move files and folders
   - iv) Create folders
   - v) Maximize and minimize a window
   - vi) Describe windows task bar

6. Describe Keyboards
   - i) Identify and locate alphabetic and numeric keys
   - ii) Identify and locate function key & special keys

7. Describe Word Processing
   - i) Describe Windows components
   - ii) Menu bar
   - iii) Menu indicators
   - iv) Document window
   - v) The Status bar
   - vi) The Help feature
   - vii) Insertion point movements

8. Describe the procedure used to development of a document
   - i) Enter text
   - ii) Change the display

9. Describe the procedure for opening, saving and exiting documents
   - i) Saving a document
   - ii) Closing a document.
   - iii) Starting a new document Window
   - iv) Opening a document
   - v) Exiting word processor

10. Describe the procedure for editing a Document
    - i) Adding new text
    - ii) Deleting text
    - iii) Using basic format enhancement (split and join paragraphs, insert text)

11. Describe the main Select Features
    - i) Identify a selection
    - ii) Moving a selection
    - iii) Copying a selection
    - iv) Deleting a selection
    - v) Saving a selection

12. Explain how to change Layout Format
    i) Changing layout format: (margins, spacing, alignment, paragraph indent, tabs, line spacing, page numbering)

13. Explain how to change Text Attributes
    i) Changing text attributes: (bold, underline, font, etc.)

14. Describe the Auxiliary Tools
    i) Using Spell Check & Thesaurus

15. Describe Print features
    i) Selecting the Print Feature: (i.e; number of copies and current document)
    ii) Identifying various options in print screen dialogue box

16. Examine & Discuss Electronic Spreadsheet
    i) Spreadsheet Basics
    ii) The Worksheet Window

17. Describe Menus
    vi) Menu Bar
    vii) Control menu
    viii) Shortcut menu
    ix) Save, Retrieve form menus

18. Describe the components of a worksheet
    i) Entering constant values and formulas
    ii) Using the Recalculation feature

19. Describe Use ranges
    i) Typing a range for a function
    ii) Pointing to a range for a function
    iii) Selecting a range for toolbar and menu commands

20. Describe how to print a worksheet
    iv) Printing to the Screen
    v) Printing to the Printer
    vi) Printing a selected Range

21. Describe how to edit a worksheet
    i) Replacing cell contents
    ii) Inserting & deleting rows and columns
    iii) Changing cell formats
    iv) Changing cell alignments
    v) Changing column width

vi) Copying and moving cells

22. State major security issues in using computers
    vii) Pass words
    viii) Accessing accounts
    ix) Viruses and how they can be avoided
    x) Identity theft and ways to protect personal information

23. Describe how to use Electronic Mail
    i) E-mail etiquette
    ii) E-mail accounts
    iii) E-mail messages
    iv) E-mail message with attachments
    v) E-mail attachments
    vi) Print e-mail messages
    vii) Deleting e-mail messages

24. Explain the Internet and its uses
    viii) The World Wide Web(www)
    ix) Accessing Web sites
    x) Internet Web Browsers
    xi) Internet Search Engines
    xii) Searching Techniques
    xiii) Posting documents on-line

Practical:

31. Create a document using Word Processing.

32. Complete word processing exercises to demonstrate proficiency in word processing

33. Prepare and send e-mails with attachments

34. Retrieve documents and e-mail attachments and print copies

35. Develop & print a spread sheet.

36. Post a document on-line

SD-1700 WORKPLACE SKILLS

Description:

This course involves participating in meetings, information on formal meetings, unions, workers' compensation, employment insurance regulations, workers' rights and human rights.

Course Outcomes:

Upon completion of this course, students will be able to:
- Participate in meetings
- Define and discuss basic concepts of:
  - unions
  - workers' compensation
  - employment insurance
  - workers' rights
  - human rights
  - workplace diversity
  - gender sensitivity

Objectives & Content:

1. Meetings
   - i) Identify & discuss meeting format and preparation required for a meeting.
   - ii) Explain the purpose of an agenda.
   - iii) Explain the roles and responsibilities of meeting participants.
   - iv) Explain the purpose of motions and amendments and withdrawals.
   - v) Explain the procedure to delay discussion of motions.
   - vi) Explain the voting process.

2. Unions
   - i) State why unions exist.
   - ii) Give a concise description of the history of Canadian labour.
   - iii) Explain how unions function.
   - iv) Explain labour's structure.
   - v) Describe labour's social objectives.
   - vi) Describe the relationship between Canadian labour and the workers.
   - vii) Describe the involvement of women in unions.

