



**PROVINCIAL PLAN OF TRAINING
FOR THE
OIL BURNER MECHANIC
OCCUPATION**

June 2003

Preface

This Provincial Plan of Training derived from the Atlantic Training Standard is based upon the 1997 edition of the National Occupational Analysis for the Oil Burner Mechanic trade. It was developed through the cooperative efforts of the Atlantic Apprenticeship Council, which consists of both the Atlantic Directors of Apprenticeship and Apprenticeship Board Chairs. This document describes the curriculum content for the Oil Burner Mechanic apprenticeship training program and outlines each of the courses necessary for completion of apprenticeship.

Acknowledgement

Advisory committees, industry representatives, instructors and apprenticeship staff provided valuable input into the development of this Provincial Plan of Training. Their dedication to quality apprenticeship will benefit institutional training for apprentices in this trade.

Apprenticeship Plan of Training Evaluation Form

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

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

Overall comments are to be entered on this evaluation form and specific changes are to be entered directly on the document in the relevant area(s). When all feedback has been recorded, return this evaluation form along with the revised Plan of Training to the Apprenticeship Office noted at the bottom of the page.

(PLEASE PRINT)

Trade: Oil Burner Mechanic

Full Name: _____

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

Company: _____

Address: _____

Telephone: _____

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

Return Evaluation Form and Plan of Training to:

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

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Program Outcomes

Upon successful completion of the Oil Burner Mechanic Apprenticeship Program, apprentices will have the knowledge and skills required to perform the following tasks:

- Task 1 Practices safety and maintains a safe work environment.
- Task 2 Installs oil liquid medium heating appliances.
- Task 3 Installs oil-combination liquid medium heating appliances.
- Task 4 Installs oil warm air heating appliances.
- Task 5 Installs oil-combination warm air heating appliances.
- Task 6 Installs waste oil burners
- Task 7 Installs fuel supply to oil burning equipment.
- Task 8 Conditions oil burning equipment and appliances annually.
- Task 9 Conditions oil-combination burning equipment and appliances annually.
- Task 10 Troubleshoots, repairs and replaces burners and components.
- Task 11 Troubleshoots, repairs and replaces controls.
- Task 12 Troubleshoots, repairs and replaces warm-air appliances.
- Task 13 Troubleshoots, repairs and replaces liquid medium appliances.
- Task 14 Evaluates existing system and plans new system.
- Task 15 Removes existing equipment.
- Task 16 Installs retrofit system.

Program Structure

OBM = Oil Burner Mechanic specific courses

NF Course No.	Atlantic Course No.	Course Name	Suggested Hours	Prerequisites	Page No.
TS-1510		Occupational Health & Safety	6		12
TS-1530		First Aid	14		15
TS-1520		WHMIS	6		16
OM-1120	OBM-0100	Print Reading & Sketching	30		19
OM-1130	OBM-0105	Tools & Equipment	45		21
OM-1140	OBM-0110	House as a System	20		23
OM-1150	OBM-0115	Trade Practice	30		25
OM-1230	OBM-1100	Soldering , Flaring & Threading Pipe	30	OBM-0105	27
OM-1240	OBM-1105	Fuel Storage Tanks	30	OBM-0105	28
OM-1250	OBM-1110	Fuel Delivery Systems	30	OBM-0105	31
OM-1320	OBM-1115	Combustion & Burner Air Handling Devices	30	OBM-1110	34
OM-1330	OBM-1120	Electricity 1 (Principles of Electricity)	30	OBM-0105	37
OM-1340	OBM-1125	Electricity 2 (Electrical Devices & Ignition Systems)	30	OBM-1120	40
OM-1350	OBM-1130	Electricity 3 (Solid State & Programmable Controls)	30	OBM-1125	43
OM-1440	OBM-1135	Controls & Wiring	75	OBM-1125	45
OM-1450	OBM-1140	Motors	30	OBM-1125	47
OM-1460	OBM-1145	Combustion Chambers	30	OBM-1115	48
OM-1470	OBM-1150	Chimneys, Venting & Draft Control	30	OBM-1115, 1140	49
OM-1600	OBM-1155	Hydronic Heating Systems	45	OBM-0100, 1100, 1110, 0115, 1130	51
OM-1610	OBM-1160	Warm Air Furnaces	45	OBM-0100, 1100, 1110, 0115, 1130	53
OM-1620	OBM-1165	Low Pressure Steam Systems	15	OBM-1155	55
OM-1630	OBM-1170	Domestic Hot Water Heaters	30	OBM-1155	57
OM-1640	OBM-1175	Specialized Systems	30	OBM-0105, 0110	59

NF Course No.	Atlantic Course No.	Course Name	Suggested Hours	Prerequisites	Page No.
OM-1650	OBM-1180	Zoning 1 (Hot Water System)	30	OBM-0110, 0115, 1100, 1115, 1135, 1155	61
OM-1660	OBM-1185	Retrofit Systems	20	OBM-0100, 0110, 0115, 1105, 1115, 1135, 1145, 1150, 1165, 1170, 1175, 1180	62
OM-1670	OBM-1190	Service & Troubleshooting	30	OBM-1185	64
OM-1680	OBM-1195	Planned Maintenance	30	OBM-1190	66
OM-1690	OBM-1180	Zoning 2 (Warm Air System)	30	OBM-0110, 0115, 1100, 1115, 1135, 1160	68
CM-2150		Workplace Correspondence	45		70
MR-1220		Customer Service	30		72
SP-2330		Quality Assurance/Quality Control	30		74
MC-1050		Introduction to Computers	30		76
SD-1700		Workplace Skills	30		80
SD-1710		Job Search Techniques	15		82
SD-1720		Entrepreneurial Awareness	15		83

CONDITIONS GOVERNING APPRENTICESHIP TRAINING

1.0 GENERAL

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

2.0 ENTRANCE REQUIREMENTS

2.1 Entry into the occupation as an apprentice requires:

The completion of designated first year courses specific to the occupation
OR

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

OR

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

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

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

2.4 A Registration for Apprenticeship form must be duly completed.

3.0 PROBATIONARY PERIOD

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

4.0 TERMINATION OF A MEMORANDUM OF UNDERSTANDING

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

5.0 APPRENTICESHIP PROGRESSION SCHEDULE AND WAGE RATES

5.1 Progression Schedule

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

4800 Hour Programs	Requirements for Progression	Progress To
First Year 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 journeyperson's wage rate in the place of employment of the apprentice. No apprentice shall be paid less than the wage rate established by the Labour Standards Act (1988), as now in force or as hereafter amended, or by other Order, as amended from time to time replacing the first mentioned Order.
	2 nd Year	65%	
	3 rd Year	75%	
	4 th Year	90%	
5400 Hours and 4800 Hours	1 st Year	55%	
	2 nd Year	70%	
	3 rd Year	85%	
4000 (Hairstylist) - The apprentice shall be paid no less than the minimum wage for hours worked and a commission agreed upon between the apprentice and the employer.			

6.0 TOOLS

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

7.0 PERIODIC EXAMINATIONS AND EVALUATION

7.1 Every apprentice shall submit to such occupational tests and examinations as the Board shall direct. If after such occupational tests and examinations the apprentice is found to be making unsatisfactory progress, his/her rate of

wage shall not be advanced as provided in Section 5 until his/her progress is satisfactory to the Director of Institutional and Industrial Education and his/her date of completion shall be deferred accordingly. Persistent failure to pass required tests shall be a cause for revocation of his/her Memorandum of Understanding.

