



PROVINCIAL PLAN OF TRAINING

FOR THE

SHEET METAL WORKER

OCCUPATION

June 2003

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)

Return Evaluation Form and Plan of Training to:

*Manager, Industrial Training
Division of Institutional and Industrial Education
Department of Youth Services and Post-Secondary Education
P.O. Box 8700
St. John's, NF
A1B 4J6*

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Workplace Skills	85
Job Search Techniques	87
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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

NF Course No.	Atlantic Course No.	Course Name	Suggested Hours	Prerequisite(s)	Page No.
TS-1510		Occupational Health & Safety	6		13
TS-1530		First Aid	14		16
TS-1520		WHMIS	6		17
SL-1100	SMW-0100	Safety	7		20
SL-1110	SMW-1105	Tools and Equipment	45	SMW-0100	22
SL-1120	SMW-1185	Material Handling and Rigging	20	SMW-1105	24
SL-1140	SMW-1175	Metallurgy	20	SMW-0120	27
SL-1150	SMW-0105	Basic Drawing and Layout	30		29
SL-1240	SMW-1005	Layout and Fabrication - Parallel Lines I	30	SMW-0105	31
SL-1250	SMW-1010	Layout and Fabrication - Radial Lines I	30	SMW-0105	33
SL-1260	SMW-1015	Layout and Fabrication - Triangulation I	30	SMW-0105	35
SL-1130	SMW-1020	Fabrication	30	SMW-1105	37
SL-1350	SMW-0110	Oxy-Acetylene Welding and Cutting	30		40
SL-1160	SMW-0115	Blueprint Reading I (Basic)	15		42
SL-1530	SMW-1025	Cost Estimation	15	SMW-0115	44
SL-1540	SMW-1030	Installation	30	SMW-1105, 0115	45
SL-1610	SMW-1035	Layout and Fabrication - Parallel Lines II	30	SMW-1005	47
SL-1620	SMW-1040	Layout and Fabrication - Radial Lines II	30	SMW-1010	49
SL-1630	SMW-1045	Layout and Fabrication - Triangulation II	30	SMW-1015	50
SL-1360	SMW-0120	Shielded Metal Arc Welding (SMAW)	30		52
SL-1550	SMW-1050	HVAC Systems	45	SMW-0115, 1030	55
SL-1170	SMW-1055	Blueprint Reading II (Advanced)	15	SMW-0115	57
SL-1370	SMW-1060	Gas Metal Arc Welding (GMAW)	30	SMW-0100, 0120	59
SL-1700	SMW-1065	Layout and Fabrication - Parallel Lines III	30	SWM-1035	62
SL-1710	SMW-1070	Layout and Fabrication - Radial Lines III	30	SWM-1040	63

NF Course No.	Atlantic Course No.	Course Name	Suggested Hours	Prerequisite(s)	Page No.
SL-1720	SMW-1075	Advanced Layout and Fabrication	30	SMW-1045, 1065, 1070	65
SL-1730	SMW-1080	Automatic Controls, Instruments and Testing	30	SMW-1050, 1055	66
SL-1740	SMW-0125	Air Quality Management	30	none	67
SL-1750	SMW-1085	Gas Tungsten Arc Welding (GTAW)	30	SMW-1020, 0120	68
SL-1760	SMW-1090	Fabricates and Installs Architectural Sheet Metal Products	10	SMW-1105, 1175	70
SL-1770	SMW-1095	Soldering	45	SMW-1005	72
CM-2150		Workplace Correspondence	45		74
MR-1220		Customer Service	30		76
SP-2330		Quality Assurance/Quality Control	30		78
MC-1050		Introduction to Computers	30		80
SD-1700		Workplace Skills	30		85
SD-1710		Job Search Techniques	15		87
SD-1720		Entrepreneurial Awareness	15		88

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:

- The completion of designated first year courses specific to the occupation
- OR
Indenturing into the occupation by an employer who agrees to provide the appropriate training and work experiences as outlined in this plan of training.
- OR
Enrolment in a program of studies that includes all entry and advanced level skills and required work experiences as approved by the Provincial Apprenticeship and Certification Board.

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	25% of Course Credit Hours, Plus relevant work experience totaling 1800 hours	Second Year
Second Year Apprentice	50% of Course Credit Hours, Plus relevant work experience totaling 3600 hours	Third Year
Third Year Apprentice	75% of Course Credit Hours, Plus relevant work experience totaling 5400 hours	Fourth Year
Fourth Year Apprentice	100% of Course Credit Hours, Plus completion and sign-off of workplace skills required for certification totaling 7200 hours	Write Certification Examination
5400 Hour Programs	Requirements for Progression	Progress To
First Year Apprentice	33% of Course Credit Hours, Plus relevant work experience totaling 1800 hours	Second Year
Second Year Apprentice	66% of Course Credit Hours, Plus relevant work experience totaling 3600 hours	Third Year
Third Year Apprentice	100% of Course Credit Hours, Plus completion and sign-off of workplace skills required for certification totaling 5400 hours	Write Certification Examination

4800 Hour Programs	Requirements for Progression	Progress To
First Year Apprenticeship	33% of Course Credit Hours, Plus relevant work experience totaling 1600 hours	Second Year
Second Year Apprenticeship	66% of Course Credit Hours, Plus relevant work experience totaling 3200 hours	Third Year
Third Year Apprenticeship	100% of Course Credit Hours, Plus completion and sign-off of workplace skills required for certification totaling 4800 hours	Write Certification Examination

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	1 st Year	55%	These wage rates are percentages of the prevailing journeyman'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.
	2 nd Year	65%	
	3 rd Year	75%	
	4 th Year	90%	
5400 Hours and 4800 Hours	1 st Year	55%	
	2 nd Year	70%	
	3 rd Year	85%	
4000 (Hairstylist) - 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 JOURNEYPEPERSONS

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 journeyman 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 Youth Services and Post-Secondary 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. Normally, a combination of training from an accredited training program and suitable work experience totalling 7200 hours

Or

A total of 9000 hours of suitable work experience.

