A PLAN OF TRAINING

FOR

RESIDENTIAL ELECTRICAL

OCCUPATION

Approved by
Provincial Apprenticeship Board

February, 1998
Revised June, 2000

Foreword

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

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

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

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Chair, Provincial Apprenticeship Board Minister of Education

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CONDITIONS GOVERNING APPRENTICESHIP TRAINING

1.0 GENERAL

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

2.0 ENTRANCE REQUIREMENTS

2.1 Entry into the occupation as an apprentice requires:

The completion of designated first year courses specific to the occupation

OR

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

OR

Enrolment in a program of studies that includes all entry and advanced level skills and required work experiences as approved by the Provincial Apprenticeship 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 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
5400/4800 Hour Programs		
First Year Apprentice	33% of Course Credit Hours, **Plus** relevant work experience totaling 1800/1600 hours	Second Year
Second Year Apprentice	66% of Course Credit Hours, **Plus** relevant work experience totaling 3600/3200 hours	Third Year
Third Year Apprentice	100% of Course Credit Hours, **Plus** completion and sign-off of workplace skills required for certification totaling 5400/4800 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	1st 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.
	2nd Year	65%	
	3rd Year	75%	
	4th Year	90%	
5400 Hours and 4800 Hours	1st Year	55%	
	2nd Year	70%	
	3rd Year	85%	
4000 (Hairstylist) - The apprentice shall be paid no less than the minimum wage for hours worked and a commission agreed upon between the apprentice and the employer.			

6.0 TOOLS

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

7.0 PERIODIC EXAMINATIONS

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

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

8.0 GRANTING OF CERTIFICATES OF APPRENTICESHIP

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

Apprenticeship

9.0 HOURS OF WORK

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

10.0 COPIES OF THE REGISTRATION FOR APPRENTICESHIP

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

11.0 RATIO OF APPRENTICES TO 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 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 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 Board.

14.3 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.

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

15.0 APPEALS TO DECISIONS BASED ON CONDITIONS GOVERNING APPRENTICESHIP TRAINING

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

REQUIREMENTS FOR PROVINCIAL CERTIFICATION IN THE RESIDENTIAL ELECTRICAL OCCUPATION

1. Evidence that the required work experiences outlined in this plan of training has been obtained. This evidence must be in a format that clearly outlines the experiences and a signature (s) of an appropriate person(s) attesting that these experiences have been obtained to the level required.

2. Normally, have a combination of training from an accredited training program and suitable work experience totalling 4800 hours

   Or

   Have a total of 6000 hours of suitable work experience.

3. Completion of a Provincial examination to be set at a place and time determined by the Industrial Training Division of the Department of Education.

4. Pay the appropriate examination fee.

ROLES AND RESPONSIBILITIES OF STAKEHOLDERS
IN THE APPRENTICESHIP PROCESS

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

Apprentices

- to complete all required technical training courses as approved by the Provincial Apprenticeship 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.
- to provide feedback to Training Institutions, the Industrial Training Division and Employers in an effort to establish a process of continuous quality improvement**.**

Employers

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

Training Institutions

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

Industrial Training Division

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

Provincial Apprenticeship Board

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

TECHNICAL COURSE OUTLINES

SUGGESTED COURSE LAYOUT FOR THE RESIDENTIAL ELECTRICAL OCCUPATION

JOURNEYPERSON CERTIFICATION

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WORK EXPERIENCE

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SEMESTER THREE
- MP2840 - Control Circuit Installation Planning . . . . . 45 Hrs.
- MP1600 - Muti-Family Service Entrance (Maximum 200A) . . . . . 45 Hrs.
- MP1610 - Home Appliance Repair . . . . . 90 Hrs.
- MP1620 - Communication & Emergency Systems . . . . . 67.5 Hrs.
- MP1630 - Single Phase Motors & Controls . . . . . 67.5 Hrs.

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SEMESTER TWO
- MP1350 - Residential Lighting and Receptacle Circuits . . . . . 67.5 Hrs.
- WD1210 - Oxy-Fuel Cutting and Welding . . . . . 60 Hrs.
- TS1300 - Rigging . . . . . 45 Hrs.
- MP1320 - Single Phase Transformers . . . . . 45 Hrs.
- MP1360 - Residential Heating Circuits . . . . . 45 Hrs.
- MP1370 - Single Family Service Entrance and Tubular Raceways . . . . . 45 Hrs.
- Related Courses . . . . . 90 Hrs.

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SEMESTER ONE
- TS1100 - Shop Fundamentals . . . . . 90 Hrs.
- DR1110 - Basic Drawing and Sketching . . . . . 67.5 Hrs.
- MP1310 - AC/DC Fundamentals . . . . . 90 Hrs.
- MP1340 - Cables and Wiring . . . . . 45 Hrs.
- Related Courses . . . . . 105 Hrs.

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Program and Apprenticeship Registration

COURSE OUTLINE - TS 1100

Name and Number: General Studies 1100

Descriptive Title: Shop Fundamentals

Description:

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

Prerequisites:

Co-requisites: None

Credit Value: 4

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

Course Aims:

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

Course Objectives (Knowledge):

1. List general workplace safety regulations
2. List fire safety regulations
3. Describe the operation and uses of different types of fire extinguishers
4. Explain the safety standards prescribed by the Occupational Health and Safety Regulations
5. Describe the use of the different types of precision measuring tools
6. Describe safety requirements for using hand tools and fasteners
7. Describe the different types of fasteners
8. Explain oxidation, corrosion, tensile strength and shear strength
9. Describe types of hydraulic and pneumatic lines and fittings and explain their

applications
10. Describe types of tubing and flaring tools and explain the application of each
11. Explain the purpose of threading taps and dies
12. Describe the types of fastener tools
13. Describe types and explain the uses of pullers, drivers and presses
14. Describe soldering tools, materials and applications
15. Describe methods of tinning and soldering
16. Describe types of solders
17. Describe the different types of power tools
18. Describe the different types of hydraulic tools
19. Describe safety requirements for using power tools
20. Describe the parts of a twist drill
21. Describe drill sizes and speed requirements
22. Describe types and uses of reaming tools
23. Explain the purpose of cutting power tools
24. Describe types and explain applications of:
    i. portable and stationary grinders
    ii. grinding wheels
    iii. grinding discs
    iv. grinder dressers
    v. rotary wire brushes
25. Describe types of compressors and components
26. Describe the pliers (all types), screwdrivers (all types), wrenches (all types), clamps (all types) and vices (all types) used for fitting and assembling as per assigned information to within specifications required
27. Describe as per the assigned information, rivets, keys, nuts, screws, pins, splines, studs, bolts, snaprings, bonds (thread locking compounds), washers, lock wires and self-locking nuts