- 7.2 Upon receipt of reports of accelerated progress of the apprentice, the Board may shorten the term of apprenticeship and advance the date of completion accordingly.
- 7.3 For each and every course, a formal assessment is required for which 70% is the pass mark. At the discretion of the instructor, the summative mark may be for completion of a theory examination or a combination of the theory examination and an assigned practical project.

8.0 GRANTING OF CERTIFICATES OF APPRENTICESHIP

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

9.0 HOURS OF WORK

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

10.0 COPIES OF THE REGISTRATION FOR APPRENTICESHIP

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

11.0 RATIO OF APPRENTICES TO JOURNEYPERSONS

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

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

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

13.0 AMENDMENTS TO A PLAN OF APPRENTICESHIP TRAINING

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

14.0 EMPLOYMENT, RE-EMPLOYMENT AND TRAINING REQUIREMENTS

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

15.0 APPEALS TO DECISIONS BASED ON CONDITIONS GOVERNING APPRENTICESHIP TRAINING

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

REQUIREMENTS FOR RED SEAL CERTIFICATION

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

Or

A total of 9000 hours of suitable work experience.

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

ROLES AND RESPONSIBILITIES OF STAKEHOLDERS IN THE APPRENTICESHIP PROCESS

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

The Apprentice

- ▶ to complete all required technical training courses as approved by the Provincial Apprenticeship and Certification Board.
- ▶ to find appropriate employment.
- ▶ to complete all required work experiences in combination with the required hours.
- ▶ to ensure that the work experiences are well documented.
- ▶ to approach apprenticeship training with an attitude and commitment that fosters the qualities necessary for a successful career as a qualified journeyperson.
- ▶ to obtain the required hand tools as specified by the Board for each period of training of the apprenticeship program.

The Employer

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

The Training Institution

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

The Industrial Training Division

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

The Provincial Apprenticeship and Certification Board

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

Description:

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

Course Outcomes:

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

1. prevent accidents and illnesses
2. improve health and safety conditions in the workplace

Theory

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

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

5. Describe discriminatory action

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

6. Explain duties of commission officers

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

7. Interpret appeals of 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 outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

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

TS1530

FIRST AID

Description:

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

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

TS 1520

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

Description:

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

Course Outcomes:

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

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

Required Knowledge and Skills:

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

- radioactive prescribed substances
- wood or products made of wood
- manufactured articles
- tobacco or products of tobacco
- hazardous wastes
- products handled or transported pursuant to the Transportation of Dangerous Goods (TDG) Act
- Comparison of classification systems - WHMIS and TDG
- General comparison of classification categories
- Detailed comparison of classified criteria

3. Explain labeling and other forms of warning

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

4. Introduce material safety data sheets (MSDS)

- Definition of a material safety data sheet
- Purpose of the data sheet
- Responsibility for the production and availability of data sheets
 - supplier responsibility
 - employer responsibility
 - workers responsibility

Practical

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

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

SUGGESTED RESOURCES:

1. WHMIS Regulation
2. Sample MSDS sheets

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 2, 3, 4, 5 & 7.

Course Outcomes:

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

- demonstrate knowledge of blueprints and drawings.
- demonstrate knowledge of single line sketches.

Theory:

1. Identify drawing instruments, describe their purpose and use.
 - traditional
 - CAD
2. Describe types of drawings and prints and their use.
3. Describe scales, their purpose and use.
4. Identify types of lines and describe their use.
 - object
 - broken
 - extension
 - dimension
 - centre
 - leader
 - break line
 - cutting plane
5. Identify drawing symbols and abbreviations and describe their use.
6. Identify views and describe their use.
7. Identify standard elevations and describe their use.
8. Identify specifications and describe their use.
9. Demonstrate how to perform heat loss calculations.

Practical:

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

1. Identify relevant symbols and lines.
2. Sketch projects to scale.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 1, 2, 3, 4 & 5.

Course Outcomes:

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

- demonstrate knowledge of safety practices in the use and care of tools and equipment.
- demonstrate knowledge in the selection, operation and maintenance of hand and power tools, equipment and facilities, without damage to equipment, operator or to others.
- demonstrate understanding of the responsibilities of the Oil Burner Mechanic toward the employer for the care and proper use of tools.

Theory:**HAND AND POWER TOOLS**

1. Describe the purpose, applications, procedures for use and care of hand tools.
 - hammers
 - screwdrivers
 - wrenches
 - pliers and wire cutters
 - rulers and measuring tools
 - cutting tools
 - files
 - torque wrenches
2. Describe the purpose, applications, procedures for use and care of power tools.
 - drills and drill bits
 - saws
 - sanders and grinders
 - powder actuated tools
3. Describe the components, applications and procedure for using compressed air systems.
4. Describe powder actuated tools, their applications and procedures for safe use.

SPECIALTY TOOLS

5. Describe the various special tools used in the Oil Burner Mechanic trade, their purpose, applications and procedures for use.
 - pressure and vacuum gauges
 - multimeter
 - nozzle wrench
 - flame mirror
 - electrode gauges
 - fan-wheel puller
6. Describe scribes and markers, their purpose, applications and procedure for use.
7. Describe flaring tools, their purpose, applications and procedures for use.
8. Describe grinding tools, their purpose, applications and procedures for use.
9. Describe taps and dies, their purpose, applications and procedures for use.
10. Describe the types of fasteners, their applications and procedures for use.
11. Describe soldering tools, their applications, care and procedures for use.
12. Describe measuring tools, their applications, care and procedures for use.

Practical:

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

1. Complete projects as assigned by instructor.
 - measuring
 - cutting
 - threading
 - filing

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis task 14.

Course Outcomes:

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

- demonstrate knowledge of building science as it relates to climate control systems.
- demonstrate knowledge of climate control systems.

Theory:**COMBUSTION AIR / VENTILATION AIR**

1. Define combustion/ventilation and describe its relationship to oil heating systems.
2. Define make up air and describe its relationship to oil heating systems
3. Calculate the amount of combustion air required for a particular system.
4. Interpret the CSA codes regarding air supply.

HUMIDITY CONTROL

5. Describe the factors affecting humidity.
6. Describe relative humidity and the importance of correct relative humidity.
7. Describe the different types of humidifiers and how they operate.
8. Describe the procedures used to install and service humidifiers.
9. Explain the importance of air change and its effects on humidity.
10. Explain the causes and effects of depressurization by exhaust appliances

BUILDING SCIENCE AND VAPOUR BARRIERS

11. Describe exterior wind barriers, their purpose and operation.
12. Describe vapour barriers, their purpose and operation.

13. Describe the various types of housing insulation, its characteristics and effect on heating requirements.
14. Identify and interpret problems related to oil heating equipment created by changes to a building structure.

Practical:

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

1. Install combustion air vents.
2. Install make up air venting system.
3. Measure humidity.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis throughout the document.

Course Outcomes:

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

- demonstrate knowledge of the scope and limitations of the trade.
- demonstrate knowledge of professional standards of customer service.
- identify and demonstrate understanding of appropriate codes and regulations.

Theory:**RESPONSIBILITIES AND TRADE PRACTICE**

1. Describe the responsibilities of the Oil Burner Mechanic under the various applicable codes and regulations.
 - workers compensation
 - Occupational Health & Safety Act
 - WHIMS
 - environmental regulations
 - environmental considerations
 - regulations governing fuel tanks
 - fire regulations
 - company regulations
 - plumbing codes
 - electrical codes
 - pressure vessels act
 - installation code for oil burning equipment
2. Describe the responsibilities of the Oil Burner Mechanic and workmanship required in the installation code for oil burning Equipment.
3. Describe the limitations of work carried out in the Oil Burner Mechanic trade and good practices when dealing with other related trade groups.

