
Plan of Training

INSULATOR (HEAT AND FROST)



Government of Newfoundland and Labrador
Department of Education
Institutional and Industrial Education Division

September 2010

PLAN OF TRAINING

Heat and Frost (Insulator)

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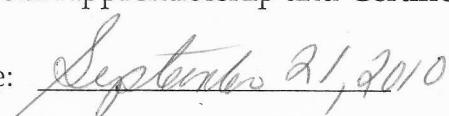
Government of Newfoundland and Labrador
Department of Education
Institutional and Industrial Education Division

Approved by:



Chairperson, Provincial Apprenticeship and Certification Board

Date:



September 21, 2010

The Joint Planning Committee (JPC) recognizes this Interprovincial Program Guide as the national curriculum for the occupation of Insulator (Heat and Frost).

Preface

This Apprenticeship Standard is based on the 2007 edition of the National Occupational Analysis for the Insulator (Heat and Frost) trade.

This document describes the curriculum content for the Insulator (Heat and Frost) apprenticeship training program and outlines each of the technical training units necessary for the completion of apprenticeship.

Acknowledgements

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.

We offer you a sincere thank you.

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A. Conditions Governing Apprenticeship Training

1.0 General

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

2.2 Notwithstanding the above, each candidate must have successfully completed a high school program or equivalent, and in addition may be required to have completed certain academic subjects as specified in particular Plan 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 toward the apprenticeship program may be awarded to an apprentice for previous work experience and/or training as validated through prior learning assessment.

2.4 An Application for Apprenticeship form must be duly completed.

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 PACB one week notice in writing.

4.0 Termination of a Memorandum of Understanding

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

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 (Blocks 5 & 6) <i>if applicable</i> , plus sign-off of workplace skills required for certification totaling a minimum of 7200 hours**	Write Certification Examination

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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.

Program Duration	Wage Rates		Comments
7200 Hours	1 st Year	60%	These wage rates are percentages of the prevailing journeyperson's wage rate in the place of employment of the apprentice. No apprentice shall be paid less than the wage rate established by the Labour Standards Act (1988), as now in force or as hereafter amended, or by other Order, as amended from time to time replacing the first mentioned Order.
	2 nd Year	70%	
	3 rd Year	80%	
	4 th Year	90%	
5400 Hours and 4800 Hours	1 st Year	60%	(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.
	2 nd Year	75%	
	3 rd Year	90%	
4000 Hours			

6.0 Tools

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

7.0 Periodic Examinations and Evaluation

- 7.1 Every apprentice shall submit to such occupational tests and examinations as the PACB shall direct. If after such occupational tests and examinations the apprentice is found to be making unsatisfactory progress, his/her 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 PACB may shorten the term of apprenticeship and advance the date of completion accordingly.
- 7.3 For each and every course, a formal assessment is required for which 70% is the pass mark. 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 PACB shall issue a Certificate of Apprenticeship

9.0 Hours of Work

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

10.0 Copies of the Registration for Apprenticeship

The Director of 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 shall not exceed two apprentices to every one journeyperson employed, with the condition that one of these be a final year apprentice.

12.0 Relationship 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 PACB.

14.0 Employment, Re-Employment and Training Requirements

- 14.1 The Plan of Training requires apprentices to regularly attend their place of employment.
- 14.2 The Plan of Training requires apprentices to regularly attend training programs for that occupation as prescribed by the PACB.
- 14.3 Failure to comply with Sections 14.1 and/or 14.2 will result in cancellation of the Memorandum of Understanding. Apprentices may have their MOUs reinstated by the PACB but would be subject to a commitment to complete the entire program as outlined in the General Conditions of Apprenticeship. An apprentice will be required to pay a reinstatement fee. 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 first opportunity to be hired before another is hired.
- 14.6 The employer will permit each apprentice to regularly attend training programs as prescribed by the PACB.
- 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.

B. Requirements for Red Seal Certification

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

C. Roles and Responsibilities of Stakeholders in the Apprenticeship Process

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

The Apprentice:

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

The Employer:

- provides high quality work experiences in an environment conducive to learning.
- remunerates apprentices as set out in the Plan of Training or Collective Agreements.
- provides feedback to training institutions, Institutional and Industrial Education Division and apprentices in an effort to establish a process of continuous quality improvement.

- where appropriate, releases apprentices for the purpose of returning to a training institution to complete the necessary technical courses.
- ensures work experiences of the apprentice are documented.

The Training Institution:

provides a high quality learning environment.

provides the necessary student support services that will enhance an apprentice's ability to be successful.

participates with other stakeholders in the continual updating of programs.

The Institutional and Industrial Education Division:

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

The Provincial Apprenticeship and Certification Board:

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

D. Program Outcomes

Upon completion of the Insulator (Heat and Frost) program, students will have demonstrated the knowledge and skills required to perform the following tasks:

- Task 1 Maintains tools and equipment.
- Task 2 Organizes Work.
- Task 3 Performs routine trade activities.
- Task 4 Installs insulation for piping and fittings.
- Task 5 Installs insulation for tanks, vessels and equipment.
- Task 6 Installs protective cladding.
- Task 7 Installs removable covers.
- Task 8 Insulates for refractory and cryogenic applications.
- Task 9 Installs underground insulating systems.
- Task 10 Insulates for soundproofing for industrial applications.
- Task 11 Insulates for marine applications.
- Task 12 Insulates plumbing systems and mechanical piping.
- Task 13 Insulates mechanical ducting.
- Task 14 Insulates mechanical equipment.
- Task 15 Installs protective finishes.
- Task 16 Insulates for soundproofing for commercial applications.
- Task 17 Prepares for asbestos abatement.
- Task 18 Performs asbestos removal procedures.
- Task 19 Performs maintenance repair.
- Task 20 Prepares for spraying.
- Task 21 Sprays insulation, sealers and coatings.
- Task 22 Installs fire stop systems.
- Task 23 Installs fireproofing.

E. Program Structure

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.

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

Entry Level – Block 1			
NL Course No.	Course Name	Hours	Pre-requisites
TS1510	Occupational Health and Safety	6	None
TS1520	WHIMIS	6	None
TS1530	Standard First Aid	14	None
HF1101	Hand and Power Tools	6	None
HF1110	Shop Tools and Equipment	15	None
HF1150	Insulation Principles	10	None
HF1200	Insulation Materials	10	None
HF1201	Insulation Practices	10	None
HF1220	Introduction to Pipe and Piping Systems	10	None
HF1310	Blanket Insulation	15	None
HF1320	Fibrous Board Insulation	15	None
HF1230	Installing Pipe Insulation	75	None
HF1240	Hot Work Practices	20	None
HF1250	Introduction to Asbestos	24	None
HF1260	Asbestos Removal Procedures	24	None
HF1550	Firestopping	25	None
HF1270	Blueprint Reading – Part 1	30	None
AP1100	Introduction to Apprenticeship	15	None
*MA1060	Basic Math	60	None
CM2150	Workplace Communications	45	None
MR1220	Customer Service	30	None
SP2330	Quality Assurance/Quality Control	30	None
MC1050	Introduction to Computers	30	None
SD1700	Workplace Skills	30	None

Entry Level – Block 1			
NL Course No.	Course Name	Hours	Pre-requisites
SD1710	Job Search Techniques	15	None
SD1720	Entrepreneurial Awareness	15	None
	Total	585	