3. Worker's Compensation
   - i) Describe the aims, objectives, benefits and regulations of the Workplace Health, safety and Compensation Commission.
   - ii) Explain the internal review process.

4. Employment Insurance
   - i) Explain employment insurance regulations
   - ii) Describe how to apply for employment insurance.
   - iii) Explain the appeal process.
   - iv) Identify the components of a letter of appeal.

5. Worker's Rights
   - i) Define labour standards.
   - ii) Explain the purpose of the Labour Standards Act.
   - iii) Identify regulations pertaining to:
     - Hours of work
     - Minimum wages
     - Employment of children
     - Vacation pay
   - iv) Explain the purpose of the Occupational Health & Safety Act as it refers to workers' rights

6. Human Rights
   - iv) Describe what information cannot be included on an employment application.
   - v) Describe what information cannot be included in an interview.
   - vi) Examine the Human Rights Code and explain the role of the Human Rights Commission.
   - vii) Define harassment in various forms and identify strategies for prevention.

7. Workplace Diversity
   - i) Define and explore basic concepts and terms related to workplace inclusively including age, race, culture, religion, socio-economic, sexual orientation with an emphasis on gender issues and gender stereotyping.

8. Gender Sensitivity
   - i) Explore gender and stereotyping issues in the workplace by identifying strategies for eliminating gender bias.

Practical:

1. Prepare an agenda.

2. Participate in a meeting.

3. Analyze a documented case of a human rights complaint with special emphasis on the application, time frame, documentation needed, and legal advice available.

SD-1710 JOB SEARCH TECHNIQUES

Description:

This course is designed to give students an introduction to the critical elements of effective job search techniques.

Course Outcomes:

Upon completion of this course, students will be able to:
– Demonstrate effective use of Job Search Techniques

Objectives & Content:

69. Identify and examine employment trends and opportunities

70. Identify sources that can lead to employment

71. Access and review information on the Newfoundland and Labrador Apprenticeship and Certification Web site and the Apprenticeship Employment Gateway

72. Analyze job ads and discuss the importance of fitting qualifications to job requirements

73. Identify and discuss employability skills as outlined by the Conference Board of Canada.

74. Discuss the necessity of fully completing application forms**.**

75. Establish the aim/purpose of a resume

76. Explore characteristics of effective resumes, types of resumes, and principles of resume format .

77. Explore characteristics of an effective cover letter.

78. Identify commonly asked questions in an interview.

79. Explore other employment related correspondence.

80. Explore the job market to identify employability skills expected by an employer.

81. Conduct a self-analysis and compare with general employer expectations.

82. Discuss the value of establishing and maintaining a portfolio.

Practical:

22. Complete sample application forms.

23. Write a resume.

24. Write an effective cover letter.

25. Establish a portfolio.

26. Write out answers to commonly asked questions asked during interviews.

27. Identify three potential employers from the Apprenticeship Employment gateway, Apprenticeship & Certification web site.

SD-1720 ENTREPRENEURIAL AWARENESS

Description:

This course is designed to introduce the student to the field of entrepreneurship, including the characteristics of the entrepreneur, the pros and cons of self-employment, and some of the steps involved in starting your own business.

Course Outcomes:

Upon completion of this course, the student will be able to:

– Identify the various types of business ownership, the advantages and disadvantages of self-employment and identify the characteristics of an entrepreneur.
– State the purpose and identify the main elements of a business plan.

Objectives & Content:

28. Explore Self-Employment: An Alternative to Employment
    - viii) Identify the advantages and disadvantages of self-employment vs. regular employment
    - ix) Differentiate between an entrepreneur and a small business owner
    - x) Evaluate present ideas about being in business

2. Identify and discuss various types of business ownership
    - i) Explore the Characteristic of Entrepreneurs
    - ii) Identify characteristics common to entrepreneurs
    - iii) Compare one's own personal characteristics with those of entrepreneurs.
    - iv) Examine one's present ideas about business people

3. Identify Business Opportunities
    - i) Distinguish between an opportunity and an idea.
    - ii) Examine existing traditional and innovative business ventures
    - iii) Identify and summarize the role of various agencies that support business development.
    - iv) Identify potential business opportunities.

4. Review the Entrepreneurial Process.
    - i) Explain the entrepreneurial process
    - ii) Describe the purpose of a business plan
    - iii) Identify & discuss the main elements of a business plan

Practical:

1. From a list potential business opportunities prepare a list of elements that would have to be included in a business plan.