



PROVINCIAL PLAN OF TRAINING

FOR THE

PLUMBER

OCCUPATION

Document Status	Date Distributed	Mandatory Implementation Date	Comments
Original Version	May, 2006	September, 2006	

May, 2006

Preface

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

Acknowledgement

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

Apprenticeship Curriculum Standard Evaluation Form

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

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

Overall comments are to be entered on this evaluation form and specific changes are to be entered directly on the document in the relevant area(s). When making proposed corrections(s) in the curriculum standard, please use red ink. When all feedback has been recorded, return this evaluation form along with the curriculum standard to the Apprenticeship Office noted at the bottom of the page.

(PLEASE PRINT)

Trade: _____ Plumber _____

Full Name: _____

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

Company: _____

Address: _____

Telephone: _____

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

Return Evaluation Form and Curriculum Standard to:

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

Table of Contents

Preface.....	i
Acknowledgement.....	ii
Evaluation Form.....	iii
Conditions Governing Apprenticeship Training.....	1
Requirements for Red Seal Certification for Apprentices.....	7
Roles and Responsibilities of Stakeholders in the Apprenticeship Process.....	8
Program Outcomes.....	10
Program Structure.....	11
Program Content.....	14
*Basic Math.....	131
REQUIRED RELATED COURSES	
Workplace Communications.....	134
Customer Service.....	136
Quality Assurance/Quality Control.....	138
Introduction to Computers.....	140
Workplace Skills.....	144
Job Search Techniques.....	146
Entrepreneurial Awareness.....	148

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 7200 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 Plans work activities.
- Task 2 Uses and maintains hand and portable power tools and equipment.
- Task 3 Prepares piping for installation.
- Task 4 Installs support systems.
- Task 5 Tests piping, plumbing systems and equipment.
- Task 6 Supervises excavation and backfilling of trenches.
- Task 7 Protects piping systems and other plumbing equipment from damage
- Task 8 Installs fire stopping systems.
- Task 9 Acts as mentor to apprentices.
- Task 10 Installs site services.
- Task 11 Installs private sewage systems.
- Task 12 Prepares rough-in for buried interior drainage, waste and vent systems.
- Task 13 Installs rough-in for interior drainage, waste and vent systems above grades.
- Task 14 Installs water services.
- Task 15 Installs water distribution systems.
- Task 16 Installs water treatment equipment.
- Task 17 Installs plumbing fixtures and appliances.
- Task 18 Installs hydronic heating/cooling piping systems.
- Task 19 Installs hydronic heating/cooling generating equipment.
- Task 20 Installs hydronic heating/cooling transfer units.
- Task 21 Installs hydronic heating/cooling system controls.
- Task 22 Installs natural and liquefied petroleum gas (LPG) systems.
- Task 23 Installs medical gas systems.
- Task 24 Installs cross connection control.
- Task 25 Installs petroleum systems.
- Task 26 Installs other specialty systems.
- Task 27 Selects pumps.
- Task 28 Installs pumps.
- Task 29 Maintains plumbing-related systems and components.
- Task 30 Repairs plumbing-related systems and components.

Program Structure

The courses listed below are required technical training in the Plumber 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	14
TS-1520		WHMIS	6	None	17
TS-1530		First Aid	14	None	20
PF-1340	PIP-200	Tools and Equipment	75	None	21
PF-1350	PIP-205	Blueprint 1 (Basic Residential)	30	None	24
PF-1360	PIP-210	Blueprint 2 (Advanced Residential/Light Commercial)	30	PF-1360	27
PF-1370	PIP-220	Rigging	39	None	31
PF-1380	PIP-225	Introduction to Fuel Brazing and Cutting	45	PF-1340	34
PF-1390	PIP-230	Pipe and Tubing Fundamentals	15	PF-1340	37
PF-1400	PIP-235	Steel Piping	90	PF-1340	39
PF-1410	PIP-240	Copper Piping	45	PF-1340	43
PF-1420	PIP-245	Plastic Piping	45	PF-1340	46
PF-1430	PIP-250	Brass Piping	15	PF-1340	48
PF-1440	PIP-260	Piping Valves	30	None	50
PF-1450	PIP-265	Hydronic Heating 1	60	PF-1340	52
PF-1610	PLG-400	Cast Iron Piping	18	PF-1340	56
PF-1620	PLG-455	Non-Metallic Piping	6	PF-1340	58
PF-1630	PLG-460	Water Service	6	PF-1340	59
PF-1640	PLG-465	Hot and Cold Water Supply	30	PF-1340	62
PF-1650	PLG-470	Hot Water Storage Tanks and Heaters	18	PF-1340	64
PF-1660	PLG-475	Water Treatment Systems	6	PF-1340	66
PF-1670	PLG-480	Residential Sanitary Drainage	60	PF-1340	68
PF-1680	PLG-485	Residential Venting	45	PF-1340; PF-1670	72

Entry Level Courses					
NL Course No.	Atlantic Course No.	Course Name	Hours	Pre-Requisites	Page No.
PF-1690	PLG-490	Storm Systems	15	PF-1340; PF-1680	74
PF-1700	PLG-495	Commercial Drainage, Waste and Venting 1	21	PF-1340; PF-1690	76
PF-1710	PLG-510	Residential Appliances, Fixtures and Trim	30	PF-1340; PF-1350; PF-1360; PF-1630; PF-1640; PF-1650; PF-1660; PF-1680	78
PF-1720	PLG-525	Rural Waste Disposal	15	PF-1340	81
PF-1730		Introduction to Electric Welding	30	PF-1340	84
*MA-1060		Basic Math	60	None	131
CM-2150		Workplace Communications	45	None	134
MR-1220		Customer Service	30	None	136
SP-2330		Quality Assurance/Quality Control	30	None	138
MC-1050		Introduction to Computers	30	None	140
SD-1700		Workplace Skills	30	None	144
SD-1710		Job Search Techniques	15	None	146
SD-1720		Entrepreneurial Awareness	15	None	148
Total Hours			1100		

REQUIRED WORK EXPERIENCE

Block 2					
NL Course No.	Atlantic Course No.	Course Name	Hours	Pre-Requisites	Page No.
PF-2100	PIP – 215	Blueprint 3 (Heavy Commercial/Industrial)	30	PF-1350; PF-1360	85
PF-2110	PIP – 255	Aluminum Piping	9	PF-1340	89
PF-2120	PIP – 270	Hydronic Heating 2	60	PF-1340; PF-1450	90
PF-2130	PIP – 280	Introduction to Electricity	15	None	92
PF-2150	PIP – 285	Introduction to Gas Piping 1 (Low Pressure)	30	None	94
PF-2160	PIP – 295	Standpipe Systems	12	PF-1340	96
PF-2170	PIP – 300	Medical Gas Systems	21	None	97
PF-2250	PLG – 405	Fire Protection Systems	6	PF-1340	99

Block 2					
NL Course No.	Atlantic Course No.	Course Name	Hours	Pre-Requisites	Page No.
PF-2260	PLG – 415	Residential Sprinkler Systems	6	PF-1340	100
PF-2270	PLG – 500	Commercial Drainage, Waste and Venting 2	21	PF-1340	101
PF-2280	PLG – 515	Commercial Appliances, Fixtures and Trim	30	PF-1340; PF-1350; PF-1360; PF-1630; PF-1640; PF-1650; PF-1660; PF-1680	103
Total Hours			240		

REQUIRED WORK EXPERIENCE

Block 3					
NL Course No.	Atlantic Course No.	Course Name	Hours	Pre-Requisites	Page No.
PF-2310	PIP – 275	Cross Connection Control Devices	45	PF-1340; PF-1390; PF-1400; PF-1410; PF-1420; PF-1430; PF-1610; PF-1620; PF2110	105
PF-2320	PIP – 290	Introduction to Gas Piping 2 (High Pressure)	30	None	107
PF-2510	PLG – 425	Compressed Air and Vacuum Systems	21	PF-1340	109
PF-2520	PLG – 430	Chilled Water Systems	12	None	111
PF-2530	PLG – 435	Solar Heating Systems	6	None	112
PF-2540	PLG – 440	Rural Water Supply	45	PF-1340	113
PF-2550	PLG – 445	Historic Piping	6	PF-1390; PF-1400; PF-1410; PF-1420; PF-1430; PF-1610; PF-1620; PF-2110	120
PF-2560	PLG – 450	Food Processing Systems	6	PF-1340	121
PF-2570	PLG – 505	Commercial Drainage, Waste and Venting III	33	PF-1700; PF-2270	123
PF-2580	PLG – 520	Industrial/Commercial Appliances, Fixtures and Trim	18	PF-1340; PF-1350; PF-1360; PF-1680	126
PF-2590	PLG – 530	Lawn Sprinkler Systems	6	PF-1340	128
PF-2600	PLG – 535	Swimming Pool Systems	12	PF-1340	129
Total Hours			240		

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

TS-1510 OCCUPATIONAL HEALTH AND SAFETY

Description:

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

Course Outcomes:

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

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

Theory:

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

PF-1340

TOOLS AND EQUIPMENT

Outcomes:

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

- demonstrate knowledge of the care and safe use of tools and equipment.

Objectives and Content:

1. Describe general safety requirements for using tools.
 - i) guarding, shielding when using tools
 - ii) body positioning
 - iii) pinch points
2. Describe the properties of metals used in hand and power tools.
 - i) tool steels for wrenches
 - ii) tool steels for saws and blades
3. Explain terminology associated with metals used in hand and power tools.
 - i) oxidation
 - ii) corrosion
 - iii) tensile strength
 - iv) shear strength
4. Identify types measuring tools and describe their purpose, applications, safe use and care.
 - i) tapes, rules, scale rules, straight edges
 - ii) calipers, micrometers, gauges
 - iii) plumb bobs, squares and levels
 - iv) torque wrench
 - v) scribes, markers, dividers and compasses
5. Identify types of hand tools and describe their purpose, applications, safe use and care.
 - i) punches, chisels, files and saws
 - ii) twist drills and drill bits
 - iii) hacksaws
 - iv) files
 - v) chisels
 - vi) hammers
 - vii) pliers
 - viii) pipe wrenches
6. Identify types of cutting, drilling and reaming tools and describe their applications and procedures for use.
 - i) snips and shears

- ii) drills and reamers
 - iii) bolt cutters
7. Identify types of threading devices and describe their purpose, applications, safe use and care.
- i) threading tools
 - ii) internal thread
 - iii) external thread
 - iv) tap and drill charts
 - v) bolt and pipe threads
8. Identify types of power tools and describe their purpose, applications, safe use and care.
- i) portable power tools
 - ii) threading machines
 - iii) reaming tools
 - iv) core drill
9. Identify types of grinding tools and describe their purpose, applications, safe use and care.
- i) portable and stationary grinders
 - ii) grinding and cutting wheels
 - iii) grinding discs
 - iv) grinder dressers
 - v) rotary wire brushes
 - vi) specialty flapper wheels
 - vii) rotary files
10. Identify types of drills and their accessories and describe their purpose, applications, safe use and care.
- i) sizes and speed requirements
 - ii) power drilling equipment (hammer and portable drill)
 - iii) cutting fluids
 - iv) clamping devices
 - v) drill presses
 - vi) portable drills
 - vii) hot tap
11. Identify the tools used to cut metals and describe the procedures for their use.
- i) saws
 - power operated saws
 - friction cut-off equipment
 - shears
 - ii) metal cutting power tools
 - iii) abrasives and blades

12. Identify shop equipment and hydraulic tools and describe their purpose, applications, safe use and care.
 - i) jacks
 - ii) shop cranes
 - iii) chain hoists
 - iv) solvent cleaning tanks
 - v) pullers, drivers and presses
 - vi) hydraulic benders
 - vii) pipe positioners

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 and maintain gripping and turning tools, measuring devices and levels
2. Use and maintain various types of hand tools
3. Use and maintain various types of power tools
4. Use and maintain various types of threading devices
5. use and maintain various types of grinding tools
6. Use and maintain various types of power operated cutting tools
7. Use and maintain various types of shop equipment

PF-1350 BLUEPRINT 1 (BASIC RESIDENTIAL)

Outcomes:

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

- interpret piping drawings in orthographic and isometric views for residential dwellings.
- complete single line sketches from drawings and blueprints.
- convert orthographic piping drawings to isometric drawings.
- convert isometric piping drawings to orthographic drawings.
- apply compass and elevations to pipe drawings.
- produce simple orthographic sketches.