Required Work Experience

Advanced Level – Block 2			
NL Course No.	Course Name	Hours	Pre-requisites
HF1280	Introduction to Foam Insulation	10	None
HF1290	Installation of Flexible Foam Insulation	30	None
HF1300	Air Handling System Components	10	None
HF1380	Insulate Underground Pipe	25	None
HF1400	Parallel Line Development	20	None
HF1410	Radial Line Development	20	None
HF1500	Tees, Valves and Elbows	35	None
HF1510	Flanges and End Caps	30	None
	Block 2 Total:	180	

Required Work Experience

Advanced Level – Block 3			
NL Course No.	Course Name	Hours	Pre-requisites
HF1330	Insulating Breeching, Flues and Precipitators	10	None
HF1340	Insulating Methods (Cylinders and Heads) (Math)	30	None
HF1350	Finishing Methods	15	None
HF1360	Introduction to Cryogenic Work	10	None
HF1370	Insulating Cryogenic Systems	25	None
HF2270	Blueprint Reading – Part II	35	None
HF1420	Triangulation	15	None
HF1520	Cones, Bevels and Transitions	25	None
HF1540	Tank Heads	15	None
	Block 3 Total:	180	

Total Course Credit Hours	945
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* A student who can meet the Mathematics requirement through an ACUPLACER® test may be exempted from Mathematics 1060. Please check with your training institution.

Entry Level – Block 1

TS1510 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.

Pre-Requisites: None

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 Labour Relations Act
- v. order in writing inclusion
- vi. report to commission Allocated period of time to request Arbitrator to deal with the matter of the request
- vii. notice of application
- viii. failure to comply with the terms of an order
- ix. order filed in the court

7. Explain duties of commission officers.

- i. powers and duties of officers
- ii. procedure for examinations and inspections
- iii. orders given by officers orally or in writing

- iv. specifications of an order given by an officer to owner of the place of employment, employer, contractor, sub-contractor, employee, or supplier
- v. service of an order
- vi. prohibition of persons towards an officer in the exercise of his/her power or duties
- vii. rescinding of an order
- viii. posting a copy of the order
- ix. illegal removal of an order

8. Interpret appeals of others.

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

9. Explain the process for reporting of accidents.

- i. application of act
- ii. report procedure
- iii. reporting notification of injury
- iv. reporting accidental explosion or exposure
- v. posting of act and regulations

Practical:

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

TS1520 Workplace Hazardous Materials Information System (WHMIS)

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).

Pre-Requisites: None

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 and 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

TS1530 Standard 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.

Pre-Requisites: None

HF1101 Hand and Power Tools

Outcomes:

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

- identify basic hand and power tools (heat and frost)
- use hand and power tools

Pre-Requisites: None

Objectives and Content:

1. Describe general safety requirements for use of hand and power tools
2. Identify common hand tools.
 - i. hammers
 - ii. screw drivers
 - iii. pliers and wire cutters
 - iv. levels
 - v. squares
 - vi. measuring tools
 - vii. clamps and temporary holding devices
 - viii. saws
 - ix. banding gear
 - x. sheet metal shears
 - xi. dividers
 - xii. knives
 - xiii. calipers
 - xiv. thickness gauge
3. Describe the procedures to use and maintain various hand tools.
4. Identify common power tools.
 - i. drills and drill bits
 - ii. saws
 - iii. hand grinder
 - iv. stud and pin welder

5. Describe the procedures to use and maintain power tools.
6. Identify safety consideration when using hand and power tools.
7. Describe the procedures to use and maintain spray equipment.
8. Describe the procedures to use and maintain personal protective and safety equipment.
 - i. glasses, gloves, boots, hearing protection, hard hats
 - ii. fall arrest equipment

Practical:

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

1. Use and maintain various types of hand tools.
2. Use and maintain various types of power tools

HF1110 Shop Tools and Equipment

Outcomes:

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

- identify shop tools and equipment
- use shop tools and equipment
- maintain shop tools and equipment

Pre-Requisites: None

Objectives and Content:

1. Describe safety precautions to be considered when working with shop tools and equipment.
2. Identify various shop tools and equipment.
 - i. lock former
 - ii. EZ edger
 - iii. combination machine (Beader/Crimper)
 - iv. sheet metal break
 - v. metal shear
 - vi. metal roller
 - vii. band saw
 - viii. pedestal grinder
3. Describe the procedures to operate shop tools and equipment.
4. Identify maintenance procedures for shop tools and equipment.

Practical:

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

1. Use and maintain various shop tool and equipment.

HF1150 Insulation Principles

Outcomes:

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

- demonstrate general knowledge of insulating principles
- identify systems requiring insulation

Pre-Requisites: None

Objectives and Content:

1. Define terminology relating to the insulating occupation.
 - i. heat related terms
 - ii. cold related terms
 - iii. thermal temperature range
2. Describe the principles and function of insulation.
3. Identify the factors to be considered in selection of insulation.
 - i. insulating ability
 - ii. temperature
 - ambient temperature
 - service temperature
 - iii. location
 - iv. durability
 - v. compatibility
 - vi. cost
4. Identify the various systems requiring insulation.
 - i. commercial
 - plumbing
 - domestic hot and cold water lines
 - roof drains
 - heating
 - boiler
 - piping
 - vessels
 - chilled water lines

- ducts
- emergency generators

- ii. industrial
 - process piping systems
 - large and small vessels
 - boilers
 - breaching
 - stacks
 - precipitators
 - tanks
- iii. soundproofing
 - types of soundproofing installations
 - piping,
 - turbines,
 - equipment
 - plenums
 - ducting
 - acoustic panels (ceilings and walls)
 - basics of sound transmission
 - types of insulation materials
 - types of jacketing
 - installation methods

Practical:

No Practical

HF1200 Insulation Materials

Outcomes:

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

- identify insulation materials and accessories
- describe procedures for use of insulator materials and accessories.

Pre-Requisites: None

Objectives and Content:

1. Identify insulation materials and their characteristics.
 - i. composition
 - fibrous
 - cellular
 - granular
 - ii. configurations
 - iii. characteristics
 - iv. temperature range
 - upper limit
 - lower limit
2. Identify application materials and where they are used.
 - i. wires
 - ii. bands
 - iii. adhesives
 - iv. tape
 - v. screws
 - vi. rivets
 - vii. tacks
 - viii. hog rings
 - ix. pins and clips
 - x. studs
3. Identify covering, finishes and sealants used in insulating.
 - i. bore coatings

- ii. adhesives
- iii. mastics
- iv. reinforcement materials
- v. cements
- vi. jacketing materials
- vii. protectors
- viii. identify mixing procedures for;
 - adhesives
 - powders

4. Identify the procedures for handling, storing and distributing insulation materials.

- i. delivery
- ii. stacking
- iii. storage
- iv. moving materials
- v. proper housekeeping procedures

5. Describe insulation certification for marine applications.

Practical:

No Practical

HF1201 Insulation Practices

Outcomes:

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

- describe basic procedures for insulating at various temperature ranges
- identify various types of access equipment

Pre-Requisites: None

Objectives and Content:

1. Trade communications.
 - i. terminology
 - ii. verbal and written communication
 - iii. coordination with other trades
 - iv. participation in safety and information meetings
2. Describe the types, uses and safety considerations of access equipment.
 - i. ladder
 - ii. scaffolding
 - iii. serial lifts
 - iv. swing stages
3. Describe the basic procedures involved in insulating.
 - i. moderate temperature
 - ii. hot temperature
 - iii. cold
 - low temperature
 - vapor barrier

Practical:

No Practical

HF1220 Introduction to Pipe and Piping Systems

Outcomes:

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

- identify and describe piping systems that require insulating

Pre-Requisites: None

Objectives and Content:

1. Identify the types and sizes of pipes and their characteristics.

- i. types of pipe
 - heat traced piping
 - steam
 - electric
- ii. thermal expansion of pipe for hot systems
- iii. pipe construction material
 - iron
 - copper
 - stainless steel

2. Identify the components of a piping system.

- i. straight thermal piping
- ii. joints
- iii. irregular surfaces
 - connectors
 - valves
 - fittings
- iv. hangers
 - clevis hanger
 - pipe shoe on roller support
 - contact hangers

Practical:

No Practical

HF1230 Installing Pipe Insulation

Outcomes:

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

- demonstrate knowledge of the procedures to install pipe insulation
- select material for pipe insulation

Pre-requisites: None

Objectives and Content:

1. Perform the Math calculations related to Installing Pipe Insulation.
2. Describe the procedures for installing plain insulation (no jacketing) on a straight run of pipe.
 - i. hot piping systems
 - ii. install with tape, wire or bands
 - iii. establish stagger pattern
3. Describe the procedure used to apply fiberglass insulation with all service jacket (ASJ).
 - i. butt strips
 - ii. staples
 - iii. self sealing lap (SSL)
4. Describe the procedures for trimming insulation.
 - i. pipe welds
 - ii. bevel for flanged fittings
5. Describe the procedures for insulating at hangers.
 - i. contact hangers
 - ii. clevis hangers
 - iii. pipe shoe on roller supports
 - iv. anchors
6. Describe the procedures for insulating pipe fittings, valves and flanges.
 - i. factory moulded or machined
 - ii. mitered segments

- long and short radius elbows
- determine size and number of miters
- methods of measuring and cutting miter
- methods of attaching miter sections
- iii. built up insulation covers
 - blanket
 - cement
 - soft cover
- iv. insulating at Tees @ 90°
 - equal
 - unequal
- v. insulating laterals
 - equal
 - unequal
- vi. in-line flanges
- vii. insulating valves
 - body
 - bonnet
- viii. insulating reducer
 - concentric
 - eccentric

7. Describe the procedures to finish insulated pipe.

- i. unjacketed
- ii. cloth jacketing or reinforced mastic (canvas)
- iii. plastic jacketing
- iv. metal jacketing
- v. cement finish jacketing

Practical:

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

1. Insulate pipe and various fittings using fibreglass insulation.
2. Insulate pipe and various fittings using mineral wool.

3. Insulate pipe and various fittings using calcium silicate.
4. Finish an insulated component using a cement finish.

HF1240 Hot Work Practices

Outcomes:

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

- identify hot work environments
 - describe procedures to work safely in hot work environment

Pre-Requisites: None

Objectives and Content:

1. Define “hot work” and its relation to the insulator occupation.
2. Describe the health effects that can result when working in hot work environments.
 - i. body’s ability to cool itself
 - blood circulation
 - sweating
 - ii. effect of hot work on the body’s cooling system
 - metabolic heat
 - iii. heat disorders
 - symptoms
 - treatments
3. Describe the procedures to prevent heat disorders when working in hot work environments.
 - i. workplace prevention
 - hot work supervisor
 - schedules
 - worker’s records
 - ii. monitoring hot work areas
 - wet bulb globe thermometer
 - determine stay times
 - acclimatization
 - iii. personal prevention
 - knowledge of personal medical/work history
 - knowledge of personal limits

4. Identify site setup methods.

i. hot work conditions

- setting up a workplace
- proper steps
 - posting signs
 - shutting off ventilation system
 - shutting off electricity
- correct procedure bringing in
 - extension cords
 - scaffolds
 - large equipment
- how to
 - build a decontamination unit
 - hook up negative air machines

5. Identify personal protective clothing.

i. special protective clothing

- hot work areas
- cooling suits
- ice vests
- fireproof suits

6. Identify fire protection techniques.

i. fires on a hot work site

- proper prevention measures
- high temperatures create dangerous atmosphere
- flammable materials
- fire extinguishers
- log book
- emergency exits
- emergency phone numbers
- preplanned escape plan

Practical:

No Practical

HF1250 Introduction to Asbestos

Outcomes:

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

- identify asbestos types
- describe procedures to work safely with asbestos

Pre-requisites: None

Objectives and Content:

1. Identify the types of asbestos and their characteristics.
 - i. dangers of asbestos
 - why asbestos is dangerous
 - when asbestos is dangerous
 - ii. possible locations of asbestos
 - iii. safe identification of asbestos
 - bulk samples
 - lab reports
 - iv. other safety issues relating to asbestos removal
 - heat
 - chemicals
 - electric shock
 - fire
 - tight places
 - scaffolds and ladders
 - slipping and tripping
2. Describe personal health and medical issues relating to asbestos.
 - i. symptoms and effects of asbestos on the body
 - latency period (how long it takes to get sick from exposure)
 - amount of asbestos that can cause illness
 - ii. functions of the human respiratory system
 - iii. effects of smoking in relation to asbestos exposure
 - iv. medical exams for workers exposed to asbestos
 - timing and frequency of exams
 - what should be included in the medical exam

- keeping records of medical exams
 - employee
 - employer
 - physician

3. Identify types of personal protective equipment used in asbestos work.
 - i. respirators
 - ii. disposable suits
 - iii. boots (rubber)
 - iv. specialty Personal Protection Equipment for hot work
4. Identify the types of respirators used on asbestos abatement.
 - i. Air Purifying Respirator (APR)
 - ii. Supplied Air Respirator (SAR)
5. Describe the procedures used to ensure use of a respirator is possible.
 - i. tests to ensure proper fit
 - qualitative test
 - quantitative test
 - negative pressure and positive pressure test
6. Describe the procedures used to determine which respirator is suitable for the job.
 - i. protection factor of respirator
 - ii. maximum use level (MUL)
7. Describe the procedures used to inspect, care for and maintain respirators.
8. Identify equipment used in asbestos abatement.
 - i. negative air machine
 - purpose
 - function
 - determining volume of air required
 - calculating number of machines required
 - ii. High Efficiency Particulate Air (HEPA Vacs)
 - HEPA filters on power tools
 - HEPA filters in vacuum cleaners
9. Describe the procedures used to control asbestos.
 - i. enclosure
 - ii. encapsulation

- iii. repair
- iv. removal
- v. operations and maintenance program

Practical:

No practical

HF1260 Asbestos Removal Procedures

Outcomes:

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

- describe procedures used to remove asbestos
- use Personal Protection Equipment

Pre-requisites: None

Objectives and Content:

1. Describe the procedures to set-up for asbestos abatement.
 - i. air sampling before set-up
 - ii. Personal Protective Equipment required
 - iii. pre-cleaning work area
 - iv. posting of signs
 - v. electrical and ventilation shut-down
 - vi. moving in large equipment
 - vii. set-up of De-con Unit
 - viii. containing work area
 - critical barriers
 - ix. entering and exiting work area
 - pre-planned escape route
 - x. placement and hook-up of negative air machines
 - xi. identification of possible changes required for set-up in hot work area
 - fire and heat resistant material
 - increased number of negative air machines
2. Describe methods used for removing asbestos.
 - i. air sampling during removal
 - area sampling
 - personal air monitoring
 - ii. removing asbestos from walls, ceilings and pipes
 - keeping out of the air
 - keeping asbestos wet
 - iii. variations to normal procedures for hot work removal
 - dry removal

