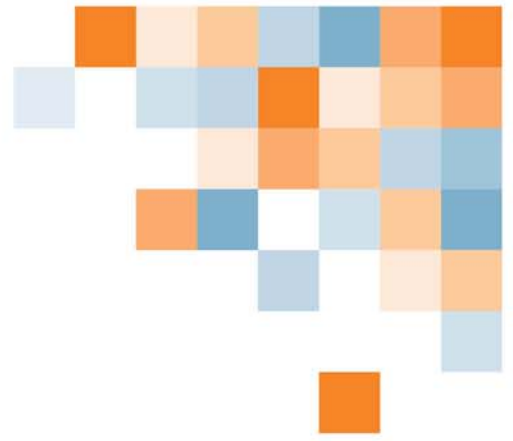


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PROGRAM OUTLINE

Power Line Technician



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POWER LINE TECHNICIAN PROGRAM OUTLINE

April, 2010

**Developed By
Industry Training Authority
Province of British Columbia**



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FORWARD

The Program Standards for Power Line Technician 2010 were updated through a Standards Review project funded by the Resource Industry Training Organization.

The work was coordinated by a joint management / labour committee that included representation from a broad cross section of employers of Power Line Technicians, labour representatives and representatives from BC's post-secondary system. These revised standards incorporate changes made to the National Occupational Analysis (Power Line Technician) released in 2004 and are based on the ITAC Program Outline released in 1997.

The standards were reviewed and adjusted by a group of Subject Matter Experts (SMEs), Power Line Technicians. The SME group met for three days in December 2009 and another two days in March 2010. The SMEs were drawn from a wide cross section of industry and thanks are extended to them for their dedication and participation in keeping Power Line Technician Program Standards technologically current and aligned with the needs of industry.

2009 Power Line Technician Standards Project SMEs

Name	Organization	Position
Gerry Bramhill	Electrical Industry Training Institute	Senior Instructor
Phil Davis	Electrical Industry Training Institute	Executive Director
Mike Ferguson	BC Hydro	Power Line Technician, Apprenticeship and Trades Training Committee
Dan Giesbrecht	IBEW 258	Power Line Technician Assistant Business Manager
Benton Hadley	Fortis BC	Power Line Technician Operations Supervisor
Allan Pineau	BC Hydro	Power Line Technician Manager, Work Methods Department
Jeff Skosnik	Line Contractors Association	Chief Executive Officer
Ben Berkelaar	BC Hydro	Power Line Technician, EITI Instructor

SAFETY ADVISORY

Be advised that references to the Workers' Compensation Board of British Columbia safety regulations contained within these materials do not/may not reflect the most recent Occupational Health and Safety Regulation (the current Standards and Regulation in BC can be obtained on the following website: <http://www.worksafebc.com>.) Please note that it is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulation pertaining to his/her work.



Achievement Standards

The Achievement Standards for each Competency in the Program Outline will define and help guide assessment of competent performance. They define what competence looks like and give guidance to assess whether a person has achieved each of the standards described in this program outline.

Achievement Criteria define what performance is expected in the technical training environment (theory tests and lab based theory assessments and practical exercises).

Workplace Achievement Criteria references the application of theory learning to performance in the workplace. It guides the employer and apprentice to understand their roles in training and is intended as an example of a criterion to reference performance. Employers determine the level of competence and accuracy with which tasks are performed.

The Achievement Standards guide assessment of competent performance but are not intended to be exclusive or exhaustive.

For example, one criterion referenced is “*the learner must achieve a minimum of 70% on a multiple choice exam...*” This is intended as an example of a criterion to reference performance against but it is possible to use other theory assessment methods. .

Technical training programs are able to use learning and assessment materials that fit their own curriculum, so long as the program of instruction incorporates theory assessment referenced against each standard, either in a stand alone form, or as part of a summative assessment.

Similarly in the **Workplace Achievement Criteria**, the specifics of what performance is used to judge competence in the workplace will vary with the type of work each industry sector requires. The Criteria are intended to be used as a guide to evaluating an equivalent level of performance across different workplace situations as well as across different industry sectors.



SECTION 1

PROGRAM OVERVIEW

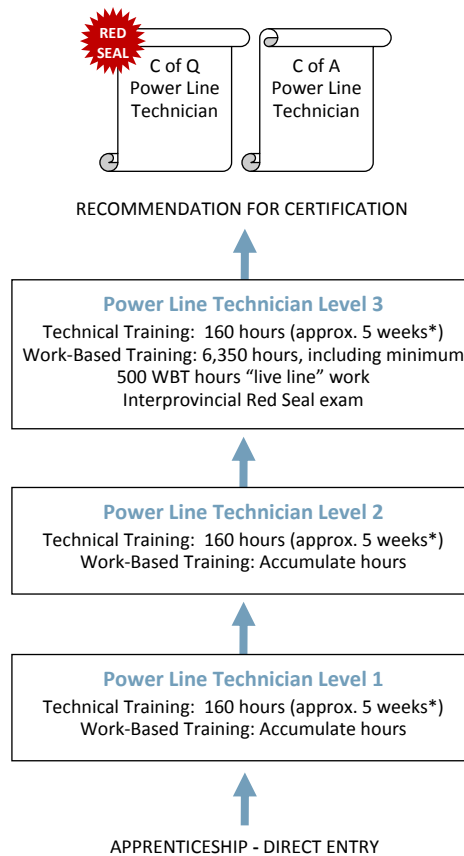


Program Credentialing Model

Apprenticeship Pathway

This graphic provides an overview of the Power Line Technician apprenticeship pathway.

C of Q = Certificate of Qualification
 C of A = Certificate of Apprenticeship
 WBT = Work-Based Training



CROSS-PROGRAM CREDITS

Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program

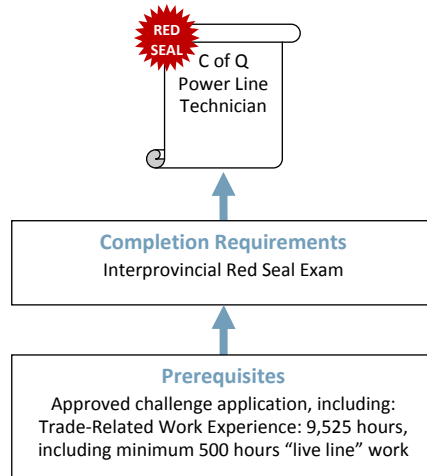
- None



Challenge Pathway

This graphic provides an overview of the Power Line Technician challenge pathway.

C of Q = Certificate of Qualification



CREDIT FOR PRIOR LEARNING

Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program

- None



**BC Power Line Technician
Occupational Analysis Chart**

A. Safety and Safe Work Practices	A1 K Identify Safety Regulations 1	A2 K Identify trade specific PPE 1	A3 K Recognize and Observe Limits of Approach 1	A4 K Describe Lock Out Procedures 1	A5 W Demonstrate Lock Out Procedures 1	A6 K Describe Correct Grounding and Equipotential Procedures 1
	A7 W Demonstrate Correct Grounding and Equipotential Procedures 1	A8 K Describe Rescue Procedures 1	A9 W Perform Rescue Procedures 1			
B. Climbing	B1 K Describe the Care and Use of Climbing Equipment 1	B2 W Demonstrate Climbing Wood Structures 1	B3 W Demonstrate Safe Climbing Techniques for Steel Structures 1	B4 K Describe Working on Elevated Platforms 1	B5 W Demonstrate Working on Elevated Platforms 1	B6 K Describe Testing for Pole (Structure) Stability 1
	B7 W Stabilize and Straighten Poles 1					
C. Policies and Regulations	C1 K Identify Environmental Hazards and Regulations 1	C2 K Identify Industry Regulations 1				
	Level					



D. Tools and Instruments

Level

D1 K Describe the Use and Care of Hand Tools	1				
--	---	--	--	--	--

D2 W Demonstrate the Use and Care of Hand Tools	1				
---	---	--	--	--	--

D3 K Describe the Use and Care of Power Tools	1				
---	---	--	--	--	--

D4 W Demonstrate the Use and Care of Power Tools	1				
--	---	--	--	--	--

D5 K Describe the Use and Care of Test Instruments	1	2			
--	---	---	--	--	--

D6 W Demonstrate the Use and Care of Test Instruments	1	2			
---	---	---	--	--	--

D7 K Describe the Use and Care of Live Line Tools	1				
---	---	--	--	--	--

E. Electrical Theory

Level

E1 K Describe Electrical Fundamentals	1	2			
---	---	---	--	--	--

E2 K Describe the Operation of Motors and Generators	1	2			
--	---	---	--	--	--

E3 K Describe Transformation	1	2			
--	---	---	--	--	--

E4 W Install Transformers	1	2			
-------------------------------------	---	---	--	--	--

E5 K Describe Metering Components	1		3		
---	---	--	---	--	--

E6 W Read Meters	1		3		
----------------------------	---	--	---	--	--

E7 K Describe Power Factor		2			
--------------------------------------	--	---	--	--	--

E8 K Describe Substation Operations, System Operations and System Protection			3		
--	--	--	---	--	--

E9 W Perform System Switching			3		
---	--	--	---	--	--

E10 K Describe Voltage Regulators and Capacitors			3		
--	--	--	---	--	--

E11 W Demonstrate the Installation, Operation and Removal of Voltage Regulators and Capacitors			3		
--	--	--	---	--	--

F. Equipment

Level

F1 W Identify Types of Mobile Line Equipment	1				
--	---	--	--	--	--

F2 W Demonstrate Use and Care of Hydraulically Equipped Vehicles	1				
--	---	--	--	--	--

F3 K Describe the Use and Care of Stringing Equipment (Distribution)		2			
--	--	---	--	--	--

F4 W Demonstrate the Use and Care of Stringing Equipment (Distribution)		2			
---	--	---	--	--	--

F5 K Describe the Equipment and Procedures for Stringing Transmission Lines			3		
---	--	--	---	--	--

F6 W Demonstrate Stringing Transmission Lines			3		
---	--	--	---	--	--



**G.
Rigging**

Level

G1 K Describe Principles of Work, Force and Mechanical Advantage	1				
--	---	--	--	--	--

G2 K Describe the Use and Care of Lifting Tools and Equipment	1				
---	---	--	--	--	--

G3 W Use Lifting Tools and Equipment	1				
--	---	--	--	--	--

G4 K Identify Lifting Components for Live Line Distribution		2			
---	--	---	--	--	--

G5 W Use Lifting Tools and Equipment in Live Line Distribution		2			
--	--	---	--	--	--

G6 K Describe the Use of Lifting Devices in Distribution Construction and Maintenance		2			
---	--	---	--	--	--

G7 W Use Lifting Devices in Distribution Construction and Maintenance		2			
---	--	---	--	--	--

G8 K Identify Lifting Components for Transmission			3		
---	--	--	---	--	--

G9 W Demonstrate the Use of Lifting Components for Transmission			3		
---	--	--	---	--	--

G10 K Describe Live Line Transmission Rigging			3		
---	--	--	---	--	--

G11 W Demonstrate Live Line Transmission Rigging			3		
--	--	--	---	--	--

**H.
Overhead Distribution (OD)**

Level

H1 K Describe Overhead Distribution Materials	1				
---	---	--	--	--	--

H2 K Describe How to Determine Overhead Line Status	1				
---	---	--	--	--	--

H3 W Determine Line Status	1				
--------------------------------------	---	--	--	--	--

H4 K Describe Construction of Distribution Lines	1	2			
--	---	---	--	--	--

H5 W Construct Distribution Lines	1	2			
---	---	---	--	--	--

H6 K Describe Procedures for Live Line Work	1				
---	---	--	--	--	--

H7 W Demonstrate Use of Live Line Tools	1				
---	---	--	--	--	--

H8 K Describe the Installation and Operation of OD Electrical Apparatus		2	3		
---	--	---	---	--	--

H9 W Install, Operate and Maintain OD Electrical Apparatus		2	3		
--	--	---	---	--	--

H10 K Describe the Maintenance of Distribution Lines (up to and Including 3 Phase)		2	3		
--	--	---	---	--	--

