

**A PLAN OF TRAINING
FOR
PLUMBER
OCCUPATION**

**Approved by
Provincial Apprenticeship and Certification Board**

**April, 1997
Revised June, 2000**

Foreword

Apprenticeship training in the Province of Newfoundland and Labrador is undergoing considerable change. This change is prompted by the need to keep pace with technological changes in industry, the need to be competitive, and the desire to be efficient and effective in meeting the needs of the apprentice. We feel that this training plan will lay the groundwork to meet both the demands of industry and the needs of the apprentice.

The plan that follows is a comprehensive one. It recognizes that apprenticeship training begins when a student first registers at a training institution, or signs a Contract of Apprenticeship with an employer, and continues until such time as the apprentice has completed all of the required technical training and has received the required industry experiences necessary to write an interprovincial examination. Passing this examination will result in the apprentice receiving Red Seal Certification which gives the journeyman national mobility of qualifications. This plan also recognizes the need to provide flexible access to training based on the needs of the employer and the apprentice while at the same time recognizing the end goal is to complete the requirements for Red Seal Certification.

It is realized that change in all facets of education and industry is continuous and sometimes rapid. This change will necessitate the review of this document on a continuous basis to ensure that current needs of industry and apprentices are being satisfied. Through a process of accreditation, regular input from industry advisory committees, as well as input from those involved in the administration and delivery of the training, we are confident that residents of our province who elect to pursue an apprenticeable occupation as a career choice will receive high quality training and thus will be prepared to compete for jobs worldwide.

Chair
Provincial Apprenticeship and Certification Board

Minister
Youth Services and Post-Secondary Education

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CONDITIONS GOVERNING APPRENTICESHIP TRAINING

1.0 GENERAL

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

2.0 ENTRANCE REQUIREMENTS

2.1 Entry into the occupation as an apprentice requires:

The completion of designated first year courses specific to the occupation

OR

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

OR

Enrolment in a program of studies that includes all entry and advanced level skills and required work experiences as approved by the Provincial Apprenticeship and Certification Board.

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

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

2.4 A Registration for Apprenticeship form must be duly completed.

3.0 PROBATIONARY PERIOD

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

4.0 TERMINATION OF A MEMORANDUM OF UNDERSTANDING

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

5.0 APPRENTICESHIP PROGRESSION SCHEDULE AND WAGE RATES

5.1 Progression Schedule

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

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

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

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

6.0 TOOLS

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

7.0 PERIODIC EXAMINATIONS

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

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

8.0 GRANTING OF CERTIFICATES OF APPRENTICESHIP

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

9.0 HOURS OF WORK

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

10.0 COPIES OF THE REGISTRATION FOR APPRENTICESHIP

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

11.0 RATIO OF APPRENTICES TO JOURNEYPEOPLE

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

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

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

13.0 AMENDMENTS TO A PLAN OF APPRENTICESHIP TRAINING

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

14.0 EMPLOYMENT, RE-EMPLOYMENT AND TRAINING REQUIREMENTS

- 14.1 The plan of training requires Apprentices to attend regularly their place of employment.
 - 14.2 The plan of training requires Apprentices to regularly attend training programs for that occupation as prescribed by The Provincial Apprenticeship and Certification Board.
 - 14.3 Failure to comply with Sections 14.1 and/or 14.2 will result in cancellation of the Memorandum of Understanding. Apprentices may have their M.O.U.'s reinstated by the Provincial Apprenticeship and Certification Board but would be subject to a commitment to complete the entire program as outlined in the General Conditions of Apprenticeship. Permanent cancellation in the said occupation is the result of non-compliance.
 - 14.4 Cancellation of the Memorandum of Understanding to challenge journeyman examinations, if unsuccessful, would require an apprentice to serve a time penalty of two (2) years before reinstatement as an apprentice or registering as a Trade Qualifier.
 - 14.5 Under the plan of training the employer is required; to keep each apprentice employed as long as work is available, and if the apprentice is laid off due to lack of work, to give opportunity to be re-employed before another is hired.
 - 14.6 The employer will permit each apprentice to attend regularly training programs as prescribed by the Provincial Apprenticeship and Certification Board.
 - 14.7 Apprentices who cannot acquire all the workplace skills at their place of employment will have to be evaluated in a simulated work environment at a training institution and have sign-off done by instructors to meet the requirements for certification.
- 15.0 APPEALS TO DECISIONS BASED ON CONDITIONS GOVERNING APPRENTICESHIP TRAINING

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

REQUIREMENTS FOR RED SEAL CERTIFICATION
IN THE PLUMBER OCCUPATION

1. Evidence that the required work experiences outlined in this plan of training has been obtained. This evidence must be in a format that clearly outlines the experiences and a signature (s) of an appropriate person(s) attesting that these experiences have been obtained to the level required.
2. Normally, have a combination of training from an accredited training program and suitable work experience totalling 7200 hours

Or

Have a total of 9000 hours of suitable work experience.

3. Completion of a National Red Seal examination to be set at a place and time determined by the Industrial Training Division of the Department of Youth Services and Post-Secondary Education.
4. Pay the appropriate examination fee.

ROLES AND RESPONSIBILITIES OF STAKEHOLDERS IN THE APPRENTICESHIP PROCESS

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

Apprentices

- ▶ to complete all required technical training courses as approved by the Provincial Apprenticeship and Certification Board.
- ▶ to find appropriate employment
- ▶ to complete all required work experiences in combination with the required hours.
- ▶ to ensure that the work experiences are well documented
- ▶ to approach apprenticeship training with an attitude and commitment that fosters the qualities necessary for a successful career as a qualified journeyman.
- ▶ to obtain the required hand tools as specified by the Board for each period of training of the apprenticeship program.
- ▶ to provide feedback to Training Institutions, the Industrial Training Division and Employers in an effort to establish a process of continuous quality improvement.

Employers

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

Training Institutions

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

Industrial Training Division

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

Provincial Apprenticeship and Certification Board

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

TS 1510 OCCUPATIONAL HEALTH AND SAFETY

Description:

This course is designed to give participants the knowledge and skills necessary to interpret the Occupational Health and Safety Act laws and regulations; understand the designated responsibilities within the laws and regulations; know the responsibilities importance of joint health and safety committees/representatives within the laws and regulations; examine right to refuse dangerous work; describe discriminatory action; explain duties of commission officers; interpret appeals of others; and, emphasize the reporting of accidents.

Prerequisites:

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
 - a. Explain the scope of the act
 - Application of the act
 - Federal/Provincial jurisdictions
 - Canada Labour Code
 - Rules and regulations
 - Private home application
 - Conformity of the Crown by the Act
2. Explain responsibilities under the Act & Regulations
 - Duties of employer, owner, contractors, sub-contractors, employees, and suppliers
3. Explain the purpose of joint health and safety committees
 - Formation of committee
 - Functions of committee
 - Legislated rights

- Deviation from policy standards
 - Performance of other duties
 - Health and safety representation
 - Reasonable grounds for refusal
 - Reporting endangerment to health
 - Appropriate remedial action
 - Committee recommendation
 - Investigation of endangerment
 - Employer's responsibility in taking remedial action
4. Examine right to refuse dangerous work
- Reasonable grounds for refusal
 - Reporting endangerment to health
 - Appropriate remedial action
 - Committee recommendation
 - Investigation of endangerment
 - Employer's responsibility to take appropriate remedial action
 - Action taken when employee does not have reasonable grounds for refusing dangerous work
 - Employee's rights
 - Assigning another employee to perform duties
 - Temporary reassignment of employee to perform other duties
 - Collective agreement influences
 - Wages and benefits
5. Describe discriminatory action
- Definition
 - Filing a complaint procedure
 - Allocated period of time a complaint can be filed with the Commission
 - Duties of an arbitrator under the Industrial Relations Act
 - Order in writing inclusion
 - Report to commission Allocated period of time to request Arbitrator to deal with the matter of the request
 - Notice of application
 - Failure to comply with the terms of an order
 - Order filed in the court
6. Explain duties of commission officers
- Powers and duties of officers

- Procedure for examinations and inspections
 - Orders given by officers orally or in writing
 - Specifications of an order given by an officer to owner of the place of employment, employer, contractor, sub-contractor, employee, or supplier
 - Service of an order
 - Prohibition of persons towards an officer in the exercise of his/her power or duties
 - Rescinding of an order
 - Posting a copy of the order
 - Illegal removal of an order
7. Interpret appeals of others
- Allocated period of time for appeal of an order
 - Person who may appeal order
 - Action taken by Commission when person involved does not comply with the order
 - Enforcement of the order
 - Notice of application
 - Rules of court
8. Explain the process for reporting of accidents
- Application of act
 - Report procedure
 - Reporting notification of injury
 - Reporting accidental explosion or exposure
 - Posting of act and regulations

Practical:

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

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

TS1530

First Aid

Description:

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

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

**TS 1520 WORKPLACE HAZARDOUS MATERIALS
 INFORMATION SYSTEM (WHMIS)**

Description:

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

Course Outcomes:

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

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

Required Knowledge and Skills:

1. Define WHMIS safety
 - Rational and key elements
 - History and development of WHMIS
 - WHMIS legislation
 - WHMIS implementation program
 - Definitions of legal and technical terms

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

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

Practical

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

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

SUGGESTED RESOURCES:

1. WHMIS Regulation
2. Sample MSDS sheets

SUGGESTED COURSE LAYOUT FOR PLUMBER

Program & Apprenticeship Registration

ENTRY LEVEL COURSES	
PF1160 - Piping Shop Fundamentals	105hrs.
TS1300 -Rigging	45hrs.
DR1760 - Basic Drawing & Sketching	75 hrs.
WD1210 - Oxy-Fuel Cutting & Welding	60hrs.
WD1120- SMAW Fundamentals	90hrs.
PF1140- Plumbing Fundamentals	60hrs.
PF1530 - Drainage & Sewage Disposal Systems	105hrs.
PF1510 - Plumbing Venting Systems	120hrs.
WA1810 - Water Supply Systems	45hrs.
PF1520 - Plumbing Appliances	90hrs.
PF2240 - Hot Water Heating Systems	105hrs.
*CM2150 - Workplace Correspondence	45hrs.
*SD1710 - Job Search Techniques	15hrs.
*SD1720 - Entrepreneurial Awareness	15hrs.
*MC1050 - Introduction to Computers	30hrs.
*MR1210 - Customer Service	30hrs.
*SP2330 -QA/QC	30hrs.
*SD1700 - Workplace Skills	30hrs.
*Related courses are to be interspersed throughout the program.	

Required Work Experience(*if applicable*)

ADVANCED LEVEL COURSES	
PF1150 - Introduction to Piping and Heating Control Systems.	30hrs
OM1100 - Basic Oil Burner	60hrs.
PF1330 - Alternate Heat Generators	45hrs.
PF1220 - Pump Installation	45hrs.
PF2410 - Specialized Piping Systems	60hrs.
PF2500 - Cross Connection Control	45hrs.

Work Experience

Journeypersons Certification

TECHNICAL COURSE OUTLINES

NAME & NUMBER PF1160 - Piping Shop Fundamentals

DESCRIPTION

This general studies course requires the use of safety equipment, tools, fasteners, shop equipment and facilities and manuals. It involves the development of safety practices in the operation and maintenance of shop tools, equipment and facilities.. It includes information on general safety regulations, occupational health and safety, and fire prevention and suppression.

