



PROVINCIAL PLAN OF TRAINING

FOR THE

METAL FABRICATOR (FITTER)

OCCUPATION

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Preface

This Apprenticeship Standard is based on the 2003 edition of the National Occupational Analysis for the Metal Fabricator (Fitter) trade. It was developed through the cooperative efforts of the Atlantic Apprenticeship Council, which consists of both the Atlantic Directors of the Apprenticeship and Apprenticeship Board Chairs. This document describes the curriculum content for the Metal Fabricator (Fitter) apprenticeship training program and outlines each of the technical training units necessary for the completion of apprenticeship.

Acknowledgment

Advisory committees, industry representatives, instructors and apprenticeship staff provided valuable input to the development of this Apprenticeship Training Standard. Without their dedication to quality apprenticeship training this document could not have been produced. A sincere thank you.

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CONDITIONS GOVERNING APPRENTICESHIP TRAINING

1.0 GENERAL

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

2.0 ENTRANCE REQUIREMENTS

2.1 Entry into the occupation as an apprentice requires:

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

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

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

2.4 A Registration for Apprenticeship form must be duly completed.

3.0 PROBATIONARY PERIOD

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

4.0 TERMINATION OF A MEMORANDUM OF UNDERSTANDING

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

5.0 APPRENTICESHIP PROGRESSION SCHEDULE AND WAGE RATES

5.1 Progression Schedule

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

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

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

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

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

Program Duration	Wage Rates		Comments
7200 Hours	1 st Year	55%	These wage rates are percentages of the prevailing journey person'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 Hours			(Hairstylist Program) - The apprentice shall be paid no less than the minimum wage for hours worked and a commission agreed upon between the apprentice and the employer.

6.0 TOOLS

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

7.0 PERIODIC EXAMINATIONS AND EVALUATION

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

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

7.3 For each and every course, a formal assessment is required for which 70% is the pass mark. At the discretion of the instructor, the summative mark may be for completion of a theory examination or a combination of the theory examination and an assigned practical project.

8.0 GRANTING OF CERTIFICATES OF APPRENTICESHIP

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

9.0 HOURS OF WORK

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

10.0 COPIES OF THE REGISTRATION FOR APPRENTICESHIP

The Director of Institutional and Industrial Education shall provide copies of the Registration for Apprenticeship form to all signatories to the document.

11.0 RATIO OF APPRENTICES TO JOURNEYPERSONS

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

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

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

13.0 AMENDMENTS TO A PLAN OF APPRENTICESHIP TRAINING

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

14.0 EMPLOYMENT, RE-EMPLOYMENT AND TRAINING REQUIREMENTS

- 14.1 The plan of training requires Apprentices to attend regularly their place of employment.
- 14.2 The plan of training requires Apprentices to regularly attend training programs for that occupation as prescribed by The Provincial Apprenticeship and Certification Board.
- 14.3 Failure to comply with Sections 14.1 and/or 14.2 will result in cancellation of the Memorandum of Understanding. Apprentices may have their M.O.U.'s reinstated by the Provincial Apprenticeship and Certification Board but would be subject to a commitment to complete the entire program as outlined in the General Conditions of Apprenticeship. Permanent cancellation in the said occupation is the result of non-compliance.
- 14.4 Cancellation of the Memorandum of Understanding to challenge journeyperson examinations, if unsuccessful, would require an apprentice to serve a time penalty of two (2) years before reinstatement as an apprentice or registering as a Trade Qualifier.
- 14.5 Under the plan of training the employer is required; to keep each apprentice employed as long as work is available, and if the apprentice is laid off due to lack of work, to give opportunity to be re-employed before another is hired.

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

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

15.0 APPEALS TO DECISIONS BASED ON CONDITIONS GOVERNING APPRENTICESHIP TRAINING

Persons wishing to appeal any decisions based on the above conditions must do so in writing to the Minister of Education within 30 days of the decision.

REQUIREMENTS FOR RED SEAL CERTIFICATION FOR APPRENTICES

1. Evidence that the required work experiences outlined in this plan of training have been obtained. This evidence must be in a format that clearly outlines the experiences and must be signed by an appropriate person or persons attesting that these experiences have been obtained to the level required.
2. Successful completion of all required courses in program.
3. A combination of training from an approved training program and suitable work experience totalling 5400 hours
4. Completion of a National Red Seal examination, to be set at a place and time determined by the Industrial Training Division.
5. Payment of the appropriate examination fee.

ROLES AND RESPONSIBILITIES OF STAKEHOLDERS IN THE APPRENTICESHIP PROCESS

The Apprenticeship process involves a number of stakeholders playing significant roles in the training of apprentices. This section captures, in a broad sense, these roles and the responsibilities that result from them.

The Apprentice

- ▶ to complete all required technical training courses as approved by the Provincial Apprenticeship and Certification Board.
- ▶ to find appropriate employment.
- ▶ to complete all required work experiences in combination with the required hours.
- ▶ to ensure that the work experiences are well documented.
- ▶ to approach apprenticeship training with an attitude and commitment that fosters the qualities necessary for a successful career as a qualified 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.
- ▶ to designate occupations for apprenticeship training and/or certification.

Program Outcomes

Upon completion of the apprenticeship program, apprentices will have the knowledge and skills required to perform the following tasks:

- Task 1 Demonstrates common trade practices.
- Task 2 Utilizes various shop drawings, sketches and fabrication drawings.
- Task 3 Employs tool, equipment and measuring instruments.
- Task 4 Receives materials.
- Task 5 Identifies materials.
- Task 6 Develops individual job plan and schedule.
- Task 7 Prepares work area and equipment schedules.
- Task 8 Handles materials.
- Task 9 Performs layout.
- Task 10 Fabricates detail materials.
- Task 11 Fits and fastens components and subcomponents.
- Task 12 Performs welding activities.
- Task 13 Prepares final products for finishes.
- Task 14 Loads finished assemblies.
- Task 15 Installs on-site.

Program Structure

The courses listed below are required technical training in the Metal Fabricator (Fitter) Apprenticeship Program.

Entry Level Courses					
NL Course No.	Atlantic Course No.	Course Name	Hours	Pre-Requisites	Page No.
TS-1510		Occupational Health and Safety	6	None	15
TS-1520		WHMIS	6	None	18
TS-1530		First Aid	14	None	21
WD-1165	WDF-1105	Hand, Measuring and Layout Tools	15	None	22
WD-1170	WDF-1110	Hand and Power Cutting Tools	15	TS-1510; WD-1165	24
WD-1175	WDF-1115	Drilling and Threading Tools	15	WD-1170	26
WD-1180	WDF-1120	Grinding and Finishing	12	WD-1170	27
WD-1185	WDF-1125	Bending and Rolling	4	SF-1460	29
WD-1270	MTF-1310	Shielded Metal Arc Welding (SMAW) Butt Joint – Flat and Horizontal Positions (F-4 Class Electrodes) – Mild Steel	30	WD-1620	30
WD-1340	MTF-1315	Gas Metal Arc Welding (GMAW) Fillet Weld – Flat And Horizontal Positions Mild Steel	15	WD-1630	31
WD-1600	WDF-1130	Oxy-Fuel Cutting, Welding, Heating and Gouging	45	TS-1530	32
WD-1610	WDF-1135	SMAW (Sheet Metal Arc Welding) 1 – Set-up, Strike and Maintain an Arc	30	WD-1600	34
WD-1620	WDF-1140	SMAW 2 – Fillet Weld All Positions	60	WD-1610	36
WD-1630	WDF-1145	GMAW (Gas Metal Arc Welding) 1 – Set-up and Maintain an Arc	15	WD-1610	38
WD-1660	WDF-1165	Blueprint Reading 1 (Basic)	30	WD-1610	44
WD-1670	WDF-1170	Blueprint Reading 2 (Welding Symbols)	30	WD-1660	46
WD-1680	WDF-1185	Metallurgy, Expansion and Contraction Control	30	WD-1610	48
WD-1700	WDF-1200	Stationary Powered Shearing	6	SF-1420	53
WD-1710	WDF-1205	Iron Worker Operation	12	TS-1510; WD-1165	54
WD-1720	WDF-1210	Jigs and Fixture Fabrication	15	WD-1730	56

Entry Level Courses					
NL Course No.	Atlantic Course No.	Course Name	Hours	Pre-Requisites	Page No.
WD-1730	WDF-1215	Fabrication Fundamentals	15	SF-1420	57
WD-2430	WDF-1195	Material Handling, Rigging and Scaffolding	35	TS-1510	67
WD-2440	WDF-1180	Blueprint Reading 4 (Shop Drawings)	15	WD-1670	70
SF-1400	MTF-1320	Press Brake Operation	45	SF-1460	71
SF-1410	MTF-1325	Roll Forming Equipment and Operation	45	WD-1185	73
SF-1420	MTF-1345	Basic Layout Operations	20	WD-1660	74
SF-1430	MTF-1350	Basic Parallel Line Development	30	SF-1420	75
SF-1440	MTF-1360	Basic Radial Layout	30	SF-1430	76
SF-1450	MTF-1370	Basic Triangulation Layout	30	SF-1440	77
SF-1460	MTF-1380	Basic Plate Development	120	SF-1450	78
SF-1470	MTF-1385	Basic Assembly and Fitting	40	SF-1420	80
*MA-1060		Basic Math	60	None	97
CM-2150		Workplace Communications	45	None	100
MR-1220		Customer Service	30	None	102
SP-2330		Quality Assurance/Quality Control	30	None	104
MC-1050		Introduction to Computers	30	None	106
SD-1700		Workplace Skills	30	None	110
SD-1710		Job Search Techniques	15	None	112
SD-1720		Entrepreneurial Awareness	15	None	114
Total Hours			1085		