Objectives and Content:

FUNDAMENTALS OF BLUEPRINT READING

1. Describe types of drawings and sketches and their significance and use in the piping trades.
 - i) orthographic drawings (series of drawings make plan)
 - ii) isometric sketches
 - iii) single line sketches
2. Explain the importance of and procedures for proper care and handling of drawings.
 - i) plastic
 - ii) tape edges
 - iii) notes/changes
 - iv) filing/rolling
 - v) storage
3. Explain visualization and its' associated views.
 - i) vertical up/down
 - ii) horizontal side/side
 - iii) plan view
 - iv) elevation view
 - v) front, rear, left, right views

ARCHITECTURAL DRAWING SYMBOLS

4. Identify and interpret the common lines found on a residential blueprint.
 - i) center line
 - ii) hidden line
 - iii) cutting plane line
 - iv) break line
 - v) dimension line

- vi) extension line
 - vii) object line
 - viii) leader line
5. Identify and interpret basic architectural symbols.
- i) earth
 - ii) concrete
 - iii) block
 - iv) metal
 - v) structural steel
 - vi) wood
 - vii) gyproc over wood
 - viii) insulation
 - ix) windows, doors
6. Explain the terms “scale” and “dimension” and their use and location on drawings.
7. Identify and interpret the components of a sketch or drawing.
- i) title block
 - ii) name
 - iii) address
 - iv) date
 - v) materials
 - vi) system
 - vii) view
 - viii) measurements
 - ix) orientation
 - x) north
 - xi) elevation orientation
 - xii) legibility
 - xiii) revisions

SKETCHES AND SYMBOLS

8. Identify basic plumbing symbols.
- i) water closet
 - ii) lavatory
 - iii) bathtub
 - iv) shower
 - v) kitchen sink
 - vi) laundry tub
 - vii) hot water tank
 - viii) water meter

9. Identify basic piping system symbols.
 - i) piping
 - ii) fittings
 - iii) valves
 - iv) pumps
 - v) drains (roof and floor)

10. Identify single line sketch symbols.
 - i) fittings
 - ii) facing viewer
 - iii) facing away
 - iv) horizontal
 - v) changes in direction
 - vi) valves, unions, reducers

11. Identify and interpret isometric drawings.
 - i) vertical lines
 - ii) angles relating to horizontal
 - iii) 45 degree angle
 - iv) floor penetrations

12. Identify and interpret roughing-in dimensions for residential piping fixtures.
 - i) manufactures literature
 - ii) rough-in books
 - iii) building codes
 - iv) barrier free 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. Interpret and sketch basic drawings and diagrams

PF-1360 BLUEPRINT 2 (ADVANCED RESIDENTIAL/LIGHT COMMERCIAL)

Outcomes:

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

- interpret piping drawings in both orthographic and isometric views for advanced residential/commercial buildings.
- complete single line sketches from advanced residential/commercial drawings and blueprints.
- convert orthographic piping drawings to isometric drawings.
- convert isometric piping drawings to orthographic drawings.
- apply compass and elevations to advanced residential/commercial pipe drawings.
- perform orthographic sketches for advanced residential/commercial installations.
- interpret architectural drawings for advanced residential/commercial installations.

Objectives and Content:

ARCHITECTURAL DRAWINGS AND SYMBOLS

1. Describe divisions, their content, relationship and numbering systems.
 - i) architectural
 - ii) mechanical
 - iii) electrical

2. Describe plans, their content and use in job planning.
 - i) plot (site)
 - ii) foundation
 - iii) floor plans
 - basement
 - first floor
 - second (subuent) floor plans
 - iv) exterior elevations
 - v) sections, details
 - vi) reflected ceiling drawings
 - vii) room finish schedules

3. Identify steps required in job planning.
 - i) job requirements
 - ii) work schedule
 - iii) access to work location
 - iv) worksite inspection
 - v) equipment and piping
 - vi) materials list

4. Identify features found on architectural drawings and describe their use.
 - i) grid lines
 - ii) exploded views
 - iii) sections
 - iv) details
 - v) finish schedule
 - vi) page references
 - vii) elevations
 - viii) architectural symbols

5. Explain the procedures used to determine accurate dimensions from a drawing, their purpose and importance.
 - i) how measurements are indicated (engineer vs. architect)
 - ii) start and finish
 - iii) wall locations
 - iv) pipe penetrations
 - v) use of scaling

6. Describe the purpose and importance of specifications.

SKETCHES AND SYMBOLS

7. Identify plumbing symbols and interpret rough-in dimensions found on a set of commercial drawings.
 - i) wall hung toilet
 - ii) wall hung lavatory
 - iii) wall hung urinal
 - iv) janitors sink
 - v) triple compartment sink
 - vi) drinking fountain
 - vii) grease interceptor
 - viii) bidets

8. Identify commercial piping system symbols and explain their importance and use.
 - i) piping
 - ii) building sewer
 - iii) building drain
 - iv) soil and waste stacks
 - v) fixture drains and branches
 - vi) venting
 - vii) domestic hot and cold
 - viii) re-circulation lines
 - ix) storm building drains and sewers
 - x) compressed air
 - xi) trap priming
 - xii) fittings

- elbows
- wye's
- tees
- cleanouts
- reducers
- unions
- flanges
- xiii) valves
 - ball
 - check
 - gate
 - globe
 - backwater
 - pressure reducing
 - trap primer
- xiv) hangers and supports
- xv) heating
 - piping
 - heating water supply
 - water return
 - anchors
 - guides
- xvi) heating equipment
 - boilers
 - oil tanks
 - radiation
 - exchangers
 - expansion tanks
 - thermometers
 - pressure gauges
 - auto air vents
 - flex connections/loops
- xvii) heating valves
 - circuit setters
 - flow control
 - pressure relief
 - control
 - 3-way

9. Identify basic welding symbols and explain their use.

10. Identify and interpret interference drawings.

- i) mechanical
- ii) electrical
- iii) architectural
- iv) structural

11. Identify and interpret rough-in dimensions for commercial piping fixtures.
 - i) manufactures literature
 - ii) rough-in books
 - iii) building codes
 - iv) barrier free requirements
 - v) fixture carriers

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. Read and interpret architectural, mechanical and electrical drawings
2. Determine, sketch and apply dimensioning
3. Read and interpret specifications
4. Complete a material take-offs

PF-1370

RIGGING

Outcomes:

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

- identify the limitations of equipment used for rigging.
- demonstrate knowledge of safe operating procedures for slings, cables and cranes.
- select rigging and lifting equipment using rigging charts and manuals as well as rule of thumb methods.

Objectives and Content:

1. Identify the Occupational Health and Safety Regulations for rigging.
2. Describe responsibilities and liabilities in the use of rigging, lifting and hoisting equipment.
3. Identify types of fibre ropes and describe their care, inspection and related safety procedures.
 - i) types
 - natural fibre,
 - synthetic fibre
 - ii) considerations for selection and use
4. Describe kinds of knots, hitches and bends and their applications.
5. Explain angle considerations when using rigging.
 - i) rigging charts
 - ii) rule of thumb formulas
 - iii) compensation for angles in lifting of loads
6. Identify types of wire rope and accessories and describe their care, inspection and safety considerations for use.
 - i) construction
 - ii) clips and attachments
 - iii) slings and end rigging
 - iv) measurement
 - v) clamps and rigging
 - vi) splicing
 - vii) shackles and turnbuckles
7. Describe synthetic sling types, their characteristics, applications and limitations.
 - i) polyethylene slings
 - ii) polyester slings
 - iii) nylon slings

- iv) mylar
 - v) kevlar
8. Describe chains and chain slings, their characteristics, applications and limitations.
 9. Identify types of scaffolds and describe their characteristics and applications.
 - i) tube and clamp
 - ii) manufactured platforms and scaffolding
 - iii) suspended scaffolding
 10. List safety rules for erecting and working on scaffolding.
 - i) kickplates
 - ii) braces
 - iii) ties
 - iv) planking
 - v) permits
 - vi) tagging
 11. Describe special problems of rolling and suspended scaffolding and safety guidelines for their use.
 12. Identify types of ladders and describe their applications and safety factors to be considered.
 13. Describe procedures prior to and during the movement of objects with rigging equipment.
 14. Identify jacks and describe their applications and procedures for use.
 15. Identify methods of communications.
 - i) hand signals
 - ii) two-way radios
 16. Identify types of cranes used in rigging.
 - i) mobile
 - ii) boom truck
 - iii) overhead

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. Assemble knots, bends and hitches
2. Use various types of slings and related equipment
3. Erect scaffolding and use as work platforms
4. Use various types of ladders

PF-1380 INTRODUCTION TO FUEL BRAZING AND CUTTING

Outcomes:

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

- use fuel cutting and brazing equipment.

Objectives and Content:

SAFETY AND EQUIPMENT

1. Identify types of heating/cutting equipment and describe their applications and procedures for use.
 - i) air-propane equipment
 - ii) air-acetylene system
 - iii) oxy-acetylene system
 - iv) oxy-propane
 - v) accessories and related equipment
 - vi) lighting and adjusting operations
 - vii) shut down

2. Describe the possible hazards of using heating/cutting equipment and procedures.
 - i) burns
 - ii) fires
 - iii) explosions
 - iv) injuries
 - v) fumes

3. Describe safety practices for use in brazing and cutting operations.
 - i) clothing
 - ii) location
 - iii) protective equipment
 - iv) work permits

4. Describe heating/cutting equipment and accessories, their components, purpose and characteristics.
 - i) cylinders
 - ii) gas
 - iii) regulators
 - iv) flashback arrestor
 - v) gauges
 - vi) hoses and connections
 - clamps
 - y-connecters
 - coupler-T

- vii) fibre washers
 - viii) equipment wrench
 - ix) torches
 - x) mixer
 - xi) tips
 - xii) cutting attachment
5. Describe the use and care of oxygen cylinders.
- i) characteristics of oxygen
 - ii) cylinder components and capacity
 - iii) storage and safety considerations
 - individual cylinder
 - bulk packs
6. Describe the use and care of acetylene and propane cylinders.
- i) characteristics of acetylene and propane
 - ii) cylinder components and capacity
 - iii) storage and safety considerations
 - individual cylinder
 - bulk packs
7. Describe the types of cylinder trucks and lifting cages.
8. Describe the procedures for assembling, testing, lighting and shutting down heating/cutting equipment.

BRAZING

9. Describe the principles of the brazing process and the differences between welding and brazing.
10. Describe fluxes, their applications and procedures for use.
- i) soldering, brazing fluxes
 - ii) components and classifications of brazing fluxes
11. Describe the brazing process as applied to various metals.
12. Describe the flame adjustment for brazing various materials.
13. Describe the considerations, preparation, process and precautions used to produce various types of joints.
- i) face feed brazed joints
 - ii) pre-inserted ring joints

CUTTING

14. List metals that can be cut using oxy-fuel equipment.
15. Describe the various styles and designs of standard cutting torches.
16. Describe the various cutting tips, their care and maintenance.
 - i) sizes, styles and indexing
 - ii) accessories and tip cleaners
17. Describe the various types of cutting flames and procedures used for flame adjustment.
 - i) oxidizing
 - ii) carburizing
 - iii) neutral
18. Describe cutting procedures.
 - i) free hand
 - ii) straight edge
19. Describe common cutting faults, their causes and remedies.

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, test, use and shut down heating/cutting equipment.
2. Perform various types of cuts
3. Perform various brazing processes

PF-1390 PIPE AND TUBING FUNDAMENTALS

Outcomes:

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

- demonstrate knowledge of the types of piping systems and their characteristics.
- demonstrate knowledge of the materials used in the construction and installation of pipe and piping systems.

Objectives and Content:

1. Identify the types of piping and tubing systems.
 - i) potable/non-potable water supply
 - ii) sanitary drainage, waste and vent systems
 - iii) storm drainage systems
 - iv) heating systems
 - v) sprinkler systems
 - vi) gas systems (fuel, medical)
 - vii) process and power generating systems
2. Identify pipe and tubing sizes.
 - i) dimensions
 - ii) lengths
 - iii) wall thickness/schedule
3. Describe the terms ferrous and non-ferrous and their significance to the trade.
4. Describe the forces that act on piping systems.
 - i) thermal expansion and contraction
 - ii) weight
 - iii) electrolysis
 - iv) friction loss
 - v) turbulence
 - vi) galvanic action
5. Describe the types of sealants used in the trade and their applications.
 - i) thread compounds
 - ii) gaskets
 - iii) packing
 - iv) cements/glue

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. No Practical.

PF-1400

STEEL PIPING

Outcomes:

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

- select materials.
- demonstrate knowledge of steel pipe and fittings and their assembly.
- carry out work in compliance with codes, standards and manufacturer's literature.