Major Tasks / Subtasks (Skills):

1. Practice safety
    a. Interpret occupational safety code
    b. Apply safe work habits at all times
    c. Use and maintain personal safety equipment
    d. Implement exhaust control procedures
    e. Use fire fighting equipment
    f. Respect noise level regulations
    g. Reduce factors that contribute to spontaneous combustion
    h. Identify potential hazards to personal safety
    i. Check for unsafe conditions
    j. Report accident

2. Complete a St. John's Ambulance Standard First Aid Course

3. Complete a Workplace Hazardous Materials Information Systems Course

4. Use and maintain gripping and turning tools, measuring devices and levels
   a. Use measuring tools (measuring tapes, rules, scale rules, calipers, micrometers, gauges, straight edges, plumb bobs, squares, and calculators) and levels
   b. Use pliers, screwdrivers, wrenches, torque multipliers, hammers and mallets and other gripping and turning tools
   c. Use torque wrench
   d. Use scribers and markers

5. Use and maintain flaring tools
   a. Single and double flare tubing
   b. Bend tubing
   c. Measure and cut tubing
   d. Use compression fittings
   e. Anneal tubing before flaring as may be necessary
   f. Test and inspect flared fittings

6. Use and maintain cutting tools
   a. Identify, maintain and use punches, chisels, files and saws
   b. Sharpen chisels and twist drills and drill bits
   c. Shape and sharpen a cold chisel
   d. Maintain and store cutting tools
   e. Cut sheet metal
   f. Make bench projects
   g. Cut bolts
   h. Drill and ream holes

7. Use and maintain threading devices
   a. Select and safely use proper tools for given job
   b. Maintain threading tools
   c. Make an internal thread
   d. Make and external thread
   e. Restore damaged thread
   f. Remove broken screw
   g. Use tap and drill chart

8. Install fasteners
   a. Use and identify fasteners such as rivets, nails, wood screws, sheet metal screws, bolts, nuts, washers, masonry anchors and shields

b. Describe specific uses for each fastener
c. Recognize sizes of fasteners
d. Rivet and soft solder lap joint in galvanized sheet
e. Torque bolts
f. Identify bolt grades
g. Identify miscellaneous anchoring devices

9. Safely and effectively use, maintain and store pullers, drivers and presses

10. Solder metals
    a. Select solder and heating unit
    b. Solder wire connections, sheet metal, and copper fittings and tubing
    c. Shut down and store equipment

11. Use power tools
    a. Operate portable power tools
    b. Operate treading machines
    c. Operate power cleaning equipment
    d. Operate hydraulic punches, pullers, drivers and presses

12. Drill materials
    a. Safely and effectively operate power drilling equipment (hammer and portable drill)
    b. Select and use cutting fluids
    c. Identify and select clamping devices
    d. Maintain drilling equipment

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

14. Grind and finish metals
    a. Install grinding wheel disc and brush
    b. Adjust tool rest
    c. Dress grinding wheel
    d. Safely and effectively operate stationary and portable grinders
    e. Maintain equipment

15. Use explosive actuated tools
    a. Select the proper tool for a specific use

b. Follow Occupational Health and Safety regulations
c. Choose the correct shot and fastener for the job
d. Apply safety practices while using explosive actuated tools
e. Fasten construction material to masonry and steel
f. Maintain and clean explosive actuated tools

16. Use and maintain compressed air system
    a. Demonstrate safety precautions when using and maintaining compressors
    b. Identify components of air controller (transformer)
    c. Use and maintain air controller (transformer)
    d. Use and maintain air and fluid hoses

17. Use and maintain shop equipment
    a. jacks
    b. shop cranes
    c. chain hoists
    d. steam cleaner
    e. solvent cleaning tanks

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes:

COURSE OUTLINE - DR 1110

Name and Number: Drafting 1110

Descriptive Title: Basic Drawing and Sketching

Description:

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

Prerequisites: None

Co-requisites: None

Credit Value: 3

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

Course Aims:

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

Course Objectives (Knowledge):

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

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

Major Tasks / Subtasks (Skills):

1. Construct geometric shapes and lines
    a. Draw lines to scale
    b. Scale lines
    c. Divide lines into equal parts
    d. Bisect lines
    e. Construct angles
    f. Bisect angles
    g. Construct concave and convex curves
    h. Construct circles, arcs, tangents, ellipses, polygons, etc.

2. Sketch orthographic projections
    a. Visualize object
    b. Select views
    c. Layout sketch
    d. Sketch projection
    e. Dimension sketch
    f. Make notations

3. Sketch sectional views
    a. Locate section
    b. Select type of view
    c. Determine scale
    d. Sketch view
    e. Dimension sketch
    f. Make notations

4. Sketch primary auxiliary views
   a. Visualize the view
   b. Layout the sketch
   c. Sketch view
   d. Dimension sketch
   e. Make notations

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

6. Read mechanical drawings
   a. Read welding drawings, hydraulics and pneumatics drawings, sheet metal drawings and piping drawings
   b. Read and apply information from cut-away drawings

7. Read electrical drawings
   a. Read schematic diagrams, flow diagrams, point-to-point diagrams, wireless diagrams and highway diagrams

8. Read architectural and structural drawings
   a. Read plot plan, foundation plans, floor plans, details, elevations and sections

9. Interpret specifications
   a. Interpret specifications
   b. Identify tolerance specifications
   c. Interpret specifications (company standards books)

10. Identify information from bill of materials

11. Operate the CAD system
   a. Start up the system
   b. Set up directories and manage files
   c. Start AutoCAD
   d. Operate the system

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes:

COURSE OUTLINE - MP 1310

Name and Number: Electrical 1310

Descriptive Title: AC/DC Fundamentals

Description:

This course in electrical fundamentals requires the use of electrical tools, circuit components, and measuring instruments. It involves constructing circuits, taking measurements, reading scales and making calculations. It includes information on Ohm's Law and Kirchhoff's Laws; DC voltage, current and resistance; conductor sizes and resistivity, line voltage drop, open circuit voltage, electric power and energy, power loss, static electricity, electron theory, units and symbols; meter operations and utilization techniques, operational circuits, characteristics of conductors and insulators and system grounding: DC series and parallel circuits; magnetic fields, electromagnetism and electromagnetic induction; AC current and voltage, capacitance and inductance, AC circuits, AC power, power factor and vector analysis.

