# A PLAN OF TRAINING

# FOR

# POWERLINE TECHNICIAN (OPERATING/CONSTRUCTION)

# OCCUPATION

**Approved by**
**Provincial Apprenticeship Board**

**July, 1996**
**Revised June, 2000**

# Foreword

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

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

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

_____ _____

Chair, Provincial Apprenticeship Board Minister 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 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** | 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 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 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.

## SPECIFIC REGULATIONS GOVERNING THE POWERLINE TECHNICIAN (OPERATING/CONSTRUCTION) OCCUPATION

### 1. RATIO OF APPRENTICES TO JOURNEYPERSONS

The ratio of apprentices to journeypersons shall not be more than one apprentice for each journeyperson employed.

REQUIREMENTS FOR RED SEAL CERTIFICATION
IN THE POWERLINE TECHNICIAN (OPERATING/CONSTRUCTION) OCCUPATION

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

2. Normally, have a combination of training from an accredited training program and suitable work experience totalling 7200 hours

   Or

   Have a total of 9000 hours of suitable work experience.

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

4. Pay 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.

# TECHNICAL COURSE OUTLINES

# SUGGESTED COURSE LAYOUT FOR THE POWERLINE TECHNICIAN (OPERATING/CONSTRUCTION) OCCUPATION

JOURNEYPERSON CERTIFICATION

↑

REQUIRED WORK EXPERIENCE

↑

ADVANCED LEVEL COURSES

| | |
|---|---|
| OL 2440 - Hot Stick Live Line Maintenance > 69kV | 45 hrs |
| OL 2430 - Hot Stick Live Line Maintenance 35 kV-69 kV | 45 hrs |
| OL 2420 - Hot Stick Live Line Maintenance <35 kV | 45 hrs |
| OL 2410 - Live Maintenance (Rubber Glove) | 45 hrs |
| OL 2400 - Underground Residential Distribution | 90 hrs |
| MP 2340 - Three Phase Systems | 90 hrs |
| OL 2120 - Quantity Cost Line Estimate | 45 hrs |
| OL 2110 - Safety Grounding | 45 hrs |
| OL 1400 - Primary Control Devices | 90 hrs |

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REQUIRED WORK EXPERIENCE

↑

INTERSESSION

| | |
|---|---|
| OL1120 - Work Term | 60 hrs |
| MP 1320 - Single Phase Transformers | 45 hrs |
| DR1700 - Blueprint Reading and Sketching | 75 hrs |

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SEMESTER TWO

| | |
|---|---|
| SD 1710 - Job Search Techniques | 15 hrs |
| SD 1700 - Workplace Skills | 30 hrs |
| SP 2330 - Quality Assurance/Quality Control | 30 hrs |
| MP 1310 - AC/DC Fundamentals | 90 hrs |
| OL2340 - Primary Conductors | 75 hrs |
| OL1500 - Workplace Management | 45 hrs |
| OL2350 - Secondary Conductors | 75 hrs |
| OL2360 - Power Line Structures II | 90 hrs |

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SEMESTER ONE

| | |
|---|---|
| SD 1720 - Entrepreneurial Awareness | 15 hrs |
| MR 1210 - Customer Service | 30 hrs |
| MC 1050 - Introduction to Computers | 30 hrs |
| CM 2150 - Workplace Correspondence | 45 hrs |
| OL1220 - Motorized Equipment | 45 hrs |
| OL1360 - Power Line Structures I | 120 hrs |
| TS 1300 - Rigging | 45 hrs |
| OL1230 - Power Tools and Utility Equipment | 60 hrs |
| TS1110 - Powerline Technician (Operating/Construction) Fundamentals | 60 hrs |

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Program and Apprenticeship Registration

## COURSE OUTLINE - TS1110

**Name and Number**: General Studies

**Descriptive Title**: Powerline Technician (Operating/Construction) 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

**Credit Transfer:**

**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 the appropriate St. John's Ambulance First Aid Course for this occcupation.
Standard or Emergency

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, gauges, straight edges, plumb bobs, squares, and calculators) and levels
   b. Use pliers, screwdrivers, wrenches, other gripping and turning tools

5. 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

6. 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. Identify bolt grades
   e. Identify miscellaneous anchoring devices

7. Use power tools
   a. Operate portable power tools
   b. Operate power cleaning equipment

8. 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

9. Cut metals (power)
    a. Maintain metal cutting power tools
    b. Identify and use abrasives

10. 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 grinders
    e. Maintain equipment

11. 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

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - TS1300

**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 (harness, belt lanyard). 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**:

**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
17. Describe the use of safety harness, safety belts, lanyards.

**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
    d. Interpret occupational health and safety regulations
    e. Select and install ladders
    f. Install scaffolds
    g. 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
    h. Demonstrate proper use of knots
    i. Use lifting attachments such as eye bolts and lifting lugs, beam clamps and crawlers, snatch blocks, spreader bars, shackles and screw jacks
    j. Transfer loads using lifting equipment
    k. Demonstrate the proper use of safety harness, safety belts, and lanyards.