CUSTOMER SERVICE

4. Describe the relationship between sales and service.
5. Describe good practices for projecting a professional attitude.
 - respect the customer

- appearance
- workplace behaviour

6. Describe effective communication.
 - first contact
 - sharing information
7. Describe methods of preventing property damage.
 - vehicles
 - cleanliness
 - use of tools and equipment
 - handling and installation of appliances
 - clean up
8. Describe good practices for dealing with customers.
 - calming customers
 - preventing problems
 - dealing with complaints
 - resolving problems
9. Describe effective strategies for dealing with difficult customers and high risk situations.
10. Describe cultural differences affecting work issues and communication and strategies for overcoming them.

Practical:

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

1. Classroom exercises as determined by the instructor.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis 1, 2, 3, 7, 8 & 9.

Course Outcomes:

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

- demonstrate knowledge of the equipment and procedures used to flare and join copper tubing.
- demonstrate knowledge of the equipment and procedures used to solder fittings.
- demonstrate knowledge of the applications, tools and procedures used for threading pipe.

Theory:

1. Describe the uses and applications of brazing and soldering processes.
2. Describe the tools used in brazing and soldering processes, their applications and care.
3. Describe the types of flux, their characteristics and applications.
4. Describe the safety precautions to be observed during brazing and soldering operations.
5. Describe the procedures used to perform brazing and soldering operations on copper tubing.
6. Describe types of pipe threading compounds, and cutting fluids.
7. Describe pipe threading devices, their purpose, applications and procedures for use.

Practical:

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

1. Flare and join copper tubing.
2. Solder fittings.
3. Thread pipe.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 7 & 8.

Course Outcomes:

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

- demonstrate knowledge of fuel storage and supply systems to oil burning equipment.
- demonstrate knowledge of oil tank installation.
- identify and demonstrate understanding of appropriate codes and regulations.

Theory:**SELECTION AND LOCATION**

1. Describe the characteristics and specifications of tanks.
 - inside
 - above ground
 - underground
2. Describe conditions for locating and placing an oil tank, both steel and non-metallic.
 - inside
 - above ground
 - underground
3. Describe the effects of condensation and methods for remedy and prevention.
4. Describe and interpret the system for pipe sizing.
5. Describe the type and sizing of pipe used in tank installation and the applications of each.
6. Identify and interpret codes and regulations that apply to piping in the trade.
7. Identify and interpret the Regulations for Underground Tanks.
8. Identify and interpret installation codes that apply to metallic and non-metallic storage tanks.
 - CSA
 - U.C.
 - ORD requirements

INSTALLATION

9. Describe safe practices for handling fuels.
10. Describe methods for installing fill and venting pipes.
11. Describe the procedures used to thread pipe.
12. Describe the procedures used to anneal pipe.
13. Describe the procedures used to flare pipe.
14. Describe the methods for installing tubing.
 - cutting and joining
 - fittings
 - clamping and supporting
 - methods of channeling in floors
15. Describe the type, location and placement of tank ancillaries and procedures for installation.
 - gauging devices
 - vent alarm
16. Describe the purpose, types and location of shut-off valves.
17. Describe the procedure for flushing fuel delivery systems.
18. Describe the oil filter assembly and procedures used for installation of oil filter assembly.
19. Describe the procedure for performing visual inspection of fuel storage tanks and installations.
20. Describe the procedures used to cut, thread and install black iron pipe.
21. Demonstrate how to perform calculations of piping material requirements for a given installation.
22. Demonstrate how to perform calculations of tank size.
23. Describe procedure to compile materials list.
24. Describe the procedures used to test oil tanks.
 - pre-installation
 - post installation

25. Describe regulations and procedures for dealing with fuel oil spillages and containment.
 - secondary containment
 - double wall requirements
26. Describe procedures for removal and disposal of oil tanks.
 - regulations
 - safety

Practical:

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

1. Cut, thread and install black iron pipe.
2. Perform calculations of piping material requirements for a given installation.
3. Perform calculations of tank size.
4. Compile materials list.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13 & 14.

Course Outcomes:

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

- demonstrate knowledge of fuel units, their installation and adjustment.
- demonstrate knowledge of fuel pumps, auxiliary fuel pumps and their installation.
- demonstrate knowledge of nozzles and fuel filters, their applications and installation.

Theory:**FUEL UNITS**

1. Identify and describe the types of fuel units and their purpose.
2. Identify and describe the component parts of the fuel unit.
3. Describe the characteristics and applications of fuel systems.
 - one pipe
 - two pipe single stage
 - two-stage fuel units
 - auxiliary pumping systems
4. Describe installation procedures for fuel units
 - pump selection
 - proper rotation
 - alignment
 - sizing of fuel lines
 - pump couplings
5. Describe installation procedures for auxiliary pumps.
 - pump selection
 - proper rotation
 - alignment
 - sizing of fuel lines
 - pump couplings
6. Describe servicing procedures for fuel units.
 - primary venting and bleeding
 - cleaning and replacement of pump screen

- pressure regulation
- pressure and vacuum
- gasket replacement
- gear replacement
- regulator replacement
- seal replacement

7. Describe servicing procedures for auxiliary pumps.
 - primary venting and bleeding
 - cleaning and replacement of pump screen
 - pressure regulation
 - pressure and vacuum
 - gasket replacement
 - gear replacement
 - regulator replacement
 - seal replacement
8. Describe the types of couplings and their applications.
9. Describe procedures used in testing and inspecting fuel units.
10. Describe procedures used in testing and inspecting auxiliary pumps.
11. Describe possible fuel unit problems, their indicators and remedial action to be taken.
12. Describe possible auxiliary pump problems, their indicators and remedial action to be taken.
13. Identify and interpret the appropriate installation codes.

NOZZLES AND FUEL FILTERS

14. Describe the purpose and function of nozzles.
15. Describe the different types of nozzles and nozzle adaptors and their applications.
16. Describe the effect on nozzles of:
 - pressures
 - gravity
 - viscosity
17. Describe the procedures for installation and servicing of nozzles.
18. Describe the procedures for testing nozzles.
19. Describe the purpose and application of oil filters and the procedures for installation

and replacement of oil filters.

20. Describe possible problems encountered in working with nozzles and oil filters and their likely causes and appropriate remedies.
21. Describe the care and maintenance of the test equipment and instruments.
22. Describe the diagnostic procedures to be used with test readings.
 - check burner shutdown
 - observe flame
 - look for air leaks
 - check burner operating period
23. Describe the common problems indicated by test readings.
24. Describe the procedure for estimating fuel savings.

Practical:

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

1. Install fuel units.
2. Perform testing procedures on fuel units.
3. Install auxiliary units.
4. Perform testing on auxiliary units.
5. Dismantle and reassemble fuel units.
6. Dismantle and reassemble auxiliary units.

OBM-1115 Combustion & Burner Air Handling Devices

NOA Reference:

The material covered satisfies in whole or in part, the requirements of national occupational Analysis tasks 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, & 13.

Course Outcomes:

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

- demonstrate understanding of oil as a fuel.
- demonstrate knowledge of the combustion process.
- demonstrate knowledge of selection, maintenance, and use of appropriate test equipment.
- identify and demonstrate understanding of appropriate codes and regulations.

Theory:

FUEL OIL PROPERTIES

1. Describe the composition and origin of heating oil.
2. Describe the refining processes and their products.
3. Describe the types of fuel oils and their applications.
4. Describe the characteristics of fuel oil and their relevance to burning characteristics.
 - flash point
 - pour point
 - water and sediment
 - volatility
 - viscosity
 - gravity
 - sulfur content
 - color
5. Describe the safe handling and storage of fuel oil.
 - storage temperature
 - cross-contamination with other fuels
6. Describe the effects of water and sediment in fuel tanks.
7. Describe the significance of regional variations of fuel properties.