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

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
 - a. 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
 - Duties of employer, owner, contractors, sub-contractors, employees, and suppliers
3. Explain the purpose of joint health and safety committees
 - Formation of committee
 - Functions of committee
 - Legislated rights
 - Health and safety representation
 - Reporting endangerment to health
 - Appropriate remedial action
 - Investigation of endangerment
 - Committee recommendation
 - Employer's responsibility in taking remedial action
4. Examine right to refuse dangerous work
 - Reasonable grounds for refusal

- Reporting endangerment to health
- Appropriate remedial action
- Investigation of endangerment
- Committee recommendation
- Employer's responsibility to take appropriate remedial action
- Action taken when employee does not have reasonable grounds for refusing dangerous work
- Employee's rights
- Assigning another employee to perform duties
- Temporary reassignment of employee to perform other duties
- Collective agreement influences
- Wages and benefits

5. Describe discriminatory action

- Definition
- Filing a complaint procedure
- Allocated period of time a complaint can be filed with the Commission
- Duties of an arbitrator under the Industrial Relations Act
- Order in writing inclusion
- Report to commission Allocated period of time to request Arbitrator to deal with the matter of the request
- Notice of application
- Failure to comply with the terms of an order
- Order filed in the court

6. Explain duties of commission officers

- Powers and duties of officers
- Procedure for examinations and inspections
- Orders given by officers orally or in writing
- Specifications of an order given by an officer to owner of the place of employment, employer, contractor, sub-contractor, employee, or supplier
- Service of an order
- Prohibition of persons towards an officer in the exercise of his/her power or duties
- Rescinding of an order
- Posting a copy of the order
- Illegal removal of an order

7. Interpret appeals of orders

- Allocated period of time for appeal of an order
- Person who may appeal order
- Action taken by Commission when person involved does not comply with the order
- Enforcement of the order

- Notice of application
- Rules of court

8. Explain the process for reporting of accidents

- Application of act
- Report procedure
- Reporting notification of injury
- Reporting accidental explosion or exposure
- 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.

1. Describe work situations that one might want to refuse.
2. Interview someone in your occupation on two or more aspects of the act and report results.

TS1530

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.

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
 - Rational and key elements
 - History and development of WHMIS
 - WHMIS legislation
 - WHMIS implementation program
 - Definitions of legal and technical terms
2. Examine hazard identification and ingredient disclosure
 - Prohibited, restricted and controlled products
 - Classification and the application of WHMIS information requirements
 - Responsibilities for classification
 - the supplier
 - the employer
 - the worker - Classification: rules and criteria
 - information on classification
 - classes, divisions and subdivision in WHMIS
 - general rules for classification
 - class A - compressed gases
 - class B - flammable and combustible materials
 - class C - oxidizing material
 - class D - poisonous and infectious material
 - class E - corrosive material
 - class F - dangerously reactive material
 - Products excluded from the application of WHMIS legislation
 - consumer products
 - explosives
 - cosmetics, drugs, foods and devices
 - pest control products

- radioactive prescribed substances
- wood or products made of wood
- manufactured articles
- tobacco or products of tobacco
- hazardous wastes
- products handled or transported pursuant to the Transportation of Dangerous Goods (TDG) Act
- 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

- Definition of a WHMIS label
 - supplier label
 - workplace label
 - other means of identification
- Responsibility for labels
 - supplier responsibility
 - employer responsibility
 - worker responsibility
- Introduce label content, design and location
 - supplier labels
 - workplace labels
 - other means of identification

4. Introduce material safety data sheets (MSDS)

- Definition of a material safety data sheet
- Purpose of the data sheet
- 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.

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

SUGGESTED RESOURCES:

1. WHMIS Regulation
2. Sample MSDS sheets

SMW-0100

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.
 - breathing apparatus
 - clothing
 - foot wear
 - eye protection
 - 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.

SMW-1105

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.

Prerequisites:

SMW-0100

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.
 - layout
 - cutting
 - forming
 - joining
2. Identify types of common portable power tools and describe their characteristics, applications and procedures for safe use.
 - pneumatic
 - hydraulic
 - electrical
 - gas powered
3. Identify types of common powder actuated tools and describe their characteristics, applications and procedures for safe use.
 - low velocity
 - high velocity
4. Identify types of common machines and equipment and describe their characteristics, applications and procedures for safe use.
 - rotary machines
 - shop tools and equipment
 - 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.

1. Produce workpieces to print specifications using the various types of power cutting equipment.
2. Use combination snips to cut to size a metal blank and circular disk.
3. Cut a circular opening in a metal blank using aviation snips.
4. Cut a piece of angle iron to size using a hack saw.
5. Cut a rectangular opening in a metal blank using a chisel.
6. Perform bending operations of ferrous and non-ferrous materials, using press brake, to specified tolerances/drawing specifications.
7. Use power shears to cut a sample piece to a given measurement and deburr.
8. Produce samples of seams and edges and check for accuracy.
9. Adjust and change punches and dies to create burr free holes.
10. Roll a work piece to a given specification.
11. Perform general maintenance according to manufacturer's specifications on hand and power tools.
12. Perform general maintenance according to manufacturer' specifications on equipment.

SMW-1185

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.

Prerequisites:

SMW-0100

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.
 - lever
 - pulley
 - wedge
2. Describe the principles of mechanical advantage.
3. Describe hoisting.
 - weight of objects
 - object configuration
 - materials
 - methods of hoisting (use of chains, slings, wire rope, etc.)
 - applicable safety
 - materials for blocking
4. Describe wire rope, chains and slings.
 - recognition of condition
 - cable
 - wire rope
 - chain
 - cable clamps
 - methods of placement
 - slings
 - nylon slings
5. Describe lifting clamps.