Prerequisites: None

Co-requisites: None

Credit Value: 4

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

Course Aims:

1. To develop the skills and knowledge required to construct and test basic DC and AC circuits.
2. To practice safety in potentially harmful situations
3. To develop an appreciation for conservation and environmental issues

Course Objectives (Knowledge):

1. Describe the operation of three wire circuits.
2. Explain minimization of voltage drop.
3. Solve problems on Ohm's Law and Kirchhoff's Law.
4. Explain conductor sizes and resistivity and line voltage drop.
5. Solve problems on power loss and voltage drop.

6. Explain static electricity and the electron theory.
7. Describe the use of electric meters.
8. Describe the characteristics of conductors and insulators.
9. Explain system ground.
10. Describe the reaction of inductors, capacitors, transistors and diodes to electric current
11. Diagram and label an emergency lighting system
12. Explain magnetic fields.
13. Explain electromagnetism and electromagnetic induction
14. Explain AC current and voltage
15. Describe single phase current and voltage
16. Describe capacitance and inductance.
17. Describe AC power and power factor.
18. Solve problems using vector analysis

Major Tasks / Subtasks (Skills):

1. Set up an Edison Three-Wire Circuit

2. Construct basic series and parallel circuits
    a. Construct a series circuit
        i. Measure voltage, current, resistance and power
        ii. Troubleshoot circuit problems
    b. Construct a parallel circuit
        i. Measure voltage, current, resistance and power
        ii. Troubleshoot circuit problems
    c. Construct a series/parallel circuit
        i. Measure voltage, current, resistance and power
        ii. Troubleshoot circuit problems

3. Test and replace basic wiring components such as terminals, fuses, circuit breakers and resistors

4. Use VIM and DVOM to check circuit voltage

5. Use ammeter to check circuit amperage

6. Use VIM and DVOM to check circuit resistance

7. Construct basic AC circuits
    a. Construct series AC circuits (R, RL, RC, and RLC)
        i. Measure voltage, current and resistance
        ii. Make calculations

iii. Troubleshoot circuit problems

b. Construct parallel AC circuits (R, RL, RC, RLC)
   i. Measure voltage, current and resistance
   ii. Make calculations
   iii. Troubleshoot circuit problems

c. Construct series/parallel AC circuits (R, RL, RC, RLC)
   i. Measure voltage, current and resistance
   ii. Make calculations
   iii. Troubleshoot circuit problems

8. Use oscilloscope
   a. Specify the use of oscilloscopes
   b. Measure characteristics of sine waves
   c. Compare wave forms
   d. Apply oscilloscope to position from diagram
   e. Measure voltage of grounded and ungrounded system

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes:

COURSE OUTLINE - MP 1340

Name and Number: Electrical 1340

Descriptive Title: Cables and Wiring

Description:

This course in industrial wiring requires the use of appropriate electrical tools and materials, cable and wiring accessories, manufacturer's instructions and test equipment. It involves installing, terminating, testing, and maintaining miscellaneous cables and wiring. It includes information on armoured cable, mineral insulated cable, TECK cable and marine cables; electrical codes; special safety codes; and terminating and splicing techniques.

Prerequisites: None

Co-requisites: None

Credit Value: 2

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

Course Aims:

1. To develop the skills and knowledge required to install, terminate, test and maintain miscellaneous cables and wiring.
2. To develop an appreciation of safety code requirements for cable and wiring installation.

Course Objectives (Knowledge):

1. Describe the types of electrical cables and wiring.
2. List the electrical code requirements for armoured cable, MI, TECK cable and marine cables.
3. Describe special safety codes required in the installation of cables and wiring.
4. List the types of conductor terminations.
5. Explain the need for specifications in cable installation.

Major Tasks / Subtasks (Skills):

1. Install, test and maintain cables and wiring

a. Rough in, strip and terminate armoured cable (AC 90), mineral insulted cable, TECK cable, aluminum sheathed cable, and wiring.
b. Test and maintain armoured cable (AC 90), mineral insulted cable, TECK cable, aluminum sheathed cable, and wiring.
c. Apply code requirement to each above task.
d. Apply special safety codes.

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes

COURSE OUTLINE - MP 1350

Name and Number: Electrical 1350

Descriptive Title: Residential Lighting and Receptacle Circuits

Description:

This residential wiring course requires the use of electrical tools and components and test equipment. It involves installation, maintenance and troubleshooting of residential lighting and receptacle circuits. It includes information on the electrical code, types of lighting and receptacle circuits and types of lighting fixtures and receptacles.

Prerequisites: MP1340

Co-requisites: None

Credit Value: 3

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

Course Aims:

1. To develop the skills and knowledge required to install residential lighting and receptacle circuits and fixtures.
2. To develop an appreciation of safety code requirements for residential lighting and receptacle circuits.

Course Objectives (Knowledge):

1. Describe the use and operation of a kilowatt-hour meter.
2. List the electrical code requirements for residential lighting and receptacle circuits.
3. Describe special safety code requirements for residential lighting and receptacle circuits.
4. Describe the different types of lighting and receptacle circuits.
5. Describe the different types of lighting fixtures and receptacles.

Major Tasks / Subtasks (Skills):

1. Install residential wiring for single and multi family dwelling
    a. Apply special code requirements
    b. Install general lighting circuits

c. Install general receptacle circuits
d. Install small appliance circuits
e. Install special appliances circuits
f. Balanced loads on above circuits
g. Install feeder circuits

2. Install non metallic sheathed cable
   a. Determine code requirements and types of nonmetallic sheathed cable
   b. Apply special codes
   c. Rough in circuits with cable
   d. Terminate nonmetallic sheathed cable
   e. Select proper size and type boxes and connectors
   f. Fasten cable according to code
   g. Ground and bond devices with cable

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes:

COURSE OUTLINE - WD 1210

Name and Number: Welding 1210

Descriptive Title: Oxy-Fuel Cutting and Welding

Description:

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

Prerequisites: None

Co-requisites: None

Credit Value: 3

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

Course Aims:

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

Course Objectives (Knowledge):

1. Describe oxy-fuel equipment and components
2. Explain lighting procedures and describe types of flame
3. Explain cutting procedures and equipment used
4. List metals that can be cut and metals that cannot be cut
5. Explain the procedure use to weld in a FLAT POSITION
6. Describe braze welding processes as applied to various metals including cast iron
7. Explain the purpose of filler metals in the brazing process
8. Describe type of flame adjustment for brazing
9. Explain the steps in oxy-fuel welding
10. Describe the types of metals that are suitable for the welding process
11. Explain the steps in oxy-fuel cutting

12. Describe types of flames, pressures and tip sizes and the application of each
13. Describe the principle of the brazing process

Major Tasks / Subtasks (Skills):

1. Set-up and use welding equipment (OFW)
    a. Demonstrate safety precautions when handling this equipment
    b. Set up, adjust equipment and check for leaks
    c. Light torch and make flame adjustments
    d. Shut down equipment and place in designated location