- special tools
- vacuum loaders
- bagging of asbestos waste

3. Describe the procedures for clean-up and disposal of asbestos.

- i. bagging of asbestos waste
 - type of bag
 - proper loading
- ii. cleaning work area
 - spray lock down
 - take down poly
 - dispose with other asbestos containing materials
 - waste load out
- iii. disposal of asbestos waste once it leaves the job site
 - air-tight containers
 - properly labeled
 - approved sanitary land fill
- iv. air sampling upon job completion
 - aggressive air sampling
 - clearance air test

4. Describe removal procedures for maintenance related (small) jobs.

- i. mini enclosure
- ii. glove bags

Practical:

No practical

HF1270 Blueprint Reading - Part 1

Outcomes:

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

- be able to identify basic information from blueprints or drawings
- interpret basic information from blueprints or drawings
- prepare basic drawings and diagrams

Pre-Requisites: None

Objectives and Content:

1. Identify and describe the components of a blueprint or drawing.
 - i. title block
 - ii. name
 - iii. address
 - iv. date
 - v. material
 - vi. system
 - vii. view
 - viii. measurements
 - ix. orientation
 - x. north
 - xi. elevation orientation
2. Identify and describe 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
3. Identify and describe different projections and drawings.

- i. orthographic projections
 - multi-view
- ii. pictorial drawings
 - perspective drawings
 - oblique drawings
 - isometric drawings
- iii. general arrangements
- iv. plot plans

4. Identify and describe different types of elevation views and details.

- i. elevations
- ii. sections and details

5. Describe the procedures used to determine measurements from scaled drawings.

- i. the alphabet of lines
 - center line
 - hidden line
 - cutting plane line
 - break line
 - dimension line
 - extension line
 - object line
 - leader line
- ii. scaling a dimension
 - scales
 - ratios
 - imperial/metric scales
 - using a scale

Practical:

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

1. Interpret and sketch basic drawings and diagrams.

HF1310 Blanket Insulation

Outcomes:

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

- describe the procedures for installing blanket insulation
- use blanket insulation

Pre-Requisites: None

Objectives and Content:

1. Describe the procedures for measuring and cutting fibrous blanket.
 - i. calculate perimeter or circumference of duct
 - ii. make allowances for insulation thickness
 - iii. add for overlap
2. Describe the procedures used to apply blanket duct insulation.
 - i. application methods
 - straight duct
 - duct bends
 - elbow on round duct
 - miter segments (gores)
 - reducers
 - ii. fastening methods
3. Describe the procedures of sealing to provide vapor barrier.

Practical:

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

1. Apply blanket insulation to duct bends, elbows, reducers and hangers.

HF1320 Fibrous Board Insulation

Outcomes:

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

- describe the procedures for installing fibrous board insulation on ductwork
- use the procedures for installing fibrous board insulation on ductwork

Pre-Requisites: None

Objectives and Content:

1. Describe the procedures for measuring and cutting fibrous board.
 - i. measure duct and make allowances for thickness of insulation
 - ii. cut to leave little waste
 - iii. kerfing or v-groove tool
2. Describe the procedures used to install board insulation on rectangular duct.
 - i. fastening procedures
 - ii. applying insulation to elbows
 - iii. applying insulation to standing ribs and stiffeners
3. Describe the procedures used to install board insulation on round or oval duct.
 - i. placement and cutting of v-grooves
 - ii. calculating circumference of insulated duct
 - iii. cutting mitre segments for elbows
4. Describe the procedures used to seal fiberglass board.

Practical:

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

1. Install fibrous board insulation on duct work.

HF1550 Firestopping

Outcomes:

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

- identify and explain the characteristics of firestopping materials.
- describe the procedures to install firestopping
- use firestopping materials

Pre-Requisites: None

Objectives and Content:

1. Explain the basics of firestopping.
 - i. introduction to firestopping
 - various definitions
 - process
 - approved
 - installations
 - materials
 - responsibilities of
 - stakeholders involved in the firestopping industry
2. Identify firestopping materials.
 - i. firestopping materials
 - different types
 - intumescent
 - endothermic material
 - silicones
 - grout
 - nonburnable materials
 - firestopping systems
3. Describe how to install firestopping.
 - i. install firestopping
 - methods
 - product information
 - safety concerns during installation

- ii. installing damming materials
- iii. installing liquid foams
- iv. temporary forms
- v. placing the liquid
- vi. calculating volume to be filled
- vii. calculating amount of mix
- viii. installing intumescent materials
- ix. installing wrap strip
- x. installing aluminum tape
- xi. composite sheet
- xii. proper way to finish the job

4. Describe firestopping systems.
 - i. various systems
 - ii. methods to select proper system
5. Describe procedures related to spraying of thermal insulation, fire protection and soundproofing materials
 - i. preparation of work area
 - ii. equipment and materials used
 - sealants and coatings
 - insulations
 - iii. spray techniques

Practical:

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

1. Apply firestopping materials to various penetrations.

AP1100 Introduction to Apprenticeship

Description:

This course is designed to give participants the knowledge base and skills necessary to understand and successfully navigate the apprenticeship/red seal program.

Pre-Requisites: None

Course Outcomes:

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

- identify the requirements for registering in an Apprenticeship Program
- describe the registration process
- explain the steps to complete the Apprenticeship Program
- articulate the roles of the Apprentice, Journeyperson, Training Institutions, Industry and Governing Bodies in the Apprentice Program
- explain the significance of the Red Seal Program

Pre-Requisites: None

Objectives and Content:

1. Define apprenticeship.
 - i. define Apprenticeship and Red Seal Certification
 - ii. discuss the definition of Apprenticeship and Red Seal Certification
 - iii. distinguish between Red Seal and Provincial Certification
2. Explore how apprenticeship is governed and administered.
 - i. explain who is responsible for administrating apprenticeship
 - Department of Education
 - Provincial Apprenticeship and Certification Board
3. Explore the roles and responsibilities of those involved in the apprenticeship process.
 - i. apprentice
 - ii. employer/journeyperson
 - iii. Industrial Training Division

- explain when and where to take the in-class portion of advance training
- discuss class calls

iv. Training Institutions

- various delivery methods

v. Provincial Apprenticeship and Certification Board

4. List and explain the steps in the apprenticeship process.

- i. explain the registration process
- ii. describe apprenticeship as an agreement between employee, employer and Provincial government
- iii. review a Memorandum of Understanding
- iv. legal document
- v. review an application of apprenticeship
 - original high school certificate or equivalent
 - original transcript from the applicant's training institution
- vi. describe the roles of Institutional and Industrial Education Division of the Department of Education in apprenticeship
- vii. explain the role of the Program Development Officer
 - define probation period
 - discusses what constitutes a cancellation of apprenticeship
 - explain the consequences of an apprenticeship cancellation
 - discuss the purpose of the Record of Occupational Progress (Log Book)
 - explore how to maintain your log book
 - discuss who is responsible for tracking and signing-off on trade skills
 - explain how and where to record hours worked
 - identify the importance of updating your file with the Program Development Officer
- viii. differentiate between provincial and interprovincial exams

5. Describe the training and education requirements.

- i. discuss the factors affecting on-the-job and in class portions of your training
- ii. define in school and on the job training
 - review a Plan of Training
 - identify the percentage of on-the-job and in class training time
 - current labour market implications on completing an apprenticeship program