- knowledge of use
 - acceptable method of applying hooks
 - safe practices
6. Describe come-alongs, rope and chain falls.
 - types
 - operation
 - safe practices
 7. Describe stacking and blocking.
 - structural shapes
 - jacking (hydraulic, screw, ratchet)
 - 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.
 - sizes
 - safe use
 - care
 - 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.
 - overwind
 - underwind
 - left and right hand lay lines
 13. Describe practices for use of block and tackle.
 - safety factors of line
 - reeving practices
 14. Describe other hoisting practices.
 - overhead cranes
 - jib cranes
 15. Describe manual lifting practices.
 - correct body position
 - necessity of obtaining assistance

16. Describe standard hand signals.
17. List the Occupational Health and Safety Regulations for rigging, life line and safety belts.
 - responsibilities and liabilities of using rigging, lifting and hoisting equipment.
 - different types of scaffolds (tube and clamp, manufactured platforms and scaffolding and suspended scaffolding).
 - safety rules for erecting and working on scaffolding (kickplates, braces, ties, planking, permits and tagging)
 - problems of rolling and suspended scaffolding and safety guidelines for their use.
 - 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. Make up spreader bar (single).
2. Whip or seize one end of fibre rope.
3. Using fibre rope tie:
 - reef knot
 - bowline
 - round turn and hitch
 - scaffold hitch
4. Demonstrate hand signals for crane operation.
5. Identify appropriate scaffold for various job situations.
6. Operate genie lift.
7. Prepare safety harness/fall arrest with tie off points.

SMW-1175

Metallurgy

NOA Reference:

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

Prerequisites:

SMW-0120

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
 - yield strength
 - elasticity
 - ductility
 - hardness
 - compressive strength
 - fatigue strength
 - impact strength
 - toughness
 - density
 - melting point
 - specific heat
 - heat of fusion
 - thermal conductivity
 - electrical conductivity and resistance
 - corrosion resistance
 - brittleness
 - malleability
 - plasticity
2. Identify and describe the ferrous and non-ferrous metals used in the trade.
 - ferrous
 - non-ferrous
 - alloys
3. Identify the types of non-metallic materials used in the trade and describe their characteristics and applications.
 - fibrous duct board

- plastics (eg, PVC, ABS)
 - reinforced fibre glass
 - PVC coated metals
 - accoustic duct liner
4. Describe heat treatment and stress relieving techniques.
 5. Describe the effects on properties when:
 - forming
 - punching
 - drilling
 - cutting
 6. Describe SAE, AISI, and ASTMS number system (introduction only).
 - ferrous metals
 7. Describe colour coding of materials (introduction only).
 - ferrous metals
 8. Describe expansion and contraction of metals.
 - 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.

SMW-0105

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.
 - stretchout
 - fitting and seam allowances
 - bisection
 - perpendicular
 - angle trisection
 - tangent
2. Describe the construction of basic geometric shapes.
 - pentagon
 - hexagon
 - octagon
 - ellipse
3. Describe sketching techniques.
 - Pencil technique
4. Describe different views and their uses.
 - front
 - right side
 - left side
 - top
 - bottom
 - rear
5. Describe the procedures used to calculate:
 - stretchout
 - allowance requirements
 - blanking
6. Describe the two main methods of developing stretchouts.
 - projection method

- step-off method
7. Describe orthographic projection.
 - glass box technique
 8. Describe views required to complete layout.
 - front
 - plan
 - auxiliary
 9. Describe layout tools and instruments, their applications and use.
 - t-square
 - set square
 - compass
 - dividers
 - 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.
 - bisect a straight line or a circle
 - erect a perpendicular
 - divide a line into a given number of equal parts
 - construct parallel lines
 - construct tangents
 - construct an ellipse
 - construct a pentagon, octagon and hexagon
2. Layout and fabricate simple fittings.
 - elbow's
 - off-sets
 - duct sections

SMW-1005 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.

Prerequisites:

SMW-0105

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.
 - elbows
 - types
 - uses
 - tees
 - types
 - uses
 - wye-branches
 - types
 - uses
 - architectural designs
 - basic flashings
3. Describe the procedures used to develop patterns and fabricate fittings.
 - determine views
 - locate views
 - symmetry of lines
 - label lines and points
 - prepare drawing
 - determine true length of lines
 - determine types of seams, joints and edges
 - calculate allowances
 - determine stretchouts
 - check pattern accuracy

- 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.

SMW-1010 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.

Prerequisites:

SMW-0105

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.
 - apex
 - frustum of a cone
 - truncated cones
 - right cones
 - true length lines
2. Identify and describe the types of fittings that require the radial line method of layout.
 - funnel
 - tapers
 - branches
3. Describe procedures to layout patterns and fabricate tapered fittings.
 - determine views
 - locate views
 - symmetry of lines
 - label lines and points
 - prepare drawing
 - determine true length of lines
 - determine types of seams, joints and edges
 - calculate allowances
 - determine stretchouts
 - check pattern accuracy
 - 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.
 - basic frustum
 - basic truncated cone

SMW-1015 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.

Prerequisites:

SMW-0105

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.
 - true length of lines
 - lines of symmetry
 - transformers (eg, change in shape)
 - transitions (eg, change in size)
2. Identify and describe the types of patterns and fittings that require the triangulation method.
 - transformers
 - transitions
3. Describe two methods of finding true length of lines.
 - separate
 - superimposed
4. Describe procedures to layout and fabricate patterns for basic transitions and transformers.
 - determine views
 - locate views
 - symmetry of lines
 - label lines and points
 - prepare drawing
 - determine true length of lines
 - determine types of seams, joints, and edges
 - calculate allowances
 - determine stretchouts
 - check pattern accuracy

- 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.