H11 W Maintain Distribution Lines		2	3		
---	--	---	---	--	--

H12 K Locate and Identify Applicable Standards		2			
--	--	---	--	--	--

H13 K Describe Troubleshooting of System Components (Overhead, UG, Transmission)			3		
--	--	--	---	--	--

H14 W Troubleshoot System Components			3		
--	--	--	---	--	--

**I.
Underground Distribution (UD)**

Level

I1 K Describe Underground Distribution Materials	1	2			
--	---	---	--	--	--

I2 K Describe How to Determine UD Line Status	1	2			
---	---	---	--	--	--

I3 W Determine UD Line Status	1	2			
---	---	---	--	--	--

I4 K Describe UD Grounding Procedures		2			
---	--	---	--	--	--

I5 W Demonstrate UD Grounding Procedures		2			
--	--	---	--	--	--

I6 K Describe the Construction of UD lines		2			
--	--	---	--	--	--



Program Overview

I7 W Construct UD Lines <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">2</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>	2				I8 K Describe the Installation, Operation and Maintenance of UD Electrical Apparatus <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3			I9 W Install, Operate and Maintain UD Electrical Apparatus <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3			I10 K Describe Maintenance of UD Conductors <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3			I11 W Maintain UD Conductors <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3		
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J. Transmission

Level

J1 K Describe Transmission Materials <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3			J2 K Describe Construction of Transmission Lines <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3			J3 W Construct Transmission Lines <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3			J4 K Describe Installation, Operation and Maintenance of Electrical Apparatus for Transmission <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3			J5 W Install, Operate and Maintain Electrical Apparatus for Transmission. <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3			J6 K Describe Maintenance of Transmission Lines <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3		
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J7 W Maintain Transmission Lines <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3		
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K. Communication

Level

K1 K Describe the Purpose of Tailboard Meetings <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>	1				K2 W Participate in Tailboard Meetings <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>	1				K3 K Identify and Describe the Use of Hand Signals <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>	1				K4 W Communicate Using Hand Signals <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>	1				K5 K Describe Tools and Systems for Electronic Communications <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>	1				K6 W Communicate Using Electronic Tools and Systems <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">1</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>	1			
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K7 K Describe Communication with Other Disciplines and Co-workers <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">2</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>	2				K8 W Communicate with Other Disciplines and Co-workers <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">2</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>	2				K9 K Describe Communication with Customers <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">2</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>	2				K10 W Communicate with Customers <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">2</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>	2				K11 K Describe Communication with Apprentices <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3			K12 W Communicate with Apprentices <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;"></td> <td style="width: 25%;">3</td> <td style="width: 25%;"></td> <td style="width: 25%;"></td> </tr> </table>		3		
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Suggested Schedule of Time Allotment - Level 1

LEVEL ONE			Theory	Practical
Line A.	Safety and Safe Work Practices	15.50% of Time		
A1 K	Identify Safety Regulations		√	
A2 K	Identify trade specific PPE		√	
A3 K	Recognize and Observe Limits of Approach		√	
A4 K	Describe Lock-Out Procedures		√	
A5 W	Demonstrate Lock-Out Procedures			√
A6 K	Describe Correct Grounding and Equi-Potential Procedures		√	
A7 W	Demonstrate Correct Grounding and Equi-Potential Procedures			√
A8 K	Describe Rescue Procedures		√	
A9 W	Perform Rescue Procedures			√
Line B.	Climbing	11.00% of Time		
B1 K	Describe the Care and Use of Climbing Equipment		√	
B2 W	Demonstrate Climbing Wood Structures			√
B3 W	Demonstrate Safe Techniques for Climbing Steel Structures		√	
B4 K	Describe Working on Elevated Platforms		√	
B5 W	Demonstrate Working on Elevated Platforms			√
B6 K	Describe Testing for Pole (Structure) Stability		√	
B7 W	Stabilize and Straighten Poles			√
Line C.	Policy and Regulations	6.00% of Time		
C1 K	Identify Environmental Hazards and Regulations		√	
C2 K	Identify Industry Regulations		√	
Line D.	Tools and Instruments	8.75% of Time		
D1 K	Describe the Use and Care of Hand Tools		√	
D2 W	Demonstrate the Use and Care of Hand Tools			√
D3 K	Describe the Use and Care of Power Tools		√	



LEVEL ONE		Theory	Practical
D4 W	Demonstrate the Use and Care of Power Tools		√
D5 K	Describe the Use and Care of Test Instruments	√	
D6 W	Demonstrate the Use and Care of Test Instruments		√
D7 K	Describe the Use and Care of Live Line Tools	√	
Line E.	Electrical Theory		14.25% of Time
E1 K	Describe Electrical Fundamentals	√	
E2 K	Describe the Operation of Motors and Generators (Single Phase)	√	
E3 K	Describe Transformation (Single Phase Transformers)	√	
E4 W	Install Transformers (Single Phase)		√
E5 K	Describe Metering Components (Single Phase)	√	
E6 W	Read Meters (Single Phase)		√
Line F.	Equipment		7.75% of Time
F1 W	Identify Types of Mobile Line Equipment		√
F2 W	Demonstrate Use and Care of Hydraulically Equipped Vehicles		√
Line G.	Rigging		9.00% of Time
G1 K	Describe Principles of Work, Force and Mechanical Advantage	√	
G2 K	Describe the Use and care of Lifting Tools and Equipment	√	
G3 W	Use Lifting Tools and Equipment		√
Line H.	Overhead Distribution		14.25% of Time
H1 K	Describe Overhead Distribution Materials	√	
H2 K	Describe How to Determine Overhead Line Status	√	
H3 W	Determine Line Status		√
H4 K	Describe Construction of Distribution Lines	√	
H5 W	Construct Distribution Lines		√
H6 K	Describe Procedures for Live Line Work	√	
H7 W	Demonstrate Use of Live Line Tools		√
Line I.	Underground Distribution (UD)		8.25% of Time
I1 K	Describe Underground Distribution Materials	√	
I2 K	Describe How to Determine UD Line Status	√	
I3 W	Determine UD Line Status		√



Program Overview



Line K.	Communication in the Workplace	5.25% of Time		
K1 K	Describe the Purpose of Tailboard Meetings		√	
K2 W	Participate in Tailboard Meetings			√
K3 K	Identify and Describe the Use of Hand Signals		√	
K4 W	Communicate Using Hand Signals			√
K5 K	Describe Tools and Systems for Electronic Communications		√	
K6 W	Communicate Using Electronic Tools and Systems			√
	Total	100% of Time		



Suggested Schedule of Time Allotment – Level 2

LEVEL TWO		Theory	Practical
Line D. Tools and Instruments	9.25% of Time		
D5 K	Describe the Use and Care of Test Instruments	√	
D6 W	Demonstrate the Use and Care of Test Instruments		√
Line E. Electrical Theory	16.75% of Time		
E1 K	Describe Electrical Fundamentals	√	
E2 K	Describe the Operation of Motors and Generators (Three Phase)	√	
E3 K	Describe Transformation (Three Phase)	√	
E4 W	Install Transformers (Three Phase)		√
E7 K	Describe Power Factor (Three Phase)	√	
Line F. Equipment	10.00% of Time		
F3 K	Describe the Use and Care of Stringing Equipment (Distribution)	√	
F4 W	Demonstrate the Use and Care of Stringing Equipment (Distribution)		√
Line G. Rigging	16.00% of Time		
G4 K	Identify Lifting Components for Live Line Distribution	√	
G5 W	Use Lifting Tools and Equipment in Live Line Distribution		√
G6 K	Describe the Use of Lifting Devices in Distribution Construction and Maintenance	√	
G7 W	Use Lifting Devices in Distribution Construction and Maintenance		√
Line H. Overhead Distribution	23.75% of Time		
H4 K	Describe Construction of Distribution Lines	√	
H5 W	Construct Distribution Lines		√
H8 K	Describe the Installation and Operation of Electrical Apparatus	√	
H9 W	Install, Operate and Maintain Electrical Apparatus		√



LEVEL TWO		Theory	Practical
H10 K	Describe the Maintenance of Distribution Lines (up to and Including 3 Phase)	√	
H11 W	Maintain Distribution Lines		√
H12 K	Locate and Identify Applicable Standards	√	
Line I.	Underground Distribution (UD)		16.25% of Time
I1 K	Describe Underground Distribution Materials	√	
I2 K	Describe How to Determine UD Line Status	√	
I3 W	Determine UD Line Status		√
I4 K	Describe UD Grounding Procedures	√	
I5 W	Demonstrate UD Grounding Procedures		√
I6 K	Describe the Construction of UD lines	√	
I7 W	Construct UD Lines		√
Line K.	Communication in the Workplace		8.00% of Time
K7 K	Describe Communication with Other Disciplines and Co-workers	√	
K8 W	Communicate with Other Disciplines ad Co-workers		√
K9 K	Describe Communication with Customers	√	
K10 W	Communicate with Customers		√
	Total		100%



Suggested Schedule of Time Allotment – Level 3

LEVEL THREE		Theory	Practical
Line E.	Electrical Theory	17.50% of Time	
E5 K	Describe Metering Components (Three Phase)	√	
E6 W	Read Meters		√
E8 K	Describe Substation Operations, System Operations and System Protection	√	
E9 W	Perform System Switching		√
E10 K	Describe Voltage Regulators and Capacitors	√	
E11 W	Demonstrate the Installation, Operation and Removal of Voltage Regulators and Capacitors		√
Line F.	Equipment	9.75% of Time	
F5 K	Describe the Equipment and Procedures for Stringing Transmission Lines	√	
F6 W	Demonstrate Stringing Transmission Lines		√
Line G.	Rigging (Live Line Transmission)	16.25% of Time	
G8 K	Describe Lifting Components for Transmission	√	
G9 W	Demonstrate the Use of Lifting Components for Transmission		√
G10 K	Describe Live Line Transmission Rigging	√	
G11 W	Demonstrate Live Line Transmission Rigging		√
Line H.	Overhead Distribution	20.00% of Time	
H8 K	Describe the Installation and Operation of Electrical Apparatus	√	
H9 W	Install, Operate and Maintain Electrical Apparatus		√
H10 K	Describe the Maintenance of Distribution Lines	√	
H11 W	Maintain Distribution Lines		√
H13 K	Describe Troubleshooting of System Components (Overhead, UG, Transmission)	√	
H14 W	Troubleshoot System Components		√



Line I	Underground Distribution (UD)	13.75% of Time		
I8 K	Describe the Installation, Operation and Maintenance of Electrical Apparatus		√	
I9 W	Install, Operate and Maintain Electrical Apparatus			√
I10 K	Describe Maintenance of UD Conductors		√	
I11 W	Maintain UD Conductors			√
Line J.	Transmission	13.25% of Time		
J1K	Describe Transmission Materials		√	



LEVEL THREE		Theory	Practical
J2 K	Describe Construction of Transmission Lines	√	
J3 W	Construct Transmission Lines		√
J4 K	Describe Installation, Operation and Maintenance of Electrical Apparatus for Transmission	√	
J5 W	Install, Operate and Maintain Electrical Apparatus for Transmission.		√
J6 K	Describe Maintenance of Transmission Lines	√	
J7 W	Maintain Transmission Lines		√
Line K.	Communication in the Workplace		9.50% of Time
K11 K	Describe Communication with Apprentices	√	
K12 W	Communicate with Apprentices		√
	Total		100%



POWER LINE TECHNICIAN PROGRAM OUTLINE



BC POWER LINE TECHNICIAN APPRENTICESHIP

YEAR ONE



LINE A: SAFETY AND SAFE WORK PRACTICES

Competency: A-1 Identify Safety Regulations

Learning Objectives:

1. The learner will be able to identify and describe the applicable Occupational Health and Safety Regulations and know how to find requirements applicable in the workplace.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Identify applicable Occupational Health and Safety regulations. 	<ul style="list-style-type: none"> • Worksafe (OHS) Regulation • WHMIS (MSDS) - TDGR <ul style="list-style-type: none"> ○ Isopropynol ○ Polychlorinated biphenals (PCBs) ○ Gas and oil ○ SF6 ○ Mineral oils ○ Cable oil ○ Propane ○ Battery acid ○ Ampact shells ○ Implosive sleeves ○ Oxyacetylene ○ Nitrogen cylinders

Achievement Criteria

Given information on Federal and Provincial Occupational Health and Safety regulations, the learner must and correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information on Federal and Provincial Occupational Health and Company Specific Safety policies, the learner must correctly follow these procedures and regulations at all times. Employer assessment of performance is required for each task.