Objectives and Content:

1. List the properties and applications of steel pipe and fittings.
2. Identify ferrous piping systems.
 - i) heating systems
 - ii) cooling systems
 - iii) drainage, waste and vent systems
 - iv) compressed air systems
 - v) fuel oil/gas systems
 - vi) steam, humidification systems
 - vii) industrial, marine, food processing
3. List the types of ferrous piping, their characteristics and applications.
 - i) steel
 - ii) galvanized
 - iii) stainless
 - iv) cast iron
4. List the information required to select and order steel pipe.
 - i) material (steel, galvanized, stainless)
 - ii) size (diameter, length, standard lengths)
 - iii) schedule (wall thickness, grade)
 - iv) characteristics (welded, seamless)
 - v) end finishes (plain end, thread, grooved, beveled)
5. Identify the tools and methods used for cutting steel, galvanized and stainless steel pipe.
 - i) pipe cutters, reamers
 - ii) cut-off saw
 - iii) oxy-acetylene pipe beveller
 - iv) plasma arc cutter
 - v) angle grinder
 - vi) carbon arc cutter

6. Identify the methods of joining steel, galvanized and stainless steel pipe and describe their associated procedures.
 - i) threading and grooving
 - ii) welding
 - iii) flanging
 - iv) press-fit

7. Identify the tools used to prepare and assemble steel, galvanized and stainless steel pipe and describe procedures for their use.
 - i) hand and power threaders
 - ii) hand and power roll groovers
 - iii) cut groovers
 - iv) welding and cutting equipment
 - oxy/acetylene
 - electric
 - mig/tig
 - v) press-fit crimper
 - vi) vice, wrenches
 - vii) beveller

8. Identify fittings used to assemble steel, galvanized and stainless steel pipe and describe their characteristics and applications.
 - i) terminology
 - ii) types
 - iii) parts
 - iv) abbreviations

9. Identify and describe the tools and procedures used to hang and support steel pipe and fittings.
 - i) code
 - ii) specifications
 - iii) grade
 - iv) components
 - v) fire stopping systems

10. Describe an angle and its parts.
 - i) vertex
 - ii) degrees
 - iii) letters

11. Describe a circle and its parts.
 - i) centre
 - ii) circumference
 - iii) diameter
 - iv) radius
 - v) cord

- vi) arc
 - vii) concentric and eccentric circle
12. Describe pipe measurement terms and their use.
- i) end to end
 - ii) end to centre
 - iii) centre to centre
 - iv) back to back
 - v) centre to back
 - vi) centre to throat
 - vii) face to face
 - viii) overall
13. Calculate the perimeter and areas of:
- i) squares
 - ii) rectangles
 - iii) triangles
 - iv) circles
14. Calculate the volume of:
- i) cubes
 - ii) rectangular prisms and cylinders
15. Explain the Metric and Imperial systems and its use in the building trades.
- i) length
 - ii) area
 - iii) volume
 - iv) temperature
 - v) pressure
 - vi) mass
16. Calculate piping measurements.
- i) run and branch
 - ii) fitting allowance
 - center
 - face
 - back
 - throat
17. Calculate piping measurements with various degree fittings.
- i) diagonal
 - ii) offset
 - iii) travel
 - iv) rise and run
 - v) factors

18. Perform piping calculations using:
 - i) grade
 - ii) drop
 - iii) rise and run

19. Identify and describe methods of pipe bending
 - i) calculations
 - ii) bend locations
 - iii) determine gain
 - iv) determine length of bend
 - v) determine angle

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. Measure, cut and prepare various types of ferrous pipe.

2. Assemble various types of ferrous pipe by the following methods:
 - thread
 - groove
 - bevel
 - flange
 - press-fit
 - tack-weld
 - mechanical

3. Bend steel pipe using hydraulic benders.

PF-1410

COPPER PIPING

Outcomes:

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

- select materials.
- demonstrate knowledge of non-ferrous pipe/tubing and its assembly.
- carry out work in compliance with codes, standards and manufacturer's literature.

Objectives and Content:

1. Describe the properties and applications of copper pipe and fittings, and describe the methods and colors used to identify the following associated systems:
 - i) underground water service
 - ii) domestic hot and cold water systems
 - iii) drainage, waste and vent systems
 - iv) hot water heating systems
 - v) medical gas systems
 - vi) refrigeration systems
 - vii) compressed air

2. Identify the systems and criteria used in referencing, selecting and ordering copper tube and tubing.
 - i) size
 - ii) I.D./O.D. dimension standards
 - iii) length
 - iv) type
 - heating (H)
 - K
 - L
 - M
 - Drainage, waste and vent (DWV)
 - Medical Gas
 - Air conditioning and refrigeration (ACR)
 - Gas (G)
 - General purpose (GP)
 - v) color coding (white, green, blue, red, yellow)

3. Describe the tools and procedures used to cut and prepare copper pipe.
 - i) tube cutter
 - ii) reamer
 - iii) cut off saw
 - iv) chop saw
 - v) hacksaw

4. Describe the tools and procedures used to join copper pipe.
 - i) solder/braze
 - ii) compression
 - iii) grooved
 - iv) swaged
 - v) flared
 - vi) T-drill
 - vii) press fit
 - viii) crimped
5. Describe the tools and procedures used for soldering, bending and annealing copper pipe and fittings.
6. Identify fittings used for joining copper pipe and describe their characteristics and applications.
 - i) terminology
 - ii) types
 - iii) parts
 - iv) acronyms and abbreviations
7. Identify and describe the tools and procedures used to hang, support and fasten copper pipe and fittings.
 - i) codes
 - ii) specifications
 - iii) grade
 - iv) components
 - v) fire stopping systems
8. Describe the procedures used to calculate fitting allowances.
 - i) tees
 - ii) elbows
 - iii) 45 degrees

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. Measure, cut and prepare various types of copper pipe.
2. Assemble various types of copper pipe and tubing by the following methods:
 - solder
 - braze
 - compression

- swaged
 - t-drill
 - press-fit
 - grooved
 - flaring
3. Bend copper tubing using tube benders.

PF-1420

PLASTIC PIPING

Outcomes:

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

- select materials.
- demonstrate knowledge of plastic pipe and fittings and their assembly.
- carry out work in compliance with codes, standards and manufacturer's literature.

Objectives and Content:

1. Identify types of plastics and describe their characteristics and applications.
 - i) thermoplastics
 - ii) thermosetting plastics

2. Identify the types of plastic piping, their properties and applications.
 - i) ABS (Acrylonitrile-Butadiene-Styrene)
 - ii) CPVC (Chlorinated Polyvinyl Chloride)
 - iii) PE (Polyethylene)
 - iv) PP (Polypropylene)
 - v) PVC (Polyvinyl Chloride)
 - vi) PEX (Cross-linked Polyethylene)
 - with/without oxygen barrier
 - vii) PTFE (Teflon)
 - viii) PEX/Aluminum/PEX

3. Describe the labelling system used to identify plastic pipe and fittings.

4. Identify tools used to cut and prepare plastic pipe and describe the procedures for their use.
 - i) tube cutter
 - ii) file
 - iii) chop saw
 - iv) hacksaw
 - v) handsaw
 - vi) tube coiler
 - vii) deburring tool

5. Identify methods used to join plastic pipe and describe their associated procedures.
 - i) solvent weld
 - ii) fusion weld
 - iii) plastic welding
 - iv) thread
 - v) compression
 - vi) flare

- vii) mechanical joint
 - viii) insert
 - ix) crimp
6. Identify types of fittings used for joining the various types of plastic pipe and describe their characteristics and applications.
- i) terminology
 - ii) types
 - iii) parts
 - iv) acronyms and abbreviations
7. Identify and describe the tools and procedures used to hang, support and fasten plastic pipe and fittings.
- i) codes
 - ii) specifications
 - iii) grade
 - iv) components
 - v) fire stopping systems
8. Describe the procedures used to calculate fitting allowances.
- i) tees
 - ii) elbows
 - iii) 45 degrees

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. Measure, cut and prepare various types of plastic pipe.
2. Assemble various types of plastic pipe by the following methods:
 - solvent weld
 - fusion weld
 - thread
 - compression
 - mechanical joint
 - insert
 - crimp

PF-1430

BRASS PIPING

Outcomes:

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

- select materials.
- demonstrate knowledge of brass pipe and fittings and its assembly.
- carry out work in compliance with codes, standards and manufacturer's literature.

Objectives and Content:

1. Identify brass pipe and fittings and describe their properties and applications.
2. Identify types and sizes of brass pipe and describe its characteristics and applications.
3. Describe methods used to cut and prepare brass pipe and their associated procedures.
 - i) pipe cutters
 - ii) reamers
 - iii) cut-off saw
 - iv) hacksaw
4. Describe the methods used to thread brass pipe and describe their associated procedures.
5. Identify the types of fittings used for joining brass pipe and describe their characteristics and applications.
 - i) terminology
 - ii) types
 - iii) parts
 - iv) acronyms and abbreviations
6. Identify and describe the tools and procedures used to hang, support and fasten brass pipe and fittings.
 - i) codes
 - ii) specifications
 - iii) grade
 - iv) components
 - v) fire stopping systems
7. Describe the procedures used to calculate fitting allowances.
 - i) tees
 - ii) elbows
 - iii) 45 degrees

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. Measure, cut and prepare various types of brass pipe.
2. Assemble various types of brass pipe by the following methods:
 - treading
 - brazing

PF-1440

PIPING VALVES

Outcomes:

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

- demonstrate knowledge of piping valves and their installation.

Objectives and Content:

1. Describe the materials and service ratings for valves.
2. Explain valve terminology.
3. Identify the principle types of valves and describe their purpose, design, components, operation and applications.
 - i) gate
 - ii) globe
 - iii) ball/plug
 - iv) butterfly (gear or lever)
 - v) check
 - vi) temperature / pressure relief
 - vii) pressure reducing
 - viii) float operated
 - ix) diaphragm
 - x) mixing
4. Describe procedures used to install valves.
 - i) position
 - ii) location
 - iii) accessibility
 - iv) joining methods
5. Describe the types, construction and operation of control valves.
 - i) two-way
 - ii) three-way
 - iii) actuated
6. Describe the care and maintenance of valves.
 - i) disassembly/reassembly
 - ii) replacement of parts
 - iii) re-packing
 - iv) tools

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 maintain and repair various types of valves.

PF-1450

HYDRONIC HEATING 1

Outcomes:

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

- demonstrate knowledge of the operation of hot water boilers and heating systems, their component parts and control systems.

Objectives and Content:

1. Define terminology associated with hydronic heating.
2. Identify types of heating systems, their components and operation
 - i) one pipe
 - ii) directional flow (monoflo)
 - iii) series loop
 - iv) two pipe
 - v) direct
 - vi) reverse return
 - vii) primary loop
 - viii) secondary circuit
 - ix) gravity systems

BOILER AND COMPONENTS

3. Describe boiler components and their purpose.
 - i) burner
 - ii) wiring
 - iii) tridicator
 - iv) aquastat
 - v) relief valve
 - vi) boiler water feed valve
 - vii) boiler fittings
 - viii) boiler drain
 - ix) tank fittings and valves
 - x) airtrol system
 - xi) air venting
 - xii) backflow prevention device
4. Describe expansion tanks and air control devices and procedures for their installation.
 - i) air control
 - automatic
 - manual
 - ii) tanks
 - diaphragm

– compression

5. Describe the procedures used to remove air from hydronic systems.
6. Describe circulating pumps, their components and operation.
 - i) circulating pumps
 - ii) low head pumps
7. Describe equipment used for erecting boilers.
 - i) dog and clamps
 - ii) tie rods
 - iii) corrugated expansion washers
 - iv) rigging equipment
8. Describe the construction of modern package boilers.
 - i) components
 - ii) section assemblies
 - iii) top clean out openings
 - iv) integral flue gas collector and smoke collar
 - v) tank-less water heaters
9. Describe procedures used to install packaged boilers.
 - i) general erection instructions
 - ii) boiler foundations
 - iii) codes and regulations

PIPING

10. Describe zone valves, their purpose and operation.
 - i) electric motor
 - ii) orifice seat sizes
 - iii) end switch
 - iv) thermostats
 - v) three-way valves
11. Describe piping arrangements used with heating systems.
 - i) piping layout and system components
 - ii) piping systems
 - iii) types and rating of heat distributing units
12. Describe the factors that affect pipe sizing and piping arrangement.
 - i) equivalent direct radiation
 - ii) piping systems
 - iii) changes in pipe size
 - iv) heat loss calculations

13. Describe zone control systems, their types, characteristics and operation.
14. Describe thermostats, their characteristics and controls.
 - i) differential
 - ii) adjustment
 - iii) sensitivity
 - iv) classification
 - v) installation procedures
15. Describe feedwater treatment systems.
 - i) chemicals used in boiler feedwater
16. Identify and interpret codes and regulations pertaining to the installation of piping systems.