COMBUSTION

8. Describe the relevance of combustion theory to the trade.
9. Define combustion, explain the process and its products.
10. Describe the composition of air and its role in the combustion process.
11. Describe the physical requirements for oil burning.
12. Describe fuel/air ratios and their importance.
13. Describe the process of atomization and its role in the burning of fuel oil.
14. Describe incomplete combustion, its causes and dangers.
15. Describe the relationship between excess combustion air, smoke, and efficiency.

AIR HANDLING PARTS

16. Describe burner fans, their purpose, parts, and operation.
17. Describe turbulators, their purpose, parts, and operation.
18. Describe the types of blowers, their characteristics and applications
19. Describe spinners, their purpose, parts, and operation.
20. Describe end cones, their purpose, parts, and operation.
21. Describe the types of combustion heads, their purpose, parts, and operation:
 - retention head
 - non-retention head
22. Explain the relationship of adjustment of the various air handling parts to the combustion of the fuel oil.
23. Explain the effects of draft on air delivery.

COMBUSTION EFFICIENCY TESTING

24. Describe the purpose of combustion testing and the main measurements included in combustion testing:
 - combustion air
 - smoke measurement and reduction
 - flue gas/net stack temperature
 - draft measurement

25. Describe the benefits of performing accurate testing interpretation and documentation:
 - to efficiency
 - to the customer
 - to the mechanic
26. Describe the draft gauge, its purpose and operation, adjustment and use.
27. Describe the common causes of poor draft.
28. Describe the smoke tester, its purpose, operating principles and procedures for adjustment and use.
29. Describe the test indications and their significance.
30. Describe the CO. analyzer, its purpose, parts, operating principles and procedures for adjustment and use.
31. Describe the dial type stack thermometer and procedures for its use.
 - drilling holes
 - stable stack temperature
32. Describe various types of diagnostic combustion test equipment, its design and advantages.

Practical:

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

1. Perform complete combustion efficiency testing on various heating units.

OBM-1120 Electricity 1 (Principles of Electricity)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 1, 3, 4, 5, 8, 9, 10, 11 & 15.

Course Outcomes:

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

- demonstrate knowledge of basic electrical theory, systems and components.
- demonstrate knowledge of selection and use of appropriate electrical test equipment.

Theory:

INTRODUCTION TO ELECTRICITY

1. Explain the electron theory.
2. Explain electrical terminology and units of measurement.
3. Describe what is meant by resistance and the factors affecting it.
4. Describe the characteristics of conductors and insulators and their applications.
5. Explain Ohm's Law and use of associated formulae.

DIRECT AND ALTERNATING CURRENT

6. Describe electromagnetism and how it can be used to produce voltage.
7. Describe direct current and how it is created.
8. Describe the trade related applications of direct current.
9. Describe alternating current and how it is created.
10. Describe terms associated with alternating current.
 - cycle
 - hertz
 - effective value
 - electrical characteristics
11. Describe the characteristics of sine waves and their interpretation.

12. Describe the applications within the trade of alternating current.
13. Describe the method of distribution of electric power .
14. Describe the layout of a typical home distribution panel and its relationship to the heating system.

ELECTRICAL CIRCUITS

15. Describe electrical circuits, their components and operation.
16. Describe the procedure used to construct series circuits.
17. Describe the procedure used to construct parallel circuits.
18. Describe the procedures used to construct series/parallel circuits.
19. Describe the causes of excessive current.
20. Describe overload protection circuits.
21. Interpret the abbreviations, formula symbols and circuit symbols found in circuit diagrams.
22. Identify the sections of the Canadian Electrical Code that apply to oil burner installation and service.
23. Describe the procedures used to perform the procedures used to wire a heating system.

ELECTRICAL TEST METERS

24. Describe the Ohmmeter, its purpose and procedures for use.
25. Describe the ammeter/amperage meter, its purpose and procedures for use.
26. Describe the procedure used to test basic wiring components and circuits.
 - fuses
 - terminals
 - circuit breakers
 - resistors
 - switches
27. Describe equipment used to measure.
 - voltage

- current
- resistance

Practical:

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

1. Perform calculations using Ohm's law and associated formulae.
2. Select and use test meters to identify problems in electrical circuits.
3. Construct parallel series circuit.

OBM-1125 Electricity 2 (Electrical Devices & Ignition Systems)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 1, 2, 3, 4, 5, 8, 9, 10, 11, 12 & 13.

Course Outcomes:

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

- demonstrate knowledge of electrical devices and their operation.
- demonstrate knowledge of the installation, diagnosis, repair and replacement of ignition systems.

Theory:

ELECTRICAL DEVICES

1. Describe electromagnetic (solenoid) valves and their function.
2. Describe the purpose, layout and operation of relays.
3. Describe the procedures for installation of relays.
4. Describe the purpose, operation and location of transformers.
5. Describe the potential problems, diagnostic procedures and servicing of relays.
6. Describe resistors and circuit breakers, their layout, purpose and operation.
7. Describe timing devices, their purpose and two most common methods of operation.
8. Describe the operating principles of electric motors.

SWITCHES

9. Describe electrical switches, their operating principles and their purpose.
10. Describe the types of switches, their operation and applications.
 - micro (snap-acting)
 - mercury switches
11. Explain switch terminology.
 - SPST

- SPDT
- DPST
- DPDT
- direct
- reverse acting

12. Describe the trade applications of the various types of switches.

- main switch
- burner control
- limit control
- timers
- thermostats
- relays

13. Describe the location of switches.

14. Describe potential problems with switches, their causes and corrective action.

TRANSFORMERS AND SOLID STATE IGNITIONS

15. Describe the purpose and operation of the ignition system.

16. Describe the purpose and parts of the A-C transformer.

17. Describe primary and secondary voltage and their relationship.

18. Describe the relationship between voltage and amperage and the dangers presented through handling transformers as a result.

19. Describe the factors to be taken into account when selecting transformers and the significance of each.

20. Describe the procedures used to wire an ignition transformer into the circuit:

- interrupted ignition
- intermittent ignition

21. Describe the characteristics of the solid state electronic ignition.

ELECTRODES AND INSULATORS

22. Describe insulators, their characteristics and function.

23. Describe the methods of providing an efficient path to the ignition electrodes.

- ignition cable
- buss bars

- spring clips

24. Describe ignition electrodes, their purpose, components and function.
 - rods
 - holders
25. Describe set up procedures for electrode adjustment.

IGNITION PROBLEMS AND CAUSES

26. Describe the procedures and equipment used to test transformers.
27. Describe problems caused by improper electrode adjustment.
28. Describe the equipment and procedures used to test and set electrodes.
29. Describe common procedures used to service ignition equipment.
30. Describe common ignition failure problems, their cause and solutions.
31. Describe the types and purpose of ignition control systems.
 - intermittent ignition
 - interrupted ignition
32. Describe the symptoms of defective ignition and their causes.
33. Describe the procedures used to perform inspection and testing of ignition systems.

Practical:

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

1. Construct a variety of electrical system circuits using electrical devices as specified by the instructor.
2. Perform the procedures used to test a transformer.
3. Adjust and set electrodes according to manufacturer's specifications.
4. Inspect and test ignition systems.

OBM-1130 Electricity 3 (Solid State & Programmable Controls)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13 & 15.