LINE A: SAFETY AND SAFE WORK PRACTICES

Competency: A-2 Identify trade specific Personal Protective Equipment

Learning objectives:

1. The learner will be able to identify and describe the purpose and use of the Personal Protective Equipment used in the Power Line Technician trade.

LEARNING TASKS	CONTENT
1. Identify and describe the use of eye protection equipment	<ul style="list-style-type: none"> • UV protective goggles
2. Identify and describe the use of hand protection equipment	<ul style="list-style-type: none"> • Class 'O' gloves • Class 1 rubber gloves • HLV rubber gloves
3. Identify and describe the use of safety footwear	<ul style="list-style-type: none"> • OHM sticker footwear • 9 inch minimum • Conductive boots (bare hand- live line transmission work)
4. Identify and describe the use of safety headwear	<ul style="list-style-type: none"> • Class 'E' hardhats • Chin straps
5. Identify and describe the use of approved clothing	<ul style="list-style-type: none"> • Fire retardant clothing • High visibility day and night clothing

Achievement Criteria

Given information on a variety of work situations and requirements for personal protective equipment, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information and regulations with respect to the use of personal protective equipment in the workplace, the learner must correctly follow relevant procedures and regulations at all times. Employer assessment of performance is required for each task.



LINE A: SAFETY AND SAFE WORK PRACTICES

Competency: A-3 Recognize and Observe Limits of Approach

Learning objectives:

1. The learner will be able to recognize potential risks and identify relevant regulations with respect to limits of approach to energized lines and equipment.
2. The learner will identify and describe specific work procedures based on limits of approach.

LEARNING TASKS	CONTENT
1. Describe 'limits of approach' and their importance	<ul style="list-style-type: none"> • Hazards and risks associated with energized lines and equipment
2. Identify factors that determine the limits of approach in different situations	<ul style="list-style-type: none"> • Weather conditions <ul style="list-style-type: none"> ○ Rain ○ Snow ○ Fog ○ Electrical storms ○ Moisture build-up ○ Ice build-up
3. Identify and describe examples of specific work procedures based on limits of approach	<ul style="list-style-type: none"> • Climbing poles • Hanging transformers • Street lights • Boom truck operations

Achievement Criteria

Given information on work situations and relevant regulations with respect to limits of approach to energized lines and equipment, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information and regulations with respect to the limits of approach to energized lines and equipment in the workplace, the learner must correctly follow relevant procedures and regulations at all times. Employer assessment of performance is required for each task.



LINE A: SAFETY AND SAFE WORK PRACTICES

Competency: A-4 Describe Lock-Out Procedures

Learning objectives:

1. The learner will be able to recognize potential risks and identify relevant lock-out procedures.
2. The learner will identify and describe workplace roles and responsibilities with respect to lock-out work procedures.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Describe the purpose and function of lock-out procedures 	<ul style="list-style-type: none"> • Risks and hazards in the workplace • Locking procedures • Tagging procedures • Progressive authorization • Live line permits • Operating diagrams (one line) • Field tags • Station tags • Mimic board and tags
<ol style="list-style-type: none"> 2. Describe the roles and responsibilities of various jobs with respect to lock-out procedures 	<ul style="list-style-type: none"> • Roles <ul style="list-style-type: none"> ○ Employer ○ Supervisor ○ Journeyperson ○ Apprentice ○ Person in charge (PIC) • Operating authority • Operating permission • Importance of area specific knowledge and experience • Station entry authorization • Guarantee of isolation • Training and authorization for apprentices

**LEARNING TASKS**

3. Describe safety protection guarantees

CONTENT

- Clearances
- Test and work
- Self-protection

Achievement Criteria

Given information on work situations and relevant regulations with respect to lock-out procedures, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information and regulations with respect to lock-out procedures in the workplace, the learner must correctly follow relevant procedures and regulations at all times. Employer assessment of performance is required for each task.



LINE A: SAFETY AND SAFE WORK PRACTICES

Competency: A-5 Demonstrate Lock-Out Procedures

Learning objectives:

1. The learner will be able to identify risks in the workplace and demonstrate appropriate lock-out procedures.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Perform various types of lock-out procedures for applicable category of authorization 	<ul style="list-style-type: none"> • Use lock-out tags • Follow lock-out procedures • Switching (de-energization-re-energization)
<ol style="list-style-type: none"> 2. Interpret operating diagrams (one line) 	<ul style="list-style-type: none"> • Schematic diagrams • Symbols • Identify regulatory operating boundaries
<ol style="list-style-type: none"> 3. Complete testing for applicable category of authorization 	<ul style="list-style-type: none"> • Progressive authorizations

Workplace Achievement Criteria

Given the risks associated with various workplace situations and information and regulations with respect to lock-out procedures in the workplace, the learner must correctly follow relevant procedures and regulations at all times. Employer assessment of performance is required for each task.



LINE A: SAFETY AND SAFE WORK PRACTICES

Competency: A-6 Describe Correct Grounding and Bonding and Equi-Potential Procedures

Learning objectives:

1. The learner will be able to recognize potential risks and identify relevant grounding and bonding procedures.

LEARNING TASKS	CONTENT
1. Describe the purpose and function of grounding and bonding	<ul style="list-style-type: none"> • Equi-potential zone • Touch potential • Step potential • Induction • Problems caused by induction
2. Identify and describe equi-potential grounding and bonding	<ul style="list-style-type: none"> • Running grounds and ground mats • Various ground clamps • Ground wire size selection • Pole bands
3. Describe grounding and bonding tools and procedures	<ul style="list-style-type: none"> • Safety grounding plan (SGP) • Use and care of ground sets • Identify grounding switches (hazards) • Hand line • Grip-all • Approved voltage testing tools



Achievement Criteria

Given information on work situations and relevant procedures with respect to grounding and bonding, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information and regulations with respect to grounding and bonding procedures in the workplace, the learner must correctly follow relevant procedures and regulations at all times. Employer assessment of performance is required for each task.



LINE A: SAFETY AND SAFE WORK PRACTICES

Competency: A-7 Demonstrate Correct Grounding and Equi-Potential Procedures

Learning objectives:

1. The learner will be able to recognize potential risks and demonstrate appropriate grounding and bonding procedures in the workplace.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Perform safety equi-potential grounding and bonding of overhead and underground lines 	<ul style="list-style-type: none"> • Limits of approach • Safety grounding plan (SGP) • Equi-potential zone • Touch potential • Step potential • Induction • Problems caused by induction • Running grounds and ground mats • Various ground clamps • Ground wire size selection • Pole bands • Use and care of ground sets • Identify grounding switches (hazards) • Hand line • Grip-all • Approved voltage testing tools

Workplace Achievement Criteria

Given the risks associated with various workplace situations and information and regulations with respect to equi-potential grounding and bonding procedures in the workplace, the learner must correctly follow relevant procedures and regulations at all times. Employer assessment of performance is required for each task.



LINE A: SAFETY AND SAFE WORK PRACTICES

Competency: A-8 Describe Rescue Procedures

Learning objectives:

1. The learner will be able to recognize potential risks and describe appropriate rescue procedures.

LEARNING TASKS	CONTENT
1. Describe a pole top rescue	<ul style="list-style-type: none"> • Hazard identification • Call for help • Rescue equipment • Pole top rescue procedures
2. Describe confined space rescue	<ul style="list-style-type: none"> • Hazard identification • Call for help • Rescue equipment • Confined space rescue procedures
3. Describe a bucket truck rescue	<ul style="list-style-type: none"> • Hazard identification • Call for help • Rescue equipment • Bucket truck rescue procedure
4. Describe tower rescue	<ul style="list-style-type: none"> • Hazard identification • Call for help • Rescue equipment • Tower rescue procedure

Achievement Criteria

Given information on workplace situations and relevant procedures with respect to rescue, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information and regulations with respect to rescue situations in the workplace, the learner must correctly follow appropriate procedures and regulations at all times. Employer assessment of performance is required for each task.



LINE A: SAFETY AND SAFE WORK PRACTICES

Competency: A-9 Perform Rescue Procedures

Learning objectives:

1. The learner will be able to recognize potential risks and perform appropriate rescue procedures.

LEARNING TASKS	CONTENT
1. Perform a pole top rescue	<ul style="list-style-type: none"> • Hazard identification • Call for help • Rescue equipment • Pole top rescue procedures
2. Perform confined space rescue	<ul style="list-style-type: none"> • Hazard identification • Call for help • Rescue equipment • Confined space rescue procedures
3. Perform a bucket truck rescue	<ul style="list-style-type: none"> • Hazard identification • Call for help • Rescue equipment • Bucket truck rescue procedure
4. Perform tower rescue	<ul style="list-style-type: none"> • Hazard identification • Call for help • Rescue equipment • Tower rescue procedure

Workplace Achievement Criteria

Given information and regulations with respect to rescue situations in the workplace, the learner must correctly follow appropriate procedures and regulations at all times. Employer assessment of performance is required for each task.



LINE B: CLIMBING

Competency: B-1 Describe the Care and Use of Climbing Equipment

Learning objectives:

1. The learner will be able to identify and describe the care and safe use of climbing equipment common to the trade.

LEARNING TASKS	CONTENT
1. Describe care and use of climbing equipment	<ul style="list-style-type: none"> • Climbers use • Climbers inspection and maintenance • Body belt • Pole strap • Second pole strap • Climbing tools and storage
2. Describe basic climbing techniques	<ul style="list-style-type: none"> • Basic climbing techniques for steel • Basic climbing techniques for wood • Safety belt climbing techniques and procedures
3. Describe the use of fall arrest when climbing wood and steel structures	<ul style="list-style-type: none"> • Fall arrest procedures for wood structures • Fall arrest equipment for wood structures • Fall arrest procedures for steel structures • Fall arrest equipment for steel structures
4. Describe safety checks required prior to climbing poles, towers and ladders.	<ul style="list-style-type: none"> • Safety check list • Structure inspection • Procedures for safety checks



Achievement Criteria

Given information on the care and safe use of climbing equipment common to the trade, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information and regulations with respect to climbing equipment common to the trade, the learner must demonstrate procedures for the care and safe use of such equipment at all times. Employer assessment of performance is required for each task.



LINE B: CLIMBING

Competency: B-2 Demonstrate Climbing Wood Structures

Learning objectives:

1. The learner will be able to safely use climbing equipment common to the trade to climb wood structures in the workplace.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Demonstrate basic climbing techniques using safety belts. 	<ul style="list-style-type: none"> • Inspect equipment • Inspect structure • Full fall arrest
<ol style="list-style-type: none"> 2. Perform safety checks prior to climbing wood structures 	<ul style="list-style-type: none"> • Safety checklist • Hazards with climbing wood

Workplace Achievement Criteria

Given information and regulations with respect to climbing equipment common to the trade, the learner must demonstrate procedures for climbing wooden structures in the workplace. Employer assessment of performance is required for each task.



LINE B: CLIMBING

Competency: B-3 Demonstrate Safe Climbing Techniques for Steel Structures

Learning objectives:

1. The learner will be able to safely use climbing equipment common to the trade to climb steel structures in the workplace.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Demonstrate basic safe climbing techniques on steel structures. 	<ul style="list-style-type: none"> • Inspect equipment • Inspect structure • Full fall arrest
<ol style="list-style-type: none"> 2. Demonstrate safety checks prior to climbing steel structures 	<ul style="list-style-type: none"> • Safety checklist • Hazards with climbing steel

Workplace Achievement Criteria

Given information and regulations with respect to climbing equipment common to the trade, the learner must demonstrate procedures for climbing steel structures in the workplace. Employer assessment of performance is required for each task.