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 - DR1700

**Name and Number**: Drafting

**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**:

**Credit Transfer**:

**Course Aims**:

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

**Course Objectives (Knowledge)**:

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

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

**Major Tasks / Subtasks (Skills)**:

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

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

3. Sketch sectional views
    a. Locate section
    b. Select type of view
    c. Determine scale
    d. Sketch view

e. Dimension sketch
f. Make notations

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

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

Choose the appropriate drawings for this occuaption from either 6, 7, 8 or other appropriate drawings for this occupation.

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.

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL1500

**Name and Number**: Powerline Technician (Operating/Construction) 1500

**Descriptive Title**: Workplace Management

**Description**:

This fundamentals course requires the use of motorized patrol equipment, rescue equipment, and work site barriers and traffic cones. It involves patrolling, inspecting and reporting on transmission line problems; bucket rescue, pole top rescue, and rescue from confined spaces; installing and maintaining work site barriers; and controlling pedestrian traffic. It includes information on pole numbering, environmental regulations and transmission line problems such as broken conductors, cracked insulators, loose guy wires, and trees on the line; rigging and rescue harnesses; and warning devices and traffic regulations.

**Prerequisites**: None

**Co-requisites**: None

**Credit Value**:

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the skills and knowledge required to patrol transmission and distribution facilities, carry out rescues, and secure and protect work sites
2. To develop an appreciation of the safety procedures required for patrolling transmission and distribution facilities, protecting work sites

**Course Objectives (Knowledge)**:

1. Explain environmental regulation with respect to transmission line construction and maintenance
2. Describe the pole numbering system
3. Explain how different transmission line problems affect the transmission of electricity and create safety hazards
4. Describe the different types of rigging and rescue harnesses
5. Explain the traffic regulations respecting work sites

**Major Tasks / Subtasks (Skills)**:

1. Patrol and inspect facilities
   a. Inspect pole and tower hardware according to checklists
   b. Inspect substation according to checklist
   c. Use climbing equipment.

2. Introduction to rubber protective equipment
   a. Inspect test and maintain rubber gloves.
   b. Inspect and test rubber equipment to detect faults and protect equipment when using and storing.
   c. Select rubber hoses, hoods, and blankets for installation on live conductors.

3. Execute emergency rescue
   a. Select proper rigging and harness for rescue operations
   b. Perform pole-top rescue, aerial bucket rescue and rescue from confined spaces

4. Employ procedures for work area protection
   a. Interpret provincial traffic control laws
   b. Select and place appropriate traffic and pedestrian warning devices for the condition
   c. Perform traffic control procedures (flagmen)
   d. Set up barriers and other devices for the protection of pedestrians and property
   e. Perform effective job planning
   f. Obtain flagpersons certificate.

**Evaluation**: Written reports and/or tests. Competence in simulated work.

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL1220

**Name and Number**: Powerline Technician (Operating/Construction) 1220

**Descriptive Title**: Motorized Equipment

**Description**:

This fundamental course requires the use of mechanical equipment and maintenance tools. It involves the operation and maintenance of motorized equipment. It includes information on specialized vehicles, hydraulic equipment and vehicle grounding.

**Prerequisites**: None

**Co-requisites**: None

**Credit Value**:

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the skills and knowledge required for the safe operation and maintenance of motorized vehicles

**Course Objectives (Knowledge)**:

1. Describe the types and functions of specialized vehicles
2. Describe the types and functions of hydraulic equipment
3. Explain low resistance vehicle grounding
4. Describe safety requirements for the operation and maintenance of motorized equipment

**Major Tasks / Subtasks (Skills)**:

1. Operate and maintain specialized vehicles
    a. Operate and maintain snowmobiles
    b. Operate and maintain line truck
    c. Operate and maintain track vehicles
    d. Drive vehicles up to 2 ½ tons with manual transmissions
    e. Drive vehicles towing light trailer

f. Operate and maintain all terrain vehicles.

2. Operate and maintain hydraulic equipment
   a. Perform proper start-up and inspection procedures for hydraulic equipment
   b. Perform proper warm-up procedures for hydraulic equipment
   c. Operate standard hydraulic powered equipment:
      i. boom
      ii. auger
      iii. winch
   d. Operate auxiliary hydraulic equipment:
      i. pole jack
      ii. tamper
      iii. drill

3. Install low resistance ground to vehicle.

4. Complete Air Brake endorsement course.

5. Complete Professional Drivers Improvement Course.

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL1360

**Name and Number**: Powerline Technician (Operating/Construction) 1360

**Descriptive Title**: Power Line Structures I

**Description**:

This transmission line installation course requires the use of tools, equipment and accessories. It involves handling, transporting and storing poles; digging holes; erecting, setting and moving poles; installing anchors. It includes information on rights of way, line construction (Helicopter), pole and anchor locations, submarine cable, transportation of poles, and pole line hardware.