MAJOR TOPICS/TASKS

Practice safety; Complete the appropriate St. John's Ambulance First Aid Course for this occupation; Complete a Workplace Hazardous Materials Information Systems Course; Use and maintain gripping and turning tools, measuring devices and levels; Use and maintain flaring tools; Use and maintain cutting tools; Use and maintain threading devices; Install fasteners; Safely and effectively use, maintain and store pullers, drivers and presses; Solder metals; Use power tools; Drill materials; Cut metals (power); Grind and finish metals; Use explosive actuated tools; Use and maintain compressed air system; Use and maintain shop equipment

PURPOSE / AIMS

1. To gain an appreciation of the need for safety regulations in the operation and maintenance of shop tools, equipment and facilities
2. To be able to administer first aid and CPR
3. To develop an awareness of hazardous workplace materials

PREREQUISITES None

COURSE DURATION 105hrs

LEARNING RESOURCES

New Brunswick Modules
Steamfitter/Pipefitter Manual
Math for Plumbers & Pipefitters
Centennial College Modules
Template Development
Welding (Pender)
Pipe Trades Handbook
Basic Blueprint Reading & Sketching

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED December 1993

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Practice safety
 - a. List general workplace safety regulations
 - b. List fire safety regulations
 - c. Describe the operation and uses of different types of fire extinguishers
 - d. Explain the safety standards prescribed by the Occupational Health and Safety Regulations
 - e. Interpret occupational safety code
 - f. Apply safe work habits at all times
 - g. Use and maintain personal safety equipment
 - h. Implement exhaust control procedures
 - i. Use fire fighting equipment
 - j. Respect noise level regulations
 - k. Reduce factors that contribute to spontaneous combustion
 - l. Identify potential hazards to personal safety
 - m. Check for unsafe conditions
 - n. Report accident
2. Complete the appropriate St. John's Ambulance First Aid Course for this occupation.
3. Complete a Workplace Hazardous Materials Information Systems Course
4. Use and maintain gripping and turning tools, measuring devices and levels
 - a. Describe the use of the different types of precision measuring tools
 - b. Describe the pliers (all types), screwdrivers (all types), wrenches (all types), clamps (all types) and vices (all types) used for fitting and assembling as per assigned information to within specifications required
 - c. Use measuring tools (measuring tapes, rules, scale rules, calipers, micrometers, gauges, straight edges, plumb bobs, squares, and calculators) and levels
 - d. Use pliers, screwdrivers, wrenches, torque multipliers, hammers and mallets and other gripping and turning tools
 - e. Use torque wrench
 - f. Use scribes and markers
5. Use and maintain flaring tools
 - a. Describe types of tubing and flaring tools and explain the application of each
 - b. Single and double flare tubing

- c. Bend tubing
 - d. Measure and cut tubing
 - e. Use compression fittings
 - f. Anneal tubing before flaring as may be necessary
 - g. Test and inspect flared fittings
6. Use and maintain cutting tools
- a. Identify, maintain and use punches, chisels, files and saws
 - b. Sharpen chisels and twist drills and drill bits
 - c. Shape and sharpen a cold chisel
 - d. Maintain and store cutting tools
 - e. Cut sheet metal
 - f. Make bench projects
 - g. Cut bolts
 - h. Drill and ream holes
7. Use and maintain threading devices
- a. Explain the purpose of threading taps and dies
 - b. Select and safely use proper tools for given job
 - c. Maintain threading tools
 - d. Make an internal thread
 - e. Make an external thread
 - f. Restore damaged thread
 - g. Remove broken screw
 - h. Use tap and drill chart
8. Install fasteners
- a. Describe safety requirements for using hand tools and fasteners
 - b. Describe the different types of fasteners
 - c. Explain oxidation, corrosion, tensile strength and shear strength
 - d. Describe the types of fastener tools
 - e. Describe as per the assigned information, rivets, keys, nuts, screws, pins, splines, studs, bolts, snaprings, bonds (thread locking compounds), washers, lock wires and self-locking nuts
 - f. Use and identify fasteners such as rivets, nails, wood screws, sheet metal screws, bolts, nuts, washers, masonry anchors and shields
 - g. Describe specific uses for each fastener
 - h. Recognize sizes of fasteners
 - i. Rivet and soft solder lap joint in galvanized sheet
 - j. Torque bolts
 - k. Identify bolt grades
 - l. Identify miscellaneous anchoring devices

9. Safely and effectively use, maintain and store pullers, drivers and presses
 - a. Describe types and explain the uses of pullers, drivers and presses

10. Solder metals
 - a. Describe soldering tools, materials and applications
 - b. Describe methods of tinning and soldering
 - c. Describe types of solders
 - d. Select solder and heating unit
 - e. Solder wire connections, sheet metal, and copper fittings and tubing
 - f. Shut down and store equipment

11. Use power tools
 - a. Describe the different types of power tools
 - b. Describe the different types of hydraulic tools
 - c. Describe safety requirements for using power tools
 - d. Describe types of hydraulic and pneumatic lines and fittings and explain their applications
 - e. Operate portable power tools
 - f. Operate treading machines
 - g. Operate power cleaning equipment
 - h. Operate hydraulic punches, pullers, drivers and presses

12. Drill materials
 - a. Describe the parts of a twist drill
 - b. Describe drill sizes and speed requirements
 - c. Describe types and uses of reaming tools
 - d. Safely and effectively operate power drilling equipment (hammer and portable drill)
 - e. Select and use cutting fluids
 - f. Identify and select clamping devices
 - g. Maintain drilling equipment

13. Cut metals (power)
 - a. Explain the purpose of cutting power tools
 - b. Safely and effectively use power operated saws, friction cut-off equipment and shears
 - c. Maintain metal cutting power tools
 - d. Identify and use abrasives

14. Grind and finish metals
 - a. Describe types and explain applications of:
 - i. portable and stationary grinders

- ii. grinding wheels
 - iii. grinding discs
 - iv. grinder dressers
 - v. rotary wire brushes
 - b. Install grinding wheel disc and brush
 - c. Adjust tool rest
 - d. Dress grinding wheel
 - e. Safely and effectively operate stationary and portable grinders
 - f. Maintain equipment
15. Use explosive actuated tools
- a. Select the proper tool for a specific use
 - b. Follow Occupational Health and Safety regulations
 - c. Choose the correct shot and fastener for the job
 - d. Apply safety practices while using explosive actuated tools
 - e. Fasten construction material to masonry and steel
 - f. Maintain and clean explosive actuated tools
16. Use and maintain compressed air system
- a. Describe types of compressors and components
 - b. Demonstrate safety precautions when using and maintaining compressors
 - c. Identify components of air controller (transformer)
 - d. Use and maintain air controller (transformer)
 - e. Use and maintain air and fluid hoses
17. Use and maintain shop equipment
- a. jacks
 - b. shop cranes
 - c. chain hoists
 - d. steam cleaner
 - e. solvent cleaning tanks

NAME & NUMBER TS1300 - Rigging

DESCRIPTION

This general studies course requires the use of rigging equipment, ladders, block and tackle, and safety equipment. It involves installing, testing and maintaining rigging; and tying knots and splicing rope. It includes information on safety requirements, types of ropes, types of knots, slings, types of scaffolds, and types of ladders.

MAJOR TOPICS/TASKS

Use and maintain rigging equipment; Use and maintain overhead cranes; Use scaffolding and rigging

PURPOSE / AIMS

1. To develop the skills and knowledge required to install safe rigging

PREREQUISITES None

COURSE DURATION 45hrs

LEARNING RESOURCES

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED December 1993

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Use and maintain rigging equipment
 - a. List the Occupational Health and Safety Regulations for rigging
 - b. Describe the different types of ropes
 - c. List the different kinds of knots
 - d. Describe slings.
 - e. Describe the different types of ladders
 - f. Describe methods of lead balancing
 - g. Describe the proper procedures and equipment for handling heavy objects
 - h. Specify the use of screw jacks versus hydraulic units
 - i. Recognize and use hand signals
 - j. Recognize lifting capabilities
 - k. Recognize necessity for swing staging

- l. Interpret occupational health and safety regulations
 - m. Select and install ladders
 - n. Install scaffolds
 - o. Demonstrate the safe and proper use of lifting equipment such as come-a-longs, chain falls, jacks, winches, overhead cranes, jacks, skids, cable tuggers, reeve blocks, slings and rope
 - p. Demonstrate proper use of knots
 - q. Use lifting attachments such as eye bolts and lifting lugs, beam clamps and crawlers, snatch blocks, spreader bars, shackles and screw jacks
 - r. Transfer loads using lifting equipment
2. Use and maintain overhead cranes
- a. Safely and effectively use overhead cranes
 - b. Use proper lifting procedures
 - c. Use hoisting and/or crane signals
 - d. Use plate grab and/or slings
3. Use scaffolding and rigging
- a. Describe the different types of scaffolds
 - b. Describe the safety factors to be considered when using swing staging
 - c. Explain how suspended scaffolding is erected and when and how it is used
 - d. Describe power scaffolding
 - e. List safety rules for erecting and working on scaffolding (Safety in structural components)
 - i. footboards
 - ii. putlogs
 - iii. braces
 - iv. ties
 - v. planking
 - vi. scaffold brackets
 - f. Describe special problems of rolling and suspended scaffolding
 - g. Specify the use of elevators
 - h. Describe types and conditions of approved work platforms
 - i. Erect section of tubular steel sectional scaffold
 - j. Describe adjustable tower scaffolding and advantages
 - k. Inspect scaffolding before using
 - l. Direct/assist in loading/unloading masonry units from trucks
 - m. Direct/assist hoisting masonry units to work stations

Name and Number: Drafting 1760

Descriptive Title: Basic Drawing and Sketching

Description:

This drafting course requires the use of basic drawings, specifications, bills of materials, drawing instruments and facilities, and CAD software and hardware. It involves reading basic drawings and diagrams, sketching, interpretation of specifications, and operating the CAD system. It includes information on sketching techniques, types of drawings, and CAD commands.

Prerequisites: None

Co-requisites: MC1050 - Introduction to Computers

Course Duration: 75hrs

Text book(s) / Software used by Lead Institution:

Course Aims:

1. To develop the skills and knowledge required to read drawings and sketch views.

Course Objectives (Knowledge):

1. Describe the alphabet of lines
2. List the basic drawing symbols
3. Explain what is meant by quality of lines
4. Describe metric, mechanical, architectural and civil scales
5. Describe the different types of pencil lead grades
6. Describe letter types
7. Describe lettering instrument types
8. Explain spacing, sizes and lettering techniques
9. Describe different view orientations
10. Describe obliques, isometrics and perspectives
11. Explain sketching techniques
12. Explain main view and possible views
13. Describe the six principle views
14. Explain association of surfaces
15. Explain matching pictorials
16. Describe types of dimensions and lines used

17. Explain the rules of dimensioning
18. Explain the various methods of producing lines
19. Describe the purpose and types of sectional views
20. Explain conventions associated with sectional views such as symbols, cutting plane lines, broken-out lines, etc.
21. Identify standard drawing symbols used on electrical, hydraulic and pneumatic drawings
22. Identify colour codes used for electrical, hydraulic and pneumatic schematics
23. Explain the purpose and methods of dimensioning
24. Explain intersections and developments
25. Explain graphs reticulation
26. Explain the functions of the CAD system

Major Tasks / Subtasks (Skills):

1. Construct geometric shapes and lines
 - a. Draw lines to scale
 - b. Scale lines
 - c. Divide lines into equal parts
 - d. Bisect lines
 - e. Construct angles
 - f. Bisect angles
 - g. Construct concave and convex curves
 - h. Construct circles, arcs, tangents, ellipses, polygons, etc.
2. Sketch orthographic projections
 - a. Visualize object
 - b. Select views
 - c. Layout sketch
 - d. Sketch projection
 - e. Dimension sketch
 - f. Make notations
3. Sketch sectional views
 - a. Locate section
 - b. Select type of view
 - c. Determine scale
 - d. Sketch view
 - e. Dimension sketch
 - f. Make notations
4. Sketch primary auxiliary views
 - a. Visualize the view

- b. Layout the sketch
 - c. Sketch view
 - d. Dimension sketch
 - e. Make notations
5. Identify information from blueprints and drawings
- a. Visualize views and projections
 - b. Identify information from schematic diagrams, assembly drawings, views, feeder maps, etc.
 - c. Identify sequence of fabrication according to blueprint
 - d. Identify cut of materials from sketches
 - e. Interpret horizontal, vertical, curved, inclined lines, fillets, and radii on working drawings
 - f. Identify dimensions of holes, cylinders, circles, angles and arcs

Choose the appropriate drawings for this occupation from 6,7,and/or 8.