LINE B: CLIMBING

Competency: B-4 Describe Working on Elevated Platforms

Learning objectives:

1. The learner will be able to describe safe procedures appropriate for working on an elevated platform.

LEARNING TASKS	CONTENT
1. Describe the installation and use of a baker board.	<ul style="list-style-type: none"> • Equipment (baker board, hardware) • Installation steps • Procedures used to transfer to and from poles and baker boards safely • Hazards with Baker boards
2. Describe the safe procedures for transferring from a tower to a suspended ladder.	<ul style="list-style-type: none"> • Procedures to safely transfer to and from a tower to a suspended ladder. • Fall arrest equipment required • Hazards with procedure
3. Describe the different types and uses of various ladders.	<ul style="list-style-type: none"> • Ladder types • Safe use of ladders • Hazards with ladders

Achievement Criteria

Given information on safe procedures for working on elevated platforms common to the trade, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information and regulations with respect to elevated platforms, the learner must identify and describe safe procedures for working on elevated platforms in the workplace. Employer assessment of performance is required for each task.



LINE B: CLIMBING

Competency: B-5 Demonstrate Working on Elevated Platforms

Learning objectives:

1. The learner will be able to demonstrate safe procedures for working on an elevated platform.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Demonstrate the installation and use of a baker board. 	<ul style="list-style-type: none"> • Installation steps • Procedures used to transfer to and from poles and baker boards safely • Hazards with Baker boards
<ol style="list-style-type: none"> 2. Demonstrate transferring from pole to baker board. 	<ul style="list-style-type: none"> • Procedures to safely transfer to and from a tower to a suspended ladder. • Fall arrest equipment required • Hazards with procedure
<ol style="list-style-type: none"> 3. Demonstrate the safe use of a ladder 	<ul style="list-style-type: none"> • Ladder types • Safe use of ladders • Hazards with ladders

Workplace Achievement Criteria

Given information and regulations with respect to elevated platforms, the learner must demonstrated safe procedures when working on elevated platforms in the workplace. Employer assessment of performance is required for each task.



LINE B: CLIMBING

Competency: B-6 Describe Testing for Pole (Structure) Stability

Learning objectives:

1. The learner will be able to describe safe procedures for testing the structural stability of poles.

LEARNING TASKS	CONTENT
1. Identify causes of pole failure	<ul style="list-style-type: none"> • Cracking, breakage, rot etc • MVA, storm damage, etc
2. Describe the inspection of poles for stability	<ul style="list-style-type: none"> • Test for pole soundness • Guy and anchor checks
3. Describe methods used to prepare temporary anchors.	<ul style="list-style-type: none"> • Temporary anchors • Preparing temporary anchors
4. Explain the ways used to support poles	<ul style="list-style-type: none"> • Pole support techniques
5. Describe the methods used to straighten poles	<ul style="list-style-type: none"> • Pole straightening techniques

Achievement Criteria

Given information on safe procedures for testing the structural stability of poles, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information and regulations with respect to testing the structural stability of poles, the learner must identify and describe safe work procedures in the workplace. Employer assessment of performance is required for each task.



LINE B: CLIMBING

Competency: B-7 Stabilize and Straighten Poles

Learning objectives:

1. The learner will be able to demonstrate safe procedures for testing the structural stability of poles.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Inspect poles for stability 2. Perform tests for pole soundness 	<ul style="list-style-type: none"> • Visual inspection • Hammer test • Prod test • Sway test • Drill test
<ol style="list-style-type: none"> 3. Stabilize – straighten poles 	<ul style="list-style-type: none"> • Use of gads • Use of rope • Pike poles • Line truck • Temporary screw anchor

Workplace Achievement Criteria

Given information and regulations with respect to testing the structural stability of poles, the learner must demonstrate safe work procedures in the workplace. Employer assessment of performance is required for each task.



LINE C: POLICY AND REGULATIONS

Competency: C-1 Identify Environmental Hazards and Regulations

Learning objectives:

1. The learner will be able to identify environmental hazards and regulations common to the trade.

LEARNING TASKS	CONTENT
1. Identify environmental hazards	<ul style="list-style-type: none"> • Hazard types • Precautions required <ul style="list-style-type: none"> ○ brush burning ○ chemical spraying ○ transferring hazardous materials ○ personal protective equipment • Chemical spill response
2. Identify environmental regulations and guidelines	<ul style="list-style-type: none"> • WHMIS • Fisheries Act
3. Identify environmental precautions to be taken when on line patrol (ground or air)	<ul style="list-style-type: none"> • Barricades and containment • Absorbents

Achievement Criteria

Given information on workplace situations involving environmental hazards and regulations, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information and regulations with respect to environmental hazards and regulations, the learner must identify and describe safe work procedures in the workplace. Employer assessment of performance is required for each task.



LINE C: POLICY AND REGULATIONS

Competency: C-2 Identify Industry Regulations

Learning objectives:

1. The learner will be able to identify industry regulations common to the trade.

LEARNING TASKS	CONTENT
1. Identify licensing/certification requirements	<ul style="list-style-type: none"> • Driver licensing (Class) and endorsements • Other types of certifications required of PLTs
2. Describe defensive driving habits (Hazard Avoidance Training, HAT)	<ul style="list-style-type: none"> • BC Professional Drivers' Manual
3. Identify traffic hazards (need for traffic control)	<ul style="list-style-type: none"> • BC traffic control manual
4. Describe the components of pre-trip inspections	<ul style="list-style-type: none"> • Requirements and exemptions
5. Worksafe (OHS) regulations	<ul style="list-style-type: none"> • Where to find OHS regulations that apply
6. Describe utility standards and/or Canadian Electrical Code	<ul style="list-style-type: none"> • CEC

Achievement Criteria

Given information on workplace situations and related industry regulations, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information on workplace situations, the learner must identify and describe the regulations that apply in the workplace. Employer assessment of performance is required for each task.



LINE D: TOOLS AND INSTRUMENTS

Competency: D-1 Describe the Use and Care of Hand Tools

Learning Objectives:

1. The learner will be able to describe the use and care of hand tools.

LEARNING TASKS	CONTENT
1. Describe good housekeeping as it relates to the care of hand tools	<ul style="list-style-type: none"> • Care of hand tools • Storage • Cleaning
2. Describe the use and care of basic hand tools	<ul style="list-style-type: none"> • Pliers • Wrenches • Knives • Hammers
3. Describe the use and care of compression tools	<ul style="list-style-type: none"> • Presses • Bolt / wire cutters
4. Describe the use and care of other hand tools	<ul style="list-style-type: none"> • Shovels • Digging bars • Spoons • Tampers • Axes • Peevies / Kant hooks
5. Describe the use and care of special tools used in Underground Distribution	<ul style="list-style-type: none"> • Semi-con stripper • Insulation remover • Propane torch

Achievement Criteria

Given information on the use and care of hand tools, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information on workplace situations, the learner must identify and describe the use and care of hand tools in the workplace. Employer assessment of performance is required for each task.



LINE D: TOOLS AND INSTRUMENTS

Competency: D-2 Demonstrate the Use and Care of Hand Tools

Learning Objectives:

1. The learner will be able to demonstrate the use and care of hand tools in the workplace.

LEARNING TASKS	CONTENT
1. Demonstrate the use and care of basic hand tools	<ul style="list-style-type: none"> • Pliers • Wrenches • Knives • Hammers
2. Demonstrate the use and care of compression tools	<ul style="list-style-type: none"> • Presses • Bolt / wire cutters
3. Demonstrate the use and care of other hand tools	<ul style="list-style-type: none"> • Shovels • Digging bars • Spoons • Tampers • Axes • Peevies / Kant hooks
4. Demonstrate the use and care of special tools used in Underground Distribution	<ul style="list-style-type: none"> • Semi-con stripper • Insulation remover • Propane torch

Workplace Achievement Criteria

Given tasks and situations at work, the learner must demonstrate the use and care of hand tools in the workplace. Employer assessment of performance is required for each task.



LINE D: TOOLS AND INSTRUMENTS

Competency: D-3 Describe the Use and Care of Power Tools

Learning Objectives:

1. The learner will be able to describe the use and care of power tools.

LEARNING TASKS	CONTENT
1. Describe the use and care of electric power tools	<ul style="list-style-type: none"> • Drills • Chain saws • Cable saws
2. Describe the use and care of hydraulic power tools	<ul style="list-style-type: none"> • Drill • Tamper • Cutter • Press • Jacks
3. Describe the use and care of gas power tools	<ul style="list-style-type: none"> • Drill • Chain saw
4. Describe the use and care of air operated power tools	<ul style="list-style-type: none"> • Drills • Wrenches • Impact guns
5. Describe the use, care and operation of explosive actuated tools	<ul style="list-style-type: none"> • Powder actuated tools



Achievement Criteria

Given information on the use and care of power tools, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information on workplace situations, the learner must identify and describe the use and care of power tools in the workplace. Employer assessment of performance is required for each task.



LINE D: TOOLS AND INSTRUMENTS

Competency: D-4 Demonstrate the Use and Care of Power Tools

Learning Objectives:

1. The learner will be able to demonstrate the use and care of power tools in the workplace.

LEARNING TASKS	CONTENT
1. Demonstrate the use and care of electric power tools	<ul style="list-style-type: none"> • Drills • Chain saws • Cable saws
2. Demonstrate the use and care of hydraulic power tools	<ul style="list-style-type: none"> • Drill • Tamper • Cutter • Press • Jacks
3. Demonstrate the use and care of gas power tools	<ul style="list-style-type: none"> • Drill • Chain saw
4. Demonstrate the use and care of air operated power tools	<ul style="list-style-type: none"> • Drills • Wrenches • Impact guns
5. Demonstrate the use, care and operation of explosive actuated tools	<ul style="list-style-type: none"> • Powder actuated tools

Workplace Achievement Criteria

Given tasks and situations at work, the learner must demonstrate the use and care of power tools in the workplace. Employer assessment of performance is required for each task.

**LINE D: TOOLS AND INSTRUMENTS****Competency: D-5 Describe the Use and Care of Test Instruments****Learning Objectives:**

1. The learner will be able to describe the use and care of test instruments.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none">1. Describe the use of various test instruments	<ul style="list-style-type: none">• Multi-purpose meter• Volt meter• Ammeter• Maximeter• Ohm-meter• Megger test set• Phase sequence indicators• Line detectors• Recording voltmeter• Recorder ammeter• Fault locators• Cable locators• Diode• Transformer tester

Achievement Criteria

Given information on the use and care of test instruments, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information on workplace situations, the learner must identify and describe the use and care of test instruments in the workplace. Employer assessment of performance is required for each task.



LINE D: TOOLS AND INSTRUMENTS

Competency: D-6 Demonstrate the Use and Care of Test Instruments

Learning Objectives:

1. The learner will be able to demonstrate the use and care of test instruments in the workplace.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Demonstrate the use and care of test instruments 	<ul style="list-style-type: none"> • Multi-purpose meter • Volt meter • Ammeter • Maximeter • Ohm-meter • Megger test set • Phase sequence indicators • Line detectors • Phasing sticks • Recording voltmeter • Recorder ammeter • Fault locators • Cable locators • Diodes • Transformer tester

Workplace Achievement Criteria

Given tasks and situations at work, the learner must demonstrate the use and care of test instruments in the workplace. Employer assessment of performance is required for each task.



LINE D: TOOLS AND INSTRUMENTS

Competency: D-7 Describe the Use and Care of Live Line Tools

Learning Objectives:

1. The learner will be able to describe the use and care of live line tools.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Describe live line tools and their special characteristics 	<ul style="list-style-type: none"> • Grip-all sticks (shot-gun) • Hand held sticks <ul style="list-style-type: none"> ○ Work sticks ○ Switch sticks • Strain sticks • Wire tong sticks • Insulator cradle sticks • Tool ends and fittings • Insulated platforms • Jibs for line / boom trucks • Single and three phase lift attachments • Wire grips (various types) • Load break tools • Cover-up equipment <ul style="list-style-type: none"> ○ Line guards ○ Arm guards ○ Pole guards • Types of ropes for live line work
<ol style="list-style-type: none"> 2. Describe the care and handling (transporting) of live line tools 	<ul style="list-style-type: none"> • Cleaning procedures • Waxing procedures • Insulated booms
<ol style="list-style-type: none"> 3. Describe procedures for field checks of live line tools 	<ul style="list-style-type: none"> • Inspections • Stickers



Achievement Criteria

Given information on the use and care of live line tools, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information on workplace situations, the learner must identify and describe the use and care of live line tools in the workplace. Employer assessment of performance is required for each task.