**Prerequisites**:

**Co-requisites**: OL1500, OL1220

**Credit Value**: 4

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the skills and knowledge required to transport, prepare and erect poles and towers

**Course Objectives (Knowledge)**:

1. Explain right of way
2. Describe safety precautions required for using and working in the presence of herbicides
3. Describe safety precautions required for transporting, handling, and erecting poles and towers
4. Describe safety precautions required for blasting
5. Describe the different types of pole anchors and their uses
6. Describe the different types of guy wires and their uses
7. Describe safety precautions required for working with helicopter
8. Install and ground tower footings

**Major Tasks / Subtasks (Skills)**:

1. Prepare rights of way
    a. Check legal right to work on public/private property
    b. Perform tree pruning operations
        i. ornamental trees
    c. Select proper route
    d. Determine width of right of way
    e. Clear right of way
    f. Use chemical brush control

2. Mark locations for poles and anchors
    a. Measure line angles
    b. Mark anchors according to guying standards
    c. Mark proper location for poles
    d. Determine type of structure required
    e. Make basic sketches as required

3. Handle, transport and store poles
    a. Load, unload, pile, support and secure poles at yard, job and on transport trucks
    b. Load, unload and secure poles on pole trailer
    c. Manoeuvre vehicles with pole trailers attached, for delivery of poles
    d. Install warning and clearance lights or flags on loads
    e. Trim, cut, bore holes for fixtures, to prepare poles for installation
    f. Identify poles as to class, length, etc.

4. Excavate pole holes
    a. Excavate holes in earth using hydraulic auger
    b. Direct the excavation of holes in earth using backhoe
    c. Excavate holes in earth manually
        i. bog
        ii. sand
    d. Assist blaster as required
        i. safety
        ii. storage and handling of blasting material
        iii. transportation of blasting material

5. Erect, set and move poles
    a. Bolt pole mounts in place
    b. Select suitable tools and equipment and erect, set and backfill poles manually
    c. Select proper equipment and erect, set and backfill poles using gin-pole and

tackle method

d. Select suitable equipment and erect, set and backfill poles using mechanical or hydraulic boom
e. Reset poles by digging out, relocating in same hole and backfilling
f. Remove poles and pole butts, using hand jacking and mechanical equipment
g. Install stub poles, brace poles and pole cribs to reinforce poles
h. Mark poles with pole insignia (dating nail)
i. Install grounding wire on poles

6. Set anchors for poles and towers
   a. Prepare and install rock anchors, log anchors, plate anchors, swamp anchors, screw anchors, and "power" install screw anchors (pisa).

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL2360

**Name and Number**: Powerline Technician (Operating/Construction) 2360

**Descriptive Title**: Power Line Structures II

**Description**:

This transmission line installation course requires the use of tools, equipment and accessories. It involves handling, transporting and storing poles; digging holes; erecting, setting and moving poles; installing anchors; and straightening and replacing poles. It includes information on rights of way, line construction (Helicopter), pole and anchor locations, transmission towers, submarine cable, transportation of poles, and pole line hardware.

**Prerequisites**:

**Co-requisites**: OL1500, OL1220

**Credit Value**:

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the skills and knowledge required to transport, prepare and erect poles and towers

**Course Objectives (Knowledge)**:

1. Explain right of way
2. Describe safety precautions required for using and working in the presence of herbicides
3. Describe safety precautions required for transporting, handling, and erecting poles and towers
4. Describe safety precautions required for blasting
5. Describe the different types of pole anchors and their uses
6. Describe the different types of guy wires and their uses
7. Describe safety precautions required for working with helicopter
8. Install and ground tower footings

**Major Tasks / Subtasks (Skills)**:

1. Install and remove pole line hardware
    a. Prepare, install and remove crossarms
    b. Select, inspect, install and remove pin, suspension and strain insulators
    c. Select, assemble and install guy wires
        i. down guys
        ii. storm guys
        iii. overhead guys
        iv. sidewalk guys
        v. line guys
        vi. span guys
    d. Install guy guards
    e. Clean insulators

2. Assemble and erect transmission towers
    a. Load, unload, pile, support and secure tower material at yard, job and on transport trucks
    b. Assemble tower components
    d. Erect tower piece by piece, panel by panel or as complete unit using crane method
    e. Erect tower panel by panel using helicopter method
    f. Insert extension on existing tower using gin pole method
    g. Install and remove tower guys

3. Straighten and replace poles
    a. Excavate, plumb, re-tamp old pole
    b. Analyze cause of problems with pole instability
    c. Install guys where necessary and required
    d. Excavate or reset and re-tamp for replacement of an old pole by a new pole
    e. Perform butt treatment on old poles

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - MP1310

**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

**Credit Transfer**: Construction Electrical, Diesel Station Operator, Industrial Electrical, Powerline Technician (Operating/Construction), Power Engineering, Refrigeration and Air Conditioning, Refrigeration Plant Operator

**Course Aims**:

1. To develop the skills and knowledge required to construct and test basic DC and AC circuits.
2. To practise 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 VOM and DVOM to check circuit voltage

5. Use ammeter to check circuit amperage

6. Use VOM 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.

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - MP1320

**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

**Credit Transfer**: Construction Electrical, Industrial Electrical, Operation Lineman, Refrigeration and Air Conditioning

**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 types of single phase 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.