REQUIRED WORK EXPERIENCE

Block 2					
NL Course No.	Atlantic Course No.	Course Name	Hours	Pre-Requisites	Page No.
WD-1640	WDF-1150	GTAW (Gas Tungsten Arc Welding) 1 – Set-up	15	WD-1630	40
WD-1650	WDF-1155	Plasma Arc Cutting & Gouging	10	WD-1610	42
WD-1690	WDF-1190	Quality Control	30	WD-1610	51
WD-1740	WDF-1220	FCAW (Flux Core Arc Welding) 1 – Set-up and Deposit a Weld	15	WD-1630	58
WD-1750	MTF-1395	FCAW 2 – Weld Plate (Flat & Horizontal)	15	WD-1740	60
WD-1760	MTF-1410	Air-Arc Cutting and Gouging	10	WD-1270	62
WD-1770	MTF-1415	Submerged Arc Welding Setup	4	WD-1270	63
WD-2410	WDF-1160	Stud and Spot Resistance Welding	4	WD-1620	64
WD-2420	WDF-1175	Blueprint Reading 3 (Advanced/CAD)	15	WD-1670	66
SF-1490	MTF-1330	Structural Components and Detailing Practices	25	SF-1420	81
SF-1500	MTF-1340	Pressure Vessel & Pipe Drawing Interpretation	10	WD-2440	82
SF-1510	MTF-1355	Advanced Parallel Line Development	40	SF-1430	83
SF-1520	MTF-1400	Oxy-Fuel Optical Tracer	6	WD-1600	84
SF-1530	MTF-1405	CNC Cutting Machine	6	SF-1520	86
SF-1540	MTF-1420	Finishing and Shipping	6	SF-1470	88
SF-1550	MTF-1425	On-site Installation	6	SF-1540	89
SF-1560	MTF-1430	Job Planning	6	WD-2440	90
Total Hours			223		

REQUIRED WORK EXPERIENCE

Block 3					
NL Course No.	Atlantic Course No.	Course Name	Hours	Pre-Requisites	Page No.
SF-1700	MTF-1335	Truss and Girder Fabrication	20	SF-1490	91
SF-1710	MTF-1365	Advanced Radial Layout	40	SF-1440	92
SF-1720	MTF-1375	Advanced Triangulation Layout	30	SF-1450	93

Block 3					
NL Course No.	Atlantic Course No.	Course Name	Hours	Pre-Requisites	Page No.
SF-1730	MTF-1390	Advanced Assembly and Fitting	60	SF-1470	94
SF-1740	MTF-1435	Advanced Plate Development	80	SF-1460	96
Total Hours			230		

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

TS-1510 OCCUPATIONAL HEALTH AND SAFETY

Description:

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

Course Outcomes:

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

- help prevent accidents and illnesses
- improve health and safety conditions in the workplace

Theory:

1. Interpret the Occupational Health and Safety Act laws and regulations
 - i) Explain the scope of the act
 - Application of the act
 - Federal/Provincial jurisdictions
 - Canada Labour Code
 - Rules and regulations
 - Private home application
 - Conformity of the Crown by the Act
2. Explain responsibilities under the Act & Regulations
 - i) Duties of employer, owner, contractors, sub-contractors, employees, and suppliers
3. Explain the purpose of joint health and safety committees
 - i) Formation of committee
 - ii) Functions of committee
 - iii) Legislated rights
 - iv) Health and safety representation
 - v) Reporting endangerment to health
 - vi) Appropriate remedial action
 - vii) Investigation of endangerment
 - viii) Committee recommendation
 - ix) Employer's responsibility in taking remedial action
4. Examine right to refuse dangerous work
 - i) Reasonable grounds for refusal
 - ii) Reporting endangerment to health
 - iii) Appropriate remedial action

- iv) Investigation of endangerment
 - v) Committee recommendation
 - vi) Employer's responsibility to take appropriate remedial action
 - vii) Action taken when employee does not have reasonable grounds for refusing dangerous work
 - viii) Employee's rights
 - ix) Assigning another employee to perform duties
 - x) Temporary reassignment of employee to perform other duties
 - xi) Collective agreement influences
 - xii) Wages and benefits
5. State examples of work situations where one might refuse work.
6. Describe discriminatory action
- i) Definition
 - ii) Filing a complaint procedure
 - iii) Allocated period of time a complaint can be filed with the Commission
 - iv) Duties of an arbitrator under the Industrial Relations Act
 - v) Order in writing inclusion
 - vi) Report to commission Allocated period of time to request Arbitrator to deal with the matter of the request
 - vii) Notice of application
 - viii) Failure to comply with the terms of an order
 - ix) Order filed in the court
7. Explain duties of commission officers
- i) Powers and duties of officers
 - ii) Procedure for examinations and inspections
 - iii) Orders given by officers orally or in writing
 - iv) Specifications of an order given by an officer to owner of the place of employment, employer, contractor, sub-contractor, employee, or supplier
 - v) Service of an order
 - vi) Prohibition of persons towards an officer in the exercise of his/her power or duties
 - vii) Rescinding of an order
 - viii) Posting a copy of the order
 - ix) Illegal removal of an order
8. Interpret appeals of others
- i) Allocated period of time for appeal of an order
 - ii) Person who may appeal order
 - iii) Action taken by Commission when person involved does not comply with the order
 - iv) Enforcement of the order
 - v) Notice of application
 - vi) Rules of court

9. Explain the process for reporting of accidents
 - i) Application of act
 - ii) Report procedure
 - iii) Reporting notification of injury
 - iv) Reporting accidental explosion or exposure
 - v) Posting of act and regulations

Practical:

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

1. Conduct an interview with someone in your occupation on two or more aspects of the act and report results.
2. Conduct a safety inspection of shop area.

TS-1520 WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

Description:

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

Course Outcomes:

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

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

Required Knowledge and Skills:

1. Define WHMIS safety
 - i) Rational and key elements
 - ii) History and development of WHMIS
 - iii) WHMIS legislation
 - iv) WHMIS implementation program
 - v) Definitions of legal and technical terms

2. Examine hazard identification and ingredient disclosure
 - i) Prohibited, restricted and controlled products
 - ii) Classification and the application of WHMIS information requirements
 - iii) Responsibilities for classification
 - the supplier
 - the employer
 - the worker - Classification: rules and criteria
 - information on classification
 - classes, divisions and subdivision in WHMIS
 - general rules for classification
 - class A - compressed gases
 - class B - flammable and combustible materials
 - class C - oxidizing material
 - class D - poisonous and infectious material
 - class E - corrosive material
 - class F - dangerously reactive material
 - iv) Products excluded from the application of WHMIS legislation

- consumer products
 - explosives
 - cosmetics, drugs, foods and devices
 - pest control products
 - radioactive prescribed substances
 - wood or products made of wood
 - manufactured articles
 - tobacco or products of tobacco
 - hazardous wastes
 - products handled or transported pursuant to the Transportation of Dangerous Goods (TDG) Act
 - v) Comparison of classification systems - WHMIS and TDG
 - vi) General comparison of classification categories
 - vii) Detailed comparison of classified criteria
3. Explain labeling and other forms of warning
- i) Definition of a WHMIS label
 - supplier label
 - workplace label
 - other means of identification
 - ii) Responsibility for labels
 - supplier responsibility
 - employer responsibility
 - worker responsibility
 - iii) Introduce label content, design and location
 - supplier labels
 - workplace labels
 - other means of identification
4. Introduce material safety data sheets (MSDS)
- i) Definition of a material safety data sheet
 - ii) Purpose of the data sheet
 - iii) Responsibility for the production and availability of data sheets
 - supplier responsibility
 - employer responsibility
 - workers responsibility

Practical:

Practical skills enhance the apprentices' ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland and Labrador, 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

TS-1530

FIRST AID

Description:

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

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

WD-1165 HAND, MEASURING AND LAYOUT TOOLS

Outcomes:

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

- demonstrate knowledge of hand, measuring and layout tools.

Objectives and Content:

1. Identify the types of hand tools and describe their applications, use, care and storage.
 - i) pliers
 - ii) chisels and punches
 - iii) wrenches
 - offset
 - sockets
 - adjustable
 - open end
 - combination
 - box end
 - allen
 - pipe
 - speed
 - iv) vices
 - pipe
 - soft jaw
 - swivel
 - v) straight edges
 - vi) screwdrivers
 - vii) files
 - viii) bolt cutters
 - ix) hammers and mallets
 - ball peen
 - cross peen
 - sledge
 - x) torque wrenches
 - xi) reamers
 - xii) chain hoists
 - xiii) jacks
 - xiv) tubing cutting tools
 - xv) punches
 - center
 - prick
 - pin
 - xvi) line up bars (drift pins)
 - xvii) clamps

2. Describe the imperial and metric measuring systems and their use in the trade.
3. Identify measuring and layout tools and instruments and describe their parts, applications and procedures for use.
 - i) squares
 - ii) tape
 - iii) compass
 - iv) protractors
 - v) levels
 - builders
 - laser
 - magnetic
 - water
 - torpedo
 - vi) gauges
 - hi-lo
 - feeler
 - welding
 - plate thickness
 - wire
 - vii) micrometer
 - viii) plum bob
 - ix) scribes
 - x) straight edge
 - xi) calipers
 - xii) chalk line
 - xiii) trammel points
 - xiv) dividers

Practical:

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

1. Layout lines on flat bar.
2. Layout drill gauge.

WD-1170 HAND AND POWER CUTTING TOOLS

Outcomes:

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

- demonstrate knowledge of cutting tools, their applications, maintenance and procedures for use.

Objectives and Content:

1. Describe hand shears, their applications, maintenance and procedures for use.
 - i) cutting techniques
 - sheet metal in a straight line
 - ii) circles
 - iii) angular shapes
2. Describe power shears and nibblers, their applications, maintenance and procedures for use.
 - i) cutting techniques
 - metal in a straight line
 - ii) circles
 - iii) angular shapes
3. Describe squaring shears, their applications, maintenance and procedures for use.
 - i) parts of the shear
 - ii) type of blade
4. Describe hand hacksaws, their applications, maintenance and procedures for use.
 - i) parts of the saw
 - ii) type of blade
5. Describe band and reciprocating saws, their applications, maintenance and procedures for use.
 - i) parts of the saw
 - ii) type of blade
6. Describe chop saws, their applications, maintenance and procedures for use.
 - i) parts of the saw
 - ii) types of blades and discs

Practical:

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

1. Use tools to cut outlines layed out on a flat bar and cut out drill gauge.

WD-1175

DRILLING AND THREADING TOOLS

Outcomes:

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

- demonstrate knowledge of drilling, threading and fastening tools, their use and maintenance.

Objectives and Content:

1. Identify the types of drills and describe their applications, use and maintenance.
 - i) parts
 - ii) sharpening
2. Describe the use and maintenance of hand power drills, drill presses, and magnetic-based drills.
3. Describe taps and dies, their applications, use and maintenance.
 - i) external
 - ii) internal
4. Identify the types of clamps, and describe their applications, use and maintenance.

Practical:

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

1. Layout and fabricate drilling and threading exercise as per assigned project.
2. Layout and fabricate circle cutting attachment.

WD-1180

GRINDING AND FINISHING

Outcomes:

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

- demonstrate knowledge of grinding and finishing tools and equipment.