LINE E: ELECTRICAL THEORY

Competency: E-1 Describe Electrical Fundamentals

Learning Objectives:

1. The learner will be able to describe the fundamentals of electrical theory and principles.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Describe and illustrate basic principles of electricity 	<ul style="list-style-type: none"> • Electron theory • Electromagnetic theory • Alternating current fundamentals for single phase • Direct current fundamentals • Ohm's law • Watt's law • Kirchoff's law • Circuits <ul style="list-style-type: none"> ○ Series ○ Parallel ○ Combination

Achievement Criteria

Given information on the basics of electrical theory and principles, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe the relevant electrical theory and principles. Employer assessment of performance is required for each task.



LINE E: ELECTRICAL THEORY

Competency: E-2 Describe the Operation of Motors and Generators

Learning Objectives:

1. The learner will be able to describe the operation of single phase motors and generators.

LEARNING TASKS	CONTENT
1. Describe the principles of operation of single phase direct current motors	<ul style="list-style-type: none"> • Single phase DC motors • Typical usage of DC motors
2. Describe the principles of operation of single phase alternating current motors	<ul style="list-style-type: none"> • Single phase AC motors • Typical usage of AC motors
3. Describe the principles of operation of single phase direct current generators	<ul style="list-style-type: none"> • Single phase DC generators • Typical usage of DC generators
4. Describe the principles of operation of single phase alternating current generators	<ul style="list-style-type: none"> • Single phase AC generators • Typical usage of AC generators

Achievement Criteria

Given information on the operation of single phase electric motors and generators, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe the principles of operation of electric single phase motors and generators. Employer assessment of performance is required for each task.



LINE E: ELECTRICAL THEORY

Competency: E-3 Describe Transformation and Transformers

Learning Objectives:

1. The learner will be able to describe single phase transformation and transformers.

LEARNING TASKS	CONTENT
1. Describe the principles of operation of single phase transformers	<ul style="list-style-type: none"> • Principles of operation of single phase transformers • Single phase transformer types • Series and parallel
2. Describe single phase transformer components and construction	<ul style="list-style-type: none"> • Components of single phase transformers • Tap changers
3. Perform single phase transformer calculations	<ul style="list-style-type: none"> • Single phase transformer ratios <ul style="list-style-type: none"> ○ Polarity ○ Average ratios ○ Voltage ratios ○ Power factor
4. Describe back-feed	<ul style="list-style-type: none"> • Circuits that create back-feed • Hazards and safety procedures related to back-feed
5. Describe paralleling procedures	<ul style="list-style-type: none"> • Paralleling procedures • Matching impedances
6. Describe open neutrals in single phase transformer secondaries	<ul style="list-style-type: none"> • Open neutrals • Single phase transformer secondaries



Achievement Criteria

Given information on single phase transformation and transformers, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe the principles of single phase transformation and transformers. Employer assessment of performance is required for each task.

**LINE E: ELECTRICAL THEORY****Competency: E-4 Install Transformers****Learning Objectives:**

1. The learner will be able to install single phase transformers.

LEARNING TASKS

1. Install single phase transformers

CONTENT

- Hazards and safety procedures
- Applicable codes and standards
- Transformer connections
 - Wye system
 - Delta system
- Voltage check
- Load checks
- Paralleling two single phase transformers
- Sketch circuits
 - Series
 - Parallel

Workplace Achievement Criteria

Given workplace situations, the learner must safely install single phase transformers. Employer assessment of performance is required for each task.

**LINE E: ELECTRICAL THEORY****Competency: E-5 Describe Metering Components****Learning Objectives:**

1. The learner will be able to identify and describe single phase metering transformer components.

LEARNING TASKS

1. Identify and describe components of single phase, primary and secondary metering transformers

CONTENT

- Metering transformer construction
- Current transformer hazards
- Potential transformer polarity
- Meter operation
- Types of meters
 - Self contained
 - Transformer
- Meter socket safety checks
- Basic code/standard requirements
- Use low voltage rubber glove techniques, eye protection

Achievement Criteria

Given information on single phase metering transformer components, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe the components of single phase metering transformers. Employer assessment of performance is required for each task.

**LINE E: ELECTRICAL THEORY****Competency: E-6 Read Meters****Learning Objectives:**

1. The learner will be able to accurately read single phase meters.

LEARNING TASKS

1. Record accurate readings from single phase meters

CONTENT

- Various types
 - Single Phase
- Meter socket safety checks

Workplace Achievement Criteria

Given workplace situations, the learner must accurately read single phase meters. Employer assessment of performance is required for each task.

**LINE F: EQUIPMENT****Competency: F-1 Identify Types of Mobile Line Equipment****Learning Objectives:**

1. The learner will be able to identify and describe various types of mobile equipment used in the trade.
2. The learner will be able to describe the safe operation of various types of mobile equipment used in the trade.

LEARNING TASKS

1. Identify and describe various types of mobile line equipment

CONTENT

- Vehicles
 - Road
 - Rail
 - All terrain
 - Track machines
- Trailers
- Aerial manlift equipment
- Boom truck equipment
 - Truck cranes
 - Pole derricks
- Digging and trenching equipment
 - Augers
 - Backhoes
 - Excavators
 - Trenchers
- Boats
- Helicopters
- Basics of hydraulic systems and components

**LEARNING TASKS**

2. Describe the safe operation of various mobile line equipment

CONTENT

- Operating principles for hydraulic equipment
 - Hiabs
 - Truck cranes
 - Aerial manlifts
 - Winches
 - Augers
 - Pole jacks
 - Tampers
 - Ground rod pounders
- Pre-job checks
- On-the-job checks
- Emergency operation of hydraulic booms and outriggers

Achievement Criteria

Given information on various types of mobile equipment used in the trade, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify various types of mobile equipment and describe the procedures for their safe operation in the workplace. Employer assessment of performance is required for each task.



LINE F: EQUIPMENT

Competency: F-2 Demonstrate Use and Care of Hydraulically Equipped Vehicles

Learning Objectives:

1. The learner will be able to demonstrate the safe use and care of hydraulically equipped vehicles.

LEARNING TASKS

1. Operate hydraulically equipped vehicles

CONTENT

- Hazards and safety procedures
- Emergency operations
- Routine operations
- Perform pre job checks
- Perform on job checks

Workplace Achievement Criteria

Given workplace situations, the learner must demonstrate the safe use and care of hydraulically equipped vehicles in the workplace.

Employer assessment of performance is required for each task.



LINE G: RIGGING

Competency: G-2 Describe the Use and Care of Lifting Tools and Equipment

Learning Objectives:

1. The learner will be able to describe the safe use and care of lifting tools and equipment.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Identify and describe various types of lifting tools and equipment 	<ul style="list-style-type: none"> • Wire rope <ul style="list-style-type: none"> ○ Characteristics ○ Construction ○ Types • Braided fibre rope <ul style="list-style-type: none"> ○ Characteristics ○ Construction ○ Types • Stranded fibre rope <ul style="list-style-type: none"> ○ Characteristics ○ Construction ○ Types • Chains <ul style="list-style-type: none"> ○ Characteristics ○ Construction ○ Types • Chain hoists • Rope blocks <ul style="list-style-type: none"> ○ Components ○ Types and sizes ○ WLL • Regular blocks <ul style="list-style-type: none"> ○ Hand line blocks ○ Stationary blocks ○ Travelling blocks



LEARNING TASKS

CONTENT

- Snatch blocks
 - Drop link
 - Self locking
 - Wood shell
 - Steel shell
 - All purpose
 - Types and sizes of gins
 - Transformer gins
 - Cargo gins
 - Crossarm gins
 - Approved hardware
 - Drop forged shackles
 - Hooks
 - WLL and size stamps

- 2. Describe the safe use of various types of lifting tools and equipment
 - Wire rope
 - Uses
 - Inspection
 - Storage
 - Care and maintenance
 - Braided fibre rope
 - Uses
 - Inspection
 - Storage
 - Care and maintenance
 - Stranded fibre rope
 - Uses
 - Inspection
 - Storage
 - Care and maintenance
 - Chains
 - Uses
 - Inspection
 - Storage



LEARNING TASKS

CONTENT

- | | |
|--|--|
| <ul style="list-style-type: none"> 3. Identify and describe reference and information sources for rigging | <ul style="list-style-type: none"> • Chain hoists <ul style="list-style-type: none"> ○ Uses ○ Care and maintenance • Rope blocks <ul style="list-style-type: none"> ○ Reeving ○ Lacing ○ Mechanical advantage ○ Boom • Work load limits (WLL) • Load weights • Calculating load limits • Ultimate tensile strength (UTS) • Rated loads <ul style="list-style-type: none"> ○ Chainjack ○ Sling • Shock loading • Knots, bends and hitches • Slinging methods • Load binders <ul style="list-style-type: none"> ○ Uses ○ Care and maintenance • Matching sheave to rope size • Riggers handbooks / manuals • Rigging for the line trade • Manufacturers' specifications • Engineering specifications |
|--|--|



Achievement Criteria

Given information on various types of lifting tools and equipment used in the trade, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify various types of lifting tools and equipment and describe the procedures for their safe operation in the workplace. Employer assessment of performance is required for each task.



LINE G: RIGGING

Competency: G-3 Use Lifting Tools and Equipment

Learning Objectives:

1. The learner will be able to demonstrate the safe use and care of lifting tools and equipment.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Demonstrate safe use of various types of lifting tools and equipment 	<ul style="list-style-type: none"> • Wire rope • Braided fibre rope • Stranded fibre rope • Chains • Chain hoists • Rope blocks • Regular blocks • Snatch blocks • Gins

Workplace Achievement Criteria

Given workplace situations, the learner must demonstrate the safe use of various types of lifting tools and equipment in the workplace.

Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-1 Describe Overhead Distribution Materials

Learning Objectives:

1. The learner will be able to describe materials used in overhead distribution systems.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Identify and describe materials used in overhead distribution 	<ul style="list-style-type: none"> • Poles <ul style="list-style-type: none"> ○ Height ○ Class ○ Type • X-arms and timbers • Bolts (various types and sizes) • Hardware to support conductors <ul style="list-style-type: none"> ○ Sky pin ○ Arm pin ○ Clevis • Insulators • Hardware to support electrical apparatus • Street light materials • Guying materials • Anchoring materials • Conductors / cables (various types and sizes) • Dead-ending conductor materials • Tying-in / clipping materials • Connectors (various types)

Achievement Criteria

Given information on materials used in overhead distribution systems, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify various materials used in overhead distribution systems in the workplace.

Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-2 Describe How to Determine Overhead Line Status

Learning Objectives:

1. The learner will be able to describe methods of determining the status of overhead lines.

LEARNING TASKS

1. Identify and describe the status of overhead lines

CONTENT

- Under construction or in service
- Energized or de-energized
- Distribution or transmission
- Line voltage
- Line source and destination
- Line / circuit number
- Conductor type and size
- Wye or delta phase configuration
- Basic structural type
- Pole mounted apparatus
- Use of one line diagrams

Achievement Criteria

Given information on determining the status of overhead distribution lines, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify methods of determining the status of overhead distribution lines in the workplace.

Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-3 Determine Line Status

Learning Objectives:

1. The learner will be able to determine the status of overhead lines, including the use of one line diagrams.

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Demonstrate procedures for identifying line status | <ul style="list-style-type: none"> • Under construction or in service • Energized or de-energized • Distribution or transmission • Line voltage • Line source and destination • Line / circuit number • Conductor type and size • Wye or delta phase configuration • Basic structural type • Pole mounted apparatus |
| <ol style="list-style-type: none"> 2. Demonstrate use of one line diagrams | <ul style="list-style-type: none"> • One line diagrams |

Workplace Achievement Criteria

Given workplace situations, the learner must accurately determine the status of overhead distribution lines and the use of one line diagrams in the workplace. Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-4 Describe Construction of Distribution Lines

Learning Objectives:

1. The learner will be able to describe methods of construction for overhead distribution lines.

LEARNING TASKS

1. Describe basic steps and elementary processes for construction of overhead distribution lines

CONTENT

- Pole selection (class)
- Job planning (work orders)
- Public safety awareness
- Delivery of poles and materials
- Digging pole holes
 - Proper depth
 - By hand
 - By machine
- Pole framing for different structure types
- Installation of pole hardware
- Setting poles with line trucks
- Installation of various types of anchors
- Installation of guy wires
- Guy wire tension
- Stringing and splicing conductors
 - Primary
 - Secondary
 - Single phase
- Installation of secondary services
 - Secondary
 - Spun
 - Open
- Tying-in and clipping conductors
- Installation and connecting system grounds



Achievement Criteria

Given information on methods for construction of overhead distribution lines, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must describe methods for construction of overhead distribution lines in the workplace.

Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-5 Construct Distribution Lines

Learning Objectives:

1. The learner will be able to demonstrate methods of construction for overhead distribution lines.

LEARNING TASKS

1. Demonstrate basic steps and elementary processes for construction of overhead distribution lines

CONTENT

- Pole selection (class)
- Job planning (work orders)
- Public safety awareness
- Delivery of poles and materials
- Digging pole holes
 - Proper depth
 - By hand
 - By machine
- Pole framing for different structure types
- Installation of pole hardware
- Setting poles with line trucks
- Installation of various types of anchors
- Installation of guy wires
- Guy wire tension
- Stringing and splicing conductors
 - Primary
 - Secondary
 - Single phase
- Installation of secondary services
 - Secondary
 - Spun
 - Open
- Tying-in and clipping conductors
- Installation and connecting system grounds



Workplace Achievement Criteria

Given workplace situations, the learner must demonstrate methods for construction of overhead distribution lines in the workplace.

Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-6 Describe Procedures for Live Line Work

Learning Objectives:

1. The learner will be able to describe safe maintenance procedures for live lines.

LEARNING TASKS

1. Describe safe maintenance procedures for live lines

CONTENT

- Hazards and safe procedures
- Various types of structures
- Maintenance procedures

Achievement Criteria

Given information on procedures for safe maintenance procedures for live lines, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must describe procedures for safe maintenance of live lines in the workplace.

Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-7 Demonstrate Use of Live Line Tools

Learning Objectives:

1. The learner will be able to demonstrate the safe use of tools for live line maintenance.

LEARNING TASKS

1. Demonstrate the safe use of live line tools for live line maintenance

CONTENT

- Grip-all sticks (shot-gun)
- Hand held sticks
 - Work sticks
 - Switch sticks
- Strain sticks
- Wire tong sticks
- Insulator cradle sticks
- Tool ends and fittings
- Insulated platforms
- Jibs for line / boom trucks
- Single and three phase lift attachments
- Wire grips (various types)
- Load break tools
- Cover-up equipment
 - Line guards
 - Arm guards
 - Pole guards
- Ropes for live line work

Workplace Achievement Criteria

Given workplace situations, the learner must demonstrate procedures for the safe use of tools in live line maintenance in the workplace.

Employer assessment of performance is required for each task.

**LINE I: UNDERGROUND DISTRIBUTION (UD)****Competency: I-1 Describe Underground Distribution (UD) Materials****Learning Objectives:**

1. The learner will be able to identify and describe materials used in underground distribution systems.

LEARNING TASKS

1. Identify and describe materials used in overhead distribution

CONTENT

- Hardware
 - Nuts and bolts
- Conductors
 - Sizes and types
 - Primary and secondary
- Connectors and covers
 - Primary and secondary
- Cable termination methods
 - Primary and secondary
- Tapes
- Approved solvents, cleaners and lubricants
- Parking cables and by-pass apparatus
 - Feed through module
 - Hop caps
- Secondary boxes
- Manholes
- Junction boxes
- Kiosks
- Switches



Achievement Criteria

Given information on materials used in underground distribution systems, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe materials used in underground distribution systems in the workplace.

Employer assessment of performance is required for each task.



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-2 Describe How to Determine UD Line Status

Learning Objectives:

1. The learner will be able to describe methods for determining the status of underground distribution lines.

LEARNING TASKS

1. Identify and describe methods to determine the status of underground lines

CONTENT

- Under construction or in service
- Energized or de-energized
- Distribution or transmission
- Single or three phase
- Line voltage
- Line source and destination
- Line / circuit number
- Cable tags
- Phasing marks and colours
- Cable types
 - Concentric neutral
 - Tape shielded
 - Plastic sheathed
 - Lead sheathed
- Direct buried or in duct
- Cable protection
 - On poles
 - Under roads
- Identify cable on one line diagrams

Achievement Criteria

Given information on determining the status of underground distribution lines, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify methods of determining the status of underground distribution lines in the workplace.

Employer assessment of performance is required for each task.



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-3 Determine UD Line Status

Learning Objectives:

1. The learner will be able to determine the status of underground distribution lines, including the use of one line diagrams.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Demonstrate procedures for determining the status of underground lines 	<ul style="list-style-type: none"> • Under construction or in service • Energized or de-energized • Distribution or transmission • Single or three phase • Line voltage • Line source and destination • Line / circuit number • Cable tags • Phasing marks and colours • Cable types <ul style="list-style-type: none"> ○ Concentric neutral ○ Tape shielded ○ Plastic sheathed ○ Lead sheathed • Direct buried or in duct • Cable protection <ul style="list-style-type: none"> ○ On poles ○ Under roads
<ol style="list-style-type: none"> 2. Demonstrate use of one line diagrams 	<ul style="list-style-type: none"> • One line diagrams

Workplace Achievement Criteria

Given workplace situations, the learner must determine the status of underground distribution lines in the workplace, including the use of one line diagrams. Employer assessment of performance is required for each task.



LINE K: COMMUNICATION IN THE WORKPLACE

Competency: K-1 Describe the Purpose of Tailboard Meetings

Learning Objectives:

1. The learner will be able to identify and describe the purposes of tailboard meetings.

LEARNING TASKS

1. Identify and describe the purpose and function of tailboard meeting

CONTENT

- Crew duties
- Crew qualifications and experience
- Sequence and schedule of work
- Hazards and safety procedures
- Other trades required for the job

Achievement Criteria

Given information on the purposes of tailboard meetings, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify the purpose and necessity of tailboard meetings in the workplace.

Employer assessment of performance is required for each task.



LINE K: COMMUNICATION IN THE WORKPLACE

Competency: K-2 Participate in Tailboard Meetings

Learning Objectives:

1. The learner will be able to effectively participate in tailboard meetings.

LEARNING TASKS

1. Participate effectively in tailboard meetings

CONTENT

- Assess and communicate potential hazards
- Monitor progress of job
- Clear task assignments

Workplace Achievement Criteria

Given workplace situations, the learner must participate in and effectively contribute to tailboard meetings in the workplace.

Employer assessment of performance is required for each task.



LINE K: COMMUNICATION IN THE WORKPLACE

Competency: K-3 Describe the Use of Hand Signals

Learning Objectives:

1. The learner will be able to identify and describe the use of hand signals.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Identify and describe the use of hand signals in the workplace | <ul style="list-style-type: none"> • Types and meanings of various hand signals • Riggers handbook |
|---|--|

Achievement Criteria

Given information on the use of hand signals, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe the use of hand signals in the workplace.

Employer assessment of performance is required for each task.



LINE K: COMMUNICATION IN THE WORKPLACE

Competency: K-4 Communicate Using Hand Signals

Learning Objectives:

1. The learner will be able to communicate using hand signals.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Demonstrate the use of hand signals in the workplace | <ul style="list-style-type: none"> • Various hand signals • Riggers handbook |
|---|--|

Workplace Achievement Criteria

Given workplace situations, the learner must effectively communicate using hand signals in the workplace.

Employer assessment of performance is required for each task.



LINE K: COMMUNICATION IN THE WORKPLACE

Competency: K-5 Describe Tools and Systems for Electronic Communications

Learning Objectives:

1. The learner will be able to describe the effective use of electronic tools and systems for communication.

LEARNING TASKS

1. Identify and describe the use of electronic communication systems in the workplace

CONTENT

- Cellular telephones
- Two-way radios
- Email
- Computers
- Text messaging
- Communications protocols
- Reporting policies

Achievement Criteria

Given information on the use of electronic tools and systems for communication, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must describe the effective use of electronic tools and systems for communication in the workplace.

Employer assessment of performance is required for each task.



LINE K: COMMUNICATION IN THE WORKPLACE

Competency: K-6 Communicate Using Electronic Tools and Systems

Learning Objectives:

1. The learner will be able to communicate effectively using electronic tools and systems.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Demonstrate the use of various forms of electronic communication systems in the workplace 	<ul style="list-style-type: none"> • Cellular telephones • Two-way radios • Email • Computers • Text messaging • Communications protocols • Reporting policies

Workplace Achievement Criteria

Given workplace situations, the learner must effectively communicate using electronic tools and systems in the workplace.

Employer assessment of performance is required for each task.



BC POWER LINE TECHNICIAN APPRENTICESHIP

YEAR TWO



LINE D: TOOLS AND INSTRUMENTS

Competency: D-5 Describe the Use and Care of Test Instruments

Learning Objectives:

2. The learner will be able to describe the use and care of advanced test instruments.

LEARNING TASKS

2. Describe the use of various advanced test instruments

CONTENT

- Phasing sticks
- Cable phasing meters
- DC hi-pot adapters
- Bare hand voltage leakage tester
- Rubber glove voltage leakage tester
- Particle discharge detector
- Gas detectors
- Safety ground tester (resistivity)

Achievement Criteria

Given information on the use and care of advanced test instruments, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information on workplace situations, the learner must identify and describe the use and care of advanced test instruments in the workplace.

Employer assessment of performance is required for each task.



LINE D: TOOLS AND INSTRUMENTS

Competency: D-6 Demonstrate the Use and Care of Test Instruments

Learning Objectives:

2. The learner will be able to demonstrate the use and care of advanced test instruments in the workplace.

LEARNING TASKS

2. Demonstrate the use and care of advanced test instruments

CONTENT

- Phasing sticks
- Cable phasing meters
- DC hi-pot adapters
- Bare hand voltage leakage tester
- Rubber glove voltage leakage tester
- Particle discharge detector
- Gas detectors
- Safety ground tester (resistivity)

Workplace Achievement Criteria

Given tasks and situations at work, the learner must demonstrate the use and care of advanced test instruments in the workplace.

Employer assessment of performance is required for each task.



LINE E: ELECTRICAL THEORY

Competency: E-1 Describe Electrical Fundamentals

Learning Objectives:

2. The learner will be able to describe the advanced principles of electrical theory.

LEARNING TASKS	CONTENT
<p>2. Describe and illustrate advanced principles of electricity</p>	<ul style="list-style-type: none"> • Alternating current fundamentals for three phase • Characteristics of Wye connected systems • Characteristics of Delta connected systems • Interconnections between systems • Circuitry within the systems

Achievement Criteria

Given information on the advanced principles of electrical theory, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information on workplace situations, the learner must identify and describe the advanced principles of electrical theory.

Employer assessment of performance is required for each task.



LINE E: ELECTRICAL THEORY

Competency: E-2 Describe the Operation of Motors and Generators

Learning Objectives:

2. The learner will be able to describe the operation of three phase motors and generators.

LEARNING TASKS	CONTENT
5. Describe the principles of operation of three phase direct current motors	<ul style="list-style-type: none"> • Three phase DC motors
6. Describe the principles of operation of three phase alternating current motors	<ul style="list-style-type: none"> • Three phase AC motors
7. Describe the principles of operation of three phase direct current generators	<ul style="list-style-type: none"> • Three phase DC generators
8. Describe the principles of operation of three phase alternating current generators	<ul style="list-style-type: none"> • Three phase AC generators

Achievement Criteria

Given information on the operation of three phase motors and generators, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given information on workplace situations, the learner must identify and describe the operation of three phase motors and generators in the workplace. Employer assessment of performance is required for each task.