6. Read mechanical drawings
- a. Read welding drawings, hydraulics and pneumatics drawings, sheet metal drawings and piping drawings
 - b. Read and apply information from cut-away drawings
7. Read electrical drawings
- a. Read schematic diagrams, flow diagrams, point-to-point diagrams, wireless diagrams and highway diagrams
8. Read architectural and structural drawings
- a. Read plot plan, foundation plans, floor plans, details, elevations and sections
9. Interpret specifications
- a. Interpret specifications
 - b. Identify tolerance specifications
 - c. Interpret specifications (company standards books)
10. Identify information from bill of materials
11. Operate the CAD system
- a. Start up the system
 - b. Set up directories and manage files
 - c. Start AutoCAD
 - d. Operate the system

Evaluation:

Written reports and/or tests.
Competence in simulated work.

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes:

NAME & NUMBER WD1210 - Oxy-Fuel Cutting

DESCRIPTION

This OFW course requires the use of welding equipment and accessories, materials and supplies and safety equipment. It involves setting up OFW equipment; preparing, cutting and welding metal; and shutting down, disassembling and storing equipment. It includes information on safety requirements, cylinder pressures, combustion and flames, storage and transporting of cylinders, and types of regulators.

MAJOR TOPICS/TASKS

Set-up and use welding equipment (OFW); Set up and use cutting equipment; Fusion weld (OFW); Braze weld metals (OFW); Assemble metals using brazing process

PURPOSE / AIMS

1. To develop the skills and knowledge required for welding metal structures with respect to various codes and standards
2. To practice safety in potentially harmful situations

PREREQUISITES PF1160 - Piping Shop Fundamentals

COURSE DURATION 60hrs

LEARNING RESOURCES

Hobart Series
Welding Skills
New Brunswick Modules

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED December 1993

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Set-up and use welding equipment (OFW)
 - a. Describe oxy-fuel equipment and components
 - b. Explain lighting procedures and describe types of flame
 - c. Demonstrate safety precautions when handling this equipment

- d. Set up, adjust equipment and check for leaks
 - e. Light torch and make flame adjustments
 - f. Shut down equipment and place in designated location
2. Set up and use cutting equipment
- a. Explain cutting procedures and equipment used
 - b. List metals that can be cut and metals that cannot be cut
 - c. Set up and adjust the cutting equipment for the assigned project
 - d. Cut mild steel 90° FREEHAND
 - e. Cut mild steel 90° GUIDED
 - f. Cut mild steel at a 30° BEVEL FREEHAND
 - g. Cut mild steel at a 30° BEVEL GUIDED
 - h. Cut regular and irregular shapes FREEHAND
 - i. Cut off bolt and/or nut FREEHAND (optional)
3. Fusion weld (OFW)
- a. Explain the procedure used to weld in the flat position
 - b. Explain the steps in oxy-fuel welding
 - c. Describe the types of metals that are suitable for the welding process
 - d. Explain the steps in oxy-fuel cutting
 - e. Describe types of flames, pressures and tip sizes and the application of each
 - f. Prepare metal for welding
 - g. Set up and adjust welding equipment
 - h. Run fusion welding beads
 - i. Weld mild steel single vee butt joint
 - j. Weld mild steel open-corner butt joint
 - k. Weld mild steel lap joint
 - l. Fuse weld sheet metal
4. Braze weld metals (OFW)
- a. Describe braze welding processes as applied to various metals including cast iron
 - b. Explain the purpose of filler metals in the brazing process
 - c. Describe type of flame adjustment for brazing
 - d. Prepare metal
 - e. Set up and adjust welding equipment
 - f. Tack weld metal
 - g. Braze weld tee joint (m.s. in flat position)
 - h. Braze weld butt joint (m.s. in flat position)
 - i. Prepare and bronze weld cast iron
 - j. Perform silver brazing

5. Assemble metals using brazing process
 - a. Operate oxy-fuel equipment to assemble metals using the brazing process
 - b. Prepare joints for brazing:
 - i. 3/4 copper tee with fittings
 - ii. tee joint (1/8x4x4 flat bar, m.s.)
 - c. Braze tee joint 1/8x1x4 copper to mild steel
 - d. Braze stainless steel tee joint (1/8x1x4"s.s.)

NAME & NUMBER WD1120 - SMAW Fundamentals

DESCRIPTION

This SMAW course requires the use of safety equipment, SMAW equipment and accessories, and materials and supplies. It involves setting up equipment, preparing and welding metal, shutting down equipment and testing the weld. It includes information on basic electricity, types of electrodes, types of welding machines, joint design and weld faults.

MAJOR TOPICS/TASKS

Describe welding methods; Explain proper procedures for handling heavy objects; Describe steel types and shapes; Set up equipment (SMAW); Strike and maintain arc (SMAW); Fillet weld flat (SMAW); Weld sheet metal (SMAW); Weld using various electrodes

PURPOSE / AIMS

1. To develop the skills and knowledge required for welding metal structures with respect to various codes and standards
2. To practice safety in potentially harmful situations

PREREQUISITES PF1160 - Piping Shop Fundamentals

COURSE DURATION 90hrs

LEARNING RESOURCES

Hobart Series
Welding Skills
New Brunswick Modules

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED May 1998

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Describe welding methods
 - a. Define the terminology associated with welding methods

- i. Explain or describe carbon steel electrodes, classification of mild steel and low alloy steel electrodes, operator protection, basic machine and circuit theory, AC & DC, Arc Blow, duty cycle, rated amperage, thawing pipes, striking and maintaining arc, stringer and weave beads, faults, safety
 - b. Describe the shielded metal arc welding process
 - c. List advantages and disadvantages of each arc welding process
 - d. Describe the potential discontinuities associated with welding processes
 - e. Explain appropriate inspection methods to locate discontinuities
 - f. Describe the five basic joint configurations
 - g. Describe applicable safety techniques
 - h. Describe the steps in the arc welding process
 - i. Explain the procedure used for welding in a flat position with SMAW
 - j. Explain joint types, designs and terminology
2. Explain proper procedures for handling heavy objects
3. Describe steel types and shapes
 - a. Describe the characteristics of hot and cold rolled steel
 - b. Determine the size of various structural shapes
4. Set up equipment (SMAW)
 - a. Describe the equipment used for arc welding
 - b. Explain the types and uses of SMAW machines and components
 - c. Describe AC transformers, AC/DC rectifiers, DC generators, engine drive (gasoline, diesel) sources
 - d. Set up SMAW equipment
 - e. Install a ground clamp and/or terminal lug
 - f. Maintain SMAW equipment
 - g. Install an electrode holder with a terminal lug or jack plug connector
 - h. Shut down and store equipment
5. Strike and maintain arc (SMAW)
 - a. Explain why correct electrode selection, current, polarity settings, arc length, travel speed, and electrode angles important are important for quality welds
 - b. Describe work and travel angles for weld metal deposition
 - c. Deposit a stringer bead
 - d. Deposit weave beads
6. Fillet weld flat (SMAW)
 - a. Strike and maintain an arc
 - b. Run stringer beads
 - c. Run weave beads

- d. Weld joints:
 - i. tee
 - ii. lap
 - iii. corner

- 7. Weld sheet metal (SMAW)
 - a. Describe electrode types and sizes used for sheet metal welding
 - b. Describe the common joints used in sheet metal welding
 - c. Weld 16 gauge mild steel semi-vertical position, travel down:
 - i. corner joint
 - ii. butt joint
 - iii. tee joint
 - iv. lap joint
 - v. edge joint

- 8. Weld using various electrodes
 - a. Describe basic classifications and applications of electrodes
 - b. Describe or explain electrode types for special applications, mild steel and low alloy electrodes, functions of flux coating, electrode identification, electrode prefix and suffix lettering system, identification of parent metal, welding position, power source, joint design and fit up, electrode diameter, metal properties, production efficiency, low hydrogen electrode, AWS and CSA electrode codes and champhertrode cutting
 - c. Operate larger diameter electrodes for high speed deposit of quality welds on a production basis
 - d. Demonstrate the proper setting for a variety of electrodes

NAME & NUMBER PF1140 - Plumbing Fundamentals

DESCRIPTION

This course requires the use of tools, equipment, materials and supplies used to install a piping system. It involves selecting, measuring, bending, threading, flaring, swaging, compression joints, soft and hard soldering, solvent cementing, victaulic and joining pipe by by manufacturers' patented methods, and other acceptable practices, repair and replace pipe materials (such as lead, vitrified clay, bituminized fibre, etc.) that are not in common use today.

MAJOR TOPICS/TASKS

Install, repair and replace copper pipe; Install, repair and replace steel and brass pipe; Install, repair and replace cast iron pipe; Bend pipe and tubing; Install, repair and replace plastic pipe; Assemble glass pipe; Repair and replace older type pipe materials; Fabricate and install hangers and supports

PURPOSE / AIMS

1. To develop the skills and knowledge required for assembling piping systems in compliance with applicable codes and standards
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

PREREQUISITES PF1160 - Piping Shop Fundamentals

COURSE DURATION 60hrs

LEARNING RESOURCES

National plumbing code
National Building Code
Manual of Instruction for the Plumbing Trades
New Brunswick Modules
Centennial College Modules
Welding (Pender)
Blueprint Reading for Plumbers
Plumbing Technology

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED February 1999

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Install, repair and replace copper pipe
 - a. Install system as per drawing
 - i. measure
 - ii. mark
 - iii. cut
 - iv. ream
 - b. Select appropriate type of copper and fittings and prepare joints
 - c. Solder joints using both soft and hard solder
 - d. Flare joints and assemble
 - e. Assemble compression fittings
 - f. Use swaging tool
 - g. Bend tubing as required.

2. Install, repair and replace steel and brass pipe
 - a. Install system as per drawing
 - i. measure
 - ii. mark
 - iii. cut
 - iv. ream
 - b. Select appropriate pipe and fittings
 - c. Apply thread lubricant and assemble joints
 - d. Tighten as required
 - e. Cut gaskets
 - f. Tighten flanges (crossover method)
 - g. Prepare and assemble victaulic joints
 - h. Install and support piping system
 - i. Hydrostatic test to requirements

3. Install, repair and replace cast iron pipe
 - a. Install system as per drawing
 - i. measure
 - ii. mark
 - iii. cut (using instantaneous CI cutters)
 - b. Make chaulked joints (vertical and horizontal)
 - c. Make Bibby, Bi-seal joints
 - d. Make mechanical joints (use torque wrench)
 - e. Install and support pipe

4. Bend pipe and tubing
 - a. Calculate length and bend location
 - b. Bend pipe or tubing as per drawing
 - c. Use hydraulic bender
 - d. Use bending springs
 - e. Use hand benders

5. Install, repair and replace plastic pipe
 - a. Install system as per drawing
 - i. Measure
 - ii. Mark
 - iii. Cut
 - b. Select appropriate fittings and prepare joints
 - c. Use pipe and fitting cleaner
 - d. Apply solvent cement
 - e. Use insert fittings
 - f. Use expander (quick and easier) tool for PEX
 - g. Assemble fittings for PEX/AL/PEX
 - h. Assemble mechanical joints as per manufacturers' specifications

6. Assemble glass pipe
 - a. Identify different methods of assembly
 - b. Prepare joint and assemble as per manufacturer's instructions

7. Repair and replace older type pipe materials
 - a. Use instantaneous cutters
 - b. Use MJ couplings
 - c. Use solvent cement
 - d. Use PC-4
 - e. Use dresser type couplings
 - f. Use unions, couplings and adaptors

8. Fabricate and install hangers and supports
 - a. Fabricate supports as drawings
 - b. Fasten hangers to various types of construction materials
 - c. Space hangers as per code requirements

NAME & NUMBER PF1530 Drainage and Sewage Disposal Systems

DESCRIPTION

This course in piping systems requires the use of tools and equipment, and materials and supplies. It involves design, installation, testing and maintenance of drainage and sewage disposal systems. It includes information on drainage and sewage disposal systems and component parts.