SMW-1020

Fabrication

NOA Reference:

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

Prerequisites:

SMW-1000

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.
 - tools and equipment required
 - scheduling labour
 - shop tickets (work order)
 - time schedule
 - coordination with other trades
 - 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.
 - methods
 - condition of material
 - interior versus exterior use
 - types of surface finish
 - corrosion protection
4. Describe procedures used to select and apply finishing materials.
 - flap wheels
 - grinding wheels
 - buffing compounds
 - paint types
 - sanding disks
 - buffing wheels
 - abrasive pads

5. Describe the purpose of alignment devices and their use.
 - jigs
 - bench plates
 - fixtures
6. Identify and apply formulas to calculate allowance for the following.
 - bends
 - seams
 - rolling stretchouts
 - metal thickness
7. Describe methods of metal manipulation.
 - shrinking
 - stretching
 - dishing
 - flattening
 - forming
 - shaping
 - planishing
8. Describe procedures to insulate ducts for sound.
9. Identify joining apparatus and describe their applications.
 - locks
 - seams
 - cleats
 - rivets
 - fasteners
 - flanges
 - clips
 - gaskets
10. Describe materials, equipment and procedures used to seal ducts and fittings.
 - sealant
 - tape
 - gaskets
 - visual inspection
 - clean up of applicator and tools
11. Describe the special requirements and governing legislation for food service equipment.
12. 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.
15. 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.
 - metallic or non-metallic
 - gauge
 - joining apparatus
 - sealing
2. Fabricate various types of seams and edges.
3. Fabricate and insulate basic duct run with basic fittings and various types of cleats.

SMW-0110

Oxy-fuel 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.
 - cleaning
 - threads
 - pressure
 - fuel gas
 - oxygen
 - set up procedures
 - lighting procedures
 - flame adjustment
 - 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.
 - flame adjustment
 - 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.

SMW-0115

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.

Prerequisites:

SMW-0105

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.
 - centre
 - hidden
 - dimension
 - extension
 - object
 - break
 - long
 - short
2. Describe types of blueprints.
 - architectural
 - mechanical
 - shop drawing
 - structural
 - electrical
3. Describe the various views used on blueprints.
 - elevation
 - plan
 - section
 - details
 - auxiliary
4. Describe notes and specifications.
 - parts and objects
 - drawing titles
 - revisions
 - drawing numbers

5. Identify and interpret common blueprint symbols and abbreviations.
 - location
 - supplementary symbols
 - outdated and preferred symbols
 - references (gridlines)
 - 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.

SMW-1025

Cost Estimation

NOA Reference:

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

Prerequisites:

SMW-0115

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.
 - labour
 - materials
 - transportation
 - permits
 - tools and equipment
 - subcontracting
2. Describe the procedures used to price materials from take-off lists.
3. Describe the procedure to arrive at the final price.
 - overhead
 - mark-up
 - 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. Prepare a cost estimate for a small heating system.
2. Prepare cost estimate using computer software.

SMW-1030

Installation

NOA Reference:

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

Prerequisites:

SMW-1000, 0115
W/F-1185

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.
 - staging (storing material)
 - planning
 - distributing of material to installation area
 - sectioning (pre-assembling on site)
 - erecting
 - 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.
 - blowpipe systems
 - boiler breechings
 - lagging / cladding
7. Describe the operation and installation of fire and smoke dampers.
 - fusible link
8. Describe procedures to install related equipment, including the following:
 - dampers
 - diffusers
 - sleeves

- registers
9. Describe the purpose of lagging / cladding.
- 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.

SMW-1035 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.

Prerequisites:

SMW-1005

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.
 - flat-on-top
 - flat-on-bottom
 - pipe
 - tee
 - mitre line
 - centerline radius
 - gore
 - seam lines
 - end gore
 - symmetry of lines
 - true length of lines

2. Describe procedures to layout and fabricate round Tees.
 - 90° Tee with equal diameters
 - patterns for the Tee
 - patterns for the hole
 - 90° Tee with unequal diameters
 - patterns for the Tee
 - patterns for the hole
 - centered Tees at an angle
 - off-center Tees
 - off-center Tees at an angle

3. Describe procedures used to layout and fabricate flat-on-top and flat-on-bottom patterns.
 - determine views
 - locate views
 - symmetry of lines
 - label lines and points
 - prepare drawing
 - determine true length of lines
 - determine types of seams, joints and edges
 - calculate allowances
 - determine stretchouts
 - cut pattern
 - 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

SMW-1040 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.

Prerequisites:

SMW-1010

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.
 - true length of lines
 - eccentrics

2. Describe procedures to layout and fabricate tapers on a pitch and scalene or oblique cones.
 - determine views
 - locate views
 - symmetry of lines
 - label lines and points
 - prepare drawing
 - determine true length of lines
 - determine types of seams, joints and edges
 - calculate allowances
 - determine stretchouts
 - cut pattern
 - 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)

SMW-1045 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.

Prerequisites:

SMW-1015

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:

1. Describe procedures used to layout patterns and fabricate cylindrical rolling offsets.
 - determine views
 - locate views
 - symmetry of lines
 - label lines and points
 - prepare drawing
 - determine true length of lines
 - determine types of seams, joints, and edges
 - calculate allowances
 - determine stretchouts
 - check pattern accuracy
 - cut pattern

2. Describe procedures used to layout patterns and fabricate square or rectangular drop cheek elbows and offsets.
 - determine views
 - locate views
 - symmetry of lines
 - label lines and points
 - prepare drawing
 - determine true length of lines
 - determine types of seams, joints, and edges
 - calculate allowances
 - determine stretchouts
 - check pattern accuracy
 - cut pattern

3. Describe procedures used to layout patterns and fabricate wye-branches and tapered elbows.
 - determine views
 - locate views
 - symmetry of lines
 - label lines and points
 - prepare drawing
 - determine true length of lines
 - determine types of seams, joints, and edges
 - calculate allowances
 - determine stretchouts
 - check pattern accuracy
 - 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 cylindrical rolling offsets as per specifications.
2. 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.

SMW-0120 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.