HEAT TRANSFER

17. Describe methods of heat transfer.
 - i) radiation
 - ii) conduction
 - iii) convection
18. Identify types of heat transfer equipment and describe their characteristics, piping arrangements and installation procedures.
 - i) heating units
 - ii) radiators
 - iii) baseboard heating
 - iv) wall fin
 - v) convectors
 - vi) pipe coils
 - vii) unit heaters horizontal and vertical unit heaters

RADIANT FLOOR HEATING

19. Describe the principles and operating characteristics of radiant floor heating.
20. Describe types of tubing used for radiant in-floor hydronic systems.
 - i) polymer piping materials
 - ii) PEX tubing
 - iii) rubber-based tubing
 - iv) steel
 - v) copper
21. Identify types of mixing components and describe their operation and applications.
 - i) three-port valves

- ii) four-port valves
 - iii) thermostatic valves
 - iv) motorized-actuated valves
 - v) injection pump
22. Describe slab-on-grade in-floor heating, preparation and installation procedures.
- i) tie spacing
 - ii) wire mesh
 - iii) plastic tracks
 - iv) spacing tubing
 - v) tubing depth
 - vi) insulation
 - vii) installation procedure
 - viii) floor preparation
23. Identify requirements for manifold stations and tubing installations.
- i) mark out on plan
 - ii) studded wall cavities
 - iii) use of template block
 - iv) centers on block
 - v) plastic bed supports
 - vi) label circuits
 - vii) pressure test
 - viii) control joints

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 hydronic heating boiler and trim.
2. Install maintain and repair various types of hydronic heating systems.
 - mono flow
 - series loop
 - direct return
 - reverse return
 - primary loop
 - secondary circuit
 - in-floor

PF-1610

CAST IRON PIPING

Outcomes:

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

- select materials.
- demonstrate knowledge of cast iron pipe and fittings and their assembly.
- carry out work in compliance with codes and standards.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Describe the properties and applications of cast iron pipe and fittings.
 - i) drainage
 - ii) waste
 - iii) vent
 - iv) potable water
3. Identify the systems and criteria used in referencing, selecting and ordering cast iron and duriron soil pipe.
 - i) diameter
 - ii) length
 - iii) end finishes
4. List the information required to select and order cast iron water pipe.
 - i) material (ductile)
 - ii) diameter
 - iii) length
 - iv) schedule - wall thickness, schedule or grade
 - v) end finishes - plain end, cut grooved
5. Explain the tools and procedures used to cut cast iron soil pipe.
 - i) snap cutters
 - ii) cut off saw
 - iii) chop saw
 - iv) hacksaw
 - v) hammer/chisel
6. Describe the tools and procedures used to cut ductile and duriron pipe.
 - i) cut off saw
 - ii) chop saw
 - iii) hydraulic pipe cutters
7. Describe the tools used to join cast iron soil pipe, ductile and duriron pipe.
 - i) bi-seal puller

- ii) torque and hand wrenches
8. Explain the methods of joining cast iron soil pipe, ductile and duriron pipe.
- i) caulked joint
 - ii) mechanical joint
 - iii) bi-seal
9. Identify the fittings used for joining cast iron soil pipe, ductile and duriron pipe and describe their characteristics and applications.
- i) terminology
 - ii) types
 - iii) parts
 - iv) acronyms and abbreviations
10. Identify and describe the tools and procedures used to hang, support, and fasten cast iron pipe and fittings.
- i) plumbing codes
 - ii) specifications
 - iii) grade
 - iv) components
 - v) fire stopping systems

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. Measure, cut, and install cast iron pipe.
- mechanical joint
 - bi-seal
 - cold caulking

PF-1620

NON-METALLIC PIPING

Outcomes:

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

- select non-metallic piping materials.
- demonstrate knowledge of non-metallic piping and fittings and their assembly.
- carry out work in compliance with codes and standards.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Identify types of non-metallic piping and describe their properties and applications.
 - i) glass
 - ii) concrete
3. Explain the tools and methods used to cut and join glass pipe.
4. Identify the types of fittings used for joining glass pipe and describe their characteristics and applications.
 - i) terminology
 - ii) types
 - iii) parts
 - iv) abbreviations and acronyms
5. Describe the methods and tools used to hang, support, and fasten glass pipe and fittings.
 - i) specifications
 - ii) grade
 - iii) components
 - iv) firestopping systems
6. Identify the applications of concrete pipe and codes references.

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. No Practical.

PF-1630

WATER SERVICE

Outcomes:

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

- demonstrate understanding of how water supply equipment functions.
- install piping systems for potable and non-potable water supplies.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Describe the procedures used to determine elevations and grades for water supply piping.
3. Describe the procedures used to lay out and shore trenches.
4. Describe the procedures used to make connections to curb stops.
 - i) service pipe
 - ii) main valves and water meters
5. Identify and interpret the National Plumbing Code sections that apply to the fabrication, application and testing of water service pipe.
6. Describe the procedures used to install water services to buildings.
 - i) purpose
 - ii) equipment and materials
 - iii) installation
 - iv) safety
 - v) plumbing requirements
7. Describe water service component parts and their applications.
 - i) water main
 - ii) corporation stop or cock
 - iii) curb stop
 - iv) meters
 - v) meter yoke
 - vi) by-pass
 - vii) strainers
 - viii) flow meters
 - ix) check valves
 - x) back flow preventers
8. Identify types of water meters and describe their purpose and operation.
 - i) types
 - ii) positive displacement

- iii) turbine
 - iv) location
9. Identify and interpret code regulations pertaining to the installation of water meters.
10. Describe the procedures used to install water supply for outbuildings.
- i) pumping system components
 - ii) tasks and uence
 - iii) piping practices
11. Describe gravity water supply systems.
- i) classes
 - ii) with or without pump
 - iii) installation
12. Identify and interpret code regulations pertaining to the selection and installation of water pipes.
13. Describe the procedures used to determine water piping requirements and procedures.
- i) drawings
 - ii) specifications
 - iii) manufacturer's literature
14. Interpret plumbing code requirements and define the requirements for support of piping.
15. Describe the procedures used to install supports.
- i) elevations and grades
 - ii) trenches
 - iii) anchors, tie rods and thrust blocks
16. Describe the procedures used for supporting, anchoring, and rodding cold water pipe.
- i) pipe protection
 - freezing
 - settling
 - blowouts
 - ii) blocking and rodding
 - iii) changes of direction
 - iv) backfilling
17. Describe the procedures used to install anchors, tie rods, thrust blocks and supports for water service.

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, flush and test a corporation stop, curb stop, service box, and stop and drain valve.

PF-1640 HOT AND COLD WATER SUPPLY

Outcomes:

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

- demonstrate understanding of procedures used to rough-in and install hot and cold water systems.
- install piping systems for potable and non-potable water supplies.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Explain the term “roughing-in”.
 - i) considerations
 - ii) importance of code
3. Describe procedures used to lay out the locations of fixtures and piping.
4. Describe procedures used to rough-in and install hot and cold water piping.
 - i) valves
 - ii) shock absorbers
 - iii) air chambers
 - iv) recirculating lines and pumps
 - v) connections to hot water storage tanks
 - vi) piping fabrication and testing
5. Describe the procedures used to layout and install water supply lines.
 - i) water distribution system
 - ii) typical installation
 - iii) definitions
 - iv) expansion of hot water lines
 - v) installation methods and procedures
 - vi) considerations
 - vii) types of pipes and fittings
 - viii) types of solder
 - ix) location and types of valves (access panels)
 - x) purpose and types of insulation
 - xi) location and size of sleeving
 - xii) pressure reducing valves
 - xiii) booster pumps
 - xiv) trap primers (cross connections)
 - xv) hangers
 - xvi) frost protection

6. Describe the purpose and installation of recirculating lines.
 - i) gravity circulation
 - ii) forced circulation
 - iii) piping arrangements
 - iv) circulating pumps
7. Describe the procedures used to install supports.
 - i) considerations
 - ii) materials
 - iii) code information
 - iv) types of hangers and supports
8. Describe the procedures used to install hose bibs and non-freeze hydrants.
9. Explain the term water hammer, its causes, problems and methods of controlling in a residential application.
 - i) air chambers
 - ii) water hammer arrestors
10. Describe procedures used for testing installations.
11. Describe the procedures used to size water supply systems.

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. Size, install, test and maintain a potable hot and cold water distribution system with each of the following materials.
 - pex
 - copper
 - pex –al-pex
 - pe-al-pe
 - cpvc

PF-1650 HOT WATER STORAGE TANKS AND HEATERS

Outcomes:

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

- demonstrate knowledge of how hot water heaters function.
- install domestic hot water heaters and storage tanks.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Identify and interpret drawings, specifications and manufacturer's literature.
3. Describe the procedures used to install storage tanks and heaters.
 - i) related piping
 - ii) safety valves and controls
 - iii) dip tubes in hot water storage tanks
4. Describe the procedures used to connect heat exchanger coils to storage tanks.
5. Describe safety regulations and precautions for the installation of storage tanks and heaters.
6. Identify and interpret National Plumbing Code sections which apply to the application, installation and testing of hot water storage tanks and heaters.
7. Describe common sources of heat for tanks.
 - i) oil
 - ii) gas
 - iii) electric
8. Describe domestic hot water heating equipment, their components and operation.
 - i) electrolysis
 - ii) dip tube
 - iii) magnesium rod
 - iv) insulation
 - v) sizing
 - vi) piping
 - vii) source of heat
 - viii) direct heat
 - ix) indirect heat
 - x) controls and safety devices
 - xi) pressure relief valves
 - xii) temperature relief valves

- xiii) combined pressure/temperature relief valve
 - xiv) aquastats and thermostats
9. Describe the procedures used to perform various hot water tank installations.
- i) direct heating
 - ii) indirect heating
 - iii) water volume expansion
 - iv) considerations
10. Describe the procedures used to plan and carry out installation of water heaters.
- i) selecting location
 - ii) installing water pipes and shut off valve
 - iii) installing relief valves
 - iv) filling
 - v) wiring (electrician)
 - vi) vacuum relief
11. Identify tests required for hot water heaters and describe their associated procedures.
- i) electric
 - ii) mineral
 - iii) bacteria
12. Describe the procedures used to estimate materials.

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 and test a domestic hot water heater.

PF-1660

WATER TREATMENT SYSTEMS

Outcomes:

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

- demonstrate knowledge of how water treatment systems function.
- install domestic water treatment equipment and component parts.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Identify and interpret drawings, specifications, manufacturer's literature and regulatory guidelines.
3. Describe testing procedures used to determine treatment required.
4. Describe the procedures used to size water treatment equipment.
5. Describe the procedures used to install water treatment equipment and component parts.
6. Describe potential dangers of and methods of preventing cross connection.
7. Describe water problems, their causes and effects.
 - i) hardness
 - ii) minerals
 - iii) contamination
 - iv) acid
 - v) taste and odor
8. Describe the devices used to correct water problems, their types and characteristics.
 - i) filters
 - ii) softeners
 - iii) conditioners
 - iv) purifiers
9. Describe the procedures and safety considerations used to treat water contamination.
 - i) ultraviolet

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. No Practical.