MAJOR TOPICS/TASKS

Transfer elevations using builders level; Interpret Department of Health specifications and regulations; Install building drains and related piping; Install sub-drainage pumps; Install common rural sewage disposal systems; Install and test building sewers; Install rain water leaders and roof drains; Install special sewage disposal units; Clear fixture drains and sewers; Install and service vacuum drainage systems (marine)

PURPOSE / AIMS

1. To develop the skills and knowledge required for the installation and maintenance of drainage and sewage disposal systems with respect to various codes and standards
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

PREREQUISITES PF1140 - Plumbing Fundamentals

COURSE DURATION 105hrs

LEARNING RESOURCES

National plumbing code
National Building Code
Manual of Instruction for the Plumbing Trades
New Brunswick Modules
Centennial College Modules
Welding (Pender)
Blueprint Reading for Plumbers
Plumbing Technology

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED February 1994

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Transfer elevations using builders level
 - a. Explain the operations of the builders level-transit
 - b. Describe the procedure for setting up the level-transit
 - c. Be familiar with surveying terms
 - d. Describe how to turn an angle with the transit
 - e. Describe how to establish piping grade from a bench mark reference
 - f. Determine invert elevations along a pipe line
 - g. Prepare offset grade stakes and ditch rod
2. Interpret Department of Health specifications and regulations
3. Install building drains and related piping
 - a. Size drainage systems as per code requirements
 - b. Install drainage systems as per code requirements and accepted trade practice
 - c. Install building drains
 - d. Install waste stack connections for bathrooms
 - e. Install waste stack connections for kitchens
 - f. Install clean-outs, backwater valves, traps and related piping
 - g. Support and protect drains
 - h. Rough-in drains for fixtures
 - i. Install drains for commercial/industrial installation
 - j. Test building drains and related piping
4. Install sub-drainage pumps
 - a. Install small sump pumps
 - b. Install discharge piping on small sump pumps
 - c. Install duplex sump pumps
 - d. Install discharge piping on duplex sump pumps
 - e. Install necessary venting
 - f. Install laundry tub pumps
 - g. Install sewage injectors
5. Install common rural sewage disposal systems
 - a. Describe the lay out procedure for excavation and installation of underground piping
 - b. Make sketches of typical disposal systems
 - c. Demonstrate competency in the installation of a common rural sewage disposal system
6. Install and test building sewers

- a. Make connections to sewers using asbestos to plastic
 - b. Make connections to sewers using ABS to PVC
 - c. Make connections to sewers using ABS to ABS
 - d. Make connections to sewers using concrete to ABS
 - e. Make connections to sewers using cast iron to ABS
 - f. Make connections to sewers using concrete to cast iron
 - g. Test building sewers
7. Install rain water leaders and roof drains
- a. Determine location of water leaders and roof drains
 - b. Install leaders on flat roof
 - c. Install gutters and leaders on slant roof
8. Install special sewage disposal units
- a. Interpret drawings and specifications
 - b. Identify and install aerated tanks
 - c. Identify and install aeration waste-water treatment plants and process equipment (concrete)
 - d. Identify and install large prefabricated steel plants
 - e. Identify and install chemical waste treatment equipment and systems
 - f. Identify sewage lagoons
9. Clear fixture drains and sewers
- a. Clear drain pipe with the use of hand tools
 - b. Clear drain pipe with the use of power tools
 - c. Clear drains with chemical cleaners
10. Install and service vacuum drainage systems (marine)

NAME & NUMBER PF1510 Plumbing Venting Systems

DESCRIPTION

This course in piping systems requires the use of tools and equipment, and materials and supplies. It involves sizing, selecting and installing plumbing venting systems. It includes information on operation and types of venting systems and component parts.

MAJOR TOPICS/TASKS

Explain aeration and de-aeration; Install stacks, branches and vents; Install venting system; Install and test solvent systems

PURPOSE / AIMS

1. To develop the skills and knowledge required for installation and maintenance of plumbing venting systems with respect to various codes and standards
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

PREREQUISITES PF1140 Plumbing Fundamentals
 PF1530 Draining & Sewage Disposal Systems

COURSE DURATION 120hrs

LEARNING RESOURCES

National plumbing code
National Building Code
Manual of Instruction for the Plumbing Trades
New Brunswick Modules
Centennial College Modules
Welding (Pender)
Blueprint Reading for Plumbers
Plumbing Technology

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED February 1994

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Explain aeration and de-aeration
2. Install stacks, branches and vents
 - a. Install stacks and vents for bathrooms
 - b. Install stacks and vents for kitchen
 - c. Install stacks and vents for laundry room and bath or shower in basement
 - d. Test stack and vent installations
 - e. Install stack and vents for commercial/industrial buildings
3. Install venting system.
 - a. Explain the purpose of venting
 - b. Interpret blueprints to determine location and size of vents
 - c. Identify various vents
 - d. Interpret code requirements for venting
 - e. Size vents as per code requirements
 - f. Select appropriate vent termination points
 - g. Install venting system as per code requirements and accepted trade practice.
4. Install and test Sovent systems
 - a. Interpret drawings and specifications
 - b. Identify and install aerator and de-aerator
 - c. Identify and install piping and fittings
 - d. Identify and install fixture drains
 - e. Test system
 - f. Service and maintain system

NAME & NUMBER WA1810 Water Supply Systems

DESCRIPTION

This course in piping systems requires the use of tools and equipment, and materials and supplies. It involves designing, installing, testing and maintaining water supply systems. It includes information on types of water supply systems and component parts.

MAJOR TOPICS/TASKS

Install municipal water service; Rough-in potable hot and cold water supply; Install water softeners and conditioners, and related equipment; Install a small submersible pump system; Install gravity water supply systems; Repair or replace defective piping; Maintain water softeners and conditioners; Repair or replace submersible pumps; Service and repair freeze-ups

PURPOSE / AIMS

1. To develop the skills and knowledge required for the installation and maintenance of water supply systems with respect to various codes and standards
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

PREREQUISITES PF1140 Plumbing Fundamentals

COURSE DURATION 45hrs

LEARNING RESOURCES

National plumbing code
National Building Code
Manual of Instruction for the Plumbing Trades
New Brunswick Modules
Centennial College Modules
Welding (Pender)
Blueprint Reading for Plumbers
Plumbing Technology

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED February 1994

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Install municipal water service
 - a. Install building stops and meter
 - b. Install by-pass for building stops and meter
 - c. Identify and install pressure reducing valves

2. Rough-in potable hot and cold water supply
 - a. Lay out hot and cold water lines
 - b. Rough-in hot and cold water lines
 - c. Install main water lines
 - d. Determine line sizes
 - e. Install supports for hot and cold lines
 - f. Locate and install water hammer arresters
 - g. Install risers and branches
 - h. Test water line installations

3. Install water softeners and conditioners, and related equipment

4. Install gravity water supply systems
 - a. Describe methods of installation of gravity water supply systems
 - b. Describe piping sizes, valves, switches, and pressure requirements for gravity water supply systems

5. Repair or replace defective piping
 - a. Repair or replace defective section of cast-iron pipe
 - b. Repair or replace defective section of copper pipe
 - c. Repair or replace defective section of galvanized pipe
 - d. Repair or replace defective section of plastic pipe

6. Maintain water softeners and conditioners
 - a. Replace cartridge in line filters
 - b. Replace line filters
 - c. Replace mineral in filters
 - d. Replace chlorinator

7. Repair or replace submersible pumps
 - a. Troubleshoot submersible pump systems
 - b. Remove pump from well
 - c. Replace pump parts

8. Service and repair freeze-ups

- a. Locate freeze-up
- b. Survey defective piping
- c. Thaw frozen water lines using electric thawing machine
- d. Repair or replace defective piping and fittings
- e. Test system

NAME & NUMBER PF1520 Plumbing Appliances

DESCRIPTION

This course in piping systems requires the use of tools and equipment, and materials and supplies. It involves installation and maintenance of plumbing appliances. It includes information on types and operation of appliances and component parts.

MAJOR TOPICS/TASKS

Install wall concealed fixture supports; Install grease traps and interceptors; Install common bathroom fixtures and trim; Install kitchen sinks, garburators and dishwashers; Install washing machines and laundry tubs; Install plumbing accessories; Install flush-o-meter operated fixtures, bidets and drinking fountains; Install commercial appliances; Install institutional and industrial fixtures and trims; Repair or replace faucets, common type valves and mechanical wastes; Repair flush-o-meter valves; Maintain water closet and urinal tanks; Install and maintain whirlpools

PURPOSE / AIMS

1. To develop the skills and knowledge required for installing and maintaining plumbing appliances with respect to various codes and standards
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

PREREQUISITES PF1140 Plumbing Fundamentals
 DR1100 Basic Drawing & Sketching
 PF1510 Plumbing Venting Systems
 WA1810 Water Supply Systems

COURSE DURATION 90hrs

LEARNING RESOURCES

National plumbing code
National Building Code
Manual of Instruction for the Plumbing Trades
New Brunswick Modules
Centennial College Modules
Welding (Pender)
Blueprint Reading for Plumbers
Plumbing Technology

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED February 1994

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Install wall concealed fixture supports
 - a. Install water closet carriers
 - b. Install basin and sink carrier
 - c. Install urinal carrier

2. Install grease traps and interceptors
 - a. Install grease interceptor
 - b. Install vents for grease interceptors
 - c. Clean grease interceptor

3. Install common bathroom fixtures and trim
 - a. Install wall hung lavatory - faucets, chain and plug P.O. or mechanical drain
 - b. Install counter top lavatory - faucets, chain and plug P.O. or mechanical drain
 - c. Install floor and wall outlet close coupled water closet
 - d. Install shower cabinet
 - e. Install bath and shower trims

4. Install kitchen sinks, garburators and dishwashers
 - a. Install kitchen sink
 - b. Install garbage disposal unit
 - c. Install automatic dishwasher

5. Install washing machines and laundry tubs
 - a. Install laundry tub
 - b. Install automatic washing machine

6. Install plumbing accessories
 - a. Locate and install:
 - i. soap dispenser
 - ii. soap holders and dishes
 - iii. paper towel dispenser
 - iv. towel shelves
 - v. towel pins
 - vi. toilet paper holder

 - b. Locate and install:

- i. grab bars
 - ii. single and double hooks
 - iii. special bars and accessories
7. Install flush-o-meter operated fixtures, bidets and drinking fountains
 - a. Install drinking fountain
 - b. Install electric water cooler
 - c. Install stall urinal with flush-o-meter valve
 - d. Install wall hung urinal with flush-o-meter valve
 - e. Install bidet
8. Install commercial appliances
 - a. Install commercial dishwasher
 - b. Install common garbage disposal unit
9. Install institutional and industrial fixtures and trims
10. Repair or replace faucets, common type valves and mechanical wastes
 - a. Repair common types of faucets and valves
 - b. Repair mechanical wastes
 - c. Replace common types of faucets and valves
 - d. Replace mechanical wastes
11. Repair flush-o-meter valves
 - a. Repair flush-o-meter valve
 - b. Replace flush-o-meter valve
 - c. Service flush-o-meter valve
12. Maintain water closet and urinal tanks
 - a. Replace ball cock
 - b. Replace flush valve
 - c. Replace tank
 - d. Repair syphon in tanks
 - e. Replace urinal tanks
13. Install and maintain whirlpools
 - a. Interpret manufacturers drawings and specifications
 - b. Identify and install types of systems
 - c. Identify and install piping, fittings, waste and vents
 - d. Test system
 - e. Service and maintain system
14. Electronically operated or controlled appliances
 - a. Install/replace and repair

NAME & NUMBER PF2240 - Hot Water Heating Systems

DESCRIPTION

This course in piping systems requires the use of tools and equipment, test equipment and materials and supplies. It involves installing, operating, testing and maintaining hot water heating systems. It includes information on types and operation of hot water heating systems and component parts.