Prerequisites:

SMW-0110

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.
 - personal protective equipment
 - protective devices
 - fire precautions
2. Describe procedures to set up, use and shut down welding equipment.
 - locate ground clamp
 - establish polarity
 - set amperage
 - set voltage
 - select electrode
3. Describe factors to consider when striking and maintaining an electric arc.
 - control
 - stop
 - restart
 - length
 - travel
4. Describe factors to consider when depositing a stringer and weave weld bead.
 - speed
 - spatter
 - electrode stud
 - type of electrode
 - angle
 - appearance
 - 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.
 - purpose
 - when necessary
 - temperature
11. Describe common problems in welding high carbon steel.
12. Describe control of shrinkage in weldments.
 - fitup
 - welding sequence
 - back step and skid back step
 - staggered
 - intermittent
 - weld size and number of passes
 - balancing of shrinkage and other forces
 - pre-heat requirements
13. Describe stress relief.
 - purpose
 - 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 tree 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.

SMW-1050

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.

Prerequisites:

SMW-0115, 1030, 1185

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.
 - psychometric chart
3. Describe air patterns and their impact on the operation of a typical HVAC system.
 - air velocity (FPM)
 - air volume (CFM)
 - duct pressure
 - static pressure (SP)
 - velocity pressure (VP)
 - total pressure (TP)
 - resistance
 - friction loss
 - dynamic loss
4. Describe ventilation.
 - purpose
 - positive and negative building pressure
 - sources of infiltration and exfiltration
 - methods of measuring
5. Describe the basic principles of heating and cooling air.
6. Identify the types of fans.
 - axial
 - propeller
 - tubeaxial
 - vaneaxial

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

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

- 8. Describe the installation of HVAC equipment.
 - regulations (SMACNA)
 - procedures
 - practices
 - principles

- 9. Describe the types of package units.
 - gas-electric
 - gas-gas
 - electric-electric
 - heat pump

- 10. Describe procedures used to install package units.
 - roof top systems
 - 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.

SMW-1055

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.

Prerequisites:

SMW-0115

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.
 - architectural
 - HVAC
 - electrical
 - plumbing
 - shop
5. Interpret a materials take-off list.
 - fabrication requirements
 - materials, tools and equipment
 - purchase requirements
6. Describe the procedures used to take field measurements.
7. 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.

SMW-1060

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.

Prerequisites:

SMW-0100, 0120

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.
 - personal protective equipment
 - protective devices
 - fire precautions

2. Describe the GMAW process.
 - metal transfer
 - power source
 - polarity
 - arc voltage
 - slope and adjustment
 - inductance
 - shielding gas and regulators
 - electrode wire
 - assembly of equipment
 - gun
 - feeder
 - welding variables and effects
 - electrode extension
 - welding voltage and current
 - travel speed
 - penetration
 - travel and work angles
 - manipulation
 - maintenance of tube
 - nozzle
 - cable
 - pulsed arc machines

- chill bars
 - purging stainless steel
 - temperature control paste
3. Describe disassembly and reassembly of GMAW welding systems.
 4. Describe factors to consider in establishing and maintaining an arc.
 - starting and stopping the weld
 - finishing end of the joint
 - power source
 - filler metal
 - adjustment
 - shielded gases
 - pre and post weld
 - feed rolls
 - gun
 - variables
 - stick-out
 - speed
 - maintenance
 - common faults
 5. Describe factors to consider and procedures used to fillet weld in the flat position using the GMAW process.
 - conventional and pulse
 - shielding gas selection
 - drift and mixtures for steel
 - addition of carbon dioxide
 - electrode wires
 - wires for carbon steel
 - operating problems
 - work and travel angles
 - gun manipulation
 6. Describe factors to consider and procedures used to fillet weld in the vertical position using the GMAW process.
 - conventional and pulse
 - Tee joint
 - lap joint
 - 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).

SMW-1065 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.

Prerequisites:

SMW-1035

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:

1. Describe procedures used to layout and fabricate complex gutter mitres.
2. 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.
 - complex gutter mitres
 - basic cornice work

SMW-1070 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.

Prerequisites:

SMW-1140

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.
 - tapered elbows
 - wye-branch
 - intersections
2. Describe procedures used to layout and fabricate tapered elbows, wye-branch and intersections.
 - determine views
 - locate views
 - symmetry of lines
 - label lines and points
 - prepare drawing
 - determine true length of lines
 - determine types of seams, joints and edges
 - calculate allowances
 - determine stretchouts
 - check pattern accuracy
 - 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 the following, as per specifications.
 - tapered elbows
 - wye-branch using scalene cones
 - intersections

SMW-1075 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.

Prerequisites:

SMW-1045, 1065, 1070

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.
 - identify shapes
 - determine layout methods
 - determine views
 - locate views
 - symmetry of lines
 - label lines and points
 - prepare drawing
 - determine true length of lines
 - determine types of seams, joints and edges
 - calculate allowances
 - determine stretchouts
 - check pattern accuracy
 - 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.

SMW-1080 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.

Prerequisites:

SMW-1050, 1055

Course Outcomes:

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

- describe the procedure to seal and test duct systems

Theory:

1. Describe the purpose of automatic controls and their use.
2. Describe the purpose of duct leakage testing.
3. Identify instruments for testing, adjusting and balancing and describe their procedures for use.
4. Describe the difference between proportional air balancing and sequential air balancing.
5. Describe the basic operation of an hydronic 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.

SMW-0125

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.
 - clean rooms
 - industrial settings
 - 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.

SMW-1085 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.

Prerequisites:

SMW-1020, 0120

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.
 - personal protective equipment
 - protective devices
 - fire precautions
2. Describe the GTAW process.
 - welding machine requirements
 - current requirement
 - shielding gases
 - GTAW torch
 - electrodes
 - gas cups
 - conditioning of the thoriated electrode
 - travel and work angles
 - filler rods
 - pulsed arc machines
 - edge preparations
3. Describe procedures to set up GTAW equipment.
4. Describe the disassemble and reassemble of GTAW equipment.
5. Describe basic joint preparation.
 - butt
 - lap
 - corner
 - tee
6. Describe procedures to deposit welds on butt, lap, tee and corner joints.

7. 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.

SMW-1090 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.