PF-1670 RESIDENTIAL SANITARY DRAINAGE

Outcomes:

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

- size building sewers and sanitary drainage systems.
- install basic domestic drainage systems.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. State the purpose and theory of drainage and venting systems.
 - i) health and sanitation
 - ii) liquids and water-borne waste
 - iii) circulation of air within plumbing system
 - iv) siphoning and back pressure
3. Identify types of building sewers, describe their characteristics and the methods and piping used in connection.
 - i) sanitary
 - ii) storm
 - iii) combined
4. Explain the methods of sizing the building sewer.
 - i) interpret code requirements
 - ii) determine hydraulic load (fixture units)
 - iii) determine grade
5. Describe the procedures for installing piping and services in trenches.
 - i) safety factors
 - ii) tools/equipment
 - iii) support
 - iv) protection
6. Describe the purpose of grading pipes.
 - i) waste
 - ii) vent
 - iii) heating
7. Describe the methods of calculating grade and percent of grade.
 - i) fall
 - ii) grade/percent of grade
 - iii) run

8. Describe the tools used for grading pipes.
 - i) level
 - ii) builders level/transit
 - iii) laser
 - iv) tape measure
9. Describe the procedures used to perform measurements and determine elevations on vertical pipe.
10. Define common terminology associated with residential drainage and waste systems.
11. Describe the components of a residential plumbing drainage system.
 - i) building drain
 - ii) branch
 - iii) stack
 - iv) fixture
 - v) fixture drain
 - vi) trap arm
 - vii) fixture outlet pipe
 - viii) clean-out
 - ix) floor drain
12. Describe the sequencing of procedures used to rough-in a complete residential plumbing drainage system.
 - i) review drawings and specifications
 - ii) sizing, material list take off
 - iii) scheduling and planning
 - iv) excavation, cutting holes, installation, testing, inspection
13. Define the terms fixture unit and hydraulic load.
14. Identify types of common residential plumbing fixtures.
15. Describe the relationship of plumbing fixtures to the sizing of drainage and vent systems.
 - i) outlet size
 - ii) volume/capacity
 - iii) waste and water connections
16. Describe the angles of branches and bends in a drainage or venting system.
 - i) wye
 - ii) sanitary tee
 - iii) elbow/bend

17. Explain the methods of sizing the building drain.
 - i) interpret plumbing code requirements
 - ii) determine hydraulic load (fixture units)
 - iii) determine grade

18. Describe the procedures used to install the building drain.
 - i) location of fixtures/services
 - ii) material lists
 - iii) excavation
 - iv) installation/support
 - v) protection/identification
 - vi) testing and inspection

18. Describe the procedures used to size the soil or waste stack.
 - i) interpret plumbing code requirements
 - ii) determine hydraulic load (fixture units)

19. Describe the procedures used to install the soil or waste stack.
 - i) location of fixtures/services
 - ii) material lists
 - iii) interference
 - iv) locate and cut openings
 - v) installation/support
 - vi) testing and inspection

20. Describe procedures used to size fixture drains and branches.
 - i) interpret plumbing code requirements
 - ii) determine hydraulic load (fixture units)

21. Describe the methods of locating services and cutting/modifying structural members to rough-in plumbing systems.

22. Identify types of cleanouts and describe their purpose and applications.
 - i) type
 - ii) size
 - iii) location/accessibility
 - iv) interpret plumbing code requirements

23. Identify traps, trap seals, floor drains and describe their purpose and applications.
 - i) size
 - ii) type
 - iii) trap primers
 - iv) interpret plumbing code requirements

24. Describe the methods used in locating floor drains and cleanouts in slabs to achieve finished elevations.
25. Describe trap seal loss and how to prevent it.
 - i) siphonage
 - ii) back pressure
 - iii) capillary attraction
 - iv) interpret plumbing code requirements
26. Identify code requirements for and explain the acceptable methods of testing drainage systems.
 - i) underground drainage systems
 - ii) above ground drainage, waste and vent systems
 - iii) fixtures
27. Describe the methods of providing back flow protection for drainage systems.
 - i) back water valve
 - ii) plug
 - iii) gate valve
28. Describe the procedures used to perform material list take-off from plans.
29. Interpret plumbing code requirements and define the requirements for non-metallic pipe fittings.
30. Interpret plumbing code requirements and define the requirements for ferrous pipe and fittings.
31. Interpret plumbing code requirements and define the requirements for non-ferrous pipe and fittings.
32. Interpret plumbing code requirements and define the requirements for joints and connections.

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. Size, install, test, maintain and repair a soil and waste residential drainage system (upstream of the building sewer).

PF-1680

RESIDENTIAL VENTING

Outcomes:

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

- plan residential venting systems.
- install basic venting systems in compliance with codes and regulations.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Define common terminology associated with residential venting systems.
3. Describe the possible elements of a residential plumbing venting system.
 - i) stack vent
 - ii) individual vent
 - iii) dual vent
 - iv) branch vent
 - v) header
 - vi) continuous vent
 - vii) wet vent (four fixtures or less)
4. Describe the procedures for installing the various residential vent systems.
 - i) material lists
 - ii) interference
 - iii) locate and cut openings
 - iv) installation/support
 - v) protection
 - vi) testing and inspection
5. Explain the methods of sizing a stack vent.
 - i) interpret plumbing code requirements
 - ii) determine hydraulic load (fixture units)
 - iii) determine developed length
6. Describe various types of individual vents, their characteristics and applications.
7. Explain the methods of sizing an individual vent.
 - i) interpret plumbing code requirements
 - ii) determine largest trap served
8. Explain the methods of sizing a dual vent.
 - i) interpret plumbing code requirements
 - ii) determine largest trap served

9. Explain the methods of sizing a branch vent.
 - i) hydraulic load (fixture units)
 - ii) developed length

10. Explain the methods of sizing a header.
 - i) interpret plumbing code requirements
 - ii) determine hydraulic load (fixture units)
 - iii) determine developed length

11. Explain the methods of sizing a continuous vent.
 - iii) interpret plumbing code requirements
 - iv) determine size of trap
 - v) determine hydraulic load (fixture units)
 - vi) determine developed length

12. Explain the methods of sizing wet vents (four fixtures or less).
 - vii) interpret plumbing code requirements
 - viii) determine fixture type/trap sizes
 - ix) determine hydraulic load (fixture units)
 - x) number of storeys
 - xi) offset length

13. Describe vent terminals, their purpose and operating principles.
 - i) interpret plumbing code requirements
 - ii) frost protection
 - iii) flashing
 - iv) installation methods

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. Size, install, test, maintain and repair a residential venting system.

PF-1690

STORM SYSTEMS

Outcomes:

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

- size building storm drains and storm drainage systems.
- install building storm drains and storm drainage systems.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Describe the purpose, properties and theories of storm drain systems and combined systems.
3. Explain common terminology associated with storm drainage systems.
4. Describe the components of a commercial storm drainage system:
 - i) storm building sewer and storm building drain
 - ii) combined building sewer and storm building drain
 - iii) combined sewer
 - iv) sub-soil drains
 - v) roof drains
5. Describe the procedures used to determine the hydraulic load from roofs or paved surfaces and explain rainfall intensities.
6. Identify and interpret plumbing code requirements for storm drain systems.
7. Explain the procedures of sizing the storm building drain or sewer or combined building sewer.
 - i) interpret plumbing code requirements
 - ii) determine hydraulic load
 - iii) determine grade
8. Explain the procedures of sizing rain water leaders.
 - i) interpret plumbing code requirements
 - ii) circular/non-circular
 - iii) determine hydraulic load
9. Describe the procedures for installing rain water leaders.
 - i) piping materials
 - ii) interference
 - iii) hangers and support
 - iv) protection and identification
 - v) testing and inspection

10. Explain the methods of sizing roof gutters.
 - i) interpret plumbing code requirements
 - ii) determine hydraulic load
 - iii) determine grade
 - iv) determine area of gutter

11. Describe the following roof drain terminology:
 - i) drain body
 - ii) receiver
 - iii) dome
 - iv) extension
 - v) clamping ring
 - vi) gasket
 - vii) deck clamp

12. Describe the procedures used to locate and install roof and area drains.
 - i) determine low point
 - ii) layout
 - iii) cut and sleeve openings
 - iv) installation
 - v) secure/protection
 - vi) connection to piping

13. Describe the methods of protecting rain water leaders from the following:
 - i) sweating
 - ii) frost/freezing
 - iii) expansion
 - iv) thrust

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. No Practical.

PF-1700 COMMERCIAL DRAINAGE, WASTE AND VENTING I

Outcomes:

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

- size commercial drainage systems.
- install drainage systems for commercial applications according to codes and regulations.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Identify and interpret the National Plumbing Code sections which apply to the fabrication, application and testing of interceptors.
3. Describe the tools, methods and procedures used to size and install a building sewer for a commercial complex.
 - i) tools used for grading pipes
 - ii) plumbing code requirements
 - iii) installing piping and services in trenches
4. Describe the procedures used to determine elevations and grades.
5. Describe the procedures used to size grease interceptors.
6. Describe the procedures used to lay out and install grease interceptors.
7. Describe the maintenance and cleaning of interceptors.
8. Describe the purpose, planning and installation of cleanouts and manholes in a commercial complex.
 - i) types, identification
 - ii) locations/spacing
 - iii) access and accessibility
 - iv) plumbing code requirements
9. Describe the types of traps used in plumbing systems, their purpose, components and applications.
10. Describe the various methods and systems of maintaining trap seals.
 - i) trap seal primers
 - ii) indirectly connected fixtures
 - iii) manual replenishment

11. Describe the various types of trap seal primers.
 - i) single and multiple distribution units
 - ii) electronic systems
 - iii) flush tanks
 - iv) individual fixtures

12. Explain floor drain terminology.
 - i) drain body
 - ii) receiver
 - iii) grate/strainer
 - iv) flashing collar/gasket
 - v) leveling screws
 - vi) primer connection
 - vii) floor sink
 - viii) flushing drain

13. Describe the procedures used to locate and install floor drains.
 - i) determine low point
 - ii) layout
 - iii) cut/sleeve openings
 - iv) installation/secure/protection
 - v) connection to piping

14. Explain the procedures for installing drains and vents for dishwashers and garbage grinders.

15. Describe the uencing and procedures used to rough-in a complete commercial plumbing drainage system.
 - i) review drawings and specifications
 - ii) sizing
 - iii) material list take off
 - iv) scheduling and planning
 - v) excavation, coring/sleeving
 - vi) installation, 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. No Practical.

PF-1710 RESIDENTIAL APPLIANCES, FIXTURES AND TRIM

Outcomes:

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

- select and install plumbing fixtures, appliances and trim for a variety of residential applications.

Objectives and Content:

COMMON BATHROOM FIXTURES AND TRIM

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Describe common fixtures, their manufacturer and characteristics.
 - i) importance of completing the job well
 - ii) common fixtures
 - iii) receiving and handling of fixtures
 - iv) use of manufacturers' instructions
3. Describe the procedures used to install common bath and shower trim and/or accessories.
 - i) bath and shower
 - ii) water supply and drainage connections
 - iii) bath and shower trim
 - iv) shower heads
4. Describe the procedures used to install common types of lavatories.
 - i) wall hung lavatory
 - ii) water supply and drainage connections
 - iii) lavatory on concealed supports
 - iv) counter top lavatory
 - v) lavatory fittings, trim and accessories
5. Describe the procedures used to install common types of water closets, bowls, trim and accessories including water supply and drainage connections.
6. Describe the procedures used to install shower stalls including water supply and drainage connections.
7. Describe the procedures used to install bidet and parts including water supply and drainage connections.
8. Identify and interpret the National Plumbing Code Sections which apply to the installation and testing of common bathroom fixtures and trim.

KITCHEN SINKS AND ACCESSORIES

9. Identify and interpret sources of information and instructions.
 - i) drawings
 - ii) specifications
 - iii) manufacturer's literature
10. Describe the types of sinks, their trim and accessories.
11. Describe procedures used for installation of kitchen sinks.
 - i) installation
 - ii) drain connection
12. Describe the procedures used for installation of a garbage grinder or garburator.
 - i) installation
 - ii) drain connection
 - iii) electrical connections (safety)
13. Describe the procedures used for installation of dishwashers.
14. Describe the procedures used for installation of hot water dispensers.
15. Identify and interpret the National Plumbing Code Sections that apply to the installation and testing of kitchen sinks and accessories.

WASHING MACHINES AND LAUNDRY TRAYS

16. Identify and interpret sources of information for installation.
 - i) drawings
 - ii) specifications
 - iii) manufacturer's literature
17. Describe the types of laundry trays and accessories, their characteristics and applications.
18. Describe the procedures used to install washing machines.
 - i) procedures
 - ii) cross connections prevention
 - iii) water supply connections
 - iv) waste connections
 - v) check operating cycle
19. Identify and interpret the National Plumbing Code sections that apply to the installation and testing of laundry trays and washing machines.

PLUMBING ACCESSORIES

20. Describe the types of plumbing accessories, their characteristics and applications.
 - i) grab bars
 - ii) soap dispenser
 - iii) paper towel dispenser
 - iv) toilet paper holder
 - v) towel shelves
 - vi) towel pins
 - vii) single and double hooks
 - viii) soap holders and dishes
 - ix) paraplegic equipment
 - x) shower curtain rods
 - xi) shower doors
21. Describe procedures used to install the various types of plumbing accessories.
22. Identify and interpret the National Building Code sections which apply to the requirements and installation of plumbing 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. Install and test residential plumbing appliances, accessories, fixtures and trim.

PF-1720

RURAL WASTE DISPOSAL

Outcomes:

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

- demonstrate knowledge of the sizing, planning and installation of rural waste disposal systems.