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL1230

**Name and Number**: Powerline Technician (Operating/Construction) 1230

**Descriptive Title**: Power Tools and Utility Equipment

**Description**:

This fundamental course requires the use of maintenance tools and equipment. It involves operating and maintaining utility equipment and electric and gas power tools. It includes information on climbing equipment, dead-ending equipment, ladders and work platforms, small gasoline engines, power saws, gas and electric drills, hydraulic tools and rock drills.

**Prerequisites**: None

**Co-requisites**: None

**Credit Value**:

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the knowledge and skills required to safely operate power tools and utility equipment.

**Course Objectives (Knowledge)**:

1. Explain maintenance requirements for the various kinds of power tools and utility equipment

2. Describe safety requirements for operating and maintaining power tools and utility equipment

**Major Tasks / Subtasks (Skills)**:

1. Use and maintain power tools
    a. Select and use power tools
        i. chainsaws

ii. electric and gas drills
iii. rock drills

b. Maintain power tools

2. Use and maintain climbing equipment
   a. Select the correct climbing equipment for personal use
   b. Climb poles using personal climbing equipment
   c. Inspect and maintain personal climbing equipment
   d. Test poles for safety prior to climbing
   e. Climb steel structures using personal climbing equipment

3. Use and maintain ladders and work platforms
   a. Select and use the correct ladders for different types of jobs
   b. Select and use the correct platforms for different types of jobs
   c. Maintain ladders and work platforms

4. Operate and maintain small gasoline engines
   a. Prepare correct fuel/oil mixtures
   b. Maintain spark plugs, filters, belts, oil levels, starting mechanisms and perform preventive maintenance procedures as required
   c. Exercise correct operating procedures
   d. Demonstrate how to troubleshoot a problem in a small engine

5. Use and maintain dead-ending equipment
   a. Select and use compression tools
   b. Maintain compression tools
   c. Select and use explosive actuated sleeves and dead ends, ratchet hoists, and wire grips

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL2340

**Name and Number**: Powerline Technician (Operating/Construction) 2340

**Descriptive Title**: Primary Conductors

**Description**:

This transmission line installation course requires the use of tools, equipment and accessories. It involves installation and maintenance of primary conductors. It includes information on armour rods, connectors, conductor ties, lightening arrestors, types of conductors, stringing, sagging, tensioning and splicing.

**Prerequisites**: OL1360, OL2360

**Co-requisites**: None

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Credit Value**:

**Course Aims**:

1. To develop the skills and knowledge required to install and maintain primary conductors

**Course Objectives (Knowledge)**:

1. Describe the different types of armour rods, connectors, conductor ties, lightening arrestors
2. Describe the different types of primary conductors
3. Explain stringing, sagging, tensioning and splicing
4. Set-up and operate tensioner equipment

**Major Tasks / Subtasks (Skills)**:

1. Install armour rods and conductor ties
    a. Select and install armour rods
    b. Prepare and install conductor tie wire for hot ties
    c. Prepare and install conductor tie wire for cold ties

2. String, sag and tension primary conductors
    a. Select and identify conductors
    b. Load and unload conductor reels
    c. Run-out, raise and tie-in primary conductor for slack stringing
    d. Sag conductor to proper tension according to sag charts
        i. transit
        ii. sag boards
        iii. timing
        iv. dynamometer
    e. Dead-end conductor using mechanical, compression and explosive attachments
    f. Install permanent feeder jumpers
    g. Install vibration dampers, counter weights and armour

3. Install lightening arrestors
    a. Inspect lightning arrestors
    b. Select, install and connect lightning arrestors

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL2350

**Name and Number**: Powerline Technician (Operating/Construction) 2350

**Descriptive Title**: Secondary Conductors

**Description**:

This transmission line installation course requires the use of tools and equipment, and secondary conductor components. It involves installation and maintenance of secondary conductors. It includes information on types of armour rods, conductor ties, conductors, stringing, sag, tension, splicing and connectors.

**Prerequisites**: OL1300

**Co-requisites**: None

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Credit Value**:

**Course Aims**:

1. To develop the skills and knowledge required to install secondary overhead conductors

**Course Objectives (Knowledge)**:

1. Describe the different types of armour rods
2. Describe conductor ties
3. Describe the different types of conductors
4. Explain stringing, sagging, tensioning, and splicing

**Major Tasks / Subtasks (Skills)**:

1. Install and maintain secondary overhead services
    a. Lay out secondary services
    b. Disconnect/reconnect secondary service at pole
    c. Install open wire bus conductors
    d. Install span secondary bus
    e. Disconnect/reconnect electric power service at service head

f. Provide temporary electric power services
g. Conduct pre-connection inspection
h. Select, install and read various types of watt hour meters

2. Install and maintain street lighting equipment
   a. Make up luminaries and supports
   b. Install, secure and connect luminaries and supports
   c. Install street lighting controls
   d. Check operation of lights, control systems and fusing to ensure safe, efficient operation
   e. Troubleshoot and maintain street light circuits
      i. types of bulbs
      ii. safety hazards

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL2400

**Name and Number**: Powerline Technician (Operating/Construction) 2400

**Descriptive Title**: Underground Residential Distribution

**Description**:

This transmission line installation course requires the use of basic tools and equipment and test equipment. It involves installing, maintaining and troubleshooting underground residential distribution systems. It includes information on safety codes, primary and secondary bus underground, isolating and protective devices, and pad mounting transformers.