Prerequisites:

SMW-1105; 0175

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.
 - saw tooth
 - gambrel
 - hip
 - shed
 - mansard
2. Identify and describe various seams, locks and cleats associated with architectural sheet metal.
3. Identify and describe the characteristics of:
 - capillary action
 - expansion and contraction
 - electrolysis
4. Identify and describe the characteristics of various roof drainage systems.
 - gutter types and styles
 - expansion joints
 - various fastening methods
 - scuppers and conductor heads
5. Identify and describe the characteristics of various roof flashing systems.
 - valley flashing

- ridge flashing
 - hip flashing
 - eaves flashing
 - roof penetrations
 - round pipe
 - chimney
 - roof curbs
 - copings
 - fascia and gravel stop
 - soffits
 - wall flashings
6. Identify and describe the characteristics of various roofing systems.
- standing seam
 - batten seam
 - flat seam
 - commercial
7. Identify and describe the various louvers and ventilators.
- gravity
 - 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.

SMW-1095

Soldering

NOA Reference:

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

Prerequisites:

SMW-1005

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.
 - types of soldering irons (copper)
 - types of soldering furnaces
2. Describe the safe operation of gas fired furnaces.
 - leaks
 - ventilation
 - cleaning
 - lighting procedure
 - 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.
 - corrosive and non-corrosive
 - safe handling of acids
 - ventilation
5. Describe the various types of solder and their advantages and disadvantages.
 - composition
 - grading (50/50, 60/40)
 - bar solder
 - wire solder
 - flux core
 - beads
6. Describe various soldering methods.
 - flame color

- sweating a joint
- skimming
- pointing up
- capillary action
- seam preparation
- flux removal
- 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.
2. Light and shut down a propane furnace.
3. Solder container having both vertical and horizontal seams.
4. Test for leaks.

CM 2150

WORKPLACE CORRESPONDENCE

Description:

This course is designed to give students the opportunity to study the principles of effective writing. Applications include letters, memos, and short report writing.

Course Outcomes:

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

- 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.
- writing effective letters and memos.
- examine the fundamentals of informal reports and the report writing procedure.
- produce and informal report

Required Knowledge and Skills:

1.0 Review of Sentences and Paragraph Construction

- 1.1.1 Define a sentence and review the four types.
- 1.1.2 Identify the essential parts of a sentence, particularly subject and predicate, direct and indirect object.
- 1.1.3 Differentiate among phrases, clauses, and sentences.
- 1.1.4 Explore the major concepts related to subject-verb agreement.
- 1.1.5 Apply rules and principles for writing clear, concise, complete sentences which adhere to the conventions of grammar, punctuation, and mechanics.

1.2 Examine and Apply Principles of Paragraph Construction

- 1.2.1 Discuss the basic purposes for writing.
- 1.2.2 Define a paragraph and describe the major characteristics of an effective paragraph.
- 1.2.3 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.

2.0 Business Correspondence

2.1 Examine the Value of Business Writing Skills

- 2.1.1 Discuss the importance of effective writing skills in business

- 2.1.2 Discuss the value of well-developed writing skills to career success
- 2.2 Examine Principles of Effective Business Writing
 - 2.2.1 Discuss the rationale and techniques for fostering goodwill in business communication, regardless of the circumstances
 - 2.2.2 Review the importance of revising and proofreading writing
- 2.3 Examine Business Letters and Memos
 - 2.3.1 Differentiate between letter and memo applications in the workplace
 - 2.3.2 Identify the parts of a business letter and memo
 - 2.3.3 Explore the standard formats for business letters and memos
 - 2.3.4 Examine guidelines for writing an acceptable letter and memo which convey: acknowledgment, routine request, routine response, complaint, refusal, and persuasive request, for three of the six types listed
 - 2.3.5 Examine samples of well-written and poorly written letters and memos
- 3.0 Informal Report
 - 3.1 Examine the Fundamentals of Informal Business Reports
 - 3.1.1 Identify the purpose of the informal report
 - 3.1.2 Identify the parts and formats of an informal report
 - 3.1.3 Identify methods of information gathering
 - 3.2 Apply Informal Report Writing Skills and Oral Reporting Skills
 - 3.2.1 Gather pertinent information
 - 3.2.2 Organize information into an appropriate outline
 - 3.2.3 Draft a five minute informal report
 - 3.2.4 Edit, proofread, and revise the draft to create an effective informal report and present orally using visual aids.

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:

- know and understand quality customer service
- know why quality service is important
- know and understand the relationship between “service” and “sales”
- understand the importance of and to demonstrate a positive attitude
- recognize and demonstrate handling of customer complaints

Required Knowledge and Skills:

1. Providing Quality Service
 - Define quality service
 - List the types of quality service
 - Define Service vs. Sales or Selling
 - Explain why quality service is important
 - Identify the various types of customers
 - Define customer loyalty
2. Determining Customers Wants and Needs
 - List four levels of customer needs
 - Identify important customer wants and needs
 - Identify ways to ensure repeat business
3. Demonstrating a Positive Attitude
 - List the characteristics of a positive attitude
 - Explain why it is important to have a positive attitude
 - List ways that a positive attitude can improve a customer’s satisfaction
 - Define perception
 - Explain how perception can alter us and customers
 - Understand how to deal with perception

4. Effectively Communicating with customers
 - Describe the main elements in the communication process
 - Identify some barriers to effective communication
 - Define body language
 - Explain how body language would affect customers
 - Determine why body language is important
 - Define active listening and state why it is important
 - Describe the four components of active listening
 - Contrast good and bad listeners
 - List and discuss the steps of the listening process
5. Effectively using Questioning Techniques
 - List questioning techniques
 - Write two examples of an open question
 - Perform a questioning and listening role play
6. Using the Telephone Effectively
 - List the qualities of a professional telephone voice
 - Explain why telephone skills are important
 - Demonstrate effective telephone skills
7. Asserting Oneself: Handling Complaints and Resolving Conflict
 - Define assertiveness
 - Define communication behaviours
 - Relate assertions to effective communication
 - Practice being assertive
 - Understand the process of assertive guidelines for action
 - Practice giving an assertive greeting
 - Acknowledge multiple customers
8. Dealing with Difficult Customers
 - Describe how you would deal with anger
 - Complete a guide to controlling feelings
 - Determine how you would feel dealing with an upset customer
 - Suggest some techniques that might control your own feelings
 - Understand leadership styles and the nature of organizations
 - List ways to dealing with conflict / customer criticism
 - Be aware of certain guidelines when confronting customers
 - List ways of preventing unnecessary conflict with customers
 - Review current skills and knowledge of customer service
 - Develop a customer satisfaction improvement plan