Objectives and Content:

1. Identify types of portable grinders and describe their applications, maintenance and use.
 - i) wheels
 - abrasive
 - grit
 - ii) speed
 - iii) attachments
 - iv) accessories
2. Identify types of portable sanders and describe their applications, maintenance and use.
 - i) discs
 - abrasive
 - grit
 - ii) speed
 - iii) attachments
 - iv) accessories
3. Identify types of stationary grinders and describe their applications, maintenance and use.
 - i) wheels
 - abrasive
 - grit
 - ii) speed
 - iii) attachments
 - iv) accessories
 - tool rest adjustment
 - wheel dressers

Practical:

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

1. Install grinding wheels on stationary grinder.

2. Grind metals with stationary grinders.
3. Demonstrate use of wheel dresser.
4. Grind metals with a portable grinder.

WD-1185

BENDING AND ROLLING

Outcomes:

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

- demonstrate knowledge of bending and rolling equipment.

Objectives and Content:

1. Define terminology associated with bending and rolling requirements.
 - i) tonnage
 - ii) spacing
 - iii) clearance
 - iv) calculations
2. Identify the types of equipment used to bend and roll metal, and describe their applications, maintenance and procedures for use.

Practical:

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

1. Theory only.

WD-1270 SHIELDED METAL ARC WELDING (SMAW) BUTT JOINT – FLAT AND HORIZONTAL POSITIONS (F-4 CLASS ELECTRODES) – MILD STEEL

Outcomes:

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

- weld butt joints on mild steel in the flat and horizontal positions with F-4 class electrodes using the SMAW process.
- test welds.

Objectives and Content:

1. Describe the procedures used to weld butt joints on mild steel in the flat position.
 - i) material preparation
 - ii) joint preparation
 - iii) inspection and testing
2. Describe the procedures used to weld butt joints on mild steel in the horizontal position.
 - i) material preparation
 - ii) joint preparation
 - iii) inspection and testing
3. Describe the procedures used to test welds.

Practical:

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

1. Weld butt joints in the flat and horizontal position with F-4 electrodes using the SMAW process.
2. Conduct a visual inspection of the edge preparation joint fit-up and completed weld assembly.
3. Conduct a bend test.

**WD-1340 GAS METAL ARC WELDING (GMAW)
FILLET WELD – FLAT AND HORIZONTAL POSITIONS
MILD STEEL**

Outcomes:

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

- fillet weld mild steel in the flat and horizontal position using the GMAW process.
- test welds.

Objectives and Content:

1. Describe the process and consumables used to fillet weld on mild steel in the flat and horizontal position.
 - i) shielding gas selection
 - ii) filler materials
 - iii) troubleshooting
 - iv) work and travel angles
 - v) gun manipulation
 - vi) joints
2. Describe the procedures used to test welds.

Practical:

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

1. Fillet weld in the flat and horizontal position using the GMAW process.
2. Conduct a visual inspection of welds.
3. Conduct a fillet weld break test.

WD-1600 OXY-FUEL CUTTING, WELDING, HEATING AND GOUGING

Outcomes:

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

- demonstrate knowledge of oxy-fuel equipment.

Objectives and Content:

1. Describe the procedures used to set-up and shut down oxy-fuel equipment.
 - i) protective equipment
 - ii) cleaning
 - iii) equipment and accessories
 - cylinders (storage and handling)
 - regulators
 - lighter
 - radiograph (semi-automatic track cutter)
 - torches
 - flashback arrestors
 - check valve
 - hose
 - manifold
 - iv) assembling
 - v) tip selection
 - cutting
 - welding
 - heating
 - gouging
 - vi) thread identification
 - vii) pressure adjustment
 - viii) quality of cut
 - ix) gas selection
 - x) types of flames
 - xi) testing
 - xii) disassembling

2. Identify oxy-fuel cutting, heating and gouging applications and procedures.
 - i) sheet metal
 - ii) plate
 - iii) structural shapes
 - iv) pipe

Practical:

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

1. Fusion Welding
 - i) closed corner
 - ii) open corner
 - iii) horizontal lap joint
 - iv) square butt joint

2. Bronze Welding
 - i) tinning
 - ii) horizontal lap joint
 - iii) square butt joint

3. Silver Brazing
 - i) copper/steel tee joint
 - ii) copper tee tubing

4. Cutting
 - i) straight cutting
 - ii) bevel cutting

5. Gouging
 - i) gouge groove in flat plate

WD-1610 SMAW (SHEET METAL ARC WELDING) 1 – SET-UP, STRIKE AND MAINTAIN AN ARC

Outcomes:

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

- set-up and maintain an arc.
- deposit a weld bead.

Objectives and Content:

1. Define the terminology associated with arc welding.
 - i) mild steel and low alloy steel electrodes
 - ii) AC (Alternating Current)
 - iii) DC (Direct Current) (polarity)
 - iv) Arc Blow
 - v) duty cycle
 - vi) rated amperage
2. Describe the SMAW process.
 - i) general precautions
 - ii) equipment and accessories
 - personal protective equipment
 - ground clamps
 - terminal lugs
 - electrode holders
 - cable connectors
 - cables
 - iii) electrodes
 - iv) codes and standards
3. Describe the characteristics and applications of different power sources.
 - i) AC transformers
 - ii) AC/DC rectifiers
 - iii) DC generators
 - iv) engine drive (gasoline, diesel)
 - v) inverters
4. Describe the set-up and maintenance of welding equipment used in the SMAW process.
5. Describe the procedures used to strike and maintain an electric arc.
6. Describe the procedures and techniques used to deposit a weld bead:
 - i) stringer
 - ii) weave

- iii) arc length
- iv) travel speed
- v) work and travel angles
- vi) visual inspection

Practical:

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

1. Set-up welding equipment check the various external components.
2. Tack weld with (6011) 4311 and (7018) 4918 electrodes.
3. Deposit stringer beads with 4311 and 4918 electrodes.
4. Deposit weave beads with 4311 and 4918 electrodes.
5. Perform padding with 4311 and 4918 electrodes.

WD-1620 SMAW 2 – FILLET WELD ALL POSITIONS

Outcomes:

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

- demonstrate knowledge of fillet weld mild steel in all positions using the SMAW process.
- perform visual inspection of welds.

Objectives and Content:

1. Identify types of joints and their characteristics.
 - i) tee
 - ii) lap
 - iii) corner

2. Identify types of fillet welds and describe their applications.
 - i) tack
 - ii) composite
 - iii) single-pass
 - iv) multi-pass
 - v) plug
 - vi) slot

3. Describe the procedures used to fillet weld on mild steel in all positions.
 - i) identify position
 - limitations
 - ii) identify material
 - iii) determine thickness of material
 - iv) determine fillet size
 - v) select electrode
 - vi) select current

4. Describe the procedures used to test welds.
 - i) destructive
 - ii) non-destructive (visual inspection)

5. Describe weld faults and their causes.

Practical:

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

1. Perform welds on tee lap and corner joint, all positions.

WD-1630 GMAW (GAS METAL ARC WELDING) 1 – SET-UP AND MAINTAIN AN ARC

Outcomes:

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

- demonstrate knowledge of the procedure to set-up GMAW equipment, strike and maintain an arc.
- disassemble and reassemble GMAW welding systems.
- perform visual inspection of weld.

Objectives and Content:

1. Define terminology associated with the GMAW process.
2. Describe the GMAW process.
 - i) general precautions
 - ii) equipment and accessories
 - shielding gas and regulators
 - electrode wire
 - gun
 - feeder
 - power source
 - nozzle
 - cable connections
 - cables
 - pulsed arc machines
 - iii) metal transfers
 - iv) polarity
 - v) arc voltage
 - vi) slope and adjustment
 - vii) inductance
 - viii) travel speed
 - ix) wire feed speed
 - x) penetration
 - xi) travel and work angles
 - xii) manipulation
 - xiii) guide tubes
 - xiv) contact tips
 - xv) liners
3. Describe the assembly and disassembly of welding equipment used in the GMAW process.
4. Describe troubleshooting and maintenance procedures for GMAW equipment.

5. Describe the procedures used to establish and maintain an arc.
 - i) starting and stopping the weld
 - finishing end of the joint
 - ii) filler metal
 - iii) adjustment
 - iv) shielding gases (pre and post weld)
 - v) drive rolls
 - vi) gun
 - vii) stick-out
 - viii) speed
6. Describe the procedures and techniques used to deposit a weld bead.
 - i) stringer
 - ii) weave
 - iii) stick-out
 - iv) travel speed
 - v) work and travel angles
 - vi) visual inspection
7. Describe the various gases and gas mixtures and describe their applications.
8. Describe weld faults and their causes.
9. Describe the procedures used to test welds.
 - destructive
 - non-destructive (visual inspection)

Practical:

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

1. Set-up GMAW equipment.
2. Change electrode wire guide.
3. Adjust and check flow meter.
4. Deposit fillet welds on mild steel, various thickness.

WD-1640 GTAW (GAS TUNGSTEN ARC WELDING) 1 – SET-UP

Outcomes:

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

- demonstrate, set-up equipment, strike and maintain an arc.
- perform visual inspection of welds.

Objectives and Content:

1. Define terminology associated with the GTAW process.
2. Describe the GTAW process.
 - i) general precautions
 - ii) equipment and accessories
 - power sources
 - torches
 - flowmeters
 - iii) electrodes
 - iv) current requirement
 - v) shielding gases
 - vi) travel and work angles
 - vii) filler rods
 - viii) joint types and their preparation
 - ix) edge preparations
 - x) weld types
3. Describe the procedures to assemble and disassemble GTAW welding equipment.
4. Describe the procedures used to establish and maintain an arc.
 - i) conventional and pulse arc welding
5. Describe the procedures used to test welds.
 - i) destructive
 - ii) non-destructive (visual inspection)

Practical:

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

1. Set-up GTAW equipment, strike and maintain arc.

2. Change electrode, collet and collet body.
3. Adjust and check flow meter.
4. Run beads on cold rolled steel plate.
5. Shut down equipment.

WD-1650 PLASMA ARC CUTTING AND GOUGING

Outcomes:

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

- set-up and operate plasma arc equipment.
- cut and gouge ferrous and non ferrous metal.

Objectives and Content:

1. Define terminology associated with the plasma arc process.
2. Describe the plasma arc process.
 - i) general precautions
 - ii) equipment and accessories
 - types of torches
 - electrodes and tips
 - iii) types of arcs
 - iv) gases
 - v) power source
 - vi) procedures to set-up equipment and check its operation
3. Describe the procedures used to assemble and disassemble plasma arc equipment.
4. Describe the procedures used to maintain and troubleshoot plasma arc equipment.
5. Describe the procedures used to cut various thicknesses of ferrous and non-ferrous metals.
 - i) structural shapes
 - ii) plate
 - iii) pipe
 - iv) sheet metal
6. Describe the process used to set-up and operate equipment for gouging ferrous and non-ferrous metals.