LINE E: ELECTRICAL THEORY

Competency: E-3 Describe Transformation and Transformers

Learning Objectives:

2. The learner will be able to describe three phase transformation and transformers.

LEARNING TASKS	CONTENT
7. Describe the principles and characteristics of three phase transformers	<ul style="list-style-type: none"> • Wye transformation systems • Delta transformation systems • Ferroresonance • Calculating load checks
8. Describe three phase transformer connections	<ul style="list-style-type: none"> • Vectoring principles • Phasor diagrams
9. Describe back-feed on three phase banks	<ul style="list-style-type: none"> • Circuits that create back-feed • Hazards and safety procedures related to back-feed
10. Describe procedures and safety precautions for three phase transformers	<ul style="list-style-type: none"> • Phasing • Paralleling <ul style="list-style-type: none"> ○ Angular displacement • Energizing <ul style="list-style-type: none"> ○ Overhead ○ UD • De-energizing <ul style="list-style-type: none"> ○ Overhead ○ UD • Sequence (rotation) • Troubleshooting installations • Troubleshooting ground faults



Achievement Criteria

Given information on three phase transformation and transformers, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe three phase transformation and transformers in the workplace.

Employer assessment of performance is required for each task.

**LINE E: ELECTRICAL THEORY****Competency: E-4 Install Transformers****Learning Objectives:**

2. The learner will be able to install three phase transformers.

LEARNING TASKS

2. Install three phase transformers

CONTENT

- Hazards and safety procedures
- Applicable codes and standards
- Transformer connections
 - Wye system
 - Delta system
- Voltage check
- Load checks
- Paralleling three phase transformers
- Sketch circuits
 - Series
 - Parallel

Workplace Achievement Criteria

Given workplace situations, the learner must safely install three phase transformers in the workplace.

Employer assessment of performance is required for each task.



LINE E: ELECTRICAL THEORY

Competency: E-7 Describe Power Factor

Learning Objectives:

1. The learner will be able to describe power factor in three phase transformers.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Identify and describe power factor in three phase transformers 	<ul style="list-style-type: none"> • 3 phase power factor • Effects of power factor on electric circuits • Power factor correction • Three types of capacitor banks • Power factor calculation for 3 phase systems • 3 phase power factor formula and power triangle

Achievement Criteria

Given information on power factor in three phase transformers, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe power factor in three phase transformers in the workplace.

Employer assessment of performance is required for each task.



LINE F: EQUIPMENT

Competency: F-3 Describe the Use and Care of Stringing Equipment (Distribution)

Learning Objectives:

1. The learner will be able to describe the use and care of distribution line stringing equipment.

LEARNING TASKS

1. Describe stringing methods

CONTENT

- Tension stringing
 - When used
 - Why preferred
- Non-tension stringing
 - When used
- Conductor tension
- Reeling out of conductors
 - Two methods
- Conductor splicing
- Double socking

**LEARNING TASKS**

2. Identify and describe the use of stringing tools and equipment

CONTENT

- Reel trailers (stands / jacks)
- Wire tensioners
- Pullers
- Pay-out reels
- Take-up reels
- Stringing sheaves and blocks
- Finger lines
 - Types
- Pulling line types
- Pulling line accessories
 - Swivels
 - Kellum grips
 - Clevis
- Grounding devices
 - Mats

Achievement Criteria

Given information on the care and use of distribution line stringing equipment, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must describe the care and use of distribution line stringing equipment in the workplace.

Employer assessment of performance is required for each task.



LINE F: EQUIPMENT

Competency: F-4 Demonstrate the Use and Care of Stringing Equipment (Distribution)

Learning Objectives:

1. The learner will be able to demonstrate the use and care of distribution line stringing equipment.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Demonstrate stringing methods 	<ul style="list-style-type: none"> • Tension stringing • Non-tension stringing • Reeling out of conductors <ul style="list-style-type: none"> ○ Two methods • Conductor splicing • Double socking
<ol style="list-style-type: none"> 2. Demonstrate the use and care of stringing tools and equipment 	<ul style="list-style-type: none"> • Reel trailers (stands / jacks) • Wire tensioners • Pullers • Pay-out reels • Take-up reels • Stringing sheaves and blocks • Finger lines <ul style="list-style-type: none"> ○ Types • Pulling line types • Pulling line accessories <ul style="list-style-type: none"> ○ Swivels ○ Kellum grips ○ Clevis • Grounding devices <ul style="list-style-type: none"> ○ Mats

Workplace Achievement Criteria

Given workplace situations, the learner must demonstrate the care and use of distribution line stringing equipment in the workplace.

Employer assessment of performance is required for each task.



LINE G: RIGGING

Competency: G-4 Identify Lifting Components for Live Line Distribution

Learning Objectives:

1. The learner will be able to identify and describe tools and equipment used in rigging for live line distribution.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Identify and describe tools and equipment used for live line distribution rigging 	<ul style="list-style-type: none"> • Approved hardware • Tackle • Slings • Rope blocks • Web hoists • Capstan winches <ul style="list-style-type: none"> ○ Electric ○ Gas ○ Hydraulic • Hydraulic jibs and winches <ul style="list-style-type: none"> ○ Bucket trucks
<ol style="list-style-type: none"> 2. Identify information sources for live line distribution rigging 	<ul style="list-style-type: none"> • Load weights of conductors • Approved hardware • Rated loads of lifting tools
<ol style="list-style-type: none"> 3. Describe the use of fibre ropes for live line distribution rigging 	<ul style="list-style-type: none"> • Uses of fibre rope • Care of fibre ropes • Storage considerations • Inspection methods • Rope strength <ul style="list-style-type: none"> ○ Knots ○ Bends ○ Hitches



Achievement Criteria

Given information on the tools and equipment used in rigging for live line distribution, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe the use of rigging tools and equipment for live line distribution in the workplace.

Employer assessment of performance is required for each task.



LINE G: RIGGING

Competency: G-5 Use Lifting Tools and Equipment in Live Line Distribution

Learning Objectives:

1. The learner will be able to demonstrate the use of rigging tools and equipment in live line distribution.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Demonstrate the use of live line distribution tools and equipment 	<ul style="list-style-type: none"> • Rope blocks <ul style="list-style-type: none"> ○ Types ○ Sheave size • Reeving <ul style="list-style-type: none"> ○ Advantages • Lacing <ul style="list-style-type: none"> ○ Advantages • Web hoists (ribbon jacks) • Capstan winches <ul style="list-style-type: none"> ○ Electric ○ Gas ○ Hydraulic • Hydraulic jibs and winches <ul style="list-style-type: none"> ○ Bucket trucks • Lever operated hoists <ul style="list-style-type: none"> ○ Safety precautions ○ Rated capacity

Workplace Achievement Criteria

Given workplace situations, the learner must demonstrate the use of rigging tools and equipment for live line distribution in the workplace.
Employer assessment of performance is required for each task.



LINE G: RIGGING

Competency: G-6 Describe the Use of Lifting Devices in Distribution Construction and Maintenance

Learning Objectives:

1. The learner will be able to describe the use of lifting devices in distribution construction and maintenance.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Describe the considerations in using lifting devices for distribution construction and maintenance 	<ul style="list-style-type: none"> • Weights • Forces • Tensions • Tools and equipment requirements
<ol style="list-style-type: none"> 2. In a lab-based exercise, safely complete a heavy lift 	<ul style="list-style-type: none"> • Identify and use correct procedures
<ol style="list-style-type: none"> 3. In a lab-based exercise, safely handle high tensions 	<ul style="list-style-type: none"> • Identify and use correct procedures

Achievement Criteria

Given information on lifting devices used in distribution construction and maintenance, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

In a lab-based exercise, the learner must use the correct procedures to safely complete a heavy lift.

In lab-based exercise, the learner must use the correct procedures to safely handle high tensions.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe the use of lifting devices for distribution construction and maintenance in the workplace.

Employer assessment of performance is required for each task.



LINE G: RIGGING

Competency: G-7 Use Lifting Devices in Distribution Construction and Maintenance

Learning Objectives:

1. The learner will be able to demonstrate the use of lifting devices in distribution construction and maintenance.

LEARNING TASKS	CONTENT
1. Demonstrate making heavy lifts	<ul style="list-style-type: none"> • Identify and use correct procedures
2. Demonstrate working with high tensions	<ul style="list-style-type: none"> • Identify and use correct procedures

Workplace Achievement Criteria

Given workplace situations, the learner must demonstrate the use of lifting devices for distribution construction and maintenance in the workplace, including heavy lifts and work with high tension.

Employer assessment of performance is required for each task.

**LINE H: OVERHEAD DISTRIBUTION****Competency: H-4 Describe the Construction of Distribution Lines****Learning Objectives:**

2. The learner will be able to describe advanced methods of construction for overhead distribution lines.

LEARNING TASKS

2. Describe advanced steps and complex processes for construction of overhead distribution lines

CONTENT

- Line design
- Laying out a line
 - Surveying transit
 - Stake sheets
 - Construction drawings
- Setting poles
 - Back-hoe
 - Helicopter
 - Hand methods
- Ruling span
- Conductor sagging methods
- Dead-ending conductors
 - Primary
 - Secondary
- Installing street lighting
- Setting up puller and tension sites
 - Safety grounding procedures
- Stringing and splicing conductors
 - Three phase

**Achievement Criteria**

Given information on advanced methods and complex processes for construction of overhead distribution lines, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe the steps and processes of advanced methods of construction of overhead distribution lines in the workplace.

Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-5 Construct Distribution Lines

Learning Objectives:

2. The learner will be able to demonstrate advanced methods of construction for overhead distribution lines.

LEARNING TASKS

2. Demonstrate advanced steps and complex processes for construction of overhead distribution lines

CONTENT

- Line design
- Lay out a line
 - Use a surveying transit
 - Stake sheets
 - Construction drawings
- Set poles
 - Back-hoe
 - Helicopter
 - Hand methods
- Sag conductors
- Dead-end conductors
- Tying-in (clipping) conductors
 - Equi-potential bonding
- Stringing and splicing conductors
 - Three phase
 - Safety grounding procedures
- Safety checks pre-energizing

Workplace Achievement Criteria

Given workplace situations, the learner must demonstrate the steps and processes of advanced methods of construction of overhead distribution lines in the workplace. Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-8 Describe the Installation and Operation of OD Electrical Apparatus

Learning Objectives:

1. The learner will be able to describe the installation and operation of overhead distribution electrical apparatus.

LEARNING TASKS

1. Describe the installation, operation and maintenance of OD electrical apparatus

CONTENT

- Single disconnect switches
 - Fused
 - Solid
- Lightning arrestors
- Street lighting apparatus
- Air brake switches

Achievement Criteria

Given information on the installation and operation of overhead distribution electrical apparatus, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe the installation and operation of overhead distribution electrical apparatus in the workplace. Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-9 Install, Operate and Maintain OD Electrical Apparatus

Learning Objectives:

1. The learner will be able to install and operate overhead distribution electrical apparatus.

LEARNING TASKS

1. Install, operate and maintain OD electrical apparatus

CONTENT

- Single disconnect switches
 - Fused
 - Solid
- Lightning arrestors
- Street lighting apparatus
- Air break switches

Workplace Achievement Criteria

Given workplace situations, the learner install and operate overhead distribution electrical apparatus in the workplace.

Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-10 Describe the Maintenance of Distribution Lines (up to and Including 3 Phase)

Learning Objectives:

1. The learner will be able to describe the maintenance of overhead distribution lines, up to and including three phase.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Describe correct live line procedures up to and including three phase lines and structure types while performing maintenance work 	<ul style="list-style-type: none"> • Live line work procedures
<ol style="list-style-type: none"> 2. Describe maintenance procedures using live line work methods 	<ul style="list-style-type: none"> • General maintenance procedures for live line work
<ol style="list-style-type: none"> 3. Calculate weights and forces on tools and equipment 	<ul style="list-style-type: none"> • 3 phase X-arm change using wire tongs, saddles and lever lifts • 3 phase X-arm change using a boom truck and a 3 phase lift • 3 phase X-arm change on an angle structure using X-arm saddles, wire tongs and strain link sticks • 3 phase X-arm change using a boom truck, 3 phase lift and roller link sticks • 3 phase dead-end pole replacement completed using baker boards and rope blocks • 3 phase X-arm change on a tangent structure using a 3 phase lift (boom mounted on a bucket truck)
<ol style="list-style-type: none"> 4. Describe the live line procedures for using explosive actuated wedge type connectors 	<ul style="list-style-type: none"> • Ampact tool



Achievement Criteria

Given information on the maintenance of overhead distribution lines, up to and including three phase, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe the maintenance of overhead distribution lines, up to and including three phase, in the workplace. Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-11 Maintain Distribution Lines

Learning Objectives:

1. The learner will be able to perform maintenance work on overhead distribution lines, up to and including three phase.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Demonstrate correct live line procedures up to and including three phase lines and structure types while performing maintenance work 	<ul style="list-style-type: none"> • Live line work procedures
<ol style="list-style-type: none"> 2. Demonstrate general maintenance procedures using live line work methods 	<ul style="list-style-type: none"> • General maintenance procedures for live line work
<ol style="list-style-type: none"> 3. Calculate weights and forces on tools and equipment 	<ul style="list-style-type: none"> • Perform 3 phase X-arm change using wire tongs, saddles and lever lifts • Perform 3 phase X-arm change using a boom truck and a 3 phase lift • Perform 3 phase X-arm change on an angle structure using X-arm saddles, wire tongs and strain link sticks • Perform 3 phase X-arm change using a boom truck, 3 phase lift and roller link sticks • Perform 3 phase dead-end pole replacement completed using baker boards and rope blocks • Perform a 3 phase X-arm change on a tangent structure using a 3 phase lift (boom mounted on a bucket truck)
<ol style="list-style-type: none"> 4. Demonstrate the live line procedures for using explosive actuated wedge type connectors 	<ul style="list-style-type: none"> • Ampact tools



Workplace Achievement Criteria

Given workplace situations, the learner must perform maintenance work on overhead distribution lines, up to and including three phase, in the workplace.
Employer assessment of performance is required for each task.



LINE H: OVERHEAD DISTRIBUTION

Competency: H-12 Locate and Identify Applicable Standards

Learning Objectives:

1. The learner will be able to locate and identify applicable standards.

LEARNING TASKS	CONTENT
1. Describe the use of the CEC	<ul style="list-style-type: none"> • Canadian Electrical Code
2. Identify company specific standards	<ul style="list-style-type: none"> • Company specific standards

Achievement Criteria

Given information on locating and identifying applicable standards, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must locate and identify standards applicable to the situation, in the workplace.

Employer assessment of performance is required for each task.



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-1 Describe Underground Distribution Materials

Learning Objectives:

2. The learner will be able to identify and describe specialized materials used in underground distribution systems.

LEARNING TASKS

2. Identify and describe specialized materials used in underground distribution

CONTENT

- Switchers
- Live front and dead front equipment
- Cable types
 - concentric neutral
 - tape shielded
 - plastic sheathed
 - lead sheathed
- Identify cable on one line diagrams
- Determine materials required for a specific job

Achievement Criteria

Given information on specialized materials used in underground distribution systems, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe specialized materials used in underground distribution systems in the workplace. Employer assessment of performance is required for each task.



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-2 Describe How to Determine UD Line Status

Learning Objectives:

2. The learner will be able to describe advanced methods for determining the status of underground distribution lines.

LEARNING TASKS

2. Identify and describe advanced methods to determine the status of underground lines

CONTENT

- Under construction or in service
- Energized or de-energized
- Distribution or transmission
- Single or three phase
- Line voltage
- Line source and destination
- Line / circuit number
- Cable tags
- Phasing marks and colours
- Cable types
 - concentric neutral
 - tape shielded
 - plastic sheathed
 - lead sheathed
- Direct buried or in duct
- Cable protection
 - On poles
 - Under roads
- Identify cable on one line diagrams

Achievement Criteria

Given information on advanced methods for determining the status of underground distribution lines, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe advanced methods for determining the status of underground distribution lines in the workplace. Employer assessment of performance is required for each task.



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-3 Determine UD Line Status

Learning Objectives:

2. The learner will be able to demonstrate advanced methods for determining the status of underground distribution lines.

LEARNING TASKS

3. Demonstrate advanced procedures to determine the status of underground lines

CONTENT

- Under construction or in service
- Energized or de-energized
- Distribution or transmission
- Single or three phase
- Line voltage
- Line source and destination
- Line / circuit number
- Cable tags
- Phasing marks and colours
- Cable types
 - Concentric neutral
 - Tape shielded
 - Plastic sheathed
 - Lead sheathed
- Direct buried or in duct
- Cable protection
 - On poles
 - Under roads
- Identify cable on one line diagrams

Workplace Achievement Criteria

Given workplace situations, the learner must use advanced methods to determine the status of underground distribution lines in the workplace.

Employer assessment of performance is required for each task.



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-4 Describe UD Grounding Procedures

Learning Objectives:

1. The learner will be able to describe grounding procedures for underground distribution systems.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Describe conductors (primary and secondary) sizes and types 	<ul style="list-style-type: none"> • Primary conductor types • Secondary conductor types • Transmission cables
<ol style="list-style-type: none"> 2. Identify and apply appropriate design specifications 	<ul style="list-style-type: none"> • Design specifications • Company UD standards
<ol style="list-style-type: none"> 3. Identify procedures for grounding UD 	<ul style="list-style-type: none"> • Grounding procedures • Safety grounding and bonding • Hazard identification • Tagging procedures (lock-out) • Grounding kits

Achievement Criteria

Given information on grounding procedures for underground distribution systems, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe grounding procedures for underground distribution systems in the workplace. Employer assessment of performance is required for each task.



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-5 Demonstrate UD Grounding Procedures

Learning Objectives:

1. The learner will be able to demonstrate grounding procedures for underground distribution systems.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Demonstrate proper safety grounding and bonding of UD cables and apparatus 	<ul style="list-style-type: none"> • Design specifications • Company UD standards • Grounding procedures • Safety grounding and bonding • Hazard identification • Tagging procedures (lock-out) • Grounding kits
<ol style="list-style-type: none"> 2. Demonstrate proper safety grounding and bonding of UD cables and apparatus 	<ul style="list-style-type: none"> • Design specifications • Company UD standards • Grounding procedures • Safety grounding and bonding • Hazard identification • Tagging procedures (lock-out) • Grounding kits

Workplace Achievement Criteria

Given workplace situations, the learner must safely demonstrate grounding procedures for underground distribution systems in the workplace.

Employer assessment of performance is required for each task.



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-6 Describe the Construction of UD lines

Learning Objectives:

1. The learner will be able to describe methods and procedures for constructing underground distribution lines.

LEARNING TASKS	CONTENT
1. Describe basic UD system design and layout	<ul style="list-style-type: none"> • Electrical and civil drawings • System grounding/neutral connections • Counter poise • Terminal poles, junction boxes, vaults, pull boxes, switching kiosks, secondary boxes and manholes (UG confined spaces)
2. Describe safety procedures for entering underground (UG) confined spaces	<ul style="list-style-type: none"> • UG Confined space procedures
3. Describe public safety awareness	<ul style="list-style-type: none"> • Public safety protocol
4. Describe installation (pulling) of primary and secondary cables	<ul style="list-style-type: none"> • Single and three phase • Cable terminations
5. Describe methods of cable identification and tagging	<ul style="list-style-type: none"> • Tug and tag • Diode
6. Describe phase identification	<ul style="list-style-type: none"> • Phase identification
7. Describe the installation of UD services	<ul style="list-style-type: none"> • Single and three phase UD services



Achievement Criteria

Given information on methods and procedures for constructing underground distribution lines, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe methods and procedures for constructing underground distribution lines in the workplace. Employer assessment of performance is required for each task.



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-7 Construct UD Lines

Learning Objectives:

1. The learner will be able to demonstrate methods and procedures for constructing underground distribution lines.

LEARNING TASKS	CONTENT
1. Participate in planning the job	<ul style="list-style-type: none"> • Job planning • Drawing and schematics review
2. Select and deliver materials and apparatus	<ul style="list-style-type: none"> • Drawing and schematics review • Materials and apparatus • Transportation and handling
3. Install apparatus as per plans	<ul style="list-style-type: none"> • Plans and procedures

Workplace Achievement Criteria

Given workplace situations, the learner must demonstrate methods and procedures for constructing underground distribution lines in the workplace.

Employer assessment of performance is required for each task.



LINE K: COMMUNICATION IN THE WORKPLACE

Competency: K-7 Describe Communication with Other Disciplines and Co-workers

Learning Objectives:

1. The learner will be able to describe methods and skills for communicating with other disciplines and co-workers.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Describe communication with other disciplines 	<ul style="list-style-type: none"> • Company reporting procedures • Reporting formats such as government and company forms • Translate technical terms into layperson language • Write reports in a prescribed format
<ol style="list-style-type: none"> 2. Describe communication with co-workers 	<ul style="list-style-type: none"> • Job related terminology • Active listening skills • Report information to supervisor/dispatcher such as hazards, accidents and line and climatic conditions • Address others' concerns • Direct others • Write reports in a prescribed format

Achievement Criteria

Given information on methods and skills for communicating with other disciplines and co-workers, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe methods and skills for communicating with other disciplines and co-workers in the workplace.

Employer assessment of performance is required for each task.



LINE K: COMMUNICATION IN THE WORKPLACE

Competency: K-8 Communicate with Other Disciplines and Co-workers

Learning Objectives:

1. The learner will be able to demonstrate methods and skills for communicating with other disciplines and co-workers.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Communicate with other disciplines 	<ul style="list-style-type: none"> • Company reporting procedures • Reporting formats such as government and company forms • Translate technical terms into layperson language • Write reports in a prescribed format
<ol style="list-style-type: none"> 2. Communicate with co-workers 	<ul style="list-style-type: none"> • Job related terminology • Active listening skills • Report information to supervisor/dispatcher such as hazards, accidents and line and climatic conditions • Address others' concerns • Direct others • Write reports in a prescribed format

Workplace Achievement Criteria

Given workplace situations, the learner must demonstrate methods and skills for communicating with other disciplines and co-workers in the workplace.

Employer assessment of performance is required for each task.



LINE K: COMMUNICATION IN THE WORKPLACE

Competency: K-9 Describe Communication with Customers

Learning Objectives:

1. The learner will be able to describe methods and skills for communicating with customers.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Describe Communication with Customers 	<ul style="list-style-type: none"> • Company policies, procedures and regulations • How to identify customers problems • Explain a problem to customer • Translate technical terms into layperson language • Address customer’s concerns • Explain scope of work to customer • Inform customers of time and duration of disruptions

Achievement Criteria

Given information on methods and skills for communicating with customers, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe methods and skills for communicating with customers in the workplace.

Employer assessment of performance is required for each task.



LINE K: COMMUNICATION IN THE WORKPLACE

Competency: K-10 Communicate with Customers

Learning Objectives:

1. The learner will be able to demonstrate methods and skills for communicating with customers.

LEARNING TASKS

1. Describe Communication with Customers

CONTENT

- Company policies, procedures and regulations
- How to identify customers problems
- Explain a problem to customer
- Translate technical terms into layperson language
- Address customer’s concerns
- Explain scope of work to customer
- Inform customers of time and duration of disruptions

Workplace Achievement Criteria

Given workplace situations, the learner must identify and demonstrate methods and skills for communicating with customers in the workplace.

Employer assessment of performance is required for each task.



BC POWER LINE TECHNICIAN APPRENTICESHIP

YEAR THREE



LINE E: ELECTRICAL THEORY

Competency: E-5 Describe Metering Components

Learning Objectives:

- The learner will be able to identify and describe three phase metering transformer components.

LEARNING TASKS	CONTENT
2. Describe the construction of three phase metering transformers	<ul style="list-style-type: none"> • Three phase metering transformer construction • Current transformer hazards • Potential transformer polarity
3. Identify types of three phase meters	<ul style="list-style-type: none"> • Self contained • Transformer • Rotation and Phase sequence
4. Describe the operation of three phase meters	<ul style="list-style-type: none"> • Three phase meter operation • Self contained • Transformer • Rotation and Phase sequence
5. Explain the use of and precautions required for potential and current three phase transformers in primary and secondary metering	<ul style="list-style-type: none"> • Potential and current in three phase transformers • Primary and secondary metering • Use of low voltage rubber gloves, eye protection
6. Describe basic installation code/standard requirements	<ul style="list-style-type: none"> • 400 A single phase • Canadian electrical code
7. Explain the concept of power factor as it relates to metering	<ul style="list-style-type: none"> • Power factor (calculation) • Power factor correction (capacitors)
8. Describe energy diversion	<ul style="list-style-type: none"> • Energy diversion



Achievement Criteria