MAJOR TOPICS/TASKS

Describe furnaces and water heaters; Design heating system layout; Service and replace heating system valves; Install and service motorized valves; Install and service circulating pumps; Install and service expansion tanks; Remove air from hydronic systems; Troubleshoot heating systems; Install hot water storage tanks and heaters; Install various types of heating furnaces (steel/cast iron); Install mono-flo and two pipe distribution systems; Replace coils, heaters and hot water storage tanks; Install gravity systems; Install forced flow heating system; Install pumps; Install heat transfer units; Install multi-zone hot water heating systems; Install radiant panel and snow melting systems; Install high temperature hot water systems; Fabricate and install expansion bends and joints; Install and service transfer systems; Maintain plant or building heating systems

PURPOSE / AIMS

1. To develop the skills and knowledge required for installing and maintaining hot water heating systems with respect to various codes and standards
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

PREREQUISITES PF1160 Piping Shop Fundamentals

COURSE DURATION 105hrs

LEARNING RESOURCES

New Brunswick Modules
Steamfitter/Pipefitter Manual
Math for Plumbers & Pipefitters
Centennial College Modules
Template Development
Welding (Pender)
Pipe Trades Handbook

Basic Blueprint Reading & Sketching
Rigging Handbook

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED June 1998

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Describe furnaces and water heaters
 - a. warm air furnace (oil)
 - b. warm air furnace (wood)
 - c. warm air furnace (wood & oil)
 - d. warm air furnace (electric)
 - e. warm air furnace (wood & electric)
 - f. hot water furnace (oil)
 - g. hot water furnace (wood)
 - h. oil fired domestic hot water heater
 - i. hot water furnace (electric)
 - j. gas heating systems

2. Design heating system layout
 - a. Describe heating systems for hot water (wood and oil) and warm air (wood and oil)
 - b. Describe the operation and specify the uses of copper pipe for hot water heating systems
 - c. Describe three hot water heating systems
 - d. Describe single zone and multizone hot water heating systems
 - e. Specify materials required for specific hot water heating systems
 - f. Interpret symbols used for hot water fittings and pipe work
 - g. Design hot water heating systems
 - h. Describe the procedure for troubleshooting hot water (wood and oil) and warm air (wood and oil) heating systems

3. Service and replace heating system valves
 - a. Describe the operation and specify the use of pressure reducing valves
 - b. Describe the operation and specify the use of vacuum valves
 - c. Describe the operation and specify the use of flo-control valves
 - d. Service and replace pressure reducing valves and safety relief valves:
 - i. isolate water pressure problems in heating systems (low and high pressure)
 - ii. replace pressure reducing valve
 - e. Replace vacuum valves:
 - i. select and install vacuum valves

- f. Service flow control valves
- 4. Install and service motorized valves
 - a. Describe the operation and specify the use of motorized valves
 - b. Determine location and the number of zones for motorized valves
 - c. Install, test and repair motorized valves in multizone systems:
 - i. test and repair switches
 - ii. detect and repair leaks
- 5. Install and service circulating pumps
 - a. Replace coupling, seals, shafts, and oil wick
 - b. Oil circulator pump and motors
- 6. Install and service expansion tanks
 - a. Install expansion tank
 - b. Drain water from expansion tank
- 7. Remove air from hydronic systems
- 8. Troubleshoot heating systems
 - a. Solve problems with heating systems
 - b. Develop and follow troubleshooting procedures
- 9. Install hot water storage tanks and heaters
 - a. Install vertical hot water storage tanks
 - b. Install electric hot water heater
 - c. Install instantaneous hot water heater in oil furnace
 - d. Install side arm heater
 - e. Install safety devices
- 10. Install various types of heating furnaces (steel/cast iron)
 - a. Describe the operation and specify the use of expansion tanks
 - b. Interpret manufacturer's drawings and specifications
 - c. Identify and install types of heating furnaces
 - d. Identify and install types of radiators
 - e. Identify and install expansion tanks
 - f. Identify and install piping and fittings, gauges, valves, and controls
 - g. Test system
- 11. Install mono-flo and two pipe distribution systems
 - a. Identify and install mono-flo tees (copper and black iron)
 - b. Identify and install mono-flo systems (up-feed and down-feed)
 - c. Identify and install trunk system

- d. Identify and install series loop system
 - e. Identify and install mono-flo and series system
 - f. Identify and install two pipe direct return system
 - g. Identify and install two pipe reverse return system
 - h. Identify and install balancing valves
12. Replace coils, heaters and hot water storage tanks
- a. Replace coils
 - b. Replace heaters
 - c. Replace hot water tanks
13. Install gravity systems
- a. Locate radiators above boiler
 - b. Pipe system
 - c. Install expansion tank
 - d. Fill and vent system
 - e. Fire system and check circulation
14. Install forced flow heating system
- a. Install series loop, series loop split, direct return and reverse return hot water systems
 - b. Install compression or expansion tanks
 - c. Make boiler headers
 - d. Test complete systems
15. Install pumps:
- a. Describe the operation and specify the use of two types of circulator pumps
 - b. Cut gaskets for pump flanges
 - c. Cut pipe and install flanges
 - d. Mount pipe and line-up flanges
 - e. Insert gaskets
 - f. Tighten flange bolts
 - g. Oil pump
 - h. Check direction of flow and rotation
16. Install heat transfer units:
- a. Describe the operation and specify the uses of fin type radiators
 - b. Describe the operation and specify the uses of cast iron radiators
 - c. Place radiators - remove a section from a cast iron sectional radiator
 - d. Install mains
 - e. Hook up risers to radiators with radiator valves and union elbow
 - f. Install vents at all high points
 - g. Fill and vent system
 - h. Check for leaks, start up system and check circulation

- i. Install unit heaters:
 - i. Locate units
 - ii. Secure units
 - iii. Install unions, valves, vents and drains
 - iv. Clean fan, motor, and heater cores
 - v. Drain and flush out heaters
 - j. Apply appropriate energy conservation materials and methods
 - k. Maintain heat transfer equipment
 - i. Replace sections of cast iron boilers
 - ii. Plug defective tubes
 - iii. Repair unit heater cores
 - iv. Replace unit heater cores
 - v. Troubleshoot heating equipment
 - vi. Replace boiler tubes
17. Install multi-zone hot water heating systems
- a. Install common zoned heating and cooling systems
 - b. Install a combination of system circuits using pumps and two-way and three-way valves
 - c. Install electric zone valves
 - d. Install thermostatic control valves
 - e. Apply appropriate energy conservation materials and methods
18. Install radiant panel and snow melting systems
- a. Install panel heating
 - b. Install control valves
 - c. Install heat exchanger
 - d. Apply appropriate energy conservation materials and methods
19. Install high temperature hot water systems
- a. Install high temperature hot water boilers and generators
 - b. Install high temperature hot water circulating pumps
 - c. Install expansion drums
 - d. Install high temperature hot water heat exchangers
 - e. Apply appropriate energy conservation materials and methods
20. Fabricate and install expansion bends and joints
- a. Measure and prepare pipe for expansion "U" bend
 - b. Measure, cut, thread, and assemble pipe and fittings for scissor type expansion joints
 - c. Install single sleeve and double sleeve expansion joints
 - d. Install bellows type expansion joints
21. Install and service transfer systems for the following equipment

- a. Install mud piping systems
 - b. Install desilter, desander, and degasser piping
 - c. Install supply-tug cement systems
 - d. Install rig flare systems piping
 - e. Install tankers inert gas systems
22. Maintain plant or building heating systems
- a. Describe the operation and specify the use of wood fired, oil fired and add-on hydronic systems
 - b. Inspect and repair hydronic heating systems - pumps, feeders, heat exchangers and convectors
 - c. Inspect and repair steam heating systems - valves radiators, traps and piping
 - d. Inspect and repair unit heaters - louvres, cabinets, fans, traps and coils
23. Calculate heat in BTU's
24. Describe methods of heat transfer
- a. Radiant
 - b. Conductive
 - c. Convective
25. Install pressure relief valves
- a. Connect pressure gauges and automatic controls
 - b. Adjust and check controls

NAME & NUMBER PF1150 Intro to Piping & Heating Controls

DESCRIPTION

This course is an introduction to piping systems which requires the use of tools, equipment, materials, and supplies. It involves installation, operation, testing and maintenance of modulating, temperature, and safety control systems.

MAJOR TOPICS/TASKS

Install and service humidifiers; Describe the operation and specify the use of primary controls; Install and service fuel modulating controls; Describe the operation and specify the uses of thermostats; Describe the operation and specify the use of limit controls; Describe the operation and specify the use of control systems; Repair and replace temperature controls; Install and service safety controls

PURPOSE / AIMS

1. To develop the skills and knowledge required for the installation, operation and maintenance modulating, temperature, and safety control systems with respect to various codes and standards
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

PREREQUISITES PF1160 - Piping Shop Fundamentals
 OM1100 - Basic Oil Burners
 PF2240 - Hot Water Heating Systems

COURSE DURATION 30hrs

LEARNING RESOURCES

New Brunswick Modules
Steamfitter/Pipefitter Manual
Math for Plumbers & Pipefitters
Centennial College Modules
Template Development
Welding (Pender)
Pipe Trades Handbook
Basic Blueprint Reading & Sketching
Rigging Handbook

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Install and service humidifiers
 - a. Describe the operation and specify the use of humidifiers
2. Describe the operation and specify the use of primary controls
3. Install and service fuel modulating controls
 - a. Explain the operation of energy modulating controls
4. Describe the operation and specify the uses of thermostats:
 - a. line voltage
 - b. low voltage
 - c. automatic set back
 - d. wood and oil combination
5. Describe the operation and specify the use of limit controls:
 - a. hot water limits
6. Describe the operation and specify the use of control systems:
 - a. hot water
7. Repair and replace temperature controls
 - a. Replace pressure relief valves
 - b. Repair or replace pressure regulator valves
 - c. Repair or replace temperature regulating valves
8. Install and service safety controls
 - a. Identify types of control valves
 - b. Safety and relief valves
 - c. Low water cutoff and fusible plugs
 - d. Feeder cutoff combinations

NAME & NUMBER OM1100 Basic Oil Burners

DESCRIPTION

Course provides training for the installation and maintenance of oil burners.