Course Outcomes:

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

- demonstrate knowledge of basic electronic theory, systems and components.
- demonstrate knowledge of programming controls.
- demonstrate knowledge of troubleshooting problems with electronic and solid state components.

Theory:

1. Describe the theory of operation of electronics solid state and programmable controls.
2. Describe components of an electronic system.
 - capacitor
 - resistance
 - diode
 - symbol
 - xener
 - transistor
 - triac
 - laser
3. Describe the principles of operation of relay circuits.
4. Describe procedures used to program controls.
 - outdoor reset controls
 - prioritizing functions
5. Identify oil burning equipment components where electronic controls are used.
6. Troubleshoot problems with electronic devices, and solid state components.
7. Describe procedures used to troubleshoot electronic circuits.
 - locate the defective components
 - test methods
 - interpretation of test results
 - corrective action

Practical:

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

1. Program a control.
2. Construct electronic circuits using electronics and solid state components.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 2, 3, 4, 5, 7, 8, 9, 10, 11, 12 & 13.

Course Outcomes:

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

- demonstrate knowledge of the procedures used to install, service and maintain limit controls and thermostats.
- demonstrate knowledge of the procedures used to install, service and maintain limit primary controls.

Theory:**LIMIT CONTROLS AND THERMOSTATS**

1. Describe the different types of limit controls, their purpose and operation.
 - hot water
 - steam
 - warm air
2. Describe the location and installation procedures for limit controls.
3. Describe the setting and adjustment of limit controls for various requirements
4. Describe the potential problems, checks, diagnostic procedures and servicing for limit controls.
5. Identify sources of information for installation of limit controls and describe their importance and use.
 - code
 - manufacturers' instructions
6. Describe the types of thermostats, their function and applications.
7. Describe factors affecting location of limit controls.
 - thermostat
 - humidity control
 - air stat
 - aquastat
 - pressure control

8. Describe the procedures for installation of limit controls.
 - thermostat
 - humidity control
 - air stat
 - aquastat
 - pressure control
9. Describe the potential problems, diagnostic procedures and servicing of thermostats.

PRIMARY CONTROLS

10. Describe the different types of primary controls used in the oil heat industry and their purpose.
11. Describe stack mounted primary controls, their layout, function and applications.
12. Describe Cad Cell primary controls, their layout, operation and applications.
13. Describe how to locate and wire controls to perform a specific function.
14. Explain procedures for testing controls for proper operation.
15. Describe troubleshooting procedures used to locate problems with controls.
16. Describe possible control problems, their cause and procedures for correction.
17. Read and interpret schematic and pictorial diagrams.

Practical:

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

1. Install heating system controls for various types of systems.
2. Wire a heating system.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 5, 8, 9, 10, 12 & 13.

Course Outcomes:

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

- demonstrate knowledge of the operation, installation and repair of motors, fans and couplings

Theory:

1. Describe the types of motors found on heating systems and their characteristics.
2. Describe motor terminology.
3. List the major characteristics of a split phase centrifugal switch motor.
4. Describe the components and operation of a split phase centrifugal switch motor.
 - start switch
 - overload switch
 - internal wiring
 - connections
 - capacitors
5. Describe the purpose of bearings, the various types of bearings and their applications.
6. Describe diagnostic and inspection procedures for motors and remedial action to be taken.
 - malfunction
 - motor replacement
 - inspection

Practical:

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

1. Disassemble an electric motor, carry out minor repairs and reassemble motor.
2. Perform various tests on motors.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 2, 3, 4 & 5.

Course Outcomes:

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

- demonstrate knowledge of the construction and operation of a combustion chamber.

Theory:

1. Identify hazardous materials and practices for safe handling.
2. Describe the types of materials used in the manufacture of combustion chambers and their characteristics.
 - common fire brick
 - insulating fire brick
 - metal
 - ceramic
 - soft fibre materials-wet and dry
3. Describe the types of insulation used and their applications.
4. Describe the characteristics of size and shape of the combustion chamber and their relationship to efficient combustion.
5. Describe the procedure for installation of combustion chambers.
6. Describe the procedures used to clean and repair combustion chambers.
7. Describe the procedures used for replacement of combustion chambers.
8. Describe chamberless firing.

Practical:

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

1. Design and construct combustion chambers to instructor's specifications.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 2, 3, 4, 5, 8, 12 & 13.

Course Outcomes:

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

- evaluate and plan the draft and venting requirements of systems
- demonstrate knowledge of venting systems and their installation

Theory:**CHIMNEYS**

1. Describe the purpose of draft and how draft is created.
 - natural
 - mechanical
 - induced
2. Describe the conditions needed to maintain adequate chimney draft.
 - location
 - chimney size
 - temperature
3. Describe potential chimney problems affecting draft, their symptoms and their solutions.
4. Describe how chimney draft is measured.

VENTING AND DRAFT CONTROL

5. Describe the effects of improper draft.
 - air leakage
 - standby losses
 - burner air delivery
 - spillage
6. Describe the purpose and function of draft regulators.
7. Describe direct venting, draft inducers and power venting, and explain operation and applications.

8. Describe the operation of a sealed combustion direct vent system.
9. Identify and interpret the CSA codes relating to venting.
10. Describe the necessity of stainless steel chimney liners and sizing procedures.

Practical:

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

1. Install smoke pipes.
2. Install a prefabricated chimney.
3. Inspect chimneys and perform draft adjustment.
4. Install mechanical venting systems.
 - sidewall
 - direct

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 2, 3 & 13.

Course Outcomes:

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

- demonstrate knowledge of hydronic heating systems and their characteristics.
- demonstrate knowledge of installation and maintenance procedures related to hot water boilers.

Theory:**HYDRONIC HEATING SYSTEMS**

1. Describe the typical components of hot water boilers, their purpose and operation:
 - combustion chamber
 - heating surfaces
 - baffles or turbulators
 - insulation
2. Describe the system for rating boilers.
 - net ratings
 - gross ratings
3. Describe the operation of a gravity type open system.
4. Describe the operation of a forced circulation closed system.
 - two-pipe system
 - reverse return system
 - in-floor radiant systems
5. Explain the purpose and function and applications of the controls and other devices used in the operation of a hot water boiler.
 - circulator
 - pressure reducing valve
 - flow control valve
 - air elimination valves
 - expansion tanks
 - zone control
 - tempering valves

- coils (tankless, indirect water heater)
- couplings
- pressure relief valves
- tridicator valve
- wood/oil combination

6. Explain the operation and application of a wood/oil add-on hot water boiler.
7. Describe the different piping systems used for heat delivery and their applications.
8. Describe the different types of radiation.
9. Describe routine maintenance procedures for hot water heating systems.
10. Describe methods of backflow prevention.
11. Describe potential boiler problems, diagnostic procedures and solutions.
12. Describe how to layout a hydronic heating system.
13. Describe the benefits of pipe insulation.

Practical:

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

1. Plumb and hook up a hydronic heating system.
2. Layout a hydronic heating system.
3. Compile a materials take off list.
4. Sketch a hydronic heating system.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 4, 5 & 12.

Course Outcomes:

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

- demonstrate knowledge of warm air heating systems and their installation.
- demonstrate knowledge of troubleshooting and servicing procedures for warm air heating systems.
- demonstrate knowledge of the installation and servicing of humidifiers and electrostatic air cleaners.