Objectives and Content:

SEPTIC TANKS AND DISPOSAL FIELDS

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Describe the location of a septic tank.
 - i) house
 - ii) well
 - iii) property lines
3. Describe the design features of a septic tank.
 - i) size
 - ii) materials liquid capacity
 - iii) measurements
 - iv) manholes
 - v) covers
 - vi) tank extensions
 - vii) tees
 - viii) baffles
 - ix) drop through tank
4. Describe the procedures used to install a septic tank.
 - i) building drain height
 - ii) depth in ground
 - iii) set tank level
 - iv) tank test
 - v) correct in and outlet
 - vi) tank covering
5. Describe the purpose and operation of a septic tank scum.
6. Describe the purpose and operation of a syphon or a lift pump in the septic tank.
7. Describe the purpose and components of an on-site sewage system.
 - i) tank
 - ii) pipe
 - iii) gravel

- iv) soil
8. Describe the elements of site evaluation.
- i) lot size and dimensions
 - ii) lot topography
 - iii) water table
 - iv) bedrock
 - v) minimum distances
9. Describe the textural properties of soils and their significance to rural waste disposal.
10. Describe the operation for disposal field soils.
- i) aerobic bacteria
 - ii) anaerobic bacteria
 - iii) maximum loading rates
 - iv) soil permeability
11. Describe the types of materials used for disposal fields and the procedures used for installation.
- i) pipe
 - ii) fittings
 - iii) grades
 - iv) gravel
 - v) geotextile
 - vi) sand
 - vii) imported fill
12. Describe a leaching chamber disposal system, its design and applications.
13. Describe some of the dangers of unregulated sewage and liquid-borne waste.
- i) danger to health
 - ii) transmission of communicable diseases
 - iii) danger to wells and water sources
 - iv) danger to aquatic and animal life

INSPECTION, MAINTENANCE & REGULATIONS

14. Explain the inspection points:
- i) pre-inspection
 - ii) final inspection
15. Describe the care and maintenance of septic tanks and disposal systems.

16. Describe the purpose and content of provincial regulations respecting on-site sewage disposal systems.
- i) definitions
 - ii) permits
 - iii) lot category
 - iv) clearances
 - v) manufacture of septic tank or other disposal system appurtenances
 - vi) licensing of installers
 - vii) licensing of septic tank cleaners
 - viii) percolation test procedure

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. No Practical.

PF-1730 INTRODUCTION TO ELECTRIC WELDING

Outcomes:

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

- demonstrate knowledge of electrically operated welding and cutting equipment and associated safety procedures.

Objectives and Content:

1. Explain the terminology associated with electric welding methods.
2. Describe types of welding and their applications.
 - i) SMAW
3. Explain the safe handling requirements used when handling shielding gas cylinders.
 - i) transportation
 - ii) storage
4. Describe electric welding equipment, its operating principles and components.
 - i) AC/DC rectifiers
5. Describe the basic classifications and applications of electrodes.
6. Describe procedures used to prepare for electric welding operations.
 - i) electrode selection
 - ii) current
 - iii) polarity settings
 - iv) special applications
7. Describe the safety procedures required in electric welding processes.
8. Explain stress relief of piping materials.
 - i) methods used to normalize materials after welding

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
2. Weld basic joint configurations using various electrodes.

PF-2100 BLUEPRINT 3 (HEAVY COMMERCIAL/INDUSTRIAL)

Outcomes:

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

- interpret industrial piping drawings in both orthographic and isometric and sketch views.
- interpret architectural drawings and specifications for commercial/industrial installations.
- complete single line sketches from commercial/industrial drawings and blueprints.
- convert orthographic commercial/industrial pipe drawings to isometrics pipe drawings.
- apply compass and elevations to commercial/industrial pipe drawings.
- compile as-built, design built and shop drawings.
- demonstrate understanding of system identification procedures.
- determine measurements and elevations using a builders level.
- compile materials lists from sketches.

Objectives and Content:

1. Identify the types of plans and describe their purpose and use for commercial/industrial projects.
 - i) plot (site)
 - ii) foundation
 - iii) floor plans
 - iv) elevations
 - v) sections
 - vi) details
 - vii) reflected ceiling drawings
 - viii) room finish schedules
 - ix) revisions
2. Describe the features contained in commercial/industrial drawings, their importance and use.
 - i) grid lines
 - ii) exploded views
 - iii) sections
 - iv) details
 - v) finish schedules
 - vi) page references
 - vii) elevations
 - viii) architectural symbols
3. Describe the uencing and procedures used to plan materials for hangers, sleeves, and fixture carriers.

- i) floor/slab construction
 - ii) wall construction
 - iii) structural supports
4. Identify and explain industrial mechanical, architectural and electrical symbols and abbreviations.
5. Identify and explain specifications.
 - i) breakdown of divisions
 - ii) trade responsibilities
6. Identify the use of computer aided drafting in the piping trades.
7. Identify and interpret the various piping related symbols found in a set of commercial or institutional drawings.
 - i) fixtures/piping/valve
 - ii) equipment
8. Identify and interpret the various heating related symbols found in a set of commercial or institutional drawings.
 - i) heating and cooling systems
 - ii) heating equipment
 - iii) heating valves
 - iv) fuel oil systems
 - v) fuel gas systems
9. Identify piping related systems from drawings.
 - i) kitchen equipment
 - ii) medical gas
 - iii) compressed air
10. Identify systems and their components found on institutional/commercial drawings.
 - i) mechanical
 - ii) electrical
 - iii) fire protection
 - iv) control systems
11. Describe the purpose and applications of the following information systems.
 - i) as-built/engineered drawings
 - ii) shop drawings
12. Explain the significance of providing system identification.
 - i) colour coding
 - ii) pipe identification
 - iii) valve tags, tabs, charts

- iv) equipment identification
13. Explain the procedures used to compile material lists from drawings.

BUILDER'S LEVEL/TRANSIT/LASER LEVEL

14. Identify the parts of a builder's level/transit/laser level and describe their purpose.
- i) telescope
 - ii) level bubbles
 - iii) leveling screws
 - iv) eye piece
 - v) focusing
 - vi) locking screws
 - vii) protective lens
15. Identify the extension rod and describe its purpose and procedures for use.
- i) height of rod
 - ii) holding the rod
 - iii) markings on rod
 - iv) readings on rod
16. Explain leveling terms.
- i) line of sight
 - ii) instrument location
 - iii) station
 - iv) bench mark
 - v) height of instrument
 - vi) back sight
 - vii) fore sight
 - viii) turning point
17. Describe the procedures used to determine measurements and elevations using a builder's level.
18. Describe the procedures used to lay out pipe lines and grades with a builder's level.
- i) turn angle
 - ii) name station
 - iii) locate and number stations

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. Read and interpret architectural, mechanical, electrical, as-built, and shop drawings
2. Determine, sketch and apply dimensioning
3. Read and interpret specifications
4. Complete a material take-offs
5. Use builders level

PF-2110

ALUMINUM PIPING

Outcomes:

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

- demonstrate knowledge of aluminum pipe and tubing.

Objectives and Content:

1. Describe the properties and applications of aluminum pipe and tubing.

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. No Practical.

PF-2120

HYDRONIC HEATING 2

Outcomes:

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

- demonstrate knowledge of the operation of commercial heating systems, their associated piping and control systems.
- demonstrate knowledge of the operation and controls of multi-zone hydronic heating systems.

Objectives and Content:

1. Identify and interpret hydronic heating schematic symbols.
2. Define the following terms:
 - i) cross connection
 - ii) back flow prevention
3. Identify types of devices used for protection of cross connection control and describe their applications.
4. Describe the operation and applications of thermostats.
 - i) line voltage
 - ii) low voltage
 - iii) automatic set back
 - iv) multiple fuel supply applications
5. Describe the operation and specify the use of hot water control systems.
6. Describe the operation and specify the use of primary controls.
7. Explain the operation of outdoor temperature sensors.
8. Describe the operation and applications of heat exchanger vacuum valves.
9. Describe the operation and applications of flow-control-control valves.
10. Describe the operation and applications of motorized valves.
11. Identify types of safety controls and describe their operation and applications.
 - i) low water cutoff and fusible plugs
 - ii) feeder cutoff combinations
 - iii) high and low water alarms
 - iv) pressure controls
 - v) gauge glass
 - vi) boiler trim

- vii) drain and blow-down valves, pigtails and steam gauges

HEAT TRANSFER SYSTEMS

- 12. Describe the purpose, parts and operating principles of heat pumps.
- 13. Describe the procedures used to install heat pumps.
- 14. Describe the components and operation of the various types of solar heating systems.

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 and test hydronic heating boiler and trim.
- 2. Install, test, maintain and repair various types of hydronic heating systems.
 - mono flow
 - series loop
 - direct return
 - reverse return
 - primary loop
 - secondary circuit
 - in-floor

PF-2130 INTRODUCTION TO ELECTRICITY

Outcomes:

Upon successful completion of this unit, the apprentice will be able to
– demonstrate knowledge of electrical principles.

Objectives and Content:

1. Explain Ohm's Law and associated formulae.
2. Explain electrical terminology.
 - i) voltage
 - ii) current
 - iii) ampere
 - iv) resistance
 - v) ohm
3. Describe what is meant by resistance and the factors affecting it.
4. Describe the characteristics of conductors and insulators and their applications.
5. Describe direct current.
6. Describe the trade related applications of direct current.
7. Describe alternating current.
8. Define terms related to alternating current.
 - i) cycle
 - ii) hertz
 - iii) electrical characteristics
9. Describe electrical circuits, their components and operation.
10. Describe the characteristics of electric circuits.
 - i) series
 - ii) parallel
 - iii) series-parallel
11. Describe the causes of excessive current.
12. Describe overload protection circuits.
13. Interpret abbreviations, formula symbols and circuit symbols found in circuit diagrams.

14. Identify and interpret nameplate data from electric circuits.
15. Describe the procedures used to troubleshoot electric motors.
16. Explain electrolysis.
17. Describe the detrimental effect of electrolysis on piping.
 - i) dissimilar piping
 - ii) incompatible pipe hanger
 - iii) underground installations of liquid and gas lines
18. Read and interpret basic electrical schematics.

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. No Practical.

PF-2150 INTRODUCTION TO GAS PIPING I (LOW PRESSURE)

Outcomes:

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

- demonstrate knowledge of the combustion process.
- demonstrate knowledge of gas piping installation according to code.

Objectives and Content:

1. Identify and interpret regulations governing:
 - i) natural gas and propane systems.
 - ii) transportation and storage of gas cylinders.

2. Describe the properties and characteristics of natural gas.
 - i) odor, color and taste
 - ii) state
 - iii) composition
 - iv) toxicity
 - v) specific gravity
 - vi) flame type
 - vii) excess air
 - viii) air composition
 - ix) heating value
 - x) flame temperature and speed
 - xi) limits of flammability
 - xii) ignition temperature
 - xiii) combustion process

3. Define terminology relating to gas piping.
 - i) gas main
 - ii) gas service
 - iii) shut-off valves
 - iv) branch line
 - v) riser
 - vi) drop line
 - vii) dirt pocket
 - viii) piping extension
 - ix) concealed piping
 - x) flexible connector

4. Describe safe gas piping practices and procedures.
 - i) gas code
 - ii) materials
 - iii) pipe coating

- iv) reaming
 - v) threading
 - vi) bushings
 - vii) brazing
 - viii) joint compounds
 - ix) gasket material
 - x) grades
 - xi) supports
 - xii) prohibited practices
 - xiii) limitations at certain locations
 - xiv) outlets
 - xv) concealed piping
 - xvi) pipe identification
5. Describe the procedures used to test a gas line.
- i) before appliance is connected
 - ii) purging a gas line
6. Describe the factors that determine the correct pipe sizing for gas systems 2 PSI or lower installations.
- i) length of pipe
 - ii) allowable pressure loss
 - iii) system capacity
 - iv) specific gravity of gas

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 and test a low pressure gas piping system.

PF-2160

STANDPIPE SYSTEMS

Outcomes:

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

- demonstrate knowledge of standpipe systems and their installation.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Identify and interpret sources of information pertaining to installation of standpipe systems.
 - i) drawings
 - ii) specifications
 - iii) manufacturer's literature
3. Identify and interpret applicable codes for fabrication and installation of standpipe systems.

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. No Practical.

PF-2170

MEDICAL GAS SYSTEMS

Outcomes:

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

- demonstrate knowledge of medical gas systems.

Objectives and Content:

1. Identify and interpret sources of information pertaining to installation of medical gas systems.
 - i) drawings
 - ii) specifications
 - iii) manufacturers literature
 - iv) codes
2. Describe medical gas systems, their components, materials and operation.
3. Describe materials and procedures required to join piping for medical gas systems.
 - i) degreasing
 - ii) purging
4. Describe oxygen supply systems, their components and installation.
 - i) piping and fittings
 - ii) jointing methods
 - iii) wall outlets
 - iv) valves
 - v) testing
5. Describe vacuum systems, their components and installation.
 - i) vacuum pumps and receivers
 - ii) piping and fittings
 - iii) wall outlets
 - iv) valves
 - v) testing
6. Describe anesthetic gas systems, their components and installation.
 - i) piping and fittings
 - ii) wall outlets
 - iii) valves
 - iv) testing
7. Describe nitrogen gas systems, their components and installation.
 - i) piping and fittings
 - ii) wall outlets

- iii) valves
 - iv) safety devices
 - v) testing
8. Describe vacuum tube and medical air systems.
- i) compressors
 - ii) piping and fittings
 - iii) reducing stations
 - iv) valves and strainers
 - v) pressure gauges and controls
 - vi) safety devices
 - vii) testing
 - viii) air dryers
9. Describe the color coding of medical gas systems.
10. Describe provincial regulations that may apply to the installation of medical gas systems.