2. Set up and use cutting equipment
    a. Set up and adjust the cutting equipment for the assigned project
    b. Cut mild steel 90º FREEHAND
    c. Cut mild steel 90º GUIDED
    d. Cut mild steel at a 30º BEVEL FREEHAND
    e. Cut mild steel at a 30º BEVEL GUIDED
    f. Cut regular and irregular shapes FREEHAND
    g. Cut off bold and/or nut FREEHAND (optional)

3. Fusion weld flat (OFW)
    a. Prepare metal for welding
    b. Set up and adjust welding equipment
    c. Run fusion welding beads
    d. Weld mild steel single vee butt joint
    e. Weld mild steel open-corner butt joint
    f. Weld mild steel lap joint
    g. Fuse weld sheet metal

4. Braze weld metals (OFW)
    a. Prepare metal
    b. Set up and adjust welding equipment
    c. Tack weld metal
    d. Braze weld tee joint (m.s. in flat position)
    e. Braze weld butt joint (m.s. in flat position)
    f. Prepare and bronze weld cast iron
    g. Perform silver brazing

5. Assemble metals using brazing process
    a. Operate oxy-fuel equipment to assemble metals using the brazing process
    b. Prepare joints for brazing:
        i. 3/4 copper tee with fittings

ii. tee joint (1/8x4x4 flat bar, m.s.)

c. Braze tee joint 1/8x1x4 copper to mild steel

d. Braze stainless steel tee joint (1/8x1x4"s.s.)

Evaluation:

Written reports and/or tests.

Competence in simulated work and/or experiential endorsements.

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes:

COURSE OUTLINE - TS 1300

Name and Number: General Studies 1300

Descriptive Title: Rigging

Description:

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

Prerequisites: None

Co-requisites: None

Credit Value: 2

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

Course Aims:

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

Course Objectives (Knowledge):

1. List the Occupational Health and Safety Regulations for rigging
2. Describe the different types of ropes
3. List the different kinds of knots
4. Describe slings.
5. Describe the different types of scaffolds
6. Describe the different types of ladders
7. Describe methods of lead balancing
8. Describe the safety factors to be considered when using swing staging
9. Describe the proper procedures and equipment for handling heavy objects
10. Describe power scaffolding
11. Describe types and conditions of approved work platforms
12. Specify the use of screw jacks versus hydraulic units
13. Specify the use of elevators
14. Explain how suspended scaffolding is erected and when and how it is used

15. List safety rules for erecting and working on scaffolding (Safety in structural components)
    a. footboards
    b. putlogs
    c. braces
    d. ties
    e. planking
    f. scaffold brackets
16. Describe special problems of rolling and suspended scaffolding

Major Tasks / Subtasks (Skills):

1. Use and maintain rigging equipment
    a. Recognize and use hand signals
    b. Recognize lifting capabilities
    c. Recognize necessity for swing staging
    a. Interpret occupational health and safety regulations
    b. Select and install ladders
    c. Install scaffolds
    d. Demonstrate the safe and proper use of lifting equipment such as come-a-longs, chain falls, jacks, winches, overhead cranes, jacks, skids, cable tuggers, reeve blocks, slings and rope
    e. Demonstrate proper use of knots
    f. Use lifting attachments such as eye bolts and lifting lugs, beam clamps and crawlers, snatch blocks, spreader bars, shackles and screw jacks
    g. Transfer loads using lifting equipment

2. Use and maintain overhead cranes
    a. Safely and effectively use overhead cranes
    b. Use proper lifting procedures
    c. Use hoisting and/or crane signals
    d. Use plate grab and/or slings

3. Use scaffolding and rigging
    a. Erect section of tubular steel sectional scaffold
    b. Describe adjustable tower scaffolding and advantages
    c. Inspect scaffolding before using
    d. Direct/assist in loading/unloading masonry units from trucks
    e. Direct/assist hoisting masonry units to work stations

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes:

COURSE OUTLINE - MP 1320

Name and Number: Electrical 1320

Descriptive Title: Single Phase Transformers

Description:

This course in electrical fundamentals requires the use of electrical tools and supplies, test equipment and safety equipment. It involves installing, connecting and troubleshooting single phase transformers. It includes information on electromagnetic induction, types of transformers, cooling methods, pad mounted transformers, protective devices, electrical code, polarity, current transformers, potential transformers, parallelling transformers, voltage ratings, protective grounding and bonding, impedance and V-A ratings.

Prerequisites: MP1310

Co-requisites: None

Credit Value: 2

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

Course Aims:

1. To develop the skills and knowledge required to install and maintain single phase transformers.
2. To develop an appreciation of safety code requirements for single phase transformer installation.

Course Objectives (Knowledge):

1. Explain electromagnetic induction.
2. Describe different of single phase types of transformers.
3. Describe transformer cooling methods.
4. Describe protective devices used with transformers.
5. List the electrical code requirements for single phase transformer installation.
6. Explain polarity.
7. Describe current transformers and potential transformers.
8. Explain voltage, impedance and V-A ratings.

9. Explain protective grounding and bonding.

Major Tasks / Subtasks (Skills):

1. Install and maintain single phase transformer systems
   a. Describe the operation and specify the use of single phase transformers.
   b. Check transformers for polarity.
   c. Check transformers for short, ground, continuity and cracked bushings.
   d. Install a single phase transformer (dry type).
   e. Install and connect a single phase 3 wire transformer and multi tap.
   f. Install and connect two single phase transformers in parallel (dry type).
   g. Identify cooling methods for transformers.
   h. Install and maintain constant current transformers.
   i. Install current transformers.
   j. Install potential transformers.
   k. Connect, test, and adjust voltage regulators.

2. Install and connect single phase transformers
   a. Perform pre-service check on overhead transformers
   b. Select and install mountings, switch gear and protective devices for overhead transformers
   c. Select and install transformers and connect leads on overhead lines.
   d. Connect and disconnect transformers from voltage source using approved safety equipment
   e. Troubleshoot single phase transformers
   f. Calculate fuse size and CL fuse sizes for single phase transformers.
   g. Connect transformers in parallel

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes:

COURSE OUTLINE - MP 1360

Name and Number: Electrical 1360

Descriptive Title: Residential Heating Circuits

Description:

This residential wiring course requires the use of electrical tools and components, wiring diagrams and test equipment. It involves installation and maintenance of residential heating circuits and heating units. It includes information on types of heaters, specifications, code requirements, types of control circuits, solid state controls, relays, transformers, low voltage conductors, thermostats, heat loss and water heaters.