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
- develop an awareness of quality management principles and processes

Required Knowledge and Skills:

1. 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 engineering drawings 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 quality management.
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.
10. Explain the concepts of quality
 - a. cost of quality
 - b. measurement of quality
 - c. quality control and quality assurance
 - d. elements of quality

- e. elements of the quality audit
 - f. quality standards
 - g. role expectations and responsibilities
11. Explain the structure of quality assurance and quality control
- a. Define quality assurance, quality control and documentation terminology
 - b. Describe organizational charts
 - c. List the elements of a quality assurance system
 - d. Explain the purpose of the quality assurance manual
 - e. Describe quality assurance procedures
 - f. Explain the key functions and responsibilities of personnel
12. Complete quality assurance/quality control documentation
- a. Describe methods of recording reports in industry
 - b. Describe procedures of traceability (manual and computer-based recording)
 - c. Identify needs for quality control procedures
13. Apply quality control to projects
- a. Follow QA/QC procedures for drawings, plans and specifications in applicable occupations.
 - b. Calibrate measuring instruments and devices in applicable occupations.
 - c. Interpret required standards
 - d. Follow QA/QC procedures for accepting raw materials
 - e. Carry out the project
 - f. Control the quality elements (variables)
 - g. 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.

Course Outcomes:

Upon completion of this course, students will have a basic understanding of:

- computer systems and their operation.
- popular software packages, their applications and future trends in computer applications

Required Knowledge and Skills:

1. Microcomputer System Hardware and Software Components

1.1 Microcomputer Hardware

1.1.1 System Components

1.1.1.1 Identify major components of a computer system.

1.1.2 Function of each Component

1.1.2.1 Describe the function of the microprocessor.

1.1.2.2 Describe and give examples of I/O DEVICES.

1.1.2.3 Describe primary storage (RAM, ROM, Cache).

1.1.2.4 Define bit, byte, code and the prefixes k.m. and g.

1.1.2.5 Describe secondary storage (diskettes and hard disks, CD ROMS, Zip Drives etc).

1.1.2.6 Describe how to care for a computer and its accessories.

1.2 Microcomputer Software

1.2.1 Software Definition and Types

1.2.1.1 Define software.

1.2.1.2 Describe, operational and application software used in this course.

1.2.1.3 Define file and give the rules for filenames and file extensions..

1.2.2 System Software (Windows 95)

- 1.2.2.1 Getting Started with Windows
- 1.2.2.2 Start and quit a Program
- 1.2.2.3 Get Help
- 1.2.2.4 Locate a specific file using the **find** function of Win95
- 1.2.2.5 Changing system settings: wall paper, screen saver, screen resolution, background.
- 1.2.2.6 Starting a program by using the Run Command
- 1.2.2.7 Shutting down your computer

1.2.3 File Management Commands (Windows 95)

- 1.2.3.1 View directory structure and folder content
- 1.2.3.2 Organizing files and folders
- 1.2.3.3 Copy, delete, and move files and folders
- 1.2.3.4 Create folders
- 1.2.3.5 Maximize and minimize a window
- 1.2.3.6 Print directory/folder content
- 1.2.3.7 Describe the Windows 95 taskbar

2. Word Processing

2.1 Keyboarding Techniques

- 2.1.1 Identify and locate alphabetic and numeric keys
- 2.1.2 Identify and locate function keys: special keys, home keys, page up key, page down key, numeric key pad, shift keys, punctuation keys, tab key

2.2 Word Processing

2.2.1 Understanding word processing

- 2.2.1.1 The Windows Component
- 2.2.1.2 The Menu Bar
- 2.2.1.3 Menu Indicators
- 2.2.1.4 The Document Window
- 2.2.1.5 The Status Bar
- 2.2.1.6 The Help Feature
- 2.2.1.7 Insertion Point Movements

2.2.2 Create a document

- 2.2.2.1 Change the Display
- 2.2.2.2 The Enter Key
- 2.2.2.3 Enter Text

2.2.3 Save, Open and Exit a document.

- 2.2.3.1 Save a document
- 2.2.3.2 Close a document.
- 2.2.3.3 Start a new document Window
- 2.2.3.4 Open a document
- 2.2.3.5 Exit Word Processor

2.2.4 Edit a Document

- 2.2.4.1 Add New Text
- 2.2.4.2 Delete text
- 2.2.4.3 Basic Format Enhancement (split and join paragraphs, insert text)

2.2.5 Understand Hidden Codes

- 2.2.5.1 Display Hidden Codes
- 2.2.5.2 Delete Text Enhancements

2.2.6 The Select Feature

- 2.2.6.1 Identify a Selection
- 2.2.6.2 Move a Selection
- 2.2.6.3 Copy a Selection
- 2.2.6.4 Delete a Selection
- 2.2.6.5 Select Enhancements
- 2.2.6.6 Save a Selection
- 2.2.6.7 Retrieve a Selection

2.2.7 Change Layout Format

- 2.2.7.1 Change layout format: (margins, spacing, alignment, paragraph indent, tabs, line spacing, page numbering)

2.2.8 Change Text Attributes

- 2.2.8.1 Change text attributes: (bold, underline, font, etc.)