Practical:

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

1. Set-up equipment, check its operation for non-transfer arc and check torch.

2. Cut steel of various thicknesses.
3. Cut stainless steel of various thicknesses.
4. Cut aluminium.
5. Gouge mild steel.

WD-1660

BLUEPRINT READING 1 (BASIC)

Outcomes:

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

- demonstrate a basic knowledge of blueprints and their purpose.

Objectives and Content:

1. Identify the types of drawings and their purpose.
2. Identify the various types of lines used on blueprints and describe their applications.
 - i) centre
 - ii) hidden
 - iii) dimension
 - iv) extension
 - v) object
 - vi) break
 - vii) long
 - viii) short
3. Identify views and describe their purpose.
 - i) front
 - ii) right side
 - iii) left side
 - iv) top (plan)
 - v) bottom
 - vi) back
 - vii) section
 - viii) detailed
4. Identify notes and specifications and describe their purpose.
 - i) parts of objects
 - ii) title block
 - iii) revisions
 - iv) drawing numbers
5. Identify sectioning practices and describe their purpose.
 - i) enlarged
 - ii) isometric
 - iii) auxiliary
 - iv) rotation
 - v) developed view
 - vi) detail

6. Identify and interpret common abbreviations and symbols.
 - i) supplementary symbols
 - ii) outdated and preferred symbols
 - iii) references
 - iv) location of symbols on drawings

Practical:

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

1. Identify the basic lines.
2. Identify various elements (ie) views notes and specifications, sections, common symbols and abbreviations.

WD-1670 BLUEPRINT READING 2 (WELDING SYMBOLS)

Outcomes:

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

- interpret welding abbreviations and symbols.

Objectives and Content:

1. Identify common welding symbols and abbreviations and describe their applications.
 - i) back gouging
 - ii) melt through
 - iii) finishing
 - iv) processes
2. Identify and interpret the symbols for fillet welds.
 - i) pitch
 - ii) dimension
 - iii) shape
 - iv) finishing
3. Identify and interpret the symbols for groove welds.
 - i) preparation
 - depth
 - angle
 - ii) root spacing
4. Identify and interpret the symbols for melt-through welds.
 - i) root spacing
 - ii) preparation angle
 - iii) backing
 - iv) fusible inserts
5. Identify and interpret the symbols for plug welds.
 - i) dimensions
 - ii) bevel angle
 - iii) filler thickness
 - iv) number
 - v) pitch
 - vi) shape
6. Identify and interpret weld finishing symbols.
 - i) grinding
 - ii) machining
 - iii) chipping

- iv) hammering
- v) rolling
- vi) unspecified

7. Identify and interpret pipe welding symbols.

Practical:

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

1. Locate and interpret abbreviations and symbols relevant to the trade
 - i) fillet welds
 - ii) groove welds
 - iii) melt through
 - iv) weld finishing
 - v) plug welds

WD-1680

**METALLURGY, EXPANSION
AND CONTRACTION CONTROL**

Outcomes:

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

- demonstrate understanding of the practices and principles to control expansion, contraction and distortion.

Objectives and Content:

1. Define terminology associated with metallurgy.
2. Describe the types and characteristics of metals.
 - i) ferrous
 - low carbon
 - medium carbon
 - high carbon
 - alloy steel
 - ii) non-ferrous
3. Describe mechanical and physical properties of metals.
 - i) tensile strength
 - ii) yield strength
 - iii) elasticity
 - iv) ductility
 - v) hardness
 - vi) compressive strength
 - vii) fatigue strength
 - viii) impact strength
 - ix) toughness
 - x) density
 - xi) melting point
 - xii) thermal conductivity
 - xiii) thermal expansion
 - xiv) electrical conductivity and resistance
 - xv) corrosion resistance
 - xvi) brittleness
 - xvii) malleability
 - xviii) plasticity
 - xix) reaction to heat
 - specific heat
 - heat of fusion
4. Describe the effects on properties of metals when:
 - i) forming

- ii) shearing
 - iii) punching
 - iv) drilling
 - v) cutting
 - vi) welding
5. Describe the effects of stresses and shrinkage on materials.
- i) hard
 - ii) brittle
 - iii) tough
 - iv) ductile
6. Describe common methods to determine the type of material and/or weldability.
- i) spark
 - ii) flame
 - iii) visual
 - iv) chip
 - v) weight
 - vi) magnet
7. Identify pre-heat and post-heat processes and describe their purpose and applications.
- i) temperature
8. Describe various classification systems used for ferrous metals.
- i) numbering systems
 - SAE (Society Automotive Engineers)
 - AISI (American Iron and Steel Institute)
 - ASTM (American Society of Testing and Materials)
 - CSA (Canadian Standards Association)
 - ii) colour coding of materials
9. Describe common problems in welding medium and high carbon steel.
10. Describe expansion and contraction of metals.
- i) heating compared with cooling
11. Describe stresses resulting from:
- i) welding
 - ii) flame cutting
 - iii) shearing
 - iv) unsatisfactory preparation for welding
 - v) forming
 - vi) rivetting

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

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

14. Describe controlled shrinkage for:
 - i) straightening of bent or distorted members
 - ii) alignment of sub-assemblies
 - iii) pre-bending
 - iv) removal of corroded or seized parts

Practical:

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

1. Identify metals using the spark test.
2. Shape, grind and heat treat chisels.
3. Observe tensile, ductility, hardness tests.
4. Demonstrate expansion and contraction.
5. Pre-set heated metal.
6. Use presetting to straighten bent members.
7. Perform pre-bending.

WD-1690

QUALITY CONTROL

Outcomes:

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

- demonstrate knowledge of quality control.
- demonstrate knowledge of non-destructive tests.

Objectives and Content:

1. Explain the purpose and scope of quality control.
2. Describe the methods used to identify and verify materials.
 - i) standards and specifications
 - ii) mill certificates
3. Describe standards and specifications applicable in the trade.
 - i) templates and/or gauges
 - ii) drawing (compliance with)
4. Describe the procedures used to ascertain compliance with design and code specifications.
5. Describe the methods of inspection and testing of structural materials and welds and their associated procedures.
 - i) non-destructive
 - visual
 - radiography
 - magnetic particle
 - ultrasonic
 - dye penetrant test
 - leak test
 - pneumatic test (air and soap, inert gas)
 - hydrostatic test (water pressure)
 - ii) paint thickness

Practical:

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

1. Perform visual inspection of welds.

2. Inspect and test structural material and weld.
 - i) inspect items and note irregularities (visual inspection)
 - ii) bend specimen and determine ductility and soundness
 - iii) perform etch test
 - iv) visual inspect radiographic film for irregularities
 - v) use magnetic particle test
 - vi) perform dye penetrant test
 - vii) perform leak test on small vessels
 - air and soap (pneumatic)
 - water pressure (hydrostatic)

3. Identify inspection and test methods for paint thickness.

WD-1700 STATIONARY POWERED SHEARING

Outcomes:

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

- demonstrate knowledge of powered shearing equipment and its applications.

Objectives and Content:

1. Identify types of powered shearing equipment and describe their characteristics and applications.
2. Describe the operation of shearing equipment.
 - i) capacity
 - ii) rake angle
 - iii) blade clearance
 - iv) back gauge calibration
 - v) lateral guide squaring
 - vi) operating procedures
 - vii) preventative maintenance

Practical:

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

1. Determine capacity of shears.
2. Setup and operate guillotine plate shears.

WD-1710

IRON WORKER OPERATION

Outcomes:

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

- operate iron worker equipment for punching and shearing of structural shapes, plate and sheet sections.
- perform preventative maintenance.

Objectives and Content:

1. Describe the purpose of the iron worker and its accessories.
 - i) punching
 - ii) shearing
 - iii) notching
 - iv) coping
 - v) bending
2. Describe coping and notching.
 - i) blade clearance
 - ii) capacity
3. Describe shearing.
 - i) blades
 - ii) blade clearance
 - iii) capacity
4. Describe angular and square cuts of angle stock.
 - i) capacity
 - ii) back gauge clearance
5. Describe punching.
 - i) die clearance
 - ii) round
 - iii) oblong
 - iv) square
6. Describe bending.
 - i) die selection
 - ii) capacity
7. Describe preventative maintenance procedures.

Practical:

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

1. Demonstrate notching.
2. Demonstrate punching.
3. Demonstrate shearing.

WD-1720 JIGS AND FIXTURE FABRICATION

Outcomes:

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

- demonstrate knowledge of jig and fixture fabrication and applications.

Objectives and Content:

1. Identify common types of jigs and fixtures and describe their purpose and applications.
2. Describe common methods used to fabricate jigs and fixtures.
 - i) design considerations
 - ii) fabrication practices

Practical:

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

1. Fabricate jigs and fixtures.
 - i) setup multi-punch operation
 - ii) fabricate jig to allow multi-drilling
 - iii) setup jig to allow for shearing
 - iv) fabricate jig to accommodate truss assembly for welding
 - v) fabricate jig to accommodate ladder assembly

WD-1730

FABRICATION FUNDAMENTALS

Outcomes:

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

- prepare joints on structural shapes to industry standards.
- fabricate using various structural shapes.

Objectives and Content:

1. Identify the various types of structural steel shapes and describe the procedures used to determine their dimensions.
 - i) S-beam (standard)
 - ii) WF-beam (wide flanged beam)
 - iii) angle iron
 - iv) channel
 - v) I-beam
 - vi) pipe and tubing
2. Identify the methods used to prepare joints on structural steel shapes to industry standards.
3. Describe the procedures used to work accurately from shop drawings or sketches.
 - i) read shop drawings
 - ii) verify dimensions
 - iii) cut parts as per shop drawings
4. Describe the procedures used to fabricate using various structural shapes.

Practical:

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

1. Theory only.

WD-1740 FCAW (FLUX-CORED ARC WELDING) 1 – SET-UP AND DEPOSIT A WELD

Outcomes:

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

- set-up and adjust FCAW equipment.

Objectives and Content:

1. Define terminology associated with the FCAW process.
2. Describe the FCAW process.
 - i) general precautions
 - ii) equipment and accessories
 - shielding gas and regulators
 - electrode wire
 - flux cored
 - metal cored
 - gun
 - feeder
 - power source
 - nozzle
 - cable connections
 - cables
 - iii) metal transfers
 - iv) polarity
 - v) arc voltage
 - vi) slope and adjustment
 - vii) inductance
 - viii) travel speed
 - ix) wire feed speed
 - x) penetration
 - xi) travel and work angles
 - xii) manipulation
 - xiii) guide tubes
 - xiv) contact tips
 - xv) liners
3. Describe the assembly and disassembly of welding equipment used in the FCAW process.
4. Describe troubleshooting and maintenance procedures for FCAW equipment.