Prerequisites: MP1310

Co-requisites: None

Credit Value: 2

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

Course Aims:

1. To develop the skills and knowledge required to install and maintain residential heating circuits and heating units.
2. To develop an appreciation of the safety code requirements for residential heating circuits and heating units.

Course Objectives (Knowledge):

1. Describe selection specifications for heating units.
2. List the electrical code requirements for installation of residential heating circuits and heating units.
3. Describe the types of residential heating units.
4. Describe the different types of control circuits.
5. Explain heat loss.

Major Tasks / Subtasks (Skills):

1. Install and maintain residential type electric heating units

a. Verify code requirements
b. Install baseboard heaters controlled by line thermostat
c. Install baseboard heaters with built-in thermostat
d. Install baseboard heaters controlled by low voltage thermostat
e. Install solid state control and thermostat
f. Install heating cables in ceilings
g. Install fan heaters:
    i. wall units
    ii. floor units
    iii. ceiling
    iv. cabinet
h. Maintain and service electric heating systems in buildings
i. Maintain electric hot water boilers (tank)
j. Apply special codes

2. Interpret schematic drawings

3. Install extra low voltage signal systems
    a. Apply special safety codes
    b. Install a single bell controlled by single station
    c. Install a single bell controlled by three stations
    d. Install a three wire return call system
    e. Install chimes in a residential situation
    f. Install an annunciator system
    g. Install apartment bell and door opening system

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes:

COURSE OUTLINE - MP 1370

Name and Number: Electrical 1370

Descriptive Title: Single Family Service Entrance and Tubular Raceways

Description:

This residential wiring course requires the use of electrical tools, components and accessories; conduit benders and threaders; and test equipment. It involves preparing, installing, and maintaining single family service entrances and tubular raceways. It includes information on electrical code requirements, conductor and raceway sizing, expansion and contraction, threading and bending techniques, gluing techniques, single phase service entrance (200 A), Edison 3-wire system, feeders, branch circuits, and temporary service.

Prerequisites: MP1310

Co-requisites: None

Credit Value: 2

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

Course Aims:

1. To develop the skills and knowledge required to install and maintain single family service entrances and tubular raceways.
2. To develop an appreciation of safety code requirements for single family service entrances and tubular raceways.

Course Objectives (Knowledge):

1. Explain heat expansion and contraction.
2. Explain the Edison three wire system.
3. List electrical code requirements for single family service entrances and tubular raceways.
4. Describe special safety code requirements for single family service entrances and tubular raceways.
5. Calculate demand loads.

Major Tasks / Subtasks (Skills):

1. Verify code requirements

2. Apply special codes

3. Install conductors in conduit according to code and blueprint specifications

4. Install single family service entrance
   a. Install temporary service entrance
   b. Install overhead service entrance
   c. Install underground service entrance
   d. Install overcurrent device
   e. Tie in distribution panel

5. Bend and install EMT, fittings and devices on a surface, in masonry block, and in enclosed spaces (attic).

6. Install rigid conduit, conductors and devices (less than 2" diameter)
   a. Bend and install rigid conduit, general fittings and devices on surface, in slab, and on bar joists
   b. Install rigid conduit and fittings in hazardous locations

7. Bend and install PVC conduit, conductors, fittings and devices (less than 1.25" diameter) on surface and in slab

8. Install large size conduit (1.25" diameter and larger)
   a. Bend and install rigid conduit fittings and devices
   b. Cut, ream, and thread rigid conduit
   c. Bend and install EMT conduit, fittings and devices
   d. Bend and install PVC conduit, fittings and devices
   e. Install mounting brackets for conduit
   f. Install pull boxes and fittings for conduit

9. Install conductors in large conduit
   a. Install conductors in flexible conduit, large conduit (larger than 2"), and in miscellaneous raceways
   b. Install fish lines by various methods

10. Use wire pulling equipment, fish tape and pulling attachments

11. Use power drives for pulling cable

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes:

COURSE OUTLINE - MP 1600

Name and Number: Electrical 1600

Descriptive Title: Multi - Family Service Entrance (Maximum 200A)

Description:

This residential wiring course requires the use of electrical tools and components and test equipment. It involves installation and maintenance of multi-family service entrances. It includes information on single phase service entrances (not exceeding 200 Amps and 150Volts to ground), Edison 3-wire system, electrical code and special codes.

Prerequisites: MP1370

Co-requisites: None

Credit Value: 2

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

Course Aims:

1. To develop the skills and knowledge required to install and maintain two-family service entrances.
2. To develop an appreciation of safety code requirements required for the installation of multi-family service entrances.

Course Objectives (Knowledge):

1. Explain the Edison 3-wire system
2. List the electrical code requirements for two-family service entrances
3. Describe special safety code requirements for two-family service entrances

Major Tasks / Subtasks (Skills):

1. Install single phase multi-meter distribution
   a. Install two meter distribution system for outside metering
   b. Install two meter distribution system for inside metering

Evaluation:

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

Lead Institution:

Development History:
Date Developed: December 1997

Instructor's Notes:

COURSE OUTLINE - MP 2840

Name and Number: Electrical 2840

Descriptive Title: Control Circuit Installation Planning

Description:

This control circuit course requires the use of manufacturer's instructions and the electrical code. It involves planning control circuits, and preparing schematic and wiring diagrams. It includes information on main feeders, branch circuits, motor groupings, types of power circuits, and types of control circuits.

Prerequisites: MP2330

Co-requisites: None

Credit Value: 2

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

Course Aims:

1. To develop the skills and knowledge required to plan the installation of control circuits
2. To develop an appreciation of the safety code requirements for control circuits

Course Objectives (Knowledge):

1. Describe main feeders and branch circuits
2. Describe the different types of motor groupings
3. Describe the different types of power circuits
4. Describe the different types of control circuits

Major Tasks / Subtasks (Skills):

1. Plan installation for equipment and controls
    a. Determine location of equipment and controls
    b. Select type of switches and controls
    c. Select type of wiring
    d. Layout location for equipment and controls
    e. Establish layout procedures

f. Determine size and shape of equipment to be installed from shop drawings
g. Read blueprints and drawings pertaining to installation

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1993

Instructor's Notes:

COURSE OUTLINE - MP 1630

Name and Number: Electrical 1630

Descriptive Title: Single Phase AC Motors & Controls

Description:

This course requires the use of electrical tools and components, manufacturer's specifications and test equipment. It involves installation, connection, troubleshooting, maintenance, dismantling, cleaning, reassembling, and repair of single phase AC motors; and record keeping. It includes information on various types of single phase AC motors, and their principle of operation, the application of the electrical code, brushes and mechanisms, bearings, single phase voltage and current, slip rings, sensors, overcurrent protection, and overload protection. It involves the basic motor control circuits including motor starters, manuel and automatic controls.