6. Explain Plans of Training.

- i. identify what is included in the Plan of Training
 - entrance requirements
 - duration of in-school and on-the-job training
 - course content
 - entry level or advanced level
- ii. explain how a Journeyperson Certificate is achieved
 - discuss Certificate of Qualification.
 - discuss Certificate of Apprenticeship.
 - discuss Red Seal endorsement

7. Discuss the Red Seal Program.

- i. define designated trade
- ii. explore the National Occupational Analysis for your trade
- iii. explain Interprovincial Standards Red Seal Program and how it works.
 - labor mobility
 - qualification recognition
- iv. discuss the range of careers possible in your chosen trade

8. Explain apprenticeship progression schedule and wage rates.

- i. review a Record of Occupational Progress (Log Book)
- ii. hours per program
- iii. requirements for progression
- iv. wage rates per year of apprenticeship

9. Identify the examinations and evaluation process used in Apprenticeship.

- i. discuss occupational tests and examinations as directed by the Provincial Apprenticeship and Certification Board
 - theory
 - practical
- ii. explain formal assessment and the pass mark of 70%

10. Examine some of the financial incentives available to apprentices.

- i. Employment Insurance (E.I.) Benefits
- ii. government sponsored student loans
- iii. apprenticeship incentive Federal and Provincial
- iv. scholarships

11. Continuing training outside the Province of Newfoundland Labrador.
 - i. training in other provinces and territories
 - procedure for registration and recognition of hours and skills in other provinces
 - ii. options for dual certification
 - transfer of credits
12. Review and define the following terms:
 - i. Apprenticeship Program Accreditation
 - ii. Cancellation of Apprenticeship
 - iii. Certificate of Apprenticeship
 - iv. Certificate of Qualification
 - v. Certification Renewal
 - vi. Criteria for Eligibility
 - vii. Journey person
 - viii. Practical Examination
 - ix. Prior Learning
 - x. Record of Occupational Progress (Logbook)
 - xi. Red Seal Certification
 - xii. Registered Apprentice
 - xiii. Theoretical Examination
 - xiv. National Occupational Analysis (NOA)
 - xv. Class Call
 - xvi. Dual certification

Practical:

1. Review the Provincial Apprenticeship web site: www.gov.nl.ca/app.
 - i. identify the requirements for registering as an apprentice and the registration process
 - ii. explain the steps to complete an apprenticeship program
 - iii. identify who is responsible for tracking and signing-off on trade skills
 - iv. identify the nearest Industrial Training Office to your community
 - v. identify the current incentives available to apprentices
2. Review a plan of training on the Provincial Apprenticeship web site.
 - i. identify the hours for your trade (in-school and on-the-job)

- ii. explain the roles and responsibilities of the following stakeholders in the apprenticeship process: employer, apprentice, training institution and the Industrial Training Division

3. Visit the Red Seal Web site <http://www.red-seal.ca>, review the National Occupational Analyses for your trade.

- i. review the scope of work for your occupation and identify the industry sectors and job types requiring your trade
- ii. identify the trends of your trade
- iii. provide a list of personal protective equipment required for your trade

MA1060 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 knowledge of math relating to on-the-job skills and practices. A detailed course outline is available from Institutional and Industrial Education, Standards and Curriculum Division to training institutions upon request.

Pre-Requisites: None

Course Outcomes:

- To develop numeracy skills and knowledge required for institutional and on-the-job learning.
- To develop the capability to apply mathematical concepts in the performance of trade practices.
- To develop an appreciation for mathematics as a critical element of the learning environment.
- 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.

Pre-Requisites: None

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.

CM2150 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

Pre-Requisites: None

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 and 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 and discuss components of an effective presentation
 - ii. review and discuss delivery techniques
 - iii. review and discuss preparation & use of audio/visual aids
 - iv. discuss and 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 and 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.

MR1220 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

Pre-Requisites: None

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 and challenges they may present
 - v. describe customer loyalty
 - vi. examine barriers to quality customer service
2. Explain how to determine customer’s 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 and resolving conflict.
 - i. examine and discuss ways to control feelings
 - ii. examine and discuss ways to interact with an upset customer
 - iii. examine and discuss ways to resolve conflict/customer criticism
 - iv. examine and discuss ways to prevent unnecessary conflict with customers

Practical:

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

SP2330 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

Pre-Requisites: None

Objectives and 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 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

MC1050 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

Pre-Requisites: None

Objectives and 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. create folders
- ii. maximize and minimize a window
- iii. 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 develop 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 and 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 and 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
- v. demonstrate how to view directory structure and folder content
- vi. organize files and folders
- vii. copy, delete, and move files and folders

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 and print a spread sheet.
6. Post a document on-line.

SD1700 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

Pre-Requisites: None

Objectives and Content:

1. Meetings.
 - i. identify and 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.

SD1710 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

Pre-Requisites: None

Objectives and 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.

SD1720 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

Pre-Requisites: None

Objectives and 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 business people
2. Identify and discuss various types of business ownership.
 - i. explore the characteristics 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

4. Review the entrepreneurial process.
 - i. explain the entrepreneurial process
 - ii. describe the purpose of a business plan

Advanced Level – Block 2

HF1280 Introduction to Foam Insulation

Outcomes:

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

- identify characteristics of foam insulation
- identify applications of foam insulation

Pre-Requisites: None

Objectives and Content:

1. Identify the characteristics and applications of elastomeric foam insulation.
2. Identify and describe the forms of foam insulation.
 - i. pipe
 - ii. sheet
 - iii. rolls
3. Identify types and characteristics of adhesives used on flexible foam insulation.
 - i. contact type
 - ii. safe use
 - flammable when wet

Practical:

No Practical

HF1290 Installation of Flexible Foam Insulation

Outcomes:

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

- describe procedures used to install flexible foam insulation and its accessories
- use flexible foam insulation

Pre-requisites: None

Objectives and Content:

1. Describe the procedures used to install flexible foam insulation using the slip on insulation method.
 - i. insulating pipe fittings
 - tees
 - ells
2. Describe the procedures used to insulate screwed fittings.
3. Describe the procedures used to apply slit tubes.
4. Describe the procedures used to create fitting covers from pipe insulation.
 - i. single miter (stove pipe) fitting covers.
 - sweated joints
 - screwed joints
 - ii. sleeve types fitting covers
 - 90° ells
 - cross fittings
 - 45° ells
 - laterals
 - tees and valves
5. Describe the procedures used to create and apply sheet fabricated fitting covers.
 - i. lay-out short of long radius ells
 - use manufacturer's templates (available for most common fittings)
 - use charts for measurements

- take measurements from pipe
- ii. apply fitting cover to short or long radius ells
 - before or after adjacent pipe insulation
- iii. fabricate flanged valve covers
 - donuts
 - build out valve body
 - measure flange circumference
 - measure and cut insulation to fit valve body
 - measure and cut insulation to fit bonnet

6. Describe the procedures used to install flexible foam insulation at hangers.

- i. high density inserts
- ii. metal shields
- iii. vapor barrier

7. Describe the procedures used to install flexible foam sheets to ductwork and equipment.

- i. determine cut sizes
- ii. apply adhesive to both surfaces
- iii. use compression joints for butt joints
- iv. standing seams
- v. apply protective coatings

Practical:

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

1. Install flexible foam insulation to copper piping and various pieces of equipment.

HF1300 Air Handling System Components

Outcomes:

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

- identify air handling systems and components related to the Insulator occupation
- describe air handling systems and components related to the Insulator occupation

Pre-Requisites: None

Objectives and Content:

1. Identify the various types of air handling systems and their applications.
2. Identify and describe components of an air handling system (HVAC).
 - i. fresh air intake
 - ii. supply air
 - iii. return air
 - iv. relief air
 - v. exhaust air
 - vi. main (trunk)
 - vii. riser
 - viii. branch
 - ix. run-out
 - x. diffuser

Practical:

No Practical

HF1380 Insulate Underground Piping

Outcomes:

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

- describe the procedures used to insulate, seal, and finish underground piping
- use insulation for underground piping

Pre-Requisites: None

Objectives and Content:

1. Describe the procedures used to insulate underground piping using pipe covering.
 - i. application procedures
 - ii. insulating connectors
2. Describe the procedures used to seal and finish underground piping.
 - i. lines
 - reinforced laminated asphalt based jacket
 - primer and membrane
 - polyethylene film
 - ii. connectors

Practical:

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

1. Apply insulation to piping in preparation for underground installation.

HF1400 Parallel Line Development

Outcomes:

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

- demonstrate knowledge of parallel line development
- identify types of applicable layouts.
- describe procedures used to perform parallel line development

Pre-Requisites: None

Objectives and Content:

1. Perform the Math Calculations related to Introduction to parallel Line Development.
2. Describe parallel line development.
3. Describe the procedures for parallel line development.
4. Identify the basic geometry skills required for parallel line development.
5. Identify the necessary views of object required for parallel line development.
6. Identify the types of layout that can be produced by parallel line development.

Practical:

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

1. Perform basic parallel line development as per job sheet

HF1410 Radial Line Development

Outcomes:

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

- demonstrate knowledge of radial line development
- identify types of applicable layouts
- describe procedures used to perform radial line development

Pre-Requisites: None

Objectives and Content:

1. Perform the Math calculations related to Introduction to Radial Line Development.
2. Describe radial line development.
 - i. importance of the apex
3. Describe the procedures used for radial line development.
4. Identify the basic geometry skills required for radial line development.
5. Identify the necessary views of object required for radial line development.
6. Identify the types of layouts that can be produced by radial line development.

Practical:

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

1. Perform basic radial line development as per job sheet

HF1500 Tees, Valves and Elbows

Outcomes:

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

- describe procedures used to develop patterns for tees, valves, and elbows
- construct patterns for tees, valves, and elbows

Pre-Requisites: None

Objectives and Content:

1. Perform the Math calculations related to Introduction to Tees, Valves and Elbows.
2. Describe the procedures used to develop patterns for equal tee or valve.
 - i. layout template
 - ii. layout pattern for main or body
 - iii. layout pattern for branch or bonnet
 - iv. demonstrate how to provide for water-shed
3. Describe the procedures used to develop patterns for unequal tee or valve.
 - i. layout template
 - ii. layout pattern for main or body
 - iii. layout pattern for branch or bonnet
 - iv. demonstrate how to provide for water-shed
4. Describe the procedures used to develop patterns for long radius elbow.
 - i. use of mitre charts
 - ii. basic layout
 - radius of elbow
 - allowances for bead and crimp
 - iii. stretch out for gores
 - identify right and left gores
5. Describe the procedures to develop patterns for segmented (stove pipe) elbow.
 - i. basic layout
 - allowances for bead and crimp
 - ii. stretch out for gores

6. Describe the procedures to develop patterns for short radius elbow.
 - i. basic layout
 - radius of elbow
 - allowances for bead and crimp
 - ii. stretch out for gores
 - iii. layout of butterfly throat

Practical:

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

1. Make gore elbow, tee, and valves out of aluminum.

HF1510 Flanges and End-caps

Outcomes:

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

- describe procedures used to develop patterns for flanges and end-caps
- construct patterns for flanges and end-caps

Pre-Requisites: None

Objectives and Content:

1. Perform the Math calculations related to Introduction to Flanges and End-caps.
2. Describe the procedures to develop patterns for flanges.
 - i. three partial patterns
 - ii. flange thickness
 - iii. edge covers
 - iv. adjoining pipe
 - v. demonstrate how to provide for water-shed
 - vi. tools and equipment required to finish and apply finished product to the insulated surface.
3. Describe the procedures to develop patterns for end-caps.
 - i. one piece end-cap
 - ii. two piece end-cap

Practical:

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

1. Apply insulation to flanges and end-caps.

Advanced Training – Block 3

HF1330 Insulating Breeching, Flues and Precipitators

Outcomes:

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

- describe the procedures used to insulate breechings and the use of associated equipment
- use insulation on breaching

Pre-Requisites: None

Objectives and Content:

1. Describe the procedures used to provide air space.
 - i. rectangular surface
 - ii. cylindrical surface
2. Describe the procedures to insulate round breechings.
 - i. apply blanket or rigid-wrap
 - using bands
 - using metal mesh blanket
3. Describe the procedures used to insulate rectangular breechings.
 - i. applying block insulation
 - ii. fastening methods
 - stand-offs
4. Describe the procedures for pin welding.
 - i. types of pin welders
 - capacitor discharge (CD)
 - stud weld
 - ii. types of pins and studs
 - iii. placement of pins
5. Describe the procedures used to finish ducts and breechings.

- i. applying canvass
- ii. applying PVC
- iii. applying metal jacketing

6. Describe refractory systems.

- i. reflective, castable and cavity
- ii. temperature ranges
- iii. specifications
- iv. application methods
- v. expansion and contraction
- vi. thermal shock

Practical:

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

1. Apply insulation to a Breeching.

HF1340 Insulating Methods (Cylinders and Heads)

Outcomes:

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

- describe the procedures used to insulate tank heads and cylinders with rigid insulation
- describe the procedures used to insulate tank heads and cylinders insulation flexible insulation
- use rigid insulation
- use flexible insulation

Pre-Requisites: None

Objectives and Content:

1. Describe the procedures used to insulate cylinders with rigid insulation.
 - i. measure and cut lags
 - calculate lag size
 - given diameter
 - given circumference
 - calculate bevel on lag
 - ii. score or kerf board insulation
 - iii. create expansion joints for hot work
 - iv. fastening insulation to substrate surface
 - v. temporary holding of materials
 - vi. cylinder legs or supports
 - vii. use of chokers
2. Describe the procedures used to insulate tank heads with rigid insulation.
 - i. types (shapes) of tank heads
 - ii. top heads
 - application of insulation to large and small heads
 - iii. bottom heads
 - chokers and pigtail wires
 - iv. on hot work
 - v. on cold work

3. Describe the procedures used to insulate cylinders with flexible fibrous insulation.
 - i. proper installation methods
 - ii. use of support bars on large diameter vessels
 - iii. insulating tank head with flexible fibrous insulation

Practical:

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

1. Apply flexible and rigid insulation to tank heads.

HF1350 Finishing Methods

Outcomes:

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

- describe the procedures used to apply finishes to tank heads and cylinders
- use finishing materials on tank heads

Pre-Requisites: None

Objectives and Content:

1. Describe the procedures used to finish heads.
 - i. apply canvass
 - ii. apply mastic
 - iii. apply metal gores
2. Describe the procedures used to finish bodies of cylinders.
 - i. apply canvass
 - ii. apply metal jacketing
 - iii. apply plastic jacketing

Practical:

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

1. Apply finishing material to tank heads.

HF1360 Introduction to Cryogenic Work

Outcomes:

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

- describe the properties of cryogenic work
- identify the types of insulation material used in cryogenic work

Pre-Requisites: None

Objectives and Content:

1. Define cryogenic work.
2. Explain the importance vapor pressure plays in cryogenic insulation work.
3. Identify the types of insulation material used in cryogenic temperature ranges.