5. Describe the procedures used to deposit a satisfactory weld.
 - i) starting and stopping the weld
 - ii) filler metal
 - iii) adjustment
 - iv) shielded gases (pre and post weld)
 - v) drive rolls
 - vi) gun
 - vii) stick-out
 - viii) speed

Practical:

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

1. Set-up FCAW equipment and adjust flow meter, if necessary.
2. Identify electrode wire and equipment components.

WD-1750

**FCAW 2 – WELD PLATE
(FLAT AND HORIZONTAL)**

Outcomes:

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

- deposit a weld in flat and horizontal positions using flux cored wire.
- identify various gases and gas mixtures.
- shut down FCAW equipment.

Objectives and Content:

1. Describe the procedures and techniques used to deposit a weld bead.
 - i) stringer
 - ii) weave
 - iii) stick-out
 - iv) travel speed
 - v) work and travel angles
 - vi) visual inspection
2. Describe the procedures used to weld a butt joint in flat and horizontal positions using flux cored wire.
 - i) quality of welds
 - ii) faults
 - iii) travel angles
 - iv) manipulation
3. Describe the various gases and gas mixtures and describe their applications.
4. Describe weld faults and their causes.
5. Describe the procedures used to test welds.
 - destructive
 - non-destructive (visual inspection)

Practical:

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

1. Perform a butt weld in the flat and horizontal positions using the flux core process.

2. Conduct visual inspection of welds.
3. Perform a side bend test.

WD-1760 AIR-ARC CUTTING AND GOUGING

Outcomes:

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

- remove a weld from a joint using the AAC process.
- cut metal using the AAC process.

Objectives and Content:

1. Identify the equipment and accessories used in the AAC process.
 - i) power source
 - ii) torch
 - iii) ground clamp
 - iv) air supply
 - v) pressure regulator
 - vi) electrodes
 - vii) cables

2. Describe the AAC process and its applications.
 - i) cut
 - ii) remove faulty welds
 - iii) joint preparation
 - iv) back gouge

Practical:

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

1. Remove a weld from a joint using the AAC process.

2. Cut metal using the AAC process

WD-1770 SUBMERGED ARC WELDING SET-UP

Outcomes:

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

- demonstrate knowledge of the SAW process.

Objectives and Content:

1. Describe the procedures used to weld carbon steel plate of various thicknesses using the SAW process.
 - i) deposition rates
 - ii) travel speeds
 - iii) depth of penetration
 - iv) welding position
 - v) fluxes
 - vi) starting methods
 - vii) faults encountered

Practical:

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

1. Theory only.

WD-2410 STUD AND SPOT RESISTANCE WELDING

Outcomes:

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

- demonstrate knowledge of stud welding and resistance spot welding

Objectives and Content:

1. Define terminology associated with the stud weld and resistance spot weld process.
2. Describe the stud weld process.
 - i) general precautions
 - ii) principles of operation
 - equipment
 - weld quality
 - variables
 - stud size
 - current
 - time
3. Describe the procedures used to stud weld.
4. Describe the resistance spot weld process.
 - i) general precautions
 - ii) principles of operation
 - equipment
 - weld quality
 - types of joints
 - variables
 - current
 - time
 - material (type and thickness)
5. Describe the procedures used to perform resistance spot weld.

Practical:

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

1. Theory only.

WD-2420

BLUEPRINT READING 3 (ADVANCED/CAD)

Outcomes:

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

- interpret dual dimensions.
- interpret international symbols.
- interpret test and inspection symbols.
- describe computer-aided drafting (CAD).

Objectives and Content:

1. Describe dual dimensions and their use in the trade.
 - i) variation
 - ii) flexibility
 - iii) accuracy
 - iv) disadvantages
2. Identify and interpret international symbols.
3. Identify and interpret test and inspection symbols.
 - i) visual inspection
 - ii) ultrasonic
 - iii) X-rays
 - iv) dye penetrates
 - v) dimensioning
 - vi) eddy current
 - vii) magnetic particle
 - viii) acoustic emissions
 - ix) leak test
4. Describe computer-aided drafting (CAD) and its use in the trade.

Practical:

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

1. Interpret dual dimensioning.
2. Locate and interpret test and inspection symbols.
3. Locate and interpret international symbols.

WD-2430

**MATERIAL HANDLING, RIGGING
AND SCAFFOLDING**

Outcomes:

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

- demonstrate knowledge of rigging, hoisting, lifting equipment, scaffolding, accessories and practices.

Objectives and Content:

1. Identify Provincial regulations applicable to material handling, rigging and scaffolding.
2. Describe the procedures for manual lifting.
3. Describe responsibilities and liabilities in the use of equipment for rigging, lifting and hoisting.
4. Describe the variables to consider when hoisting.
 - i) weight of objects
 - ii) object of configuration
 - iii) materials
 - iv) materials for blocking
5. Describe the methods of hoisting, their applications and procedures for use.
6. Describe the various types of wire ropes, chains, cables, cable clamps and their accessories.
 - i) characteristics
 - ii) applications
 - iii) precautions
 - iv) procedures for use
 - v) inspection
7. Identify and describe the various types of lifting clamps.
 - i) characteristics
 - ii) applications
 - iii) precautions
 - iv) inspection
 - v) procedures for use
8. Identify types of come alongs, rope and chain falls, and describe their applications and procedures for use.

9. Identify types of jacks and describe their applications and procedures for use.
 - i) hydraulic
 - ii) screw
 - iii) ratchet
10. Describe stacking and blocking.
 - i) structural shapes
 - ii) plate and sheet
 - iii) weldments and components
11. Describe the methods of securing chains to provide for manipulation of structural shapes.
12. Identify types of slings and describe their applications and procedures for use.
 - i) wire rope slings
 - ii) nylon slings
13. Describe use of hooks and shackles.
14. Describe rope and its use.
 - i) sizes
 - ii) care and inspection
 - iii) knots
 - bowline
 - square or reef
 - round turn and two half hitches
 - scaffold hitch
 - whipped ends and eyes
15. Describe use of chokers, slings and tag lines.
16. Describe spooling of line on drums.
 - i) over wind
 - ii) under wind
 - iii) left and right hand lay lines
17. Describe practices for use of tackle.
 - i) safety factors
 - ii) reeving practices
18. Identify mechanical types of hoisting methods and describe their applications.
 - i) overhead crane
 - ii) jib crane
 - iii) boom crane
 - iv) mobile crane
 - v) fork lifts

19. Describe standard hand signals.
20. Identify the different types of scaffolds, and describe their applications and procedures for use.
 - i) tube and clamp
 - ii) manufactured platforms and scaffolding
 - iii) rolling scaffolding
 - iv) suspended scaffolding
21. Describe safety requirements for erecting and working on scaffolding.
 - i) kick plates
 - ii) braces
 - iii) ties
 - iv) planking
 - v) permits
 - vi) tagging
 - vii) fall arrest
 - viii) railings
22. Describe special problems of rolling and suspended scaffolding and guidelines for their use.
23. Identify types of ladders and describe their applications and use.
24. Identify powerline hazards when using lifting equipment.

Practical:

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

1. Make up spreader bar.
2. Tie knots using fiber rope.
 - i) reef knot
 - ii) bowline knot
 - iii) round turn and hitch
 - iv) scaffold hitch
 - v) demonstrate hand signals

WD-2440

BLUEPRINT READING 4 (SHOP DRAWINGS)

Outcomes:

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

- identify structural components from shop drawings.
- draw templates for structural parts.

Objectives and Content:

1. Identify and interpret abbreviations used on shop drawings.
2. Identify and interpret various structural components found on shop drawings.
 - i) column
 - ii) beam
 - iii) truss
 - iv) purlin
 - v) joists
3. Identify and interpret shop drawings.
 - i) beams
 - ii) columns
 - iii) stairs
 - iv) brace
4. Identify and interpret information used to cut beams to desired dimensions from shop drawings.
 - i) notch
 - ii) cut
 - iii) cope
5. Describe the procedures used to draw templates for structural parts.

Practical:

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

1. Interpret instructions and symbols found on working drawings.
2. Draw templates for structural parts.

SF-1400

PRESS BRAKE OPERATION

Outcomes:

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

- bend sheet and plate using a press brake.
- layout materials in preparation for bending.
- perform operational adjustments and corrective maintenance.

Objectives and Content:

1. Identify types of press brakes and describe their applications.
 - i) hydraulic
 - ii) mechanical
 - iii) Computerized Numerical Control (CNC)
2. Describe the set-up of press brake machinery.
 - i) attachments
 - ii) adjustments
 - iii) machine capabilities
 - sheet
 - plate
 - ferrous and non-ferrous
3. Describe the procedures used to layout materials for bending on a press brake.
 - i) allowances
 - future operations
 - bending
 - ii) dies and jigs
 - iii) bending charts
 - iv) bending sequence
4. Describe operational maintenance of press brake equipment.

Practical:

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

1. Set-up press brake.
2. Layout materials in preparation for bending.

3. Bend sheet and plate using a press brake, as per blueprint.
4. Perform operational adjustments and corrective maintenance.

SF-1410

ROLL FORMING EQUIPMENT AND OPERATION

Outcomes:

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

- roll ferrous and non-ferrous plate, sheet and structural shapes to specified dimensions.
- demonstrate knowledge of attachments used with roll forming equipment.
- perform maintenance to roll forming equipment.

Objectives and Content:

1. Describe the procedures used to set-up roll forming equipment.
2. Describe operation of equipment for:
 - i) roll configuration
 - ii) pre-bend
 - iii) capacity
 - iv) template
 - over roll
 - under roll
3. Describe the procedures used to roll ferrous and non-ferrous plate, sheet and structural shapes to specified dimensions.
 - i) equipment selection
 - ii) effects of rolling on material
4. Identify types of attachments and describe their applications, installation and adjustment.
 - i) cone rolling
 - ii) flat bar rolling
 - iii) angle rolling
5. Describe maintenance of roll forming equipment.

Practical:

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

1. Set-up plate rolling equipment.
2. Roll mild steel plate as per blueprint.

SF-1420

BASIC LAYOUT OPERATIONS

Outcomes:

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

- demonstrate knowledge of basic layout operations.
- perform a simple sketch.