Prerequisites: MP 1310

Co-requisites: None

Credit Value:

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

Course Aims:

1. To develop the skills and knowledge required to install and maintain AC motors.
2. To develop an appreciation of safety code requirements for AC motor installation and maintenance.

Course Objectives (Knowledge):

1. Describe the operation and the connection of single phase motors.
2. Describe the types of single phase motors.
3. List the electrical code requirements for installation of AC motors.
4. Describe single phase voltage and current.
5. Explain overcurrent and overload protection
6. Describe the use of manual AC motor starters.
7. Describe the use of magnetic AC motor starters.
8. List the electrical code requirements for the installation of motor starters and controls.

Major Tasks / Subtasks (Skills):

1. Install, test and maintain AC motors
   a. Maintain single phase motors
   b. Disassemble and reassemble single phase motor

2. Test and repair AC motors
   a. Interpret name plate data
   b. Examine and test single phase AC motors
   c. Dismantle and clean motors
   d. Maintain brush mechanism
   e. Remove and replace bearings, bushings and seals

3. Test for speed, power, frequency
   a. Determine and check rotor speed
   b. Determine frequency of motors and the results of varying frequency
   c. Determine torque value of various single phase motors

4. Install and maintain electric control circuits
   a. Interpret schematic diagram
   b. Identify manual and automatic control devices
   c. Convert from schematic to wiring diagram
   d. Design a basic control circuit (manual and automatic)
   e. Identify parts of a manual motor starter
   f. Identify parts of a magnetic motor starter

5. Install and maintain AC motor starters
   a. Install and maintain single phase manual motor starter
   b. Install and maintain single phase magnetic motor starters complete with controls
   c. Install and maintain single phase reversing type magnetic motor starter complete with controls.
   d. Determine installation requirements according to code
   i. Install and maintain manual and automatic control circuits.

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1997

Instructor's Notes:

COURSE OUTLINE - MP1620

Name and Number: Electrical 1620

Descriptive Title: Communication and Emergency Systems

Description:

This wiring course requires the use of electrical tools and supplies related to the installation and maintenance of fire alarm systems, burglar alarm systems and emergency lighting systems and their accessories. It involves the installation and maintenance requirements as per Canadian Electrical Code, Provincial and Local Codes.

Prerequisites: MP2840

Co-requisites: None

Credit Value:

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

Course Aims:

1. To develop the skills and knowledge required to install and maintain fire alarm systems, burglar alarm systems emergency lighting.
2. To become knowledgeable in various codes and regulations governing fire alarm and emergency systems.

Course Objectives (Knowledge):

1. Describe the operation of the types of emergency lighting systems.
2. List the electrical code requirements for the installation of emergency lighting systems.
3. Describe the operation of a single stage fire alarm system
4. Describe the operation of various types of burglar alarm systems.
5. List the electrical code requirements for fire alarm and burglar alarm systems.
6. Describe the use of Canadian Building and Fire Codes.

Major Tasks / Subtasks (Skills):

1. Verify code requirements for fire alarm system.

2. Verify code requirements for burglar alarm system.

3. Verify code requirements for emergency lighting system.

4. Install and test a single stage fire alarm system.

5. Install, test, and maintain a burglar alarm system.

6. Install and test an emergency lighting system.

7. Verify the maintenance procedure for a battery operated emergency lighting unit.

8. Verify building and fire code requirements.

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1997

Instructor's Notes:

COURSE OUTLINE - MP1610

Name and Number: Electrical 1610

Descriptive Title: Home Appliance Repair

Description:

This course will require the use of electrical tools, metering equipment and test equipment. It involves the use of troubleshooting techniques necessary to determine the causes of malfunctions in various home appliances. It includes reporting recommendations for the necessary action to repair appliances and completing the repair work.

Prerequisites: MP2840, single phase motors and controls

Co-requisites: None

Credit Value: 4

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

Course Aims:

1. To develop the skills necessary to test and troubleshoot electrical problems in various home appliances.
2. To develop an appreciation for the necessary safety precautions required when working on electrical equipment.

Course Objectives (Knowledge):

1. Describe the safety procedure to follow before working on electrical equipment.
2. Describe the importance of operation manuals.
3. List procedures to follow when troubleshooting appliances.
4. Describe the manufacture warranty requirements.

Major Tasks / Subtasks (Skills):

1. Follow safety procedures
   (a) Use lock-out devices and tagging
   (b) Use testing meters and devices

2. Test and repair hot water tank (electrical)
    a. Identify electrical components
    b. Use voltmeters
    c. Use ammeter
    d. Verify type of connection (flip-flop)
    e. Test thermostat
    f. Test heating element
    g. Follow troubleshooting procedure

3. Test and repair electrical range
    a. Identify electrical components
    b. Describe the function of various control devices
    c. Test and repair and/or replace stove top burners
    d. Test and repair and/or replace oven elements
    e. Test and repair and/or replace controls
    f. Describe the use of timer units
    g. Follow troubleshooting procedures

4. Test and repair electrical clothes dryer
    a. Identify electrical components
    b. Describe the function of various control devices
    c. Test, repair and/or replace controls
    d. Follow troubleshooting procedures
    e. Test, repair and/or replace heating elements
    f. Test, repair and/or replace motor

5. Test and repair electric clothes washer
    a. Follow troubleshooting procedures
    b. Identify electrical components
    c. Test, repair and/or replace controls and solenoids
    d. Test, repair and/or replace motor
    e. Describe the function of various control devices

6. Test and repair electric pumps
    a. List components of jet pump, submersible pump and sump pump
    b. Describe the operation of the jet pump, the submersible pump and the sump pump
    c. Describe the control devices used with jet pumps, submersible pumps and sump pumps.
    d. Test and repair jet pump
    e. Test and repair submersible pump
    f. Test and repair sump pump.