MAJOR TOPICS/TASKS

Explain the methods for preparing fuel for combustion; Describe burner types used to prepare fuel for combustion; Describe combustion principles with respect to; Use cleaning equipment; Install and service flue pipes and draft regulators; Install and repair oil burners; Install and service oil burner nozzles; Install and service ignition systems; Service air delivery systems; Install and service oil burner couplings; Interpret manufacturer's drawings and specifications; Install and replace combustion chambers; Describe types of heating furnaces

PURPOSE / AIMS

1. To develop the skills and knowledge required for the installation and maintenance of oil burners with respect to various codes and standards
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

PREREQUISITES None

COURSE DURATION 60hrs

LEARNING RESOURCES

Canadian Oil Heat Manual
CSAB 139 Regulation Manual

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED November 1998

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Explain the methods for preparing fuel for combustion:
 - a. atomization
 - b. vaporization
2. Describe burner types used to prepare fuel for combustion:
 - a. gun type

- b. rotary type
 - c. pot type
3. Describe combustion principles with respect to:
- a. moisture content
 - b. oxygen delivery
 - c. applied design
 - d. catalytic combustion
4. Use cleaning equipment
- a. Explain the purpose of cleaning equipment
 - b. Select and use equipment
 - c. Maintain equipment as per instructions
 - d. Clean oil and wood furnaces
 - e. Clean flue pipes and chimney systems for wood and oil
5. Install and service flue pipes and draft regulators
- a. Explain the purpose of using the correct sizes of flue pipes on:
 - i. solid fuel units
 - ii. oil units
 - iii. combination units
 - b. Select the correct size of flue pipes
 - c. Install flue pipe
 - d. Install draft regulator
 - e. Clean flue pipe
6. Install and repair oil burners:
- a. Describe the operation and specific uses of three specific types of oil burning units.
 - b. Mount oil burner
 - c. Hook up oil burner to supply tank using a one-pipe system
 - d. Hook up oil burner to supply tank using a two-pipe system
 - e. Install fittings and valve
 - f. Install pressure gauge and adjust pump pressure
 - g. Install nozzle and adjust electrodes
 - h. Fire burner and visually inspect flame
 - i. Check safety cut-out
 - j. Check oil level
 - k. Change oil filter
 - l. Replace nozzle
 - m. Replace and set electrodes
 - n. Clean stack switch
 - o. Clean cad cell
 - p. Check for smooth operation

7. Install and service oil burner nozzles
 - a. Describe the operation and specify the uses of nozzles
 - b. Install oil burner nozzles

8. Install and service ignition systems
 - a. Describe the operation and specify the use of all components of oil burner ignition systems
 - b. Clean and adjust electrodes
 - c. Inspect ignition system
 - d. Inspect and test transformer
 - e. Replace electrodes
 - f. Replace transformers

9. Service air delivery systems
 - a. Install burner fan
 - b. Service burner fan
 - c. Adjust air band
 - d. Inspect:
 - i. air turbulator
 - ii. blast tube
 - iii. nose cone

10. Install and service oil burner couplings
 - a. Install oil burner coupling
 - b. Inspect oil burner coupling

11. Interpret manufacturer's drawings and specifications

12. Install and replace combustion chambers
 - a. Describe the requirements and functions of combustion chambers.
 - b. Explain the uses of various materials used in the construction of combustion chambers.
 - c. Identify material used in the construction of combustion chambers.
 - d. Select appropriate material for combustion chambers.
 - e. Install (construct) combustion chambers.
 - f. Select and identify appropriate bonding material for construction and repair of combustion chambers.
 - g. Replace and reline combustion chambers.
 - h. Design combustion chambers for oil heating appliances.

13. Describe types of heating furnaces

NAME & NUMBER PF1330 - Alternate Heat Generators

DESCRIPTION

This course in heat generation systems requires the use of tools and equipment, and materials and supplies. It involves sizing, installing, maintaining, testing and troubleshooting alternative heat generators. It includes information on operation and types of alternate heat generators and component parts.

MAJOR TOPICS/TASKS

Identify solar heating systems; Install and service electric units; Explain the theory of operation and application of coal burners; Describe the operation and specify the uses of specific types of solid fuel burning units; Describe types of solid fuel feed systems; Install and service wood add-on (warm air); Install and service wood/oil combination (warm air); Install and service wood burning/hot water system; Install and service wood/electric combination units; Service gas fitting systems; Describe appropriate energy conservation materials and methods

PURPOSE / AIMS

1. To develop the skills and knowledge required for installing and maintaining alternate heat generation systems with respect to various codes and standards
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

PREREQUISITES PF1140 - Plumbing Fundamentals
 PF1160 - Piping Shop Fundamentals

COURSE DURATION 45hrs

LEARNING RESOURCES

New Brunswick Modules
Steamfitter/Pipefitter Manual
Math for Plumbers & Pipefitters
Centennial College Modules
Template Development
Welding (Pender)
Pipe Trades Handbook
Basic Blueprint Reading & Sketching
Rigging Handbook

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED February 1994

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Identify solar heating systems
 - a. Describe the operation and specify the uses of passive and active solar heating systems
 - b. Install a passive solar heating system
 - c. Install an active solar heating system

2. Install and service electric units
 - a. Select size and location of electric unit
 - b. Install electric unit
 - c. Service electric unit

3. Explain the theory of operation and application of coal burners
 - a. stokers
 - b. pulverized- coal burners
 - c. coal/oil and coal/water fuels
 - d. retrofitting
 - e. fuel handling and storage
 - f. emission controls

4. Describe the operation and specify the uses of specific types of solid fuel burning units:
 - a. wood/ hot water
 - b. wood/ warm air
 - c. wood/ radiant space heater
 - d. wood/ convective space heater

5. Describe types of solid fuel feed systems:
 - a. automated
 - b. manual

6. Install and service wood burning/hot water system
 - a. Install piping for wood burning hot water system
 - b. Connect wiring for hot water system
 - c. Service wood burning hot water system
 - d. Install flue pipe for wood hot water system

7. Service gas fitting systems
 - a. Install and service gas lines:
 - i. Install and corrosion-protect gas service piping and valves
 - ii. Install gas pipe systems, building lines, branch lines, drop lines, dirt pockets

- iii. Test and purge the system
 - b. Install gas meters:
 - i. Install various types of gas meters
 - ii. Read the meters
 - c. Install gas pressure regulators
 - d. Install and service gas venting systems:
 - i. Size vent systems
 - ii. Install various types of vents
 - iii. Install draft controls and draft inducers
 - iv. Apply code requirements
 - e. Install and service atmospheric burners:
 - i. Install and light up atmospheric burners
 - ii. Troubleshoot atmospheric burners
 - f. Install and service gas controls:
 - i. Install thermocouple and powerpile
 - ii. Install automatic pilots and pilotstats
 - iii. Install central valves (electric and non-electric)
 - iv. Install automatic ignition systems
 - g. Install conversion systems:
 - i. Install upshot conversion burners
 - ii. Install inshot conversion burners
 - iii. Install power gas conversion burners
 - iv. Size the burner input
 - h. Perform combustion efficiency tests:
 - i. Set the conversion burner
 - ii. Perform flue gas tests
10. Describe appropriate energy conservation materials and methods

NAME & NUMBER PF1220 Pump Installation

DESCRIPTION

This course in piping fundamentals requires the use of tools and equipment, and materials and supplies. It involves selecting, installing, testing and adjusting pumps. It includes information on various types of pumps and component parts.

MAJOR TOPICS/TASKS

Describe various types of pumps and explain their operation; Install and align reciprocating pumps; Install centrifugal pumps; Install and service fuel pumps; Install and service rotary pumps

PURPOSE / AIMS

1. To develop the skills and knowledge required for the installation and maintenance of pumps with respect to various codes and standards
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

PREREQUISITES PF1160 - Piping Shop Fundamentals

COURSE DURATION 45hrs

LEARNING RESOURCES

New Brunswick Modules
Steamfitter/Pipefitter Manual
Math for Plumbers & Pipefitters
Centennial College Modules
Template Development
Welding (Pender)
Pipe Trades Pocket Manual
Pipe Trades Handbook
Basic Blueprint Reading & Sketching
Rigging Handbook

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED February 1994

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Describe various types of pumps and explain their operation
 - a. vane
 - b. radial piston
 - c. axial piston
 - d. vacuum
 - e. gear type
 - f. screw type
 - g. metering
 - h. multi-stage
 - i. lobe type

2. Install and align reciprocating pumps
 - a. Install shallow well domestic water pump system
 - b. Install water tank and accessories
 - c. Test water pump installation
 - d. Repair and reset pressure switch
 - e. Repair or replace pressure relief valve
 - f. Replace cylinder sleeves
 - g. Maintain oil levels as required
 - h. Check for bearing wear
 - f. Check discharge flow and/or pressure indicating general overall condition of pistons or rings (depending on design)
 - g. Check for sticky or worn valves
 - h. Check for overload conditions
 - i. Check for roughness indicating cavitation

3. Install centrifugal pumps
 - a. Install deep well centrifugal pumps
 - b. Install deep well double pipe system
 - c. Install deep well single pipe system
 - d. Repair seal assembly
 - e. Repair ejector
 - f. Repair pressure regulator
 - g. Replace air volume control
 - h. Maintain correct oil or grease level
 - i. Check bearing clearance
 - j. Maintain required flow rate by adjusting RPMs or impeller spacing, where applicable
 - k. Check shaft or impeller for wear
 - l. Check for leaks

4. Install and service fuel pumps
 - a. Describe the operation and specify the use of fuel pumps
 - b. Describe the use of fuel pumps for mounting, g.p.h., rotation, speed and one or

two pipe systems

5. Install and service rotary pumps
 - a. Install and align rotary pumps
 - b. Check timing on lobe and screw types
 - c. Check for noises caused by wear while affecting timing
 - d. Maintain oil levels
 - e. Check for sticky or worn valves
 - f. Check for overheating
 - g. Check for roughness indicating cavitation

6. Install a small submersible pump system

NAME & NUMBER PF2410 Specialized Piping Systems

DESCRIPTION

This course in piping systems requires the use of tools and equipment, test instruments and materials and supplies. It involves installation, testing and maintenance of specialized piping systems. It includes information on types and operation of specialized piping systems and component parts.

MAJOR TOPICS/TASKS

Install pipe covering; Install and service vacuum systems; Install underground distribution systems; Install equipment for bulk loading station; Install fire extinguishing systems; Install fire lines and fire hose cabinets; Install and maintain swimming pool piping and accessories; Install and maintain lawn sprinkler system; Install food processing systems

PURPOSE / AIMS

1. To develop the skills and knowledge required for the installation and maintenance of specialized piping systems with respect to various codes and standards
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

PREREQUISITES PF1160 - Piping Shop Fundamentals

COURSE DURATION 60hrs

LEARNING RESOURCES

New Brunswick Modules
Steamfitter/Pipefitter Manual
Math for Plumbers & Pipefitters
Centennial College Modules
Template Development
Welding (Pender)
Pipe Trades Handbook
Basic Blueprint Reading & Sketching
Rigging Handbook

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED June 1998

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Install pipe covering
 - a. Describe types of pipe covering
 - b. Describe types of piping systems with sanitary fittings
 - c. Select pipe covering including steam, hot and cold water, and refrigeration process designed covering
 - d. Apply appropriate energy conservation materials and methods

2. Install and service vacuum systems
 - a. Describe types and explain the operation of vacuum systems
 - b. Install power units
 - c. Locate and pipe inlet connections
 - d. Vent the power units
 - e. Test systems

3. Install underground distribution systems
 - a. Describe types of underground distribution systems
 - b. Shore trenches
 - c. Anchor piping
 - d. Rod piping

4. Install equipment for bulk loading station
 - a. Describe equipment for bulk loading station
 - b. Install piping
 - c. Install rotary joints
 - d. Make and install flex hoses
 - e. Install pumps
 - f. Install on-ground piping systems
 - g. Install preheaters

5. Install fire extinguishing systems
 - a. Explain the operation of Halon fire extinguishing systems

6. Install fire lines and fire hose cabinets
 - a. Describe types of fire lines and fire hose cabinets
 - b. Install fire hose cabinets
 - c. Install stand pipes
 - d. Test and maintain fire alarm and sprinkler systems

7. Install and maintain swimming pool piping and accessories
 - a. Describe swimming pool piping and accessories
 - b. Interpret drawings and specifications

- c. Identify and install types of systems
 - d. Identify and install piping and fittings
 - e. Identify and install balancing tanks
 - f. Clean equipment
 - g. Identify and install filters
 - h. Identify and install chlorinators
 - i. Identify and install circulating systems
 - j. Identify and install heaters
 - k. Identify and install automatic controls
 - l. Service and maintain systems
8. Install and maintain lawn sprinkler system
- a. Explain wet and dry sprinkler systems and wet systems with siamese connections
 - b. Describe types and explain the operation of lawn sprinkler systems
 - c. Interpret drawings and specifications
 - d. Identify and install types of systems
 - e. Identify and install spray heads
 - f. Identify and install draining points
 - g. Identify and install valves
 - h. Identify and install chemical fertilizer injectors
 - i. Identify and install back siphonage preventer
 - j. Service and maintain system
9. Install food processing systems
- a. Describe types and explain the operation of food processing systems
 - b. Interpret drawings and specifications
 - c. Identify and install types of systems
 - d. Identify and install piping and fittings
 - e. Identify types and effects of fluids transferred
 - f. Test system
 - g. Service and maintain system

NAME & NUMBER PF2500 - Cross-Connection Control

DESCRIPTION

This course involves selecting, testing, and troubleshooting various types of back-flow prevention devices. It includes information on code requirements, industry standards and manufacturer's specifications.