Objectives and Content:

1. Describe methods used to carry out basic layout operations.
2. Describe geometric operations used in performing layout.
 - i) bisecting lines and circles
 - ii) erecting perpendiculars
 - iii) dividing lines and circles
 - iv) trisecting angles
 - v) drawing a tangent from a given point
 - vi) constructing a pentagon
 - vii) constructing a hexagon
 - viii) constructing an octagon
 - ix) drawing an ellipse
 - x) drawing a spiral/helix
3. Describe the procedures to perform a simple sketch.

Practical:

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

1. Perform layout operations.

SF-1430 BASIC PARALLEL LINE DEVELOPMENT

Outcomes:

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

- perform basic parallel line development.

Objectives and Content:

1. Describe terminology associated with parallel line development.
2. Describe the purpose of parallel line development.
3. Describe cylinders with various mitre cuts.
 - i) use of views
 - ii) methods of development
 - iii) elements
 - iv) pattern of development
4. Describe two, three, four and five piece elbows.
 - i) elbow rule
 - ii) types of patterns
 - iii) necessary view
 - iv) pattern development
5. Describe layout to provide for bending of flat surfaces at various angles.
6. Describe development of pipe or tubing tee.
 - i) equal and unequal diameters
 - ii) unequal diameter with branch placed off centre
 - iii) method of establishing mitre lines (line of cut)
 - iv) pattern development

Practical:

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

1. Perform basic parallel line development as per job sheet.

SF-1440

BASIC RADIAL LAYOUT

Outcomes:

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

- perform basic radial line development.
- use radial line layout in combination with other layout methods.

Objectives and Content:

1. Define terminology associated with radial line development.
2. Describe the purpose of radial line development.
3. Describe development of conical sections.
 - i) plane through cone 90° to axis of circle
 - ii) plane through both sides inclined to the axis of an ellipse
 - iii) plane through apex of a cone vertically to the base triangle
 - iv) plane through a cone parallel to the apex in a hyperbola
 - v) plane through a cone parallel to its sides in a parabola
4. Describe the process to draw a truncated cone.
 - i) concentric
 - ii) eccentric
5. Describe development of a round cylinder intersecting a cone at 90° .
 - i) intersecting radial line to parallel line

Practical:

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

1. Perform basic radial line development as per job sheet.

SF-1450 BASIC TRIANGULATION LAYOUT

Outcomes:

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

- use triangulation to develop patterns.
- use triangulation layout in combination with other layout methods.

Objectives and Content:

1. Define terminology associated with triangulation.
2. Describe the purpose of triangulation.
3. Describe true length lines.
 - i) use of plan and elevation to determine true lengths
 - ii) numbering and lettering
4. Describe development of transitional concentric and eccentric shapes.
 - i) square to square
 - ii) square to rectangular
 - iii) square to round

Practical:

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

1. Perform basic triangulation development as per job sheet.

SF-1460

BASIC PLATE DEVELOPMENT

Outcomes:

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

- lay out basic cylinders, cones, hoppers and chutes.
- use plate development in combination with other layout methods.

Objectives and Content:

1. Describe the purpose of plate development.
2. Identify types of cylinders and describe their applications.
 - i) small shop fabricated
 - ii) large field assembled
3. Interpret drawings and identify material type and size of cylinder.
4. Describe cylinder development.
 - i) interpret the drawing
 - inside diameter
 - outside diameter
 - mean diameter
 - ii) check materials
 - iii) stretch-out of plate material
 - iv) preparation of plate for layout
 - squaring up
 - marking-out in preparation for bevelling
 - reason for roll up or roll down
 - mark out for assembly holes
5. Describe cones and development of conical shapes.
 - i) interpret the drawing
 - ii) check materials
 - iii) method of development
 - one piece cone
 - two half sections
 - iv) layout methods
 - plate thickness allowance
 - calculation of true lengths
 - marking out radial lines
 - prepare plate edges for welding or bolting
 - mark up plates for bending
 - v) prepare bending templates
 - vi) use template to check accuracy of contours

6. Identify hoppers and describe their applications.
 - i) small shop fabricated
 - ii) simple square
 - iii) simple rectangular
7. Interpret drawings and identify material type and size of hopper.
8. Describe layout for plate development of hoppers and chutes.
 - i) thickness of plate
 - ii) bending allowance
 - iii) calculation of true lengths
 - iv) bevels and angles
 - v) establish work and bend lines
 - vi) make bending templates
 - vii) marking of material
 - viii) bolt hold pattern

Practical:

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

1. Lay out and fabricate basic shapes as per job sheet.
2. Lay out and fabricate basic hoppers.

SF-1470

BASIC ASSEMBLY AND FITTING

Outcomes:

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

- fit and assemble basic shop and field units.
- demonstrate knowledge of common accessories and related equipment.

Objectives and Content:

1. Define terminology associated with assembly and fitting.
2. Identify common accessories used to assemble and fit components and describe their applications.
 - i) dogs
 - ii) wedges
 - iii) clips
 - iv) angles
 - v) tie-down plates
 - vi) spider jigs
3. Describe the procedures used to fitup and assemble:
 - i) small units
 - ii) large units
 - iii) large units to be disassembled for field erection
4. Describe the procedures to layout and fit complex beams and columns.
 - i) interpret drawings
 - ii) check bill of materials and mill certificate
 - iii) determine layout
 - iv) check gauges
 - v) block outs
 - vi) copes
 - vii) clearances
 - viii) mark up
 - ix) back check of work

Practical:

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

1. Fabricate beams and columns as per blueprint instructions.

SF-1490

STRUCTURAL COMPONENTS AND DETAILING PRACTICES

Outcomes:

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

- interpret basic prints and working drawings pertaining to structural members.
- identify basic structural components and detailing practices.

Objectives and Content:

1. Identify structural members and describe their applications.
2. Describe the fabrication of beams and columns.
 - i) cuts, copes, block out, cut and chip
 - ii) stiffeners, gussets and filler plates
 - iii) minimum edge distances – standard gauges
 - iv) marking of parts numbers and piece marks
3. Interpret drawings and layout.
 - i) stairs and handrails
 - ii) templates
 - iii) platforms
 - iv) structural symbols
4. Identify and interpret symbols.
 - i) structural shapes
 - ii) type of material
 - iii) processes
 - machining
 - iv) rivet and bolt
 - v) revision
 - vi) erection mark
 - vii) orientation mark
5. Identify abbreviations commonly encountered.

Practical:

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

1. Develop templates as per job sheets.

SF-1500

PRESSURE VESSEL AND PIPE DRAWING INTERPRETATION

Outcomes:

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

- interpret pressure vessel and pipe drawings.
- identify specifications and symbols used in piping and pressure vessel drawings.

Objectives and Content:

1. Identify terminology and components used in pressure vessels and pipe drawings.
2. Interpret pressure vessels and pipe drawings.
 - i) codes
 - ii) specifications
 - iii) symbols
 - iv) testing & inspection

Practical:

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

1. Theory only.

SF-1510 **ADVANCED PARALLEL LINE DEVELOPMENT**

Outcomes:

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

- perform advanced parallel line development.

Objectives and Content:

1. Describe development of a lateral.
 - i) use of projection lines
 - ii) use of profiles
 - iii) location and shape of mitres
2. Describe development of an off-set pipe.
 - i) location and shape of a mitre
 - ii) methods of construction
 - iii) use of elbow patterns
3. Describe development of an off-centre lateral.
 - i) methods of construction
 - ii) pattern development

Practical:

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

1. Perform advanced parallel line development as per job sheet.

SF-1520

OXY-FUEL OPTICAL TRACER

Outcomes:

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

- demonstrate knowledge of optical tracer equipment and its setup and adjustment.
- demonstrate knowledge of procedures used to operate the cutting machine in the strip and trace mode.

Objectives and Content:

1. Identify types of optical tracers and describe their applications.
 - i) size
 - ii) capacity
 - iii) number of cutting heads
 - iv) cantilevers
 - v) bridges

2. Describe the procedures used to operate the optical tracer.
 - i) gas controls
 - ii) pressure settings
 - iii) ignition
 - iv) pre-heat settings
 - v) high pre-heat settings
 - vi) cutting oxygen settings
 - vii) torch height
 - viii) torch height setting and control
 - ix) master height control
 - x) tracing head
 - kerf offset adjustment
 - determining kerf compensation
 - direction of kerf adjustment
 - xi) tracing and stripping mode
 - piercing
 - lead in
 - lead out
 - xii) material utilisation
 - plate alignment
 - placement of the pattern
 - nesting of part
 - material and part identification

3. Identify pattern materials and describe their preparation.

4. Describe cutting charts and their uses.
 - i) cutting tip selection
 - pressure settings
 - cutting speed settings
 - kerf dimensions

5. Describe factors affecting set-up of equipment.
 - i) tip size and conditions
 - ii) quality of the cuts
 - iii) pre-heat adjustment
 - iv) cutting pressure adjustment
 - v) cutting speed
 - vi) torch height
 - vii) motion stability of the machine

6. Describe routine operational maintenance of the optical tracer.
 - i) rail cleaning
 - ii) gear box oil level check
 - iii) tracing check

Practical:

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

1. Use optical tracer to cut components as per instructions on job sheet.

SF-1530

CNC CUTTING MACHINE

Outcomes:

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

- demonstrate knowledge of CNC controls and commands.
- demonstrate knowledge of CNC cutting machine operation.

Objectives and Content:

1. Describe the use of CNC shape cutting machines and describe their applications in industry.
2. Describe shape selection.
 - i) 50 standard shape library
 - ii) standard shape operation
 - iii) shape number
 - iv) part number
 - v) program name defined by user
 - vi) prompting operation and menu
3. Describe the conditions affecting the quality of the cut.
 - i) tip and size conditions
 - ii) pre-heat adjustment
 - iii) piercing time setting
 - iv) cutting pressure adjustment
 - v) cutting speed
 - vi) torch height
 - vii) plasma height sensing unit
 - viii) motion stability of the machine
4. Describe main menu operation.
 - i) load program
 - standard shape library
 - panel device
 - floppy disk
 - ii) run program
 - iii) store program
 - panel device
 - floppy disk
 - iv) delete program
 - v) utilities
 - display system data
 - display/edit/nest
 - directory support
 - setup and configuration

- diagnostic support
- setup/load/store

5. Describe cutting machine maintenance.
 - i) rail cleaning
 - ii) gear box oil level check
 - iii) tracing deck

Practical:

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

1. Theory only.

SF-1540

FINISHING AND SHIPPING

Outcomes:

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

- demonstrate knowledge of finishing and shipping products.