Evaluation:

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

Lead Institution:

Development History:

Date Developed: December 1997

Instructor's Note

REQUIRED RELATED COURSES

COURSE NAME & NUMBER: Workplace Correspondence CM2150

DESCRIPTIVE TITLE: Workplace Correspondence

CALENDAR TITLE:

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

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

PREREQUISITES: Nil

CO-REQUISITES: Nil

COURSE DURATION 45hrs

SUGGESTED TEXT/ LEARNING RESOURCES:

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

Student Projects and Activities for Business English and Communications,

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

Effective Business Writing, Jennifer MacLennon

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

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

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

References: Pittman Office Handbook, Smith/Hay-Ellis

The Gregg Reference Manual, Fourth Canadian Edition, Sabin/O'Neill

McGraw Hill Handbook

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

Guest Speakers

Sell Yourself (Video)

COURSE AIMS:

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

MAJOR TOPICS/TASKS:

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

COURSE OUTLINE:

1.0 Review of Sentence and Paragraph Construction

- 1.1 Examining and applying principles of sentence construction
- 1.2 Examining and applying principles of paragraph construction

2.0 Business Correspondence

- 2.1 Examining the value of well-developed business writing skills
- 2.2 Examining principles of effective business writing
- 2.3 Examining business letters and memos

3.0 Informal Report

3.1 Examining the fundamentals of informal business reports

3.2 Applying informal report writing skills

LEARNING OBJECTIVES:

1.0 Review of Sentences and Paragraph Construction

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

1.2 Examine and Apply Principles of paragraph Construction

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

2.0 Business Correspondence

2.1 Examine the Value of Business Writing Skills

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

2.2 Examine Principles of Effective Business Writing

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

2.3 Examine Business Letters and Memos

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

3.0 Informal Report

3.1 Examine the Fundamentals of Informal Business Reports

3.1.1 Identify the purpose of the informal report
3.1.2 Identify the parts and formats of an informal report
3.1.3 Identify methods of information gathering

3.2 Apply Informal Report Writing Skills and Oral Reporting Skills

3.2.1 Gather pertinent information
3.2.2 Organize information into an appropriate outline
3.2.3 Draft a five minute informal report
3.2.4 Edit, proofread, and revise the draft to create an effective informal report and present orally using visual aids.

RECOMMENDED EVALUATION:

Required Pass Mark 70%

DEVELOPMENT HISTORY:

Date Developed:

Date Revised: 1999 05 03

Name and Number: Customer Service MR1210

Descriptive Title: Customer Service

Summary Description:

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

Prerequisites: None

Co-requisites: None

Suggested Duration: 30 hrs

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

Course Aims:

1. To know and understand quality customer service

2. To know why quality service is important

3. To know and understand the relationship between "service" and "sales"

4. To understand the importance of and to demonstrate a positive attitude

5. To recognize and demonstrate handling of customer complaints

Course Objectives (Knowledge):

1. Providing Quality Service

- Define quality service
- List the types of quality service
- Define Service vs. Sales or Selling
- Explain why quality service is important

- Identify the various types of customers
- Define customer loyalty

2. Determining Customers Wants and Needs

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

3. Demonstrating a Positive Attitude

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

4. Effectively Communicating with customers

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

5. Effectively using Questioning Techniques

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

6. Using the Telephone Effectively

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

7. Asserting Oneself: Handling Complaints and Resolving Conflict

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

8. Dealing with Difficult Customers

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

COURSE OUTLINE - SP 2330

Name and Number: QA/QC SP2330

Descriptive Title: Quality Assurance / Quality Control

Description:

This general studies course requires the use of basic tools and equipment and materials and supplies. It requires controlling drawings and specifications and/or calibrating measuring devices in applicable occupations.It involves interpreting standards, controlling the acceptance of raw materials, controlling quality variables and documenting the process. It includes information on quality concepts, codes and standards, documentation, communications, human resources, company structure and policy, teamwork and responsibilities.

Prerequisites: None

Co-requisites: None

Suggested Duration: 30 Hrs

Course Aims:

1. To develop the skills and knowledge required to apply quality assurance/quality control procedures

2. To develop an awareness of quality management principles and processes

Course Objectives (Knowledge):

1. Describe the reasons for quality assurance and quality plans.

2. Explain the relationship between quality assurance and quality control.

3. Describe quality control procedures as applied to the production and checking of engineering drawings in applicable occupations.

4. Describe quality control procedures as applied to the acceptance and checking of raw materials.

5. Explain the role of communications in quality management.

6. Explain why it is important for all employees to understand the structure of the company and its production processes.

7. Explain how human resource effectiveness is maximized in a quality managed organization.

8. Explain the role of company policy in quality management.

9. Explain the purpose of codes and standards.

10. Explain the concepts of quality

    a. cost of quality
    b. measurement of quality
    c. quality control and quality assurance
    d. elements of quality
    e. elements of the quality audit
    f. quality standards
    g. role expectations and responsibilities

11. Explain the structure of quality assurance and quality control

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

12. Complete quality assurance/quality control documentation

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

Major Tasks / Subtasks (Skills):

1. Apply quality control to projects

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

Evaluation:

Pass Mark Required 70%

Development History:

Date Developed: February 1994
Date Revised: April, 1999

COURSE DESCRIPTION

COURSE NAME & NUMBER: Introduction to Computers MC1050

DESCRIPTIVE TITLE: Introduction to Computers

CALENDAR ENTRY:

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

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

PRE-REQUISITES: Nil

CO-REQUISITES: Nil

SUGGESTED DURATION: 30 hours

SUGGESTED TEXT/

LEARNING RESOURCES:

Textbook(s):

References:

Other Resources:

COURSE AIMS:

1. To provide students with a introduction to computer systems and their operation.

2. To introduce students to popular software packages, their applications and future trends in computer applications.

MAJOR TOPICS:

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

COURSE OUTLINE:

1.0 Microcomputer System Hardware and Software Components

1.1 Microcomputer Hardware

1.1.1 System Components
1.1.2 Function of each Component

1.2 Microcomputer Software

1.2.1 Software Definition and Types

1.2.2 System Software (Windows 95)

1.2.3 File Management Commands (Windows 95)

2. Word Processing

2.1 Keyboarding Techniques
2.2 Word Processing

2.2.1 Understanding Word Processing
2.2.2 Create a Document
2.2.3 Save, Open and Edit a Document
2.2.4 Edit a Document: Cut and Paste
2.2.5 Understand Hidden codes.
2.2.6 The Select Feature (Block)
2.2.7 Change Layout Format
2.2.8 Change Text Attributes
2.2.9 Use Auxiliary Tools
2.2.10 Select the Print Feature (number of copies and current document)

3. Electronic Spreadsheet

3.1 Spreadsheet Basics

3.2 Operate Menus
3.3 Create a Worksheet
3.4 Use Ranges
3.5 Print a Worksheet
3.6 Edit a worksheet

4. Electronic Mail and the Internet

4.1 Electronic Mail
4.2 The Internet

Learning Objectives:

1. Microcomputer System Hardware and Software Components

1.1 Microcomputer Hardware

1.1.1 System Components

1.1.1.1 Identify major components of a computer system.

1.1.2 Function of each Component

1.1.2.1 Describe the function of the microprocessor.
1.1.2.2 Describe and give examples of I/O DEVICES.
1.1.2.3 Describe primary storage (RAM, ROM, Cache).
1.1.2.4 Define bit, byte, code and the prefixes k.m. and g.
1.1.2.5 Describe secondary storage (diskettes and hard disks, CD ROMS, Zip Drives etc).
1.1.2.6 Describe how to care for a computer and its accessories.