MAJOR TOPICS/TASKS

Identify cross-connections and describe cross-connection control systems management; Install back-flow prevention devices; Test back-flow prevention devices; Repair back-flow prevention device

PURPOSE / AIMS

1. To develop the skills and knowledge required to select, install, test and maintain back-flow prevention devices.
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues.

PREREQUISITES PF1140 - Plumbing Fundamentals
PF1160 - Piping Shop Fundamentals

COURSE DURATION 45 hrs

LEARNING RESOURCES

EVALUATION Theory and Practical Applications Require a Pass Mark of 70%.

DATE DEVELOPED July 1998

COURSE OUTLINE / LEARNING OBJECTIVES:

1. Identify cross-connections and describe cross-connection control systems management
 - a. Identify an existing cross-connection.
 - b. Recognize a potential cross-connection situation.
 - c. Describe the administrative structure necessary to set up and manage an effective cross-connection control system.

2. Install back-flow prevention devices.
 - a. Describe cross-connection control and back-flow prevention.
 - b. Distinguish between back siphonage and back pressure.

- c. Explain the scientific concepts involved in a back-flow situation.
 - d. Describe the functional operation of each back-flow prevention device.
 - e. Check direction of flow
 - f. Locate isolating valve(s)
 - g. Maintain device supports
 - h. follow manufacturer's and code requirements
3. Test back-flow prevention devices
- a. Determine when to implement internal isolation, premise isolation, or both.
 - b. Explain the importance of proper and regular maintenance and testing.
 - c. Describe testing procedures.
 - d. Distinguish between the degrees of hazards.
 - e. Locate isolating valve(s)
 - f. Select test equipment
 - g. Conduct test as per manufacturer and code requirements.
 - h. Record test results.
4. Repair back-flow prevention device.
- a. Choose the most appropriate method of protecting the potable water system in any given situation.
 - b. Evaluate test results
 - c. Isolate device
 - d. Repair/replace as per code requirements and manufacturers specifications
 - e. Retest device
 - f. Record test results.

REQUIRED RELATED COURSES

COURSE NAME & NUMBER: Workplace Correspondence CM2150

DESCRIPTIVE TITLE: Workplace Correspondence

CALENDAR TITLE:

1.0 Type and Purpose Communications 2150 gives students the opportunity to study the principles of effective writing. Applications include letters, memos, and short report writing.

2.0 Major Topics Review of Sentence and Paragraph Construction; Business Correspondence; Informal Report; Job Search Techniques.

PREREQUISITES: Nil

CO-REQUISITES: Nil

COURSE DURATION 45hrs

**SUGGESTED TEXT/
LEARNING RESOURCES:**

Textbooks: Business English and Communications, Fourth Canadian Edition, Clark, Zimmer, et al., McGraw-Hill Ryerson, 1990

Student Projects and Activities for Business English and Communications,

Fourth Canadian Edition, Clark, et al., McGraw-Hill, 1990

Effective Business Writing, Jennifer MacLennon

Simon and Shuster Handbook for Writers, Second Edition, Troyka Lynn Quitman, Prentice Hall

College English Communication, Third Canadian Edition, Stewart, Zimmer, et al., McGraw-Hill Ryerson Limited, 1989

Business and Administrative Communication, Second Edition, Kitty O. Locker. IRWIN, 1991

References: Pittman Office Handbook, Smith/Hay-Ellis
The Gregg Reference Manual, Fourth Canadian Edition, Sabin/O'Neill

McGraw Hill Handbook

Other Resources: Business Letter Business (Video), Video Arts

Guest Speakers

Sell Yourself (Video)

COURSE AIMS:

1. To help students understand the importance of well-developed writing skills in business and in career development.
2. To help students understand the purpose of the various types of business correspondence.
3. To examine the principles of effective business writing.
4. To examine the standard formats for letters and memos.
5. To provide opportunities for students to practice writing effective letters and memos.
6. To examine the fundamentals of informal reports and the report writing procedure.
7. To provide an opportunity for students to produce and informal report.

MAJOR TOPICS/TASKS:

- 1.0 Review of Sentence and Paragraph Construction
- 2.0 Business Correspondence
- 3.0 Informal Report/Present Orally

COURSE OUTLINE:

- 1.0 Review of Sentence and Paragraph Construction
 - 1.1 Examining and applying principles of sentence construction
 - 1.2 Examining and applying principles of paragraph construction
- 2.0 Business Correspondence
 - 2.1 Examining the value of well-developed business writing skills
 - 2.2 Examining principles of effective business writing
 - 2.3 Examining business letters and memos
- 3.0 Informal Report
 - 3.1 Examining the fundamentals of informal business reports
 - 3.2 Applying informal report writing skills

LEARNING OBJECTIVES:

1.0 Review of Sentences and Paragraph Construction

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

1.2 Examine and Apply Principles of paragraph Construction

- 1.2.1 Discuss the basic purposes for writing.
- 1.2.2 Define a paragraph and describe the major characteristics of an effective paragraph.
- 1.2.3 Write well-developed, coherent, unified paragraphs which illustrate the following: A variety of sentence arrangements; conciseness and clarity; and adherence to correct and appropriate sentence structure, grammar, punctuation, and mechanics.

2.0 Business Correspondence

2.1 Examine the Value of Business Writing Skills

- 2.1.1 Discuss the importance of effective writing skills in business
- 2.1.2 Discuss the value of well-developed writing skills to career success

2.2 Examine Principles of Effective Business Writing

- 2.2.1 Discuss the rationale and techniques for fostering goodwill in business communication, regardless of the circumstances
- 2.2.2 Review the importance of revising and proofreading writing

2.3 Examine Business Letters and Memos

- 2.3.1 Differentiate between letter and memo applications in the workplace
- 2.3.2 Identify the parts of a business letter and memo
- 2.3.3 Explore the standard formats for business letters and memos
- 2.3.4 Examine guidelines for writing an acceptable letter and memo which convey: acknowledgment, routine request, routine response, complaint, refusal, and persuasive request, for three of the six types listed
- 2.3.5 Examine samples of well-written and poorly written letters and memos

3.0 Informal Report

- 3.1 Examine the Fundamentals of Informal Business Reports
 - 3.1.1 Identify the purpose of the informal report
 - 3.1.2 Identify the parts and formats of an informal report
 - 3.1.3 Identify methods of information gathering

- 3.2 Apply Informal Report Writing Skills and Oral Reporting Skills
 - 3.2.1 Gather pertinent information
 - 3.2.2 Organize information into an appropriate outline
 - 3.2.3 Draft a five minute informal report
 - 3.2.4 Edit, proofread, and revise the draft to create an effective informal report and present orally using visual aids.

RECOMMENDED EVALUATION:

Required Pass Mark 70%

DEVELOPMENT HISTORY:

Date Developed:

Date Revised: 1999 05 03

Name and Number: Customer Service MR1210

Descriptive Title: Customer Service

Summary 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.

Prerequisites: None

Co-requisites: None

Suggested Duration: 30 hrs

Evaluation: Theory and Practical Applications Require a Pass Mark of 70%.

Course Aims:

1. To know and understand quality customer service
2. To know why quality service is important
3. To know and understand the relationship between “service” and “sales”
4. To understand the importance of and to demonstrate a positive attitude
5. To recognize and demonstrate handling of customer complaints

Course Objectives (Knowledge):

1. **Providing Quality Service**
 - Define quality service
 - List the types of quality service
 - Define Service vs. Sales or Selling
 - Explain why quality service is important
 - Identify the various types of customers
 - Define customer loyalty

2. Determining Customers Wants and Needs

- List four levels of customer needs
- Identify important customer wants and needs
- Identify ways to ensure repeat business

3. Demonstrating a Positive Attitude

- List the characteristics of a positive attitude
- Explain why it is important to have a positive attitude
- List ways that a positive attitude can improve a customer's satisfaction
- Define perception
- Explain how perception can alter us and customers
- Understand how to deal with perception

4. Effectively Communicating with customers

- Describe the main elements in the communication process
- Identify some barriers to effective communication
- Define body language
- Explain how body language would affect customers
- Determine why body language is important
- Define active listening and state why it is important
- Describe the four components of active listening
- Contrast good and bad listeners
- List and discuss the steps of the listening process

5. Effectively using Questioning Techniques

- List questioning techniques
- Write two example of an open question
- Perform a questioning and listening role play

6. Using the Telephone Effectively

- List the qualities of a professional telephone voice
- Explain why telephone skills are important
- Demonstrate effective telephone skills

7. Asserting Oneself: Handling Complaints and Resolving Conflict

- Define assertiveness
- Define communication behaviors
- Relate assertions to effective communication
- Practice being assertive
- Understand the process of assertive guidelines for action
- Practice giving an assertive greeting
- Acknowledge multiple customers

8. Dealing with Difficult Customers

- Describe how you would deal with anger
- Complete a guide to controlling feelings
- Determine how you would feel dealing with an upset customer
- Suggest some techniques that might control your own feelings
- Understand leadership styles and the nature of organizations
- List ways to dealing with conflict / customer criticism
- Be aware of certain guidelines when confronting customers
- List ways of preventing unnecessary conflict with customers
- Review current skills and knowledge of customer service
- Develop a customer satisfaction improvement plan

Name and Number: General Studies SP2330

Descriptive Title: Quality Assurance / Quality Control

Description:

This general studies course requires the use of basic tools and equipment and materials and supplies. It requires controlling drawings and specifications and/or calibrating measuring devices in applicable occupations. It involves 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.