**Prerequisites**: OL1400, OL2110

**Co-requisites**: None

**Credit Value**:

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the skills and knowledge to install underground residential distribution systems.
2. To develop an appreciation of CSA standards for the installation of underground residential distribution systems.

**Course Objectives (Knowledge)**:

1. Describe primary and secondary bus underground systems.
2. Explain the operation of isolation and protective devices.
3. Describe CSA standards for primary and secondary bus underground systems.
4. Describe the operation of single-phase and three-phase transformer systems.

**Major Tasks / Subtasks (Skills)**:

1. Install and maintain secondary bus underground
   a. Lay secondary cable underground in accordance with CSA standards

b. Install and protect cable risers for secondary bus underground
c. Make connections on underground secondary bus
d. Terminate plastic covered cables in secondary bus underground installations
e. Select, install and connect pedestals and junction boxes for underground secondary buses
f. Cut and seal plastic covered cables for secondary bus underground
g. Make moulded joints and terminations for underground secondary buses
h. Install temporary overhead service to a service designed for underground installation
i. Use testers to determine and locate faults in underground cables

2. Install and maintain primary bus underground
   a. Set up reels in preparation for installing underground cable
   b. Lay direct buried cable in accordance with CSA standards
   c. Rod and clean conduit ducts to install primary ducted cables
   d. Rack and train ducted cables
   e. Install manhole rigging to pull cables in conduit
   f. Construct moulded joints and terminations
   g. Use tester to determine faults
   h. Select and install underground grounding devices

3. Install and maintain isolating and protective devices
   a. Install and connect lightning arrestors for underground conductors
   b. Install load break switches for underground installations
   c. Operate U.R.D. transformer switch gear
   d. Operate load break and non-break terminators with rubber gloves and live line tools
   e. Operate load break switches with rubber gloves and live line tools
   f. Install safety grounding on underground circuits

4. Install and maintain pad-mount transformer
   a. Conduct pre-service check of single phase, three phase or three phase bank pad-mount transformers
   b. Install and connect single phase and three phase pad-mount transformers

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL2110

**Name and Number**: Powerline Technician (Operating/Construction) 2110

**Descriptive Title**: Safety Grounding

**Description**:

This course in transmission line installation requires the use of basic tools and equipment. It involves de-energizing transmission lines and installing safety grounding. It includes information on safety regulations, power outage and tagging procedures, shorts and grounds, grounding theory and equipotential grounding.

**Prerequisites**: OL1230, OL1500, Plus 900 Hours of Work Experience

**Co-requisites**: None

**Credit Value**:

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the skills and knowledge required to safely install safety grounding

**Course Objectives (Knowledge)**:

1. Describe the safety regulations required for installation of safety grounding
2. Explain equipotential grounding

**Major Tasks / Subtasks (Skills)**:

1. Perform/confirm power outage and tagging procedure
   a. Carry out power outage procedures
   b. Confirm that power outage procedures have been carried out
   c. Attach correct tags for switching equipment
   d. Obtain and follow switching orders

2. Install safety grounding
   a. Select, inspect and install proper cable sets for grounding and jumpering
   b. Operate and maintain grounding switches in substations
   c. Practice equipotential grounding techniques

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL2120

**Name and Number**: Powerline Technician (Operating/Construction) 2120

**Descriptive Title**: Quantity Cost Line Estimate

**Description**:

This transmission line maintenance course requires the use of transmission line specifications and costing information. It involves designing a line and estimating quantities and cost. It includes information on line components and types of transmission line systems.

**Prerequisites**: DR1700

**Co-requisites**: None

**Credit Value**: 2

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the skills and knowledge required to estimate transmission line costs

**Course Objectives (Knowledge)**:

1. Describe the types of transmission line components
2. Describe the different types of transmission line systems

**Major Tasks / Subtasks (Skills)**:

1. Estimate quantities and cost for lines
    a. Make material lists
    b. Estimate the amount of time required to accomplish the job
    c. Determine manpower and equipment requirements
    d. Estimate the total costs

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL1400

**Name and Number**: Powerline Technician (Operating/Construction) 1400

**Descriptive Title**: Primary Control Devices

**Description**:

This transmission line installation course requires the use of basic tools and equipment and test equipment. It involves installing, maintaining, and troubleshooting primary control devices. It includes information on high voltage switching, air break switching, metering, voltage regulation, isolation and protection, reclosing and sectionalizing, and supervisory control.

**Prerequisites**: MP1310, MP1320, MP2340, Plus 2600 Hours Work Experience

**Co-requisites**: None

**Credit Value**: 4

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the skills and knowledge required to install primary control devices
2. To develop an appreciation of the safety requirements for installing primary control devices

**Course Objectives (Knowledge)**:

1. Describe the operation of the types of primary control devices.
2. Explain high voltage switching
3. Explain voltage regulation
4. Describe safety requirements for installation of primary control devices
5. Explain reclosing and sectionalizing
6. Describe supervisory control systems
7. Install and maintain line capacitors
8. Install and maintain reactors

**Major Tasks / Subtasks (Skills)**:

1. Install and maintain high voltage switches and circuit breakers
   a. Inspect, install and operate H.V. switches and circuit breakers
   b. Select and install mountings and associated equipment

2. Install and maintain automatic reclosers and sectionalizers
   a. Perform pre-installation inspection of hydraulic reclosers
   b. Inspect electronic reclosers
   c. Install and connect hydraulic reclosers and test controls
   d. Install and connect electronic reclosers and test controls
   e. Perform pre-installation inspection of automatic sectionalizers
   f. Install, connect and test automatic sectionalizers

3. Install and maintain voltage regulators
   a. Conduct pre-service check of voltage regulators
   b. Select and install mountings and associated equipment
   c. Install voltage regulator
   d. Place installed voltage regulator into service
   e. Conduct regular in-service inspection and record readings
   f. Remove regulator from service

4. Verify use of supervisory control
   a. Identify functions of remote control
   b. Demonstrate correct use of remote control

5. Install air break switches
   a. Inspect air-break switches
   b. Install air-break switches according to types, sizes and ratings
   c. Adjust air-break switches for proper operation

6. Install and maintain metering tanks
   a. Specify use of metering tanks
   b. Conduct pre-service inspection of metering tanks
   c. Install metering tanks
   d. Verify use of current transformers and potential transformers

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL2410

**Name and Number**: Powerline Technician (Operating/Construction) 2410

**Descriptive Title**: Live Maintenance (Rubber Gloves)

**Description**:

This transmission line maintenance course requires the use of protective equipment, basic tools and test equipment. Live maintenance usually requires suitable weather conditions. It involves maintenance and installation of transmission line components on live lines. It includes information on safety requirements, overhead isolating and protecting devices, and hot stick equipment.

**Prerequisites**: Core courses and OL1400, Plus 2600 Work Experience

**Co-requisites**: None

**Credit Value**: 2

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the skills and knowledge required to maintain live transmission lines using rubber gloves
2. To develop an appreciation of safety requirements for live line maintenance using rubber gloves

**Course Objectives (Knowledge)**:

1. Describe the safety requirements for the for live line maintenance using rubber gloves
2. Explain the purpose and operation of overhead isolating and protecting devices
3. Explain the purpose and operation of hot stick equipment.

**Major Tasks / Subtasks (Skills)**:

1. Carry out live line maintenance using rubber gloves
    a. Inspect, test and maintain rubber gloves
    b. Inspect and test rubber equipment to detect faults and protect equipment when using and storing
    c. Select and install rubber hoses, hoods and blankets on live conductors

d. Tie/untie, clamp/unclamp live line conductors using rubber gloves and rubber protective equipment
e. Move and relocate live line conductors using rubber gloves and rubber protective equipment
f. Repair live line conductors using rubber glove and rubber protective equipment
g. Install stirrup, full tension connections and dead-ends using rubber gloves and rubber protective equipment
h. Install jumpers on live line conductors using rubber gloves and rubber protective equipment
i. Make tap connections using rubber gloves
j. Install live line openers on live conductors using rubber gloves
k. Install armour rods

2. Operate/Re-fuse overhead isolating and protective devices
   a. Operate/re-fuse cutouts
      i. select and install fuses of correct size and time rating
      ii. select and install fuses according to location and time rating
   b. Operate air break switches, solid blade disconnects, load interrupters, repeater switches and load break switches
   c. Open and close oil switches
   d. Close in, open and lock-out reclosers and sectionalizers
   e. Operate electronic controls to open or close reclosers

3. Straighten and replace poles and X-arms
   a. Change crossarms using rubber glove method
   b. Replace pole using rubber protective equipment

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL2420

**Name and Number**: Powerline Technician (Operating/Construction) 2420

**Descriptive Title**: Hot Stick Live Line Maintenance <35 kV

**Description**:

This transmission line maintenance course requires the use of protective equipment, <35 kV hot stick equipment, block and tackle, and live line jack. Live line maintenance usually requires suitable weather conditions. It involves troubleshooting, maintenance and repair of <35 kV live transmission lines. It includes information on hot line tools, testing equipment, and tagging and permits.

**Prerequisites**: Core and OL1400, Plus 2600 Hours Work Experience

**Co-requisites**: None

**Credit Value**: 2

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the skills and knowledge required to perform hot stick live line maintenance on lines up to 35 kV
2. To develop an appreciation of safety requirements for hot stick live line maintenance up to 35 kV

**Course Objectives (Knowledge)**:

1. Explain the purpose and operation of hot line tools.
2. Explain the purposes of tagging and permits.
3. Describe the safety requirements for hot stick live line maintenance up to 35 kV.

**Major Tasks / Subtasks (Skills)**:

1. Maintain live lines up to 35 kV using hot line tools
    a. Install protective cover-up with hot sticks
    b. Tie/untie, clamp/unclamp live conductors using hot sticks
    c. Support and relocate live conductors on wooden poles using hot sticks
    d. Dead end live conductors on wooden poles using hot sticks

e. Install armour rods on live conductors using hot sticks
f. Phase out live conductors

2. Use line testing equipment
   a. Make electrical test for broken or leaky insulators
      i. voltage drop test
      ii. buzz test
   b. Test for phase rotation
   c. Perform phasing out procedure
   d. Test for ground faults
   e. Perform load check

3. Straighten and replace poles and crossarms
   a. Change crossarms using hot stick method
   b. Replace pole using hot stick method
   c. Erect pole in midspan.

4. Maintain and test hot stick equipment
   a. Inspect live line tools for defects
   b. Repair and re-gloss fibreglass sticks
   c. Remove and install ferrules on fibreglass sticks
   d. Test sticks for moisture content with hot stick tester

   NOTE: The voltages at which the above noted subtasks should be accomplished are listed below as a guide. The method used to work at different voltages may vary between companies according to company policy.

   Voltages:
   Up to 35Kv
   35 to 69Kv
   69 to 230Kv

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL2430

**Name and Number**: Powerline Technician (Operating/Construction) 2430

**Descriptive Title**: Hot Stick Live Line Maintenance 35 kV - 69 kV

**Description**:

This transmission line maintenance course requires the use of basic tools and equipment, protective equipment, 35 kV - 69 kV equipment, and tension pullers. Live maintenance usually requires suitable weather conditions. It involves troubleshooting, maintaining and repairing live transmission lines from 35 kV to 69 kV. It includes information on safety requirements, hot line tools, and bare hand maintenance.

**Prerequisites**: OL2420, Plus 2600 Hours of Work Experience

**Co-requisites**: None

**Credit Value**: 2

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the skills and knowledge required to maintain live lines from 35 kV to 69 kV using hot line tools
2. To develop the skills and knowledge required to carry out bare hands live line maintenance
3. To develop an appreciation of safety requirements for live line maintenance using bare hands and hot line tools (35 kV to 69 kV)

**Course Objectives (Knowledge)**:

1. Describe safety requirements for bare hands live line maintenance.
2. Describe safety requirements for live line maintenance from 35 kV to 69 kV using hot line tools.
3. Explain the purpose and operation of hot line tools (35 kV - 69 kV).

**Major Tasks / Subtasks (Skills)**:

1. Maintain live lines from 35 kV to 69 kV using hot line tools
    a. Clamp and unclamp live conductors with hot-sticks
    b. Support and relocate live conductors on wooden poles with hot-sticks
    c. Install and remove insulators and suspension clamps on live conductors using hot sticks
    d. Dead end live conductors using hot sticks

2. Carry out live line maintenance using bare hand method
    a. Clamp and unclamp live line conductors using bare hand method
    b. Relocate live line conductors using bare hand method
    c. Repair live line conductors using bare hand method
    d. Install jumpers, tap connections, openers, deadends, vibration dampers, on live line conductors using bare hand method
    e. Install and remove insulators on live line conductors using bare hand method

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - OL2440

**Name and Number**: Powerline Technician (Operating/Construction) 2440

**Descriptive Title**: Hot Stick Live Line Maintenance > 69 kV

**Description**:

This transmission line maintenance course requires the use of basic tools and equipment, protective equipment, > 69 Kv equipment and strain carriers. Live maintenance usually requires suitable weather conditions. It involves troubleshooting, maintaining and repairing live transmission lines > 69 kV. It includes information on > 69 kV tools and equipment, tagging and permits.

**Prerequisites**: OL2430, Plus 3600 Hours of Work Experience

**Co-requisites**: None

**Credit Value**: 2

**Credit Transfer:** Powerline Technician (Operating/Construction)

**Course Aims**:

1. To develop the skills and knowledge required to maintain live lines above 69 kV using hot line tools
2. To develop an appreciation of safety requirements for hot stick live line maintenance over 69 kV

**Course Objectives (Knowledge)**:

1. Explain the purpose and operation of live line tools (over 69 kV)
2. Describe safety requirements for live line maintenance over 69 kV.

**Major Tasks / Subtasks (Skills)**:

1. Maintain live lines above 69 kV using hot line tools
    a. Clamp and unclamp live conductors with hot sticks
    b. Support and relocate live conductors on H-frames and towers using hot sticks
    c. Install and remove insulators and suspension clamps on live conductors using hot sticks
    d. Dead end live conductors using hot sticks

e. Install vibration dampers on live conductors using hot sticks

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

## COURSE OUTLINE - MP2340

**Name and Number**: Electrical 2340

**Descriptive Title**: Three Phase Systems

**Description**:

This course in electrical fundamentals requires the use of electrical tools and equipment and test equipment. It involves constructing three phase circuits, taking measurements and making calculations; and installing, connecting and troubleshooting three phase transformers. It includes information on Wye and Delta type circuits, high leg characteristics, phase rotation, power factor, three phase power, types of three phase transformers, types of hookups, construction of three phase transformers, balance and neutral, lightening arrestors, surge suppressors, protective devices, and electrical code.

**Prerequisites**: MP1320, Plus 3600 Hours of Work Experience

**Co-requisites**: None

**Credit Value**: 4

**Credit Transfer:** Construction Electrical, Diesel Station Operator, Industrial Electrical, Powerline Technician (Operating/Construction), Refrigeration and Air Conditioning.

**Course Aims**:

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

**Course Objectives (Knowledge)**:

1. Describe the operation and specify the uses of 3 phase transformers.
2. Distinguish between Delta and Wye connections.
3. Calculate fuse size and CL fuse size for 3 phase banks.
4. Describe phase rotation.
5. Explain power factor.
6. Explain three phase power.
7. Describe the types of three phase transformers.
8. Describe the types of transformer hookups.

9. Explain balance and neutral.
10. List the electrical code requirements for the installation of three phase transformers.

**Major Tasks / Subtasks (Skills)**:

1. Connect and verify three phase circuits
   a. Connect a 3 Phase 3 wire Wye circuit and verify voltage and current relationship.
   b. Connect a 3 phase 3 wire Delta circuit and verify voltage and current relationship.
   c. Connect a 3 phase 4 wire Wye circuit and verify voltage current relationship.
   d. Connect a 3 phase 4 wire Delta circuit and verify high leg characteristics.
   e. Identify phase sequence of supply.

2. Install and maintain three phase transformer systems
   a. Connect 3 phase 3 wire transformer and measure phase, line voltage current (dry type).
   b. Connect 3 phase 4 wire transformer and measure phase, line, and neutral voltage and current (dry type).
   c. Service and maintain transformer taps.
   d. Perform dielectric test on oil.
   e. Connect, test and adjust voltage regulator.
   f. Install lightning arrestors.
   g. Install surge suppressors.
   h. Check for balanced neutral.
   i. Check for dangers of a floating neutral in transformer banking.
   j. Install overcurrent protection.

3. Install and connect three phase transformer bank
   a. Perform pre-service check on overhead transformers.
   b. Select and install mountings, switch gear and protective devices for three-phase transformer banks.
   c. Select and install transformers and connect leads for three-phase banks.
   d. Connect and disconnect three phase transformers from voltage source using approved safety equipment.
   e. Construct three-phase wye and delta transformer banks.
   f. Construct three-phase open wye and open delta transformer banks.
   g. Troubleshoot three-phase transformer bank installations.

4. Insulate and ground equipment
   a. Use all tools required in the isolating and grounding of equipment.
   b. Discharge capacitors.
   c. Remove loads from source prior to isolating.
   d. Install protective grounding.
   e. Lock out and tag all electrical equipment to be worked on.

f. Use high voltage tester to verify that circuit is isolated.
g. CAD Weld - Terminate ground connectors using weld techniques.

5. Install system ground
   a. Install neutral grounds.
      i. ground wire to neutral
   b. Install grounding electrodes.
      i ground coil
      ii. ground rod
   c. Attach grounding wire to electrode using cad weld method.
   d. Attach guy wire to multi-grounded neutral.

**Evaluation**:

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

**Development History**:

Date Developed: December 1993

# 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

**COURSE NAME & 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 NAME & 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 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 NAME & 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.
    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 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

**COURSE NAME & 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

**COURSE NAME & NUMBER:** Entrepreneurial Awareness SD 1720

**DESCRIPTIVE TITLE:** Entrepreneurial Awareness

**PREREQUISITES:** None

**CO-REQUISITES:** None

**SUGGESTED DURATION:** 15 hrs

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

**COURSE OBJECTIVES (KNOWLEDGE):**

**1. Explore Self-Employment: An Alternative to Employment**

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

**2. Explore the Characteristic of Entrepreneurs**

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

**3. Identifying Business Opportunities**

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

**4. Demystifying the Entrepreneurial Process.**

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

# REQUIRED WORK EXPERIENCES

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

**REQUIRED WORK EXPERIENCES:**

- Operating, maintenance and use of motorized equipment power tools and utility equipment.
- General Line Construction ( to be obtained either at the training institution or in the workplace).
- Extensive experience in installing, connecting and troubleshooting single and phase transformers.
- Extensive experience in installing, connecting and troubleshooting three phase transformers
- Installation and maintenance of primary and secondary conductors.
- Installation, maintenance and troubleshooting underground residential distribution systems. ( to be obtained either at the training institution or in the workplace).
- De-energizing and grounding power lines and equipment.
- Maintaining and troubleshooting primary control devices (to be obtained either at the training institution or in the workplace).
- Installation and maintenance of street lights
- General work procedures on live lines with the use of rubber gloves
- Live line troubleshooting, maintenance and repair at <35KV
- Live line troubleshooting , maintenance and repair at 35KV-69 KV
- Live line troubleshooting, maintenance and repair at >69KV.