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 procedure for braizing a purged and non-purged medical gas joint.

PF-2250

FIRE PROTECTION SYSTEMS

Outcomes:

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

- demonstrate knowledge of fire protection systems and their installation.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Describe types of fire protection systems, their component parts and operation.
 - i) standpipe
 - ii) wet and dry
3. Describe methods of supplying water to system.
 - i) Siamese connection
 - ii) Tanks
 - iii) Pumps

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. No Practical.

PF-2260 RESIDENTIAL SPRINKLER SYSTEMS

Outcomes:

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

- demonstrate knowledge of residential sprinkler systems and their installation.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Describe the purpose, components and operation of residential sprinkler systems.
3. Identify sources of information pertaining to residential sprinkler system installation, maintenance and testing and describe their use.
 - i) drawings
 - ii) specifications
 - iii) manufacturers' literature

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. No Practical.

PF-2270 COMMERCIAL DRAINAGE, WASTE AND VENTING II

Outcomes:

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

- size commercial venting systems.
- install venting systems for commercial applications according to codes and regulations.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Describe the components, purpose and applications of the following venting systems:
 - i) stacks over 3 storeys
 - ii) individual
 - iii) dual
 - iv) branch
 - v) header
 - vi) continuous
 - vii) vent stack
 - viii) relief vent
 - wet vents
 - stack offsets
 - ix) single story wet vent (over four fixtures)
3. Identify and interpret plumbing codes for commercial venting systems.
4. Describe the criteria and procedures for installation of:
 - i) vent pipes for traps
 - ii) miscellaneous vent pipes
 - iii) arrangement of vent pipes
 - iv) minimum size of vent pipes
5. Explain the procedures for connecting fixtures, offsets and vents to venting systems.
6. Describe the procedures used to install the various commercial vent systems.
 - i) material lists
 - ii) interference
 - iii) location and cutting of openings
 - iv) installation and support
 - v) protection
 - vi) testing and inspection

7. Describe the location and sizing of vent pipe terminals.
8. Describe the purpose and installation of fresh air inlets and building traps.
9. Describe the purpose and procedures for testing DWV systems.

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. No Practical.

PF-2280 COMMERCIAL APPLIANCES, FIXTURES AND TRIM

Outcomes:

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

- select, install plumbing fixtures, appliances and trim for a variety of commercial applications.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Describe the types of fixture carriers, their parts, characteristics and applications.
 - i) water closet connection
 - ii) urinal wall carrier
 - iii) lavatory supports
3. Describe and identify the sources of information relevant to installation.
 - i) drawings
 - ii) specifications
 - iii) manufacturers' literature
4. Describe carriers for batteries of fixtures.
 - i) determination of left-hand and right-hand systems
5. Describe typical installations.
 - i) residential
 - ii) commercial/industrial
6. Describe the various types of connections used for fixtures.
 - i) floor style back outlet closet connection
 - ii) lead pipe connection
 - iii) tapered thread connection
 - iv) o-ring seal connection
7. Describe the procedures used to install the following:
 - i) water closet carriers
 - ii) basin and sink carrier
 - iii) urinal carrier

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 and test commercial plumbing fixtures and trim.

PF-2310 CROSS CONNECTION CONTROL DEVICES

Outcomes:

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

- identify cross connections and determine how to correct them.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Identify and interpret sources of information pertaining to installation.
 - i) the National Plumbing Code
 - ii) manufacturers' literature
3. Describe the division of responsibilities for cross connection control.
 - i) installation
 - ii) troubleshooting
 - iii) repair
4. Describe the cross connection control program.
 - i) administration
 - ii) legal aspects
 - iii) health aspects
 - iv) minimum standards
 - v) inspection of devices
 - vi) licensing of testers
 - vii) testing of devices
5. Identify methods and devices used for cross connection control and describe their location and operation in various systems.
6. Describe the procedures used for maintenance and repair of devices.
 - i) troubleshooting
 - ii) repair procedures
7. Describe the causes of backflow and their role in cross connection.
8. Explain backflow control.
 - i) causes
 - ii) classification of hazards
 - iii) assessment of hazards
 - iv) types of devices
 - v) selection of proper devices
 - vi) methods of backflow control
 - vii) typical occurrences and recommended protection

9. Describe the purpose and operation of:
 - i) back siphonage devices
 - ii) back pressure devices

10. Identify testable devices.
 - i) non-testable devices
 - ii) testable devices
 - iii) testing procedures

11. Describe the procedures used to install devices.
 - i) location of devices
 - ii) National Plumbing Code applications
 - iii) manufacturer's recommendations
 - iv) warranty of devices

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. Select, install, test and repair various cross connection control devices.
 - atmospheric vacuum breaker
 - pressure vacuum breaker
 - double check valve assembly
 - reduced pressure zone assembly

PF-2320 INTRODUCTION TO GAS PIPING II (HIGH PRESSURE)

Outcomes:

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

- demonstrate knowledge of the combustion process.
- demonstrate knowledge of gas piping installation according to code.

Objectives and Content:

1. Describe the purpose, parts and operation of a gas distribution system from the well head to the service regulator.
 - i) gas well
 - ii) compressor station
 - iii) city gate station
 - iv) district regulating station
 - v) regulators
 - vi) high pressure distribution service
 - vii) high pressure distribution lines
 - viii) line pressures
 - ix) meters

2. Identify types of gas pressure regulators and describe their purpose.
 - i) low capacity
 - ii) high capacity
 - iii) combination
 - iv) loading element
 - v) measuring element
 - vi) restricting element
 - vii) 1st stage
 - viii) 2nd stage
 - ix) service
 - x) system
 - xi) appliance
 - xii) code

3. Describe the factors that determine the correct pipe sizing for gas systems over 2 PSI.
 - i) installations.
 - ii) length of pipe
 - iii) allowable pressure loss
 - iv) system capacity
 - v) specific gravity of gas
 - vi) number and type of fittings

4. Describe the purpose and operation of gas venting.
 - vii) gravity or natural venting
 - viii) spillage
 - ix) combustion process
 - x) carbon monoxide
 - xi) power venting
 - xii) fan assisted

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. No Practical.

PF-2510 COMPRESSED AIR AND VACUUM SYSTEMS

Outcomes:

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

- demonstrate knowledge of compressed air and vacuum systems and their installation.

Objectives and Content:

1. Explain air theory.
 - i) effects of water within a system
 - ii) humidity
 - iii) air treatment and storage
 - iv) safety
2. Identify component parts of vacuum systems and describe their purpose.
3. Identify and interpret sources of information applicable to the installation of compressed air systems.
 - i) drawings
 - ii) specifications
 - iii) manufacturers' literature
 - iv) codes and regulations
4. Describe types of compressors, their operating principles and applications.
 - i) rotary
 - ii) piston
5. Describe the procedures used to install compressors.
 - i) cold climate
 - ii) damp climate or high humidity
 - iii) bases and foundations
6. Describe the procedures used to install compressor piping.
 - i) inlet piping
 - ii) discharge piping
 - iii) safety valves
 - iv) shut-off valves
 - v) controls
 - vi) condensate drain valve/trap
7. Describe the procedures used to install distribution piping to draw-off point.
 - i) systems
 - laboratories,
 - instrumentation

- workshops
 - ii) supports
 - iii) materials
 - iv) branch connections off main
 - v) drop lines
 - vi) drains
 - vii) shut-off valves
 - viii) quick-connects
8. Identify component parts of pneumatic transfer systems and describe their purpose.

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 and test a basic compressed air system.

PF-2520

CHILLED WATER SYSTEMS

Outcomes:

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

- demonstrate knowledge of chilled water systems and their installation.

Objectives and Content:

1. Describe the purpose, component parts and operation of a chilled water system.
2. Identify and interpret sources of information pertaining to the installation of chilled water systems.
 - i) drawings
 - ii) specifications
 - iii) manufacturers' literature
3. Describe the procedures used to install a chilled water system.

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. No Practical.

PF-2530

SOLAR HEATING SYSTEMS

Outcomes:

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

- demonstrate knowledge of solar heating systems and their installation.

Objectives and Content:

1. Identify the types of solar heating systems and describe their operating principles and applications.
 - i) passive
 - ii) forced
 - iii) direct
 - iv) indirect
2. Identify and interpret sources of information pertaining to installation.
 - i) drawings
 - ii) specifications
 - iii) manufacturers' literature
3. Describe solar heating systems, their component parts and installation procedures.
 - i) piping
 - ii) solar panels
 - iii) insulation
 - iv) controls and sensors
 - v) storage
 - vi) pumps
 - vii) electrolysis
 - viii) purging

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. No Practical.

PF-2540

RURAL WATER SUPPLY

Outcomes:

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

- demonstrate understanding of the operation of rural water supply systems.
- demonstrate understanding of the operation, installation and repair of water pumps.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Describe the surface sources of water supply.
 - i) rivers
 - ii) lakes
 - iii) ponds
 - iv) streams
 - v) cisterns
3. List and describe the most common contamination sources of water supply.
4. Describe the types of wells, their characteristics, advantages and disadvantages.
 - i) shallow
 - ii) deep
 - iii) dug
 - iv) bored
 - v) driven
 - vi) drilled
5. Explain well terminology.
 - i) static water level
 - ii) draw down
 - iii) recovery rate
 - iv) well casing
 - v) submergence
 - vi) well cap
 - vii) pumping water level
 - viii) water seams
 - ix) well capacity
6. Describe the various purposes of a well driller's report and the information contained in it.
 - i) well owner
 - ii) well contractor
 - iii) well log

- iv) well information
 - v) method of drilling
 - vi) water usage
 - vii) pumping rate
7. Identify provisions of Well Drilling Regulations in respect to:
- i) definitions
 - ii) location of well
 - iii) protection of aquifers
 - iv) pump installation

POSITIVE DISPLACEMENT PUMPS & ACCESSORIES

8. List and describe the components of a hydro-pneumatic system.
- i) foot valve
 - ii) piping
 - iii) clamps
 - iv) pumps
 - v) pressure tanks
 - vi) controls
 - vii) shut-off valves
 - viii) drainage
 - ix) relief valve
 - x) air volume control
9. Identify types of positive displacement pumps and describe their operating principles.
- i) gear
 - ii) helical rotary
 - iii) piston
10. Identify types of shallow well piston pumps and describe their theory of operation.
- i) types
 - single acting
 - double acting
 - dual double acting
 - ii) lift
 - iii) gallons per minute
 - iv) relief valve
 - v) priming
 - vi) pump chart
 - vii) pressure switch
11. Describe procedures used to install a shallow well piston pump.
- i) location
 - ii) pump tapping size

- iii) suction line
- iv) grade
- v) depth
- vi) foot or check valve
- vii) venting well
- viii) noise control

JET PUMPS

12. Identify types of shallow well jet pumps and describe their characteristics, parts and operation.
- i) lift
 - ii) types
 - single stage
 - multi-stage
 - iii) parts
 - impeller
 - diffuser
 - ejector
 - pressure switch
 - motor size
13. Identify types of deep well jet pumps and describe their characteristics, parts and operation.
- i) lift
 - ii) types
 - single stage
 - multi-stage
 - iii) parts
 - suction line
 - drive line
 - deep well ejector
 - tail pipe
 - pitless adapter
 - air vent
 - control valve or regulating valve
 - pressure switch
 - foot valve
14. Describe the installation and start up procedures for shallow and deep well jet pumps.
- i) depth
 - ii) frost protection
 - iii) priming
 - iv) control valve

15. Describe how to read a shallow and deep well jet pump chart.
- i) types of ejectors
 - ii) motor HP
 - iii) ejector location
 - iv) pipe size
 - v) litres per second
 - vi) gallons per minute

SUBMERSIBLE PUMPS

16. Describe the components and operation of a submersible pump.
- i) pump size
 - ii) check valve
 - iii) discharge head
 - iv) impellers
 - v) diffusers
 - vi) suction screen
 - vii) cable lead - splicing
 - viii) motor size
 - ix) voltage
 - x) torque arrestor
 - xi) wire guard
 - xii) relief valve
 - xiii) tank tee
 - xiv) pitless adaptor
17. Describe the procedure used to wire a two- or three-wire submersible pump.
- i) wire size
 - ii) distance
 - iii) voltage
 - iv) phase
 - v) control box
 - vi) start capacitor
 - vii) relay
 - viii) pressure switch
18. Describe the installation procedure for a submersible pump.
- i) inspect pump
 - ii) electrical preparation
 - iii) torque arrester
 - iv) taping wires
 - v) aligning pump
 - vi) checking flow
19. Describe how to read a submersible pump chart.
- i) pumping depth