Prerequisites: None

Co-requisites: None

Suggested Duration: 30 Hrs

Course Aims:

1. To develop the skills and knowledge required to apply quality assurance/quality control procedures
2. To develop an awareness of quality management principles and processes

Course Objectives (Knowledge):

1. Describe the reasons for quality assurance and quality plans.
2. Explain the relationship between quality assurance and quality control.
3. Describe quality control procedures as applied to the production and checking of engineering drawings in applicable occupations.
4. Describe quality control procedures as applied to the acceptance and checking of raw materials.
5. Explain the role of communications in quality management.
6. Explain why it is important for all employees to understand the structure of the company and its production processes.
7. Explain how human resource effectiveness is maximized in a quality managed

- organization.
8. Explain the role of company policy in quality management.
 9. Explain the purpose of codes and standards.
 10. Explain the concepts of quality
 - a. cost of quality
 - b. measurement of quality
 - c. quality control and quality assurance
 - d. elements of quality
 - e. elements of the quality audit
 - f. quality standards
 - g. role expectations and responsibilities
 11. Explain the structure of quality assurance and quality control
 - a. Define quality assurance, quality control and documentation terminology
 - b. Describe organizational charts
 - c. List the elements of a quality assurance system
 - d. Explain the purpose of the quality assurance manual
 - e. Describe quality assurance procedures
 - f. Explain the key functions and responsibilities of personnel
 12. Complete quality assurance/quality control documentation
 - a. Describe methods of recording reports in industry
 - b. Describe procedures of traceability (manual and computer-based recording)
 - c. Identify needs for quality control procedures

Major Tasks / Subtasks (Skills):

1. Apply quality control to projects
 - a. Follow QA/QC procedures for drawings, plans and specifications in applicable occupations.
 - b. Calibrate measuring instruments and devices in applicable occupations.
 - c. Interpret required standards
 - d. Follow QA/QC procedures for accepting raw materials
 - e. Carry out the project
 - f. Control the quality elements (variables)
 - g. Complete QA/QC reports

Evaluation:

Pass Mark Required 70%

Development History:

Date Developed: February 1994

Date Revised: April, 1999

COURSE NAME & NUMBER: Introduction to Computers MC1050

DESCRIPTIVE TITLE: Introduction to Computers

CALENDAR ENTRY:

Type and Purpose 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.

Major Topics Microcomputer System Hardware and Software Components; Word Processing; Electronic Spreadsheets; Electronic Mail and the Internet.

PRE-REQUISITES: Nil

CO-REQUISITES: Nil

SUGGESTED DURATION: 30 hours

**SUGGESTED TEXT/
LEARNING RESOURCES:**

Textbook(s):

References:

Other Resources:

COURSE AIMS:

1. To provide students with a introduction to computer systems and their operation.
2. To introduce students to popular software packages, their applications and future trends in computer applications.

MAJOR TOPICS:

1. Microcomputer System Hardware and Software Components
2. Word Processing
3. Spreadsheet
4. E-Mail and the Internet

COURSE OUTLINE:

- 1.0 Microcomputer System Hardware and Software Components
 - 1.1 Microcomputer Hardware
 - 1.1.1 System Components
 - 1.1.2 Function of each Component
 - 1.2 Microcomputer Software
 - 1.2.1 Software Definition and Types
 - 1.2.2 System Software (Windows 95)
 - 1.2.3 File Management Commands (Windows 95)
- 2. Word Processing
 - 2.1 Keyboarding Techniques
 - 2.2 Word Processing
 - 2.2.1 Understanding Word Processing
 - 2.2.2 Create a Document
 - 2.2.3 Save, Open and Edit a Document
 - 2.2.4 Edit a Document: Cut and Paste
 - 2.2.5 Understand Hidden codes.
 - 2.2.6 The Select Feature (Block)
 - 2.2.7 Change Layout Format
 - 2.2.8 Change Text Attributes
 - 2.2.9 Use Auxiliary Tools
 - 2.2.10 Select the Print Feature (number of copies and current document)
- 3. Electronic Spreadsheet
 - 3.1 Spreadsheet Basics
 - 3.2 Operate Menus
 - 3.3 Create a Worksheet
 - 3.4 Use Ranges
 - 3.5 Print a Worksheet
 - 3.6 Edit a worksheet
- 4. Electronic Mail and the Internet
 - 4.1 Electronic Mail
 - 4.2 The Internet

Learning Objectives:

1. Microcomputer System Hardware and Software Components

1.1 Microcomputer Hardware

1.1.1 System Components

1.1.1.1 Identify major components of a computer system.

1.1.2 Function of each Component

1.1.2.1 Describe the function of the microprocessor.

1.1.2.2 Describe and give examples of I/O DEVICES.

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

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

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

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

1.2 Microcomputer Software

1.2.1 Software Definition and Types

1.2.1.1 Define software.

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

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

1.2.2 System Software (Windows 95)

1.2.2.1 Getting Started with Windows

1.2.2.2 Start and quit a Program

1.2.2.3 Get Help

1.2.2.4 Locate a specific file using the **find** function of Win95

1.2.2.5 Changing system settings:wall paper, screen saver, screen resolution, background.

1.2.2.6 Starting a program by using the Run Command

1.2.2.7 Shutting down your computer

1.2.3 File Management Commands (Windows 95)

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

2. Word Processing

2.1 Keyboarding Techniques

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

2.2 Word Processing

2.2.1 Understanding word processing

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

2.2.2 Create a document

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

2.2.3 Save, Open and Exit a document.

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

2.2.4 Edit a Document

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

2.2.5 Understand Hidden Codes

- 2.2.5.1 Display Hidden Codes
- 2.2.5.2 Delete Text Enhancements

2.2.6 The Select Feature

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

2.2.7 Change Layout Format

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

2.2.8 Change Text Attributes

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

2.2.9 Use Auxiliary Tools

- 2.2.9.1 Spell Check

2.2.10 Select the Print Feature

- 2.2.10.1 Select the Print Feature: (i.e; number of copies and current document)
- 2.2.10.2 Identify various options in print screen dialogue box

3. Electronic Spreadsheet

3.1 Spreadsheet Basics

3.1.1 The Worksheet Window

- 3.2 Operates Menus
 - 3.2.1 Use a Menu Bar
 - 3.2.2 Use a Control Menu
 - 3.2.3 Use a Shortcut Menu
 - 3.2.4 Save, Retrieve form Menus

- 3.3 Create a Worksheet
 - 3.3.1 Enter Constant Values and Formulas
 - 3.3.2 Use the Recalculation Feature
 - 3.3.3 Use Cell References (relative and absolute references)

- 3.4 Use Ranges
 - 3.4.1 Type a Range for a Function
 - 3.4.2 Point to a Range for a Function
 - 3.4.3 Select a Range for Toolbar and Menu Commands

- 3.5 Print a Worksheet
 - 3.5.1 Print to the Screen
 - 3.5.2 Print to the Printer
 - 3.5.3 Print a Selected Range

- 3.6 Edit a Worksheet
 - 3.6.1 Replace Cell Contents
 - 3.6.2 Insert and Delete Rows and Columns
 - 3.6.3 Change Cell Formats
 - 3.6.4 Change Cell Alignments
 - 3.6.5 Change Column Width
 - 3.6.6 Copy and Move Cells

- 4. Electronic Mail and the Internet
 - 4.1 Electronic Mail
 - 4.1.1 Compose and send an e-mail message
 - 4.1.2 Retrieve an e-mail attachments
 - 4.1.3 Send an e-mail message with attachments
 - 4.1.4 Retrieve and save e-mail attachments
 - 4.1.3 Print an e-mail message
 - 4.1.4 Delete an e-mail message

 - 4.2 The Internet

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

STUDENT EVALUATION:

Required Pass Mark 70%

DEVELOPMENT HISTORY:

Date Designed 1998
Date Revised 1999

Name and Number: Workplace Skills SD 1700

Descriptive Title: Workplace Skills

Description:

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

Prerequisites: None

Co-requisites: None

Suggested Duration: 30 Hrs

Course Aims:

1. Participate in meetings (conduct meetings).
2. Be aware of union procedures.
3. Be aware of workers' compensation regulations.
4. Be aware of occupational health and safety regulations.
5. Be aware of employment insurance regulations
6. Be aware of workers' rights.
7. Be aware of human rights

Course Objectives (Knowledge):

1. Meetings
 - a. Explain preparation requirements prior to conducting a meeting
 - b. Explain the procedures for conducting a meeting.
 - c. Explain participation in meetings.
 - d. Explain the purpose of motions.
 - h. Explain the procedure to delay discussion of motions.
 - i. Explain how to amend and vote upon a motion.
2. Unions

- a. Why do unions exist?
 - b. Give a concise description of the history of Canadian labour.
 - c. How do unions work?
 - d. Explain labour's structure.
 - e. Describe labour's social objectives.
 - f. Describe the relationship between Canadian labour and the workers.
 - g. Describe the involvement of women in unions.
3. Worker's Compensation
- a. Describe the aims, objectives, benefits and regulations of the Workers Compensation Board.
 - b. Explain the internal review process.
4. Occupational Health and Safety
- a. Describe the rules and regulations directly related to your occupation.
5. Employment Insurance Regulations
- a. Explain employment insurance regulations
 - b. Describe how to apply for employment insurance.
 - c. Explain the appeal process.
6. Worker's Rights
- a. Define labour standards.
 - b. Explain the purpose of the Labour Standards Act.
 - c. List regulations pertaining to:
 - i. Hours of work.
 - ii. Minimum wage.
 - iii. Employment of children.
 - iv. Vacation pay
7. Human Rights
- a. Describe what information cannot be included on an application.
 - b. Describe what information cannot be included in an interview
 - c. Why is there a Human Rights Code?
 - d. Define sexual harassment.

Major Tasks / Subtasks (Skills):

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

2. Complete a safety inspection of your shop.
3. Complete an employment insurance application form.
4. Write a letter of appeal.
5. Analyze a documented case of a human rights complaint with special emphasis on the application form, time-frame, documentation needed, and legal advice available.

Evaluation:

Required Pass Mark 70%

Development History:

Date Developed:

Date Revised: April, 1999

Name and Number: Job Search Techniques SD 1710

Descriptive Title: Job Search Techniques

Prerequisites: None

Co-requisites: None

Suggested Duration: 15 hrs.

Evaluation: Theory and Practical Applications Require a Pass Mark of 70%.

Course Objectives (Knowledge):

1. Examine and Demonstrate Elements of Effective Job Search Techniques

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

DEVELOPMENT HISTORY:

Date Developed:

Date Revised: 1999 05 03

Name and Number: Entrepreneurial Awareness SD 1720

Descriptive Title: Entrepreneurial Awareness

Prerequisites: None

Co-requisites: None

Suggested Duration: 15 hrs

Evaluation: Theory and Practical Applications Require a Pass Mark of 70%.

Course Objectives (Knowledge):

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

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

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

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

REQUIRED WORK EXPERIENCES

National Red Seal Certification requires that all Apprentices obtain appropriate industry based work experiences. The required work experiences identified in this section are written in the broadest terms so as to ensure the apprentices receive experiences in each of the required areas and to ensure that employers have a degree of flexibility in applying the terms and conditions implicit in a Contract of Apprenticeship. What is important is that both the apprentice and the employer understand the obligations laid out in this plan of training which is designed to ensure that at the completion of both the technical training and the required hours of work experience the apprentice has both the knowledge and the skills necessary to successfully complete the Red Seal Examination.

REQUIRED WORK EXPERIENCES:

Read basic drawings and diagrams, sketch diagrams, interpret specifications, and operate computer assisted drafting software.

Set up oxy-fuel welding equipment; prepare, cut, and weld metal; shut down, disassemble, and store equipment.

Set up shielded metal arc welding equipment; prepare and weld metal; shut down equipment and test weld.

Select, measure, bend, thread, flare, and swage, and join various types of pipe and tubing.

Design, install, test, and maintain drainage and sewage disposal systems.

Size, select, and install plumbing venting systems.

Design, install, test, and maintain water supply systems.

Install, repair, and maintain plumbing appliances.

Install, operate, test, and maintain hot water heating systems.

Size, install, maintain, test, and troubleshoot oil burner system components.

Install, operate, test, and maintain piping and heating control systems.

Size, install, maintain, test, and troubleshoot alternative heat generators.

Select, install, test, and adjust pumps.

Install, test, and maintain specialized piping systems such as vacuum systems, underground distribution systems, bulk loading stations, fire lines, swimming pool piping, and sprinkler systems.