Objectives and Content:

1. Identify the types of finishes and describe their applications.
 - i) paint and primer
 - ii) galvanized
2. Identify the types of surface preparation methods for finishing products.
 - i) abrasive blasting
 - ii) chemical cleaning
 - iii) mechanical cleaning
 - iv) polishing
3. Describe the procedures to finish products.
 - i) ferrous
 - ii) non-ferrous
4. Describe procedures to prepare materials for shipping.
 - i) identifies piece marks to be shipped
 - ii) determines weight
 - iii) coordinates sequence of loading
 - iv) determines dunnage and false work requirements

Practical:

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

1. Theory only.

SF-1550

ON-SITE INSTALLATION

Outcomes:

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

- demonstrate knowledge of on-site installation.
- demonstrate knowledge of codes and regulations.
- demonstrate knowledge of site hazards.

Objectives and Content:

1. Describe the procedures for site installation.
 - i) interpret codes and site drawings
 - ii) coordinate with other tradespeople
 - iii) receipt of materials
 - iv) establish lay down area and dunnage
 - v) determine equipment
 - vi) determine consumables
 - vii) confirm field dimensions
 - viii) install components

Practical:

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

1. Theory only.

SF-1560

JOB PLANNING

Outcomes:

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

- demonstrate ability to estimate materials and timeline.
- describe sequential procedures for a complete project.

Objectives and Content:

1. Describe the components of job planning.
 - i) document receipt of materials
 - ii) coordinate lay down area
 - iii) identify structural components and pieces
 - iv) identify sub-assemblies
 - v) schedule equipment and manpower
 - vi) estimate materials and consumables

Practical:

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

1. Theory only.

SF-1700 TRUSS AND GIRDER FABRICATION

Outcomes:

Upon successful completion of this unit, the apprentice will have a knowledge to:

- interpret truss and girder prints and drawings.
- identify characteristics of trusses and girders.
- demonstrate knowledge of layout and fabrication.

Objectives and Content:

1. Identify types of trusses and girders, and describe their characteristics, components and materials to fabricate.
2. Interpret prints and drawings to produce trusses and girders.
3. Describe procedures used to layout components of trusses and girders.
4. Describe the procedures used to fabricate trusses and girders.

Practical:

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

1. Fabricate simple trusses and girders.

SF-1710

ADVANCED RADIAL LAYOUT

Outcomes:

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

- perform advanced radial line development.
- use radial line layout in combination with other layout methods.

Objectives and Content:

1. Describe development of a round cylinder intersecting a cone at 45° .
2. Describe development of a 90° equally tapering elbow.
3. Describe development of an oblique cone.

Practical:

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

1. Perform advanced radial line development as per job sheet.

SF-1720 ADVANCED TRIANGULATION LAYOUT

Outcomes:

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

- use triangulation to develop patterns for transitional and/or twisted shapes.
- use triangulation layout in combination with other layout methods.

Objectives and Content:

1. Describe development of transitional concentric and eccentric shapes.
 - i) square to square rotated half turn
 - ii) square to rectangular rotated half turn
 - iii) inclined square to square
 - iv) rectangular to round pitch at top
 - v) oblong to round

Practical:

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

1. Perform advanced triangulation development as per job sheet.

SF-1730 **ADVANCED ASSEMBLY AND FITTING**

Outcomes:

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

- fit and assemble girders and trusses.
- demonstrate knowledge of the installation and testing of large structures.

Objectives and Content:

1. Describe the procedures used to layout welded girders.
 - i) interpret drawings
 - ii) check bill of materials
 - iii) web plates
 - iv) flange plates
 - v) cambers
 - vi) templates
 - vii) gauges
 - viii) web stiffeners

2. Describe the procedures used to layout bolted girders.
 - i) interpret drawings
 - ii) check bill of materials
 - iii) web plates
 - iv) flange plates
 - v) cambers
 - vi) templates
 - vii) gauges
 - viii) web stiffeners

3. Describe the procedures used to fit girders.
 - i) interpret drawings
 - ii) prefabricated sub assemblies
 - iii) fit up of girders
 - iv) shop splicing
 - v) fit detail on the girder
 - stiffeners
 - end plates
 - gussets
 - clips
 - vi) shop welding
 - vii) riveting
 - viii) bolting
 - ix) cambered girders

4. Describe components and processes specific to bolted bridge trusses.
 - i) top-bottom chord units
 - ii) end posts
 - iii) web members
 - iv) floor system
 - v) brace members
 - vi) bearing shoes
 - vii) expansion joints
 - viii) fitting the trusses
 - ix) reaming and bolting

5. Describe interpretation of drawings, layout and fitting practices for large structures.
 - i) tanks
 - ii) field fabricated cones
 - iii) cranes
 - iv) truss conveyors

6. Describe installation and testing procedures.
 - i) interpretation of drawing
 - establish reference points
 - elevation
 - ii) use of transit and builders level
 - use of equipment
 - set-up on tripod
 - level the instrument
 - use of plumb bomb
 - accuracy requirements

7. Interpret applicable codes.

Practical:

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

1. Fabricate girders as per blueprints.

SF-1740 **ADVANCED PLATE DEVELOPMENT**

Outcomes:

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

- lay out advanced cylinders, cones, hoppers and chutes.
- use plate development in combination with other layout methods.

Objectives and Content:

1. Describe cones and the development of conical shapes.
 - i) large cone with multiple sections
2. Identify hoppers and describe their applications.
 - i) large field assembled
 - ii) hoppers having offset opening
 - iii) hoppers with flanges
3. Interpret drawings and identify material type and size of hopper.
4. Describe outlet ends of hoppers and chutes and their accessories.
 - i) plane and flanged end (bolted)
 - ii) geared or power driven gate end
 - iii) sliding end
 - iv) support members
5. Describe special hopper and chute requirements.
 - i) channel and angle stiffeners
 - ii) flat bar stiffeners
 - iii) lap joints
 - iv) butt joints
 - v) accessories

Practical:

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

1. Layout and fabricate conical shapes as per job sheet.
2. Layout and fabricate hoppers as per job sheet.

MA-1060

BASIC MATH

Description:

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

Course Outcomes:

1. To develop numeracy skills and knowledge required for institutional and on-the-job learning.
2. To develop the capability to apply mathematical concepts in the performance of trade practices.
3. To develop an appreciation for mathematics as a critical element of the learning environment.
4. To use mathematical principles accurately for the purposes of problem solving, job and materials estimation, measurement, calculation, system conversion, diagram interpretation and scale conversions, formulae calculations, and geometric applications.

Prerequisites:

Course Duration: 60 hrs.

Course Objectives (Knowledge):

1. Define and calculate using whole number operations
2. Define and demonstrate use of correct orders of operations
3. Demonstrate examples of operations with fractions and mixed numbers
4. Demonstrate examples of operations with decimals
5. Demonstrate examples of operations with percentages
6. Employ percent/decimal/fraction conversion and comparison
7. Define and calculate with ratios and proportions

8. Use the Imperial Measurement system in relevant trade applications
9. Use the Metric Measurement system in relevant trade applications
10. Perform Imperial/Metric conversions
11. Define and demonstrate the formulation of variables
12. Demonstrate and define the various properties of angles and make relevant calculations

Major Tasks/Sub-tasks (Skills):

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

REQUIRED RELATED COURSES

CM-2150 WORKPLACE COMMUNICATIONS

Description:

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

Course Outcomes:

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

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

Objectives and Content:

1. Apply rules and principles for writing clear, concise, complete sentences which adhere to the conventions of grammar, punctuation, and mechanics.
2. Explain the rules of subject-verb agreement.
3. Define and describe the major characteristics of an effective paragraph
4. Examine the Value of Business Writing Skills
 - i) Describe the importance of effective writing skills in business
 - ii) Describe the value of well-developed writing skills to career success as referenced in the Employability Skills
5. Examine Principles of Effective Business Writing
 - i) Discuss the rationale and techniques for fostering goodwill in business communication, regardless of the circumstances
 - ii) Review the importance of revising and proofreading
 - iii) Differentiate between letter and memo applications in the workplace & review samples
 - iv) Identify the parts of a business letter and memo
 - v) Review the standard formats for business letters and memos
 - vi) Examine samples of well-written and poorly written letters and memos

- vii) Examine guidelines for writing sample letters and memos which convey: acknowledgment, routine request, routine response, complaint, refusal, persuasive request and letters of appeal.
6. Examine the Fundamentals of Informal Business Reports
 - i) Identify the purpose of the informal report
 - ii) Identify the parts and formats of an informal report
 - iii) Identify methods of information gathering
 - iv) Describe the methods of referencing documents
 - v) Review the importance of proof reading and editing
 7. Examine types of presentations
 - i) Review & discuss components of an effective presentation
 - ii) Review & discuss delivery techniques
 - iii) Review & discuss preparation & use of audio/visual aids
 - iv) Discuss & participate in confidence building exercises used to prepare for giving presentations
 8. Interpersonal Communications
 - i) Examine and apply listening techniques
 - ii) Discuss the importance of body language

Practical:

1. Write well-developed, coherent, unified paragraphs which illustrate the following: A variety of sentence arrangements; conciseness and clarity; and adherence to correct and appropriate sentence structure, grammar, punctuation, and mechanics.
2. Write sample letters and memos which convey: acknowledgment, routine request, routine response, complaint, refusal, persuasive request and letters of appeal.
3. Gather pertinent information, organize information into an appropriate outline & write an informal report with documented resources.
 - i) Edit, proofread, and revise the draft to create an effective informal report and present orally using visual aids
 - ii) Participate in confidence building exercises
4. Present an effective presentation.
5. Evaluate presentations.