1.2 Microcomputer Software

1.2.1 Software Definition and Types

1.2.1.1 Define software.
1.2.1.2 Describe, operational and application software used in this course.
1.2.1.3 Define file and give the rules for filenames and file extensions..

1.2.2 System Software (Windows 95)

1.2.2.1 Getting Started with Windows
1.2.2.2 Start and quit a Program
1.2.2.3 Get Help
1.2.2.4 Locate a specific file using the **find** function of Win95
1.2.2.5 Changing system settings:wall paper, screen saver, screen resolution, background.
1.2.2.6 Starting a program by using the Run Command
1.2.2.7 Shutting down your computer

1.2.3 File Management Commands (Windows 95)

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

2. Word Processing

2.1 Keyboarding Techniques

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

2.2 Word Processing

2.2.1 Understanding word processing

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

2.2.2 Create a document

2.2.2.1 Change the Display
2.2.2.2 The Enter Key
2.2.2.3 Enter Text

2.2.3 Save, Open and Exit a document.

2.2.3.1 Save a document
2.2.3.2 Close a document.
2.2.3.3 Start a new document Window
2.2.3.4 Open a document

2.2.3.5 Exit Word Processor

2.2.4 Edit a Document

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

2.2.5 Understand Hidden Codes

2.2.5.1 Display Hidden Codes
2.2.5.2 Delete Text Enhancements

2.2.6 The Select Feature

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

2.2.7 Change Layout Format

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

2.2.8 Change Text Attributes

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

2.2.9 Use Auxiliary Tools

2.2.9.1 Spell Check

2.2.10 Select the Print Feature

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

3. Electronic Spreadsheet

3.1 Spreadsheet Basics

3.1.1 The Worksheet Window

3.2 Operates Menus

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

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

3.4 Use Ranges

3.4.1 Type a Range for a Function
3.4.2 Point to a Range for a Function
3.4.3 Select a Range for Toolbar and Menu Commands

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

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

4. Electronic Mail and the Internet

4.1 Electronic Mail

- 4.1.1 Compose and send an e-mail message
- 4.1.2 Retrieve an e-mail attachments
- 4.1.3 Send an e-mail message with attachments
- 4.1.4 Retrieve and save e-mail attachments
- 4.1.3 Print an e-mail message
- 4.1.4 Delete an e-mail message

4.2 The Internet

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

STUDENT EVALUATION:

Required Pass Mark 70%

DEVELOPMENT HISTORY:

Date Designed 1998
Date Revised 1999

COURSE OUTLINE - SD 1700

Name and Number: Workplace Skills SD 1700

Descriptive Title: Workplace Skills

Description:

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

Prerequisites: None

Co-requisites: None

Suggested Duration: 30 Hrs

Course Aims:

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

Course Objectives (Knowledge):

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

2. Unions
   a. Why do unions exist?
   b. Give a concise description of the history of Canadian labour.
   c. How do unions work?
   d. Explain labour's structure.
   e. Describe labour's social objectives.
   f. Describe the relationship between Canadian labour and the workers.
   g. Describe the involvement of women in unions.

3. Worker's Compensation
   a. Describe the aims, objectives, benefits and regulations of the Workers Compensation Board.
   b. Explain the internal review process.

4. Occupational Health and Safety
   a. Describe the rules and regulations directly related to your occupation.

5. Employment Insurance Regulations
   a. Explain employment insurance regulations
   b. Describe how to apply for employment insurance.
   c. Explain the appeal process.

6. Worker's Rights
   a. Define labour standards.
   b. Explain the purpose of the Labour Standards Act.
   c. List regulations pertaining to:
      i. Hours of work.
      ii. Minimum wage.
      iii. Employment of children.
      iv. Vacation pay

7. Human Rights

a. Describe what information cannot be included on an application.
b. Describe what information cannot be included in an interview
c. Why is there a Human Rights Code?
d. Define sexual harassment.

Major Tasks / Subtasks (Skills):

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

2. Complete a safety inspection of your shop.

3. Complete an employment insurance application form.

4. Write a letter of appeal.

5. Analyze a documented case of a human rights complaint with special emphasis on the application form, time-frame, documentation needed, and legal advice available.

Evaluation:

Required Pass Mark 70%

Development History:

Date Developed:
Date Revised: April, 1999

Name and Number: Job Search Techniques SD 1710

Descriptive Title: Job Search Techniques

Prerequisites: None

Co-requisites: None

Suggested Duration: 15 hrs.

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

Course Objectives (Knowledge):

1. Examine and Demonstrate Elements of Effective Job Search Techniques

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

DEVELOPMENT HISTORY:

Date Developed:

Date Revised: 1999 05 03

Name and Number: Entrepreneurial Awareness SD 1720

Descriptive Title: Entrepreneurial Awareness

Prerequisites: None

Co-requisites: None

Suggested Duration: 15 hrs

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

Course Objectives (Knowledge):

1. Explore Self-Employment: An Alternative to Employment

- Identify the advantages and disadvantages of self-employment vs. regular employment
- Differentiate between an entrepreneur and a small business owner
- Evaluate present ideas about being in business

2. Explore the Characteristic of Entrepreneurs

- Identify characteristics common to entrepreneurs
- Relate their own personal characteristics with those of entrepreneurs.
- Evaluate their present ideas about business people

3. Identifying Business Opportunities

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

4. Demystifying the Entrepreneurial Process.

- Explain the entrepreneurial process
- Describe the purpose of a business plan
- Identify the main ingredients of a business plan
- Summarize the role of such agencies as BDC's, ACOA, Women's Enterprise Bureau etc.
- List other agencies where assistance - financial and otherwise - is

available to those interested in starting a business venture.

REQUIRED WORK EXPERIENCES

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

REQUIRED WORK EXPERIENCES:

Use hand tools, power tools, and fastening devices.

Install conductors and cables. (Teck cable, armoured cable, flexible cords, NMD90).

Install and maintain residential branch wiring. (Receptacles, lighting, small appliances, major appliances).

Install residential underground and overhead service entrance. (Switchboards, switchgear assemblies, panelboards, distribution centres)

Interpret diagrams, drawings, codes and tables associated with residential electrical installations.

Install and maintain incandescent, fluorescent lighting fixtures and circuits.

Install emergency systems. (Emergency lighting).

Install alarm and communication systems. (Fire alarm, burglar alarm)

Install AC motors, single phase and their control circuits.

Repair Home Appliances