2.2.9 Use Auxiliary Tools

- 2.2.9.1 Spell Check

2.2.10 Select the Print Feature

- 2.2.10.1 Select the Print Feature: (i.e; number of copies and current document)

2.2.10.2 Identify various options in print screen dialogue box

3. Electronic Spreadsheet

3.1 Spreadsheet Basics

3.1.1 The Worksheet Window

3.2 Operates Menus

3.2.1 Use a Menu Bar

3.2.2 Use a Control Menu

3.2.3 Use a Shortcut Menu

3.2.4 Save, Retrieve from Menus

3.3 Create a Worksheet

3.3.1 Enter Constant Values and Formulas

3.3.2 Use the Recalculation Feature

3.3.3 Use Cell References (relative and absolute references)

3.4 Use Ranges

3.4.1 Type a Range for a Function

3.4.2 Point to a Range for a Function

3.4.3 Select a Range for Toolbar and Menu Commands

3.5 Print a Worksheet

3.5.1 Print to the Screen

3.5.2 Print to the Printer

3.5.3 Print a Selected Range

3.6 Edit a Worksheet

3.6.1 Replace Cell Contents

3.6.2 Insert and Delete Rows and Columns

3.6.3 Change Cell Formats

3.6.4 Change Cell Alignments

3.6.5 Change Column Width

3.6.6 Copy and Move Cells

4. Electronic Mail and the Internet

4.1 Electronic Mail

4.1.1 Compose and send an e-mail message

- 4.1.2 Retrieve an e-mail attachments
- 4.1.3 Send an e-mail message with attachments
- 4.1.4 Retrieve and save e-mail attachments
- 4.1.3 Print an e-mail message
- 4.1.4 Delete an e-mail message

4.2 The Internet

- 4.2.1 Overview of the World Wide Web
- 4.2.2 Accessing Web sites
- 4.2.3 Internet Web Browsers
- 4.2.4 Internet Search Engines
- 4.2.5 Searching Techniques

SD 1700

WORKPLACE SKILLS

Description:

This course involves participating in meetings, doing safety inspections, completing employment insurance forms, writing letters of employment insurance appeal, and filing a human rights complaint. Includes information on formal meetings, unions, worker's compensation, employment insurance regulations, worker's rights and human rights.

Course Outcomes:

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

- Participate in meetings (conduct meetings).
- Be aware of union procedures
- Be aware of workers' compensation regulations.
- Be aware of occupational health and safety regulations.
- Be aware of employment insurance regulations
- Be aware of workers' rights.
- Be aware of human rights

Required Knowledge and Skills:

1. Meetings
 - a. Explain preparation requirements prior to conducting a meeting
 - b. Explain the procedures for conducting a meeting.
 - c. Explain participation in meetings.
 - d. Explain the purpose of motions.
 - e. Explain the procedure to delay discussion of motions.
 - f. Explain how to amend and vote upon a motion.
2. Unions
 - a. Why do unions exist?
 - b. Give a concise description of the history of Canadian labour.
 - c. How do unions work?
 - d. Explain labour's structure.
 - e. Describe labour's social objectives.
 - f. Describe the relationship between Canadian labour and the workers.
 - g. Describe the involvement of women in unions.
3. Worker's Compensation
 - a. Describe the aims, objectives, benefits and regulations of the Workers Compensation Board.
 - b. Explain the internal review process.
4. Occupational Health and Safety
 - a. Describe the rules and regulations directly related to your occupation.

5. Employment Insurance Regulations
 - a. Explain employment insurance regulations
 - b. Describe how to apply for employment insurance.
 - c. Explain the appeal process.

6. Worker's Rights
 - a. Define labour standards.
 - b. Explain the purpose of the Labour Standards Act.
 - c. List regulations pertaining to:
 - i. Hours of work.
 - ii. Minimum wages.
 - iii. Employment of children.
 - iv. Vacation pay

7. Human Rights
 - a. Describe what information cannot be included on an application.
 - b. Describe what information cannot be included in an interview
 - c. Why is there a Human Rights Code?
 - d. Define sexual harassment.

8. Participate in meetings.
 - a. Follow the form of getting a motion on the floor
 - b. Discuss a motion
 - c. Amend a motion
 - d. Vote on a motion.

9. Complete a safety inspection of your shop.

10. Complete an employment insurance application form.

11. Write a letter of appeal.

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

SD 1710

JOB SEARCH TECHNIQUES

Description:

This fifteen-hour seminar is designed to give students an introduction to the critical elements of effective job search techniques.

Required Knowledge and Skills:

Examine and Demonstrate Elements of Effective Job Search Techniques

- Identify and examine employment trends and opportunities
- Identify sources that can lead to employment
- Discuss the importance of fitting qualifications to job requirements
- Discuss and demonstrate consideration in completing job application forms
- Establish the aim/purpose of a resume
- Explore characteristics of effective resumes, types of resumes, and principles of resume format
- Explore characteristics of and write an effective cover letter
- Explore, and participate in a role play of a typical job interview with commonly asked questions and demonstrate proper conduct
- Explore other employment related correspondence
- Explore the job market to identify employability skills expected by employer
- Conduct a self-analysis and compare with general employer expectations

Description:

This fifteen-hour seminar 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.

Required Knowledge and Skills:

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

2. Explore the Characteristic of Entrepreneurs
 - Identify characteristics common to entrepreneurs
 - Relate their own personal characteristics with those of entrepreneurs.
 - Evaluate their present ideas about business people

3. Identifying Business Opportunities
 - Distinguish between an opportunity and an idea.
 - List the existing traditional and innovative business ventures in the region.
 - Explain the general parameters between which business ventures should fit.
 - Summarize the role of such agencies Regional Economic Development Boards, Business Development Corporations, etc.
 - Identify potential business opportunities within the region.

4. Demystifying the Entrepreneurial Process.
 - Explain the entrepreneurial process
 - Describe the purpose of a business plan
 - Identify the main ingredients of a business plan
 - Summarize the role of such agencies as BDC's, ACOA, Women's Enterprise Bureau etc.
 - List other agencies where assistance - financial and otherwise - is available to those interested in starting a business venture.