- ii) pressure
- iii) litres per second
- iv) gallons per minute
- v) head loss

PRESSURE TANKS AND CONTROLS

20. Identify types of tanks and explain the reasons for a pressure tank in a pump system.
- i) types
 - water compatibility – galvanized
 - glass lined
 - fiberglass
 - bladder tank
 - diaphragm
 - ii) purpose
 - prevent rapid cycling
 - shut down period
 - storage
21. Explain pressure tank terminology.
- i) capacity
 - ii) cycle rate
 - iii) demand
 - iv) draw-down
 - v) usable water
 - vi) minimum operating pressure
 - vii) peak demand period
 - viii) supercharge
 - ix) recharge
 - x) water logging
 - xi) pressure
 - xii) pump start pressure
 - xiii) supplemental supply
22. Describe the operating principles of pressure tanks.
- i) standard galvanized tank with an air volume control
 - ii) standard galvanized tank with a floating diaphragm
 - iii) diaphragm tank
 - iv) bladder tank
 - v) floated tank
 - vi) in-line tank
 - vii) vertical and horizontal tanks
23. Describe the procedures used to size a pressure tank.
- i) tank dimensions

- ii) peak demand
 - iii) tank selection tables
 - iv) manufacturers' specifications
 - v) pump run time
24. Describe the operation of an add air type and an air release type air volume control.
- i) snifter valve
 - ii) diaphragm type
 - iii) float operated type
 - iv) vacuum booster
25. Describe the operation of a pressure switch, float switch and liquid level controllers.
- i) switch settings
 - ii) differential nut
 - iii) range nut
 - iv) low water cut off switch
 - v) depth of floats
 - vi) electrical hook up
26. Describe the procedures used to measure flow from a pump.

PUMP SERVICE AND MAINTENANCE

27. Describe the use of gauges to diagnose pump problems.
- i) pressure gauge
 - ii) compound gauge
 - iii) vacuum gauge
 - in feet
 - in inches
28. Describe the use of pump charts to diagnose causes and correct problems in a jet pump.
- i) failure to start or run
 - ii) overheating or tripping out
 - iii) frequent starting or stopping
 - iv) failure to shut off
 - v) little or no water delivery
29. Describe the use of pump charts to diagnose causes and correct problems in a submersible pump.
- i) failure to start or run
 - ii) overheating or tripping out
 - iii) frequent starting or stopping
 - iv) failure to shut off

- v) little or no water delivery
30. Describe the use of pump charts to diagnose and correct problems in a reciprocating pump.
- i) failure to start or run
 - ii) little or no water delivery
 - iii) low capacity
 - iv) pump loses its prime
 - v) frequent starting or stopping
 - vi) failure to shut off
 - vii) excessive operating noise
31. Describe the procedure for taking meter readings.
- i) ammeter
 - ii) ohmmeter
 - iii) volt meter

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. Disassemble, inspect and reassemble a domestic water pump.
2. Install a water pump including related components and controls for a rural water pumping system.

PF-2550

HISTORIC PIPING

Outcomes:

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

- demonstrate knowledge of historic piping materials.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Identify less common plumbing related piping and describe their properties and applications.
 - i) lead
 - ii) bituminized fiber
 - iii) plastic lined metal
 - iv) vitrified clay
 - v) aluminum DWV
 - vi) asbestos cement
 - vii) polybutylene
3. Describe the characteristics of lead pipe and procedures for its 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. No Practical.

PF-2560

FOOD PROCESSING SYSTEMS

Outcomes:

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

- demonstrate knowledge of food processing systems and their installation.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Identify and interpret sources of information pertaining to installation of food processing systems.
 - i) drawings
 - ii) specifications
 - iii) manufacturers' literature
 - iv) regulations and codes
3. Identify types of food processing systems and describe their purpose, components and operation.
4. Describe indirect waste connections, their purpose and installation.
5. Describe venting requirements and arrangements for food processing systems.
6. Describe traps and trap primers, their purpose, operation and location.
7. Describe cleanouts, their purpose and location.
8. Identify types of food processing equipment and accessories and describe their purpose and operating principles
 - i) ice makers
 - ii) potato peelers
 - iii) drink dispensers
 - iv) food coolers
 - v) food processing tables
 - vi) steam table
9. Describe procedures used to install food processing systems.
10. Describe procedures used to install food processing 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. No Practical.

PF-2570 COMMERCIAL DRAINAGE, WASTE AND VENTING III

Outcomes:

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

- size building sewers and sanitary drainage systems for commercial/industrial applications according to code.
- demonstrate knowledge of the procedures to install venting systems for commercial/industrial applications according to code.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Identify and interpret applicable sections of the National Plumbing Code applicable to mobile home services.
3. Describe the purpose, components and sizing of relief vents for stacks over 11 storeys.
4. Describe the purpose and components of a municipal sewage system.
 - i) types of sewer
 - ii) construction and design
 - iii) grades and elevation
 - iv) methods of connection
5. Describe the purpose and design of waste water treatment plants.
 - i) methods of disposal
 - ii) methods of treatment
 - iii) lift stations
 - iv) piping materials and components
6. Describe the terminology, factors and procedures involved in sizing sewage pumps or receiving tanks.
 - i) capacity
 - ii) purpose
 - iii) application
 - iv) interpret plumbing code requirements
7. Describe the components and operation of sewage pumps or receiving tanks.
 - i) materials/covers
 - ii) types of pumps and components
 - iii) control/alarm

8. Describe the methods of installing and servicing sewage pumps and their components.
 - i) excavation/bedding/backfill
 - ii) pumps and their controllers
 - iii) floats and alarm
 - iv) troubleshooting
 - v) interpret codes and manufacturers' literature

9. Describe the procedures for connecting sewage sump drains.
 - i) to building drains
 - ii) arrangement of fittings
 - iii) sizing
 - iv) termination

10. Describe the terminology, purpose and applications associated with indirect wastes.

11. Describe the criteria used to size and install indirect piping connections and air breaks.
 - i) types of fixtures/equipment
 - ii) fixture outlet sizes
 - iii) material
 - iv) methods of support
 - v) venting of traps
 - vi) interpret plumbing code requirements

12. Describe the terminology, purpose and common types of interceptors.
 - i) oil/gas
 - ii) sediment/sand

13. Describe the methods of sizing, installing and servicing interceptors.
 - i) capacity
 - ii) purpose
 - iii) application

14. Describe the procedures used to connect drains and vents of interceptors to build drains, stacks, and branches.
 - i) arrangement of fittings
 - ii) sizing
 - iii) termination

15. Describe the methods of protecting plumbing systems from extreme conditions.
 - i) high temperature
 - ii) corrosive waste

16. Identify types of acid resistant piping systems and describe associated safety precautions and installation procedures.
 - i) acid resistant plastics
 - ii) glass
 - iii) duriron and teflon
 - iv) stainless steel

17. Describe the methods of treating corrosive waste before entering the plumbing system and explain the requirements for installation, sizing and venting.
 - i) acid-dilution tanks
 - ii) neutralizing tanks

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. No Practical.

PF-2580 INDUSTRIAL/COMMERCIAL APPLIANCES, FIXTURES AND TRIM

Outcomes:

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

- demonstrate knowledge of the procedures to select and install plumbing fixtures, appliances and trim for a variety of commercial/Industrial applications.

Objectives and Content:

COMMERCIAL APPLIANCES

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Identify and interpret sources of information for installation of appliances.
 - i) drawings
 - ii) specifications
 - iii) manufacturer's literature
3. Identify types of dishwashers and describe their operation and procedures used for installation.
4. Identify types of automatic clothes washers and describe their operation and procedures used for installation.
5. Identify types of garbage disposal units and describe their operation and procedures used for installation.
6. Identify types of water stations and describe their operation and procedures used for installation.
7. Describe potential cross connections and effective preventative measures.
8. Identify and interpret the National Plumbing Code sections that apply to the installation and testing of commercial appliances.

INSTITUTIONAL AND INDUSTRIAL FIXTURES AND TRIM

9. Identify and interpret the National Building Code and National Plumbing Code sections which apply to the installation and testing of institutional and industrial fixtures and trim.
10. Identify and interpret sources of information for installations.
 - i) drawings
 - ii) specifications
 - iii) manufacturers' literature

11. Describe institutional and industrial fixtures and their characteristics.
- i) water closet (patients)
 - ii) water closet (specimen)
 - iii) lavatory (patients)
 - iv) lavatory (exam/treatment)
 - v) lavatory (general)
 - vi) bathtub
 - vii) sitz bath
 - viii) clinic service sink
 - ix) surgeon's scrub sink
 - x) eye wash
 - xi) emergency shower
 - xii) plaster sink
 - xiii) vacuum breaker
 - xiv) bedpan cleanser
 - xv) thermostatic mixing valve
 - xvi) pedal valve or stop
 - xvii) knee action mixing valve
 - xviii) shower head
 - xix) bradley wash fountain
 - xx) mop sinks
 - xxi) vandal proof fixtures and fittings
 - xxii) whirlpool bath
12. Describe procedures used to install institutional and industrial fixtures and trim.

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. No Practical.

PF-2590

LAWN SPRINKLER SYSTEMS

Outcomes:

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

- demonstrate knowledge of the installation of lawn sprinkler systems and equipment.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Describe the component parts of a lawn sprinkler system, their purpose and operation.
 - i) spray heads
 - ii) draining points
 - iii) valves
 - iv) chemical fertilizer injectors
 - v) water supply connections
3. Identify and interpret sources of information pertaining to lawn sprinkler systems.
 - i) drawings
 - ii) specifications
 - iii) manufacturers' literature
4. Describe the types of pipes and fittings used in lawn sprinkler systems.
5. Describe potential dangers from cross connection and methods used to eliminate them.
6. Describe the procedures required to install lawn sprinkler systems.

Practical:

Practical skills enhance the apprentices' ability to meet the objectives of the unit.

Practical Projects include:

1. No Practical.

PF-2600

SWIMMING POOL SYSTEMS

Outcomes:

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

- demonstrate knowledge of installation of swimming pool systems and equipment.

Objectives and Content:

1. Identify and interpret applicable sections of the National Plumbing Code.
2. Identify and interpret sources of information pertaining to installation.
 - i) drawings
 - ii) specifications
 - iii) manufacturers' literature
3. Describe a typical swimming pool installation, the component parts and operation.
 - i) piping
 - ii) skimmer
 - iii) hair and lint strainer
 - iv) filter pump
 - v) circulating pump
 - vi) filter
 - vii) chlorinator
 - viii) pool heater
 - ix) controls
4. Describe skimmers, their location and operation.
 - i) residential installation
 - ii) normal skimming operation
 - iii) safety by-pass operation
 - iv) skimmers and accessories
5. Describe hair and lint strainers, their location and operation.
 - i) typical types of hair and lint strainers
 - ii) layout of plumbing
6. Identify types of filter systems and describe their location and operation.
 - i) operating principle
 - ii) types of installations
 - iii) cleaning the filter
 - iv) two tank battery system
 - v) single tank systems
 - vi) multiple-battery system

7. Identify types of filter pumps and describe their parts and operation.
8. Describe vacuum systems, their parts and operation.
9. Describe methods of heating swimming pools.
 - i) gas
 - ii) electric
 - iii) solar
 - iv) heat exchangers
 - v) heat pumps
10. Describe chlorinators, their purpose and operation.
11. Describe flowmeters, their purpose and operation.
12. Describe the procedures used to install swimming pool piping and 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. No Practical.

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. A detailed course outline is available from the Department of Education, Industrial Training Section to training institutions upon request.

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 and Certification website.

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.

Filename: POT_Plumber_May 2006_FINAL
Directory: G:\Plans of Training\2006
Template: C:\Documents and Settings\bharvey\Application
Data\Microsoft\Templates\Normal.dot
Title: ATLANTIC CURRICULUM OUTLINE
Subject:
Author: test
Keywords:
Comments:
Creation Date: 5/12/2006 11:44 AM
Change Number: 16
Last Saved On: 5/25/2006 11:08 AM
Last Saved By: staff
Total Editing Time: 58 Minutes
Last Printed On: 5/25/2006 11:16 AM
As of Last Complete Printing
Number of Pages: 154
Number of Words: 23,297 (approx.)
Number of Characters: 132,798 (approx.)