Practical:

No Practical

HF1370 Insulating Cryogenic Systems

Outcomes:

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

- describe the procedures used to insulate cryogenic systems
- use foam glass

Pre-requisites: None

Objectives and Content:

1. Describe the procedures used to install cellular glass or rigid foam to pipes and equipment for cryogenic service.
 - i. all joints staggered
 - ii. applied in several layers
 - iii. sealing joints
 - iv. vapor stops
 - v. expansion/contraction joints
 - vi. at pipe supports and hangers
 - vii. external vapor barrier required
2. Describe the procedures used to insulate pipe connectors between prefabricated insulated pipe sections.
 - i. foam in place
 - calculate volume required
 - factor expansion rate of foam
 - snap time of foam product
 - forms required
 - methods to deliver foam
3. Describe the procedures to insulate pipe by foaming in place.
 - i. setting of forms
 - ii. delivery of foam product
4. Describe the procedures used to insulate a tank shell using particulate insulation.
 - i. application of particulate
 - ii. sealing the vessel once insulation is in place

5. Describe the procedures used to insulate pipes or equipment by packing in mineral wool.
 - i. equipment or pipes encased in metal box
 - mineral wool packed to desired density

Practical:

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

1. Apply foam glass insulation to piping, valves, and fittings.

HF1420 Triangulation

Outcomes:

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

- demonstrate knowledge of triangulation
- identify types of applicable layouts
- describe procedures used to perform triangulation

Pre-Requisites: None

Objectives and Content:

1. Perform the Math Calculations related to Introduction to Triangulation.
2. Describe triangulation.
3. Describe the procedures for triangulation.
 - i. true length lines
 - ii. Pythagorean theorem
4. Identify the basic geometry skills required for triangulation.
5. Identify the necessary view of object required for triangulation.
6. Identify the types of layouts that can be produced by triangulation.

Practical:

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

1. Perform basic triangulation development as per job sheet.

HF1520 Cones, Bevels and Transitions

Outcomes:

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

- describe procedures used to layout and develop patterns for cones, bevels, and transitions
- construct patterns for cones, bevels and transitions

Pre-Requisites: None

Objectives and Content:

1. Perform the Math calculations related to Introduction to Cones, Bevels and Transitions.
2. Describe the procedures used to produce layout for 45° bevel.
 - i. drawn with a series of concentric circles
 - ii. identify measurements required
 - iii. calculation of the size of material required for pattern layout
 - iv. allowances for bead and crimp
 - v. tools and equipment required to finish and apply the finished product to the insulated surface
3. Describe the procedures used to develop pattern for a cylindrical cone (concentric reducer).
 - i. identify measurement required
 - ii. calculation of the size of material required for pattern layout
 - iii. describe how to finish pattern for water-shed and adjoining pieces
 - iv. tools and equipment required to finish and apply the finished product to the insulated surface
4. Describe the procedures used to develop pattern for square to square concentric reducer.
 - i. identify measurements required
 - ii. calculation of the size of material required for pattern layout
 - iii. describe how to finish pattern for water-shed and adjoining pieces

- iv. tools and equipment required to finish and apply the finished product to the insulated surface

5. Describe the procedures used to layout pattern for square to round or round to square transition.
 - i. using triangulation method of development
 - ii. using radial line development
 - iii. identify which views are required
 - iv. identify measurements required
 - v. calculation of the size of material required for pattern layout
 - vi. describe how to finish pattern for water-shed and adjoining pieces
 - vii. tools and equipment required to finish and apply the finish product to the insulated surface
6. Describe how to layout pattern for eccentric reducing cones.
 - i. using triangulation method of development
 - ii. using radial line development
 - iii. identify which views are required
 - iv. identify measurements required
 - v. calculation of the size of material required for pattern layout
 - vi. describe how to finish pattern for water-shed and adjoining pieces
 - vii. tools and equipment required to finish and apply the finish product to the insulated surface

Practical:

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

1. Make a pattern for cones.
2. Make a pattern for bevels.
3. Make a pattern for transitions.

HF1540 Tank Heads

Outcomes:

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

- describe procedures used to layout patterns for tank heads

Pre-Requisites: None

Objectives and Content:

1. Describe the procedures used to layout pattern for tank heads.
2. Explain the use of starter piece, center piece and anchor strips.
3. Identify starter gore, closing gore, right and left gores.
4. Explain the steps to do a snap line head gore.
 - i. identify measurements required
 - ii. transfer measurements to layout
 - iii. allowance for bead and crimp
5. Describe layout for flat or conical head gores.

Practical:

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

1. Make and apply gores to tank heads.

HF2270 Blueprint Reading – Part II

Outcomes:

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

- read and interpret information from related construction drawings

Pre-requisites: None

Objectives and Content:

1. Read architectural drawings.
 - i. architectural sheets
 - items of information
 - ii. architectural drawings
 - know way around
 - quickly find out general information about a new building
2. Read structural drawings.
 - i. use structural drawings
 - proper manner
 - find information
 - correctly interpret elevation markings
 - identify steel beams by codes
 - marked on structural drawings
3. Read plumbing drawings.
 - i. use plumbing drawings
 - ii. find necessary information
 - domestic water system
 - hot water
 - cold water
 - drainage
 - sewer connections
 - iii. read plumbing drawings to determine
 - lines that need to be insulated
 - lines that do not need to be insulated

4. Read electrical drawings.
 - i. read electrical drawings to
 - find where the heat tracing is being used
 - ii. exhaust pipe on emergency generator to be insulated
 - carrying out asbestos abatement work
 - electrical drawings are used to
 - determine fixtures to be removed
 - power outlets to be located
5. Read mechanical drawings.
 - i. use mechanical drawings to find information on
 - insulation requirements of various sections of the HVAC system
 - what parts of that system require insulation to be installed
6. Ductwork drawings.
 - i. read drawings to find information regarding ductwork
7. Read pipe drawings.
 - i. read drawings to find information regarding piping
8. Estimate material quantities and sequence to accomplish jobs.

Practical:

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

1. Interpret and sketch drawings and diagrams.
2. Estimate materials required from a drawing.

Profile Chart

Occupational Skills			
MA1050 Basic Math	HF1101 Hand and Power Tools	HF1110 Shop Tools and Equipment	HF1200 Insulation Materials
HF1201 Insulation Practices	HF1250 Introduction to Asbestos	HF1270 Blueprint Reading, Part 1	HF1510 Flanges and End Caps
HF1520 Cones, Bevels and Transitions	HF2150 Workplace Communications	HF2270 Blueprint Reading, Part 2	
Industrial Application			
HF1150 Insulation Principles	HF1200 Insulation Materials	HF1220 Introduction to Pipe and Pipe Systems	HF1230 Installing Pipe Insulation
HF1280 Introduction to Foam insulation	HF1330 Insulation Breeching, Flues and Precipitators	HF1340 Insulation Methods (Cylinders and Heads)	HF1350 Finishing Methods
HF1360 Introduction to Cryogenic Work	HF1370 Insulating Cryogenic Systems	HF1380 Insulate Underground Piping	HF1400 Parallel Line Development
HF1410 Radial Line Development	HF1420 Triangulation	HF1520 Cones, Bevels and Transitions	HF1540 Tank Heads
Commercial Application			
HF1150 Insulation Principles	HF1200 Insulation Materials	HF1201 Insulation Practices	HF1300 Air Handling System Components
HF1310 Blanket Insulation	HF1320 Fibrous Board Insulation	HF1330 Insulation Breeching, Flues and Precipitators	HF1350 Finishing Methods
HF1520 Cones, Bevels and Transitions	HF1540 Tank Heads		