MR-1220

CUSTOMER SERVICE

Description:

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

Course Outcomes:

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

- define customer service
- explain why service is important
- describe the relationship between “service” and “sales”
- demonstrate an understanding of the importance of a positive attitude
- demonstrate methods of resolving customer complaints

Objectives and Content:

1. Define quality service
 - i) Identify and discuss elements of customer service
 - ii) Explain the difference between Service vs. Sales or Selling
 - iii) Explain why quality service is important
 - iv) Identify the various types of customers & challenges they may present
 - v) Describe customer loyalty
 - vi) Examine barriers to quality Customer Service
2. Explain how to determine customers wants and needs
 - i) Identify customer needs
 - ii) Explain the difference between customer wants and needs
 - iii) Identify ways to ensure repeat business
3. Demonstrate an understanding of the importance of having a positive attitude
 - i) Identify & discuss the characteristics of a positive attitude
 - ii) Explain why it is important to have a positive attitude
 - iii) Explain how a positive attitude can improve a customer’s satisfaction
 - iv) Define perception and explain how perception can alter us and customers
 - v) Describe methods of dealing with perception
4. Communicating effectively with customers
 - i) Describe the main elements in the communication process
 - ii) Identify some barriers to effective communication
 - iii) Explain why body language is important

- iv) Define active listening and state why it is important
 - v) Identify and discuss the steps of the listening process
 - vi) Identify and discuss questioning techniques
5. Demonstrate using the telephone effectively
- i) Explain why telephone skills are important
 - ii) Describe the qualities of a professional telephone interaction
6. Demonstrate an understanding of the importance of asserting oneself
- i) Define assertiveness
 - ii) Discuss assertive techniques
 - iii) Explain the use of assertiveness when dealing with multiple customers
7. Demonstrate techniques for interacting with challenging customers in addressing complaints & resolving conflict
- i) Examine & discuss ways to control feelings
 - ii) Examine & discuss ways to interact with an upset customer
 - iii) Examine & discuss ways to resolve conflict/customer criticism
 - iv) Examine & discuss ways to prevent unnecessary conflict with customers

Practical:

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

SP-2330 QUALITY ASSURANCE/QUALITY CONTROL

Description:

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

Course Outcomes:

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

- develop the skills and knowledge required to apply quality assurance/quality control procedures as related to the trade
- develop an awareness of quality principles and processes
- apply quality assurance/quality control procedures in a shop project

Objectives & Content:

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 specifications and processes in applicable occupations.
4. Describe quality control procedures as applied to the acceptance and checking of raw materials.
5. Explain the role of communications in a quality environment.
6. Explain why it is important for all employees to understand the structure of the company and its production processes.
7. Explain how human resource effectiveness is maximized in a quality managed organization.
8. Explain the role of company policy in quality management.
9. Explain the purpose of codes and standards in various occupations.
10. Explain the concepts of quality
 - i) cost of quality
 - ii) measurement of quality
 - iii) elements of quality

- iv) elements of the quality audit
 - v) quality standards
 - vi) role expectations and responsibilities
11. Explain the structure of quality assurance and quality control
- i) Describe organizational charts
 - ii) Identify the elements of a quality assurance system such as ISO, CSA, WHMIS, Sanitation Safety Code (SSC)
 - iii) Explain the purpose of the quality assurance manual
 - iv) Describe quality assurance procedures
12. Examine quality assurance/quality control documentation
- i) Describe methods of recording reports in industry
 - ii) Describe procedures of traceability (manual and computer-based recording)
 - iii) Identify needs for quality control procedures

Practical:

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

MC-1050 INTRODUCTION TO COMPUTERS

Description:

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

Course Outcomes:

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

- computer systems and their operation.
- popular software packages, their applications
- security issues of Computers

Objectives & Content:

1. Identify the major components of microcomputer system hardware and software system.
2. Describe the functions of the microprocessor.
 - i) Describe and give examples of I/O DEVICES.
 - ii) Describe primary storage (RAM, ROM, Cache).
 - iii) Define bit, byte, code and the prefixes k.m. and g.
 - iv) Describe secondary storage (diskettes and hard disks, CD ROMS, Zip Drives etc).
 - v) Describe how to care for a computer and its accessories.
3. Describe microcomputer software
 - i) Define software.
 - ii) Describe types of operational and application software
 - iii) Define file and give the rules for filenames and file extensions.
4. Describe windows software
 - i) Start and quit a Program
 - ii) Demonstrate how to use the help function
 - iii) Locate a specific file using the **find** function
 - iv) Identify system settings: wall paper, screen saver, screen resolution, background
 - v) Start a program by using the Run Command
 - vi) Shutting down your computer
5. Identify File Management commands
 - i) Demonstrate how to view directory structure and folder content
 - ii) Organize files and folders
 - iii) Copy, delete, and move files and folders

- iv) Create folders
 - v) Maximize and minimize a window
 - vi) Describe windows task bar
6. Describe Keyboards
- i) Identify and locate alphabetic and numeric keys
 - ii) Identify and locate function key & special keys
7. Describe Word Processing
- i) Describe Windows components
 - ii) Menu bar
 - iii) Menu indicators
 - iv) Document window
 - v) The Status bar
 - vi) The Help feature
 - vii) Insertion point movements
8. Describe the procedure used to development of a document
- i) Enter text
 - ii) Change the display
9. Describe the procedure for opening, saving and exiting documents
- i) Saving a document
 - ii) Closing a document.
 - iii) Starting a new document Window
 - iv) Opening a document
 - v) Exiting word processor
10. Describe the procedure for editing a Document
- i) Adding new text
 - ii) Deleting text
 - iii) Using basic format enhancement (split and join paragraphs, insert text)
11. Describe the main Select Features
- i) Identify a selection
 - ii) Moving a selection
 - iii) Copying a selection
 - iv) Deleting a selection
 - v) Saving a selection
12. Explain how to change Layout Format
- i) Changing layout format: (margins, spacing, alignment, paragraph indent, tabs, line spacing, page numbering)
13. Explain how to change Text Attributes
- i) Changing text attributes: (bold, underline, font, etc.)

14. Describe the Auxiliary Tools
 - i) Using Spell Check & Thesaurus
15. Describe Print features
 - i) Selecting the Print Feature: (i.e; number of copies and current document)
 - ii) Identifying various options in print screen dialogue box
16. Examine & Discuss Electronic Spreadsheet
 - i) Spreadsheet Basics
 - ii) The Worksheet Window
17. Describe Menus
 - i) Menu Bar
 - ii) Control menu
 - iii) Shortcut menu
 - iv) Save, Retrieve form menus
18. Describe the components of a worksheet
 - i) Entering constant values and formulas
 - ii) Using the Recalculation feature
19. Describe Use ranges
 - i) Typing a range for a function
 - ii) Pointing to a range for a function
 - iii) Selecting a range for toolbar and menu commands
20. Describe how to print a worksheet
 - i) Printing to the Screen
 - ii) Printing to the Printer
 - iii) Printing a selected Range
21. Describe how to edit a worksheet
 - i) Replacing cell contents
 - ii) Inserting & deleting rows and columns
 - iii) Changing cell formats
 - iv) Changing cell alignments
 - v) Changing column width
 - vi) Copying and moving cells
22. State major security issues in using computers
 - i) Pass words
 - ii) Accessing accounts
 - iii) Viruses and how they can be avoided
 - iv) Identity theft and ways to protect personal information

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

24. Explain the Internet and its uses
 - i) The World Wide Web(www)
 - ii) Accessing Web sites
 - iii) Internet Web Browsers
 - iv) Internet Search Engines
 - v) Searching Techniques
 - vi) Posting documents on-line

Practical:

1. Create a document using Word Processing.
2. Complete word processing exercises to demonstrate proficiency in word processing
3. Prepare and send e-mails with attachments
4. Retrieve documents and e-mail attachments and print copies
5. Develop & print a spread sheet.
6. Post a document on-line

SD-1700

WORKPLACE SKILLS

Description:

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

Course Outcomes:

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

- Participate in meetings
- Define and discuss basic concepts of:
 - unions
 - workers' compensation
 - employment insurance
 - workers' rights
 - human rights
 - workplace diversity
 - gender sensitivity

Objectives & Content:

1. Meetings
 - i) Identify & discuss meeting format and preparation required for a meeting.
 - ii) Explain the purpose of an agenda.
 - iii) Explain the roles and responsibilities of meeting participants.
 - iv) Explain the purpose of motions and amendments and withdrawals.
 - v) Explain the procedure to delay discussion of motions.
 - vi) Explain the voting process.
2. Unions
 - i) State why unions exist.
 - ii) Give a concise description of the history of Canadian labour.
 - iii) Explain how unions function.
 - iv) Explain labour's structure.
 - v) Describe labour's social objectives.
 - vi) Describe the relationship between Canadian labour and the workers.
 - vii) Describe the involvement of women in unions.
3. Worker's Compensation
 - i) Describe the aims, objectives, benefits and regulations of the Workplace Health, safety and Compensation Commission.
 - ii) Explain the internal review process.

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

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

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

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

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

Practical:

1. Prepare an agenda.
2. Participate in a meeting.
3. Analyze a documented case of a human rights complaint with special emphasis on the application, time frame, documentation needed, and legal advice available.

SD-1710

JOB SEARCH TECHNIQUES

Description:

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

Course Outcomes:

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

- demonstrate effective use of Job Search Techniques

Objectives & Content:

1. Identify and examine employment trends and opportunities
2. Identify sources that can lead to employment
3. Access and review information on the Newfoundland and Labrador Apprenticeship and Certification Web site and the Apprenticeship Employment Gateway
4. Analyze job ads and discuss the importance of fitting qualifications to job requirements
5. Identify and discuss employability skills as outlined by the Conference Board of Canada.
6. Discuss the necessity of fully completing application forms.
7. Establish the aim/purpose of a resume
8. Explore characteristics of effective resumes, types of resumes, and principles of resume format .
9. Explore characteristics of an effective cover letter.
10. Identify commonly asked questions in an interview.
11. Explore other employment related correspondence.
12. Explore the job market to identify employability skills expected by an employer.
13. Conduct a self-analysis and compare with general employer expectations.
14. Discuss the value of establishing and maintaining a portfolio.

Practical:

1. Complete sample application forms.
2. Write a resume.
3. Write an effective cover letter.
4. Establish a portfolio.
5. Write out answers to commonly asked questions asked during interviews.
6. Identify three potential employers from the Apprenticeship Employment gateway, Apprenticeship & Certification web site.

SD-1720 ENTREPRENEURIAL AWARENESS

Description:

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

Course Outcomes:

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

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

Objectives & Content:

1. Explore Self-Employment: An Alternative to Employment
 - i) Identify the advantages and disadvantages of self-employment vs. regular employment
 - ii) Differentiate between an entrepreneur and a small business owner
 - iii) Evaluate present ideas about being in business
2. Identify and discuss various types of business ownership
 - i) Explore the Characteristic of Entrepreneurs
 - ii) Identify characteristics common to entrepreneurs
 - iii) Compare one's own personal characteristics with those of entrepreneurs.
 - iv) Examine one's present ideas about business people
3. Identify Business Opportunities
 - i) Distinguish between an opportunity and an idea.
 - ii) Examine existing traditional and innovative business ventures
 - iii) Identify and summarize the role of various agencies that support business development.
 - iv) Identify potential business opportunities.
4. Review the Entrepreneurial Process.
 - i) Explain the entrepreneurial process
 - ii) Describe the purpose of a business plan
 - iii) Identify & discuss the main elements of a business plan

Practical:

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

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