Theory:**SYSTEM COMPONENTS AND OPERATION**

1. Describe the components and operation of a warm air system.
 - gravity
 - forced
2. Explain the purpose and function of controls and other devices used in the operation of a warm air system.
 - oil
 - wood/oil combination
 - wood add-on
3. Describe the parts of warm air distribution systems and their applications.
 - oil
 - wood/oil combination
 - wood add-on
4. Describe the procedures used to test, adjust and balance air flow systems.
 - static pressure
 - temperature rise

INSTALLATION

5. Explain the basic procedures for design and installation of a warm air system.
 - duct sizing
 - heat loss
 - size and type of furnace

- CFM air flow
- system requirements
- code requirements
- manufacturer specifications
- diffusers and registers

6. Describe humidifiers, their parts, operation and procedures for installation.
7. Describe electrostatic air cleaners, their parts, operation and procedures for installation.

SERVICE AND MAINTENANCE

8. Describe routine maintenance procedures for warm air heating systems.
9. Describe the potential problems in warm air systems, diagnostic procedures and remedies.
10. Describe procedures used to test heat exchangers for leakage

Practical:

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

1. Install plenums and sheet metal ductwork.
2. Design a warm air system.
3. Compile a materials list.
4. Measure and adjust air flow.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 2, 3 & 13.

Course Outcomes:

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

- demonstrate knowledge of steam heating systems and their components.
- demonstrate knowledge of installation, servicing and maintenance of steam heating systems.

Theory:**SYSTEM COMPONENTS AND OPERATION**

1. Describe methods of heat transfer.
 - latent
 - radiant
 - conductive
 - convective
2. Describe the principles of steam heating.
3. Describe one pipe systems, their layout and operation.
4. Describe two pipe systems, their layout and operation.
5. Describe the operation, function and proper location of the controls required.
6. Describe the function of steam traps.
7. Describe pumps, receivers and Hartford hoop.

INSTALLATION

8. Describe procedures used to remove and replace system components.
9. Describe the importance of piping specifications and the general instructions given by manufacturers.
10. Explain how to skim a new boiler to remove contaminants.

11. Explain how to balance system radiation.
 - one pipe systems
 - two pipe systems

SERVICE AND MAINTENANCE

12. Describe routine inspection and maintenance procedures for steam heating systems.
13. Describe troubleshooting procedures used to identify problems in steam heating systems and corrective action to be taken.

Practical:

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

1. Wire controls for steam heating systems.
2. Set up and adjust the burner.
3. Perform efficiency testing of the burner.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 2 & 3.

Course Outcomes:

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

- demonstrate knowledge of domestic hot water heaters their components and operation.
- demonstrate knowledge of the installation procedures for domestic hot water heaters.

Theory:**SYSTEM TYPES AND COMPONENTS**

1. Describe the components and operation of indirect fired hot water heaters.
2. Describe the components and operation of direct fired hot water heaters.
3. Explain the purpose and function of controls and other devices used on domestic hot water heaters.
 - relief valves
 - backflow preventers
 - tempering valves
 - dielectric fittings
 - pressure reducing valves
 - anode rod

INSTALLATION

4. Describe the procedures for installation of indirect fired hot water heaters (tankless coil).
5. Describe the procedures for the installation of direct fired hot water heaters.

SERVICE AND MAINTENANCE

6. Describe the procedures for performing routine maintenance of domestic hot water heaters.
7. Describe procedures for identifying problems in hot water heaters and corrective action to be taken.

Practical:

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

1. Install an oil fired water heater.
2. Install an indirect water storage and heater.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 1, 3, 4, 5, 8, 9, 10, 11 & 15.

Course Outcomes:

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

- demonstrate knowledge of vaporizing oil burners, their components, operation and installation.
- demonstrate knowledge of waste oil burners, their components and operation.
- demonstrate knowledge of combo systems, their components and operation.

Theory:**VAPORIZING OIL BURNERS**

1. Identify the types of vaporizing oil burners, and their characteristics and applications.
 - natural draft pot-type
 - forced draft
2. Describe the oil supply system for vaporizing burners.
 - wall lift pump
 - day tank
 - installation
3. Explain how to service, adjust and calibrate a constant level value.
4. Explain installation and service procedures for both natural and forced draft vaporizing burners.
 - code requirements
 - oil flow control valve
 - level seating of the burner
5. Describe the troubleshooting and maintenance and procedures related to vaporizing oil burners.
 - position of flame rings
 - oil flow control valve

WASTE OIL HEATING

6. Describe the types of waste oil heating systems, their principles of operation, characteristics and applications.

- furnace
- boiler

7. Describe the various regulations affecting the installation and use of waste oil systems.
 - laws
 - code requirements (fire and environmental)
8. Describe the types of secondary pumps, their functions, components and applications.
9. Describe the procedures used to install waste oil heating systems.
 - manufacturer's instructions
 - assembly
 - venting
 - fuel pipes
 - wiring
10. Describe the procedures used to set up and test the burner.
 - safety set-up
 - operation of burner in relation to system
 - testing

COMBO SYSTEMS

11. Describe combo systems, their components and principles of operation.
12. Describe the procedures used to install a combo-system.
13. Describe the procedures used to perform routine maintenance of a combo-system.

Practical:

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

1. Remove, disassemble, clean, reassemble, calibrate and reinstall the oil flow control valve.
2. Install a natural draft burner.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 2, 3 & 11.

Course Outcomes:

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

- demonstrate knowledge of the purpose, design and operation of zoned systems.
- demonstrate knowledge of the installation of zoned systems.

Theory:

1. Explain the benefits of zoning and its applications.
2. Describe different types of zone valves and their applications.
3. Describe warm air zone dampers and how they operate.
4. Interpret the wiring schematics for zoning installations.
5. Describe the procedures used to install a 3-zone hot water system.
6. Describe the use of circulators for hot water zoning.

Practical:

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

1. Plan and install a zoned hot water system to specifications.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 14, 15 & 16.

Course Outcomes:

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

- demonstrate knowledge to plan appropriate climate control systems.
- demonstrate knowledge of the removal and installation of retrofit systems and components
- demonstrate knowledge of installation procedures of humidifiers.
- identify and apply code requirements for air exchangers and humidifiers.

Theory:**SYSTEM EVALUATION AND PLANNING**

1. Describe the sources of heat loss and their effects on efficiency.
 - off-cycle
 - on-cycle
 - jacket loss
 - pipe and duct loss
2. Describe the characteristics of flame retention burners and their effect on efficiency.
3. Describe the design characteristics of heating systems that will most benefit by boiler or furnace replacement.
4. Describe draft regulators, the factors that affect their efficient operation, and their contribution to the reduction of heat loss.
5. Describe the logic behind reducing fuel nozzle size and the effect on efficient heating.
6. Describe the possibilities and methods for reducing temperature settings of boilers and furnaces for maximum efficiency.
7. Describe methods of heat loss reduction, their applications and effects on efficiency.
 - insulation and air sealing
 - turbulator (baffle) replacement

8. Describe the advantages of regular system tune ups and the basic steps involved in efficiency tune up.
9. Describe the procedures used to calculate the heating requirements of the customer.
10. Describe the process for obtaining approval for retrofit from the necessary agencies.

SYSTEM REMOVAL AND INSTALLATION

11. Describe the precautions to be taken before removal of an existing appliance or system.
12. Describe the sequence of procedures to be followed when removing an existing oil fired appliance.
13. Describe codes and regulations that apply to the disposal of system components and materials.
14. Describe the sequence of procedures involved in the installation of a retrofit system.

Practical:

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

1. Evaluate an existing heating system and prepare a proposal with recommendations for retrofit and upgrading.
2. Compile a work schedule.
3. Compile a materials list.
4. Perform modernization and upgrade on an existing system.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 10 & 13.

Course Outcomes:

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

- demonstrate knowledge of troubleshooting techniques and diagnostic procedures.
- demonstrates knowledge of servicing procedures.
- demonstrate knowledge of selecting of appropriate test equipment.

Theory:**NO HEAT**

1. Describe the procedure used to identify the point of failure.
2. Describe the system parts associated with each step of the sequence.
3. Describe the possible causes and corrective action for each indication.

UNDERHEATING/OVERHEATING

4. Describe the possible problems associated with oil delivery and courses of corrective action to be taken.
5. Describe the possible problems associated with electrical circuit and courses of corrective action to be taken.
6. Describe the possible problems associated with flame adjustment and courses of corrective action to be taken.
7. Describe the possible problems associated with heating systems and courses of corrective action to be taken.

OPERATIONAL PROBLEMS

8. Describe the possible problems associated with oil delivery and courses of corrective action to be taken.
9. Describe the possible problems associated with electrical circuit and courses of corrective action to be taken.

10. Describe the possible problems associated with flame adjustment and courses of corrective action to be taken.
11. Describe the possible problems associated with venting systems and courses of corrective action to be taken.
12. Describe the possible problems associated with heating systems and courses of corrective action to be taken.
13. Describe the possible problems associated with the mechanical components and courses of corrective action to be taken.

Practical:

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

1. Select and use appropriate test equipment to troubleshoot systems

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 5, 8, 9, 10, 11, 12 & 13.

Course Outcomes:

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

- demonstrate knowledge of regular maintenance requirements and practices
- provide a professional standard of customer service
- identify and demonstrate understanding of appropriate codes and regulations

Theory:

1. Describe the objectives of regular service and maintenance.
 - reduction of service calls
 - efficiency
 - life of equipment
 - customer comfort and satisfaction
2. Describe the advantages of adopting a systematic approach and sequence to service calls.
3. Describe the components serviced during annual maintenance.
4. Describe the inspection and servicing procedures involved in annual maintenance of the various types of heating system.
5. Describe the steps of annual maintenance checks and their associated procedures
6. Describe the procedures used to disassemble and clean components of various types of heating system.
7. Describe the procedures used to reassemble and set up various types of heating system.
8. Describe the factors evaluated to determine system efficiency and the adjustments made to ensure safe and efficient operation of the system.

Practical:

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

1. Disassemble and clean components of various types of heating system.
2. Reassemble and set up various types of heating system.
3. Perform efficiency test and make appropriate adjustments.

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 2, 3 & 11.

Course Outcomes:

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

- demonstrate knowledge of the purpose, design and operation of zoned systems.
- demonstrate knowledge of the installation of zoned systems.

Theory:

1. Explain the benefits of zoning and its applications.
2. Describe different types of zone valves and their applications.
3. Describe warm air zone dampers and how they operate.
4. Interpret the wiring schematics for zoning installations.
5. Describe the procedures used to install a 3-zone hot water system.
6. Describe the use of circulators for hot water zoning.

Practical:

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

1. Plan and install a zoned warm air system to specifications.

REQUIRED RELATED COURSES

Description:

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

Course Outcomes:

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

- understand the importance of well-developed writing skills in business and in career development.
- understand the purpose of the various types of business correspondence.
- examine the principles of effective business writing.
- examine the standard formats for letters and memos.
- writing effective letters and memos.
- examine the fundamentals of informal reports and the report writing procedure.
- produce an informal report

Required Knowledge and Skills:**1.0 Review of Sentences and Paragraph Construction**

- 1.1.1 Define a sentence and review the four types.
- 1.1.2 Identify the essential parts of a sentence, particularly subject and predicate, direct and indirect object.
- 1.1.3 Differentiate among phrases, clauses, and sentences.
- 1.1.4 Explore the major concepts related to subject-verb agreement.

- 1.1.5 Apply rules and principles for writing clear, concise, complete sentences which adhere to the conventions of grammar, punctuation, and mechanics.

1.2 Examine and Apply Principles of Paragraph Construction

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

2.0 Business Correspondence**2.1 Examine the Value of Business Writing Skills**

- 2.1.1 Discuss the importance of effective writing skills in business
- 2.1.2 Discuss the value of well-developed writing skills to career success
- 2.2 Examine Principles of Effective Business Writing
 - 2.2.1 Discuss the rationale and techniques for fostering goodwill in business communication, regardless of the circumstances
 - 2.2.2 Review the importance of revising and proofreading writing
- 2.3 Examine Business Letters and Memos
 - 2.3.1 Differentiate between letter and memo applications in the workplace
 - 2.3.2 Identify the parts of a business letter and memo
 - 2.3.3 Explore the standard formats for business letters and memos
 - 2.3.4 Examine guidelines for writing an acceptable letter and memo which convey: acknowledgment, routine request, routine response, complaint, refusal, and persuasive request, for three of the six types listed
 - 2.3.5 Examine samples of well-written and poorly written letters and memos

3.0 Informal Report

- 3.1 Examine the Fundamentals of Informal Business Reports
 - 3.1.1 Identify the purpose of the informal report
 - 3.1.2 Identify the parts and formats of an informal report
 - 3.1.3 Identify methods of information gathering
- 3.2 Apply Informal Report Writing Skills and Oral Reporting Skills
 - 3.2.1 Gather pertinent information
 - 3.2.2 Organize information into an appropriate outline
 - 3.2.3 Draft a five minute informal report
 - 3.2.4 Edit, proofread, and revise the draft to create an effective informal report and present orally using visual aids.

Description:

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

Course Outcomes:

Upon successful completion of this course, students will:

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

Required Knowledge and Skills:**1. Providing Quality Service**

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

2. Determining Customers Wants and Needs

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

3. Demonstrating a Positive Attitude

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

4. Effectively Communicating with customers

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

5. Effectively using Questioning Techniques

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

6. Using the Telephone Effectively

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

7. Asserting Oneself: Handling Complaints and Resolving Conflict

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

8. Dealing with Difficult Customers

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

SP 2330 QUALITY ASSURANCE/QUALITY CONTROL

Description:

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

Course Outcomes:

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

- develop the skills and knowledge required to apply quality assurance/quality control procedures
- develop an awareness of quality management principles and processes

Required Knowledge and Skills:

1. Describe the reasons for quality assurance and quality plans.
2. Explain the relationship between quality assurance and quality control.
3. Describe quality control procedures as applied to the production and checking of engineering drawings in applicable occupations.
4. Describe quality control procedures as applied to the acceptance and checking of raw materials.
5. Explain the role of communications in quality management.
6. Explain why it is important for all employees to understand the structure of the company and its production processes.
7. Explain how human resource effectiveness is maximized in a quality managed organization.
8. Explain the role of company policy in quality management.
9. Explain the purpose of codes and standards.
10. Explain the concepts of quality
 - a. cost of quality
 - b. measurement of quality
 - c. quality control and quality assurance
 - d. elements of quality

- e. elements of the quality audit
- f. quality standards
- g. role expectations and responsibilities

11. Explain the structure of quality assurance and quality control

- a. Define quality assurance, quality control and documentation terminology
- b. Describe organizational charts
- c. List the elements of a quality assurance system
- d. Explain the purpose of the quality assurance manual
- e. Describe quality assurance procedures
- f. Explain the key functions and responsibilities of personnel

12. Complete quality assurance/quality control documentation

- a. Describe methods of recording reports in industry
- b. Describe procedures of traceability (manual and computer-based recording)
- c. Identify needs for quality control procedures

13. Apply quality control to projects

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

Description:

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

Course Outcomes:

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

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

Required Knowledge and Skills:

1. Microcomputer System Hardware and Software Components
 - 1.1 Microcomputer Hardware
 - 1.1.1 System Components
 - 1.1.1.1 Identify major components of a computer system.
 - 1.1.2 Function of each Component
 - 1.1.2.1 Describe the function of the microprocessor.
 - 1.1.2.2 Describe and give examples of I/O DEVICES.
 - 1.1.2.3 Describe primary storage (RAM, ROM, Cache).
 - 1.1.2.4 Define bit, byte, code and the prefixes k.m. and g.
 - 1.1.2.5 Describe secondary storage (diskettes and hard disks, CD ROMS, Zip Drives etc).
 - 1.1.2.6 Describe how to care for a computer and its accessories.
 - 1.2 Microcomputer Software
 - 1.2.1 Software Definition and Types
 - 1.2.1.1 Define software.
 - 1.2.1.2 Describe, operational and application software used in this course.
 - 1.2.1.3 Define file and give the rules for filenames and file extensions..
 - 1.2.2 System Software (Windows 95)
 - 1.2.2.1 Getting Started with Windows
 - 1.2.2.2 Start and quit a Program
 - 1.2.2.3 Get Help
 - 1.2.2.4 Locate a specific file using the **find** function of Win95
 - 1.2.2.5 Changing system settings:wall paper, screen saver,

- 1.2.2.6 screen resolution, background.
- 1.2.2.7 Starting a program by using the Run Command
- 1.2.2.7 Shutting down your computer
- 1.2.3 File Management Commands (Windows 95)
 - 1.2.3.1 View directory structure and folder content
 - 1.2.3.2 Organizing files and folders
 - 1.2.3.3 Copy, delete, and move files and folders
 - 1.2.3.4 Create folders
 - 1.2.3.5 Maximize and minimize a window
 - 1.2.3.6 Print directory/folder content
 - 1.2.3.7 Describe the Windows 95 taskbar
- 2. Word Processing
 - 2.1 Keyboarding Techniques
 - 2.1.1 Identify and locate alphabetic and numeric keys
 - 2.1.2 Identify and locate function keys: special keys, home keys, page up key, page down key, numeric key pad, shift keys, punctuation keys, tab key
 - 2.2 Word Processing
 - 2.2.1 Understanding word processing
 - 2.2.1.1 The Windows Component
 - 2.2.1.2 The Menu Bar
 - 2.2.1.3 Menu Indicators
 - 2.2.1.4 The Document Window
 - 2.2.1.5 The Status Bar
 - 2.2.1.6 The Help Feature
 - 2.2.1.7 Insertion Point Movements
 - 2.2.2 Create a document
 - 2.2.2.1 Change the Display
 - 2.2.2.2 The Enter Key
 - 2.2.2.3 Enter Text
 - 2.2.3 Save, Open and Exit a document.
 - 2.2.3.1 Save a document
 - 2.2.3.2 Close a document.
 - 2.2.3.3 Start a new document Window
 - 2.2.3.4 Open a document
 - 2.2.3.5 Exit Word Processor
 - 2.2.4 Edit a Document
 - 2.2.4.1 Add New Text
 - 2.2.4.2 Delete text
 - 2.2.4.3 Basic Format Enhancement (split and join paragraphs, insert text)

2.2.5 Understand Hidden Codes

- 2.2.5.1 **Display Hidden Codes**
- 2.2.5.2 **Delete Text Enhancements**

2.2.6 The Select Feature

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

2.2.7 Change Layout Format

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

2.2.8 Change Text Attributes

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

2.2.9 Use Auxiliary Tools

- 2.2.9.1 **Spell Check**

2.2.10 Select the Print Feature

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

3. Electronic Spreadsheet

3.1 Spreadsheet Basics

- 3.1.1 **The Worksheet Window**

3.2 Operates Menus

- 3.2.1 **Use a Menu Bar**
- 3.2.2 **Use a Control Menu**
- 3.2.3 **Use a Shortcut Menu**
- 3.2.4 **Save, Retrieve from Menus**

3.3 Create a Worksheet

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

3.4 Use Ranges

- 3.4.1 **Type a Range for a Function**

- 3.4.2 Point to a Range for a Function
- 3.4.3 Select a Range for Toolbar and Menu Commands
- 3.5 Print a Worksheet
 - 3.5.1 Print to the Screen
 - 3.5.2 Print to the Printer
 - 3.5.3 Print a Selected Range
- 3.6 Edit a Worksheet
 - 3.6.1 Replace Cell Contents
 - 3.6.2 Insert and Delete Rows and Columns
 - 3.6.3 Change Cell Formats
 - 3.6.4 Change Cell Alignments
 - 3.6.5 Change Column Width
 - 3.6.6 Copy and Move Cells

4. Electronic Mail and the Internet

- 4.1 Electronic Mail
 - 4.1.1 Compose and send an e-mail message
 - 4.1.2 Retrieve an e-mail attachments
 - 4.1.3 Send an e-mail message with attachments
 - 4.1.4 Retrieve and save e-mail attachments
 - 4.1.3 Print an e-mail message
 - 4.1.4 Delete an e-mail message
- 4.2 The Internet
 - 4.2.1 Overview of the World Wide Web
 - 4.2.2 Accessing Web sites
 - 4.2.3 Internet Web Browsers
 - 4.2.4 Internet Search Engines
 - 4.2.5 Searching Techniques

Description:

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

Course Outcomes:

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

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

Required Knowledge and Skills:

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

4. Occupational Health and Safety
 - a. Describe the rules and regulations directly related to your occupation.
5. Employment Insurance Regulations
 - a. Explain employment insurance regulations
 - b. Describe how to apply for employment insurance.
 - c. Explain the appeal process.
6. Worker's Rights
 - a. Define labour standards.
 - b. Explain the purpose of the Labour Standards Act.
 - c. List regulations pertaining to:
 - i. Hours of work.
 - ii. Minimum wages.
 - iii. Employment of children.
 - iv. Vacation pay
7. Human Rights
 - a. Describe what information cannot be included on an application.
 - b. Describe what information cannot be included in an interview
 - c. Why is there a Human Rights Code?
 - d. Define sexual harassment.
8. Participate in meetings.
 - a. Follow the form of getting a motion on the floor
 - b. Discuss a motion
 - c. Amend a motion
 - d. Vote on a motion.
9. Complete a safety inspection of your shop.
10. Complete an employment insurance application form.
11. Write a letter of appeal.
12. Analyze a documented case of a human rights complaint with special emphasis on the application form, time frame, documentation needed, and legal advice available.

Description:

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

Required Knowledge and Skills:**Examine and Demonstrate Elements of Effective Job Search Techniques**

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

Description:

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

Required Knowledge and Skills:

1. Explore Self-Employment: An Alternative to Employment
 - Identify the advantages and disadvantages of self-employment vs. regular employment
 - Differentiate between an entrepreneur and a small business owner
 - Evaluate present ideas about being in business
2. Explore the Characteristic of Entrepreneurs
 - Identify characteristics common to entrepreneurs
 - Relate their own personal characteristics with those of entrepreneurs.
 - Evaluate their present ideas about business people
3. Identifying Business Opportunities
 - Distinguish between an opportunity and an idea.
 - List the existing traditional and innovative business ventures in the region.
 - Explain the general parameters between which business ventures should fit.
 - Summarize the role of such agencies Regional Economic Development Boards, Business Development Corporations, etc.
 - Identify potential business opportunities within the region.
4. Demystifying the Entrepreneurial Process.
 - Explain the entrepreneurial process
 - Describe the purpose of a business plan
 - Identify the main ingredients of a business plan
 - Summarize the role of such agencies as BDC's, ACOA, Women's Enterprise Bureau etc.
 - List other agencies where assistance - financial and otherwise - is available to those interested in starting a business venture.