Asbestos Abatement		
HF1250 Introduction to Asbestos	HF1260 Asbestos Removal Procedures	
Spraying Insulating Materials		
HF1550 Fire Stopping		
Fire Stopping and Fireproofing		
HF1550 Fire Stopping		

NOA Comparison Table

NOA Sub-task		Plan of Training Unit		
Task 1 – Maintains tools and equipment				
1.01	Maintains hand tools	HF1101 HF1110	Hand and Power Tools	
1.02	Maintains power tools		Shop Tools and Equipment	
1.03	Maintains spray equipment			
1.04	Maintains layout and fabrication tools and equipment			
1.05	Maintains PPE and safety equipment	HF1101 HF1250	Hand and Power Tools Introduction to Asbestos	
Task 2 – Organizes Work				
2.01	Performs task scheduling	HF1270 HF2270	Blueprint reading, part 1	
2.02	Interprets specifications and drawings		Blueprint reading, part 2	
2.03	Uses documentation	HF1510 HF1520	Flanges and End Caps Cones, Bevels and Transitions	
2.04	Communicates with others	HF2150	Workplace Communication	
2.05	Organizes materials	HF1270 HF2270	Blueprint Reading, part 1 Blueprint Reading, part 2	
Task 3 – Performs Routine Trade Activities				
3.01	Performs measurements	HF1101 MA1050	Hand and Power Tools Basic Math	
3.02	Uses access equipment	HF1101 HF1201	Hand and Power Tools Insulation Practices	
3.03	Prepares substrate	HF1200	Insulation Materials	
3.04	Applies sealants			
3.05	Maintains safe work environment	Practiced in all courses		
Task 4 – Installs insulation for piping and fittings				
4.01	Selects pipe insulations	HF1220	Introduction to Pipe and Pipe systems	
4.02	Fabricates insulation for pipe fittings and hangers	HF1230	Installing Pipe Insulation	
4.03	Cuts pipe insulation			
4.04	Fits pipe insulation			

Task 5 – Installs insulation for tanks, vessels and equipment				
5.01	Cuts insulation for tanks, vessels and equipment	HF1220 HV1330 HF1340 HF1520	Introduction to Pipe and Pipe Systems	
5.02	Fits insulation for tanks, vessels and equipment		Insulating Breeching, Flues and Precipitators	
5.03	Fastens insulation on tanks, vessels and equipment		Insulating methods (Cylinders and Heads)	
			Cones, Bevels and Transitions	
Task 6 – Installs protective cladding				
6.01	Selects cladding	HF1350	Finishing Methods	
6.02	Performs cladding layout	HF1400	Parallel Line Development	
6.03	Fabricates cladding	HF1410	Radial Line Development	
6.04		HF1420	Triangulation	
	Assembles cladding components	HF1540	Tank Heads	
Task 7 – Installs removable covers				
7.01	Layout removable covers	HF1350 HF1400 HF1410 HF1420 HF1540	Finishing Methods	
7.02	Fabricates removable covers		Parallel Line Development	
7.03	Fits removable covers		Radial Line Development	
			Triangulation	
			Tank Heads	
Task 8 – Insulates for refractory and cryogenic applications				
8.01	Applies insulation to refractory systems	HF1330	Insulating Breeching, Flues and Precipitators	
8.02	Applies insulation to cryogenic systems	HF1360 HF1370	Introduction to cryogenic work Insulating Cryogenic Systems	

Task 9 – Installs underground insulating systems			
9.01	Applies pipe insulation to underground systems	HF1280 HF1380	Introduction to Foam Insulation
9.02	Applies pour-in-place insulation to underground systems		Insulate Underground Piping
Task 10 – Insulates for soundproofing for industrial applications			
10.01	Insulates industrial piping for soundproofing	HF1150	Insulation Principles
10.02	Insulates turbines and equipment for soundproofing		
Task 11 – Insulates for marine applications (not common core)			
11.01	Insulates bulkheads, deckheads and hulls	HF1200	Insulation Materials
11.02	Installs finish material on marine applications		
Task 12 – Insulates plumbing systems and mechanical piping			
12.01	Selects insulation for plumbing systems and mechanical piping	HF1201	Insulation Practices
12.02	Cuts insulation for plumbing systems and mechanical piping		
12.03	Fits insulation for plumbing systems and mechanical piping		
12.04	Installs vapour barrier on plumbing systems and mechanical piping		
Task 13 – Insulates mechanical ducting			
13.01	Selects insulation for mechanical ducting	HF1310 HF1320 HF1300	Blanket Insulation
13.02	Cuts insulation for mechanical ducting		Fibrous Board Insulation
13.03	Fits insulation for mechanical ducting		Air Handling System Components
13.04	Installs vapour barrier for insulation for mechanical ducting		

Task 14 – Insulates mechanical equipment			
14.01	Selects insulation for mechanical equipment	HF1150 HF1201 HF1320 HF1330 HF1520	Insulation Principles
14.02	Cuts insulation for mechanical equipment		Insulation Practices
14.03	Fits insulation for mechanical equipment		Fibrous Board Insulation
14.04	Installs vapour barrier for mechanical equipment		Insulation Breeching, flues and Precipitators
			Cones, Bevels and Transitions
			Tank Heads
Task 15 – Installs protective finishes			
15.01	Selects protective finishes	HF1200	Insulation Materials
15.02	Cuts protective finishes		
15.03	Fits protective finishes	HF1350	Finishing Methods
Task 16 – Insulates for soundproofing for commercial applications			
16.01	Selects soundproofing materials	HF1150	Insulation Principles
16.02	Insulates piping for soundproofing		
16.03	Insulates plenums for soundproofing		
16.04	Installs acoustic panels to ceilings and walls		
Task 17 – Prepares for asbestos abatement			
17.01	Retrieves sample of asbestos for testing	HF1250 HF1260	Introduction to Asbestos
17.02	Determines scope of work		Asbestos Removal Procedures
17.03	Determines PPE for asbestos abatement		
17.04	Prepares site for removal or containment of asbestos		
17.05	Builds temporary enclosure		
Task 18 – Performs asbestos removal procedures			
18.01	Removes asbestos	HF1250 HF1260	Introduction to Asbestos
18.02	Disposes of asbestos material		Asbestos Removal Procedures

Plan of Training – Insulator (Heat and Frost)

Task 19 – Performs maintenance repair			
19.01	Encapsulates asbestos	HF1250	Introduction to Asbestos
19.02	Encloses asbestos		Asbestos Removal Procedures
Task 20 – Prepares for spraying.			
20.01	Protects surrounding work area for spraying	HF1550	Firestopping
20.02	Prepares material, equipment and substrate for spraying		
Task 21 – Sprays insulations, sealers and coatings			
21.01	Installs reinforcing material for spraying	HF1550	Firestopping
21.02	Applies spray		
Task 22 – Installs fire stop systems			
22.01	Applies fire stop materials	HF1550	Firestopping
22.02	Covers fire stop materials		
22.03			
Task 23 – Installs fireproofing			
23.01	Applies fireproofing to structural components	HF1550	Firestopping
23.02	Applies fireproofing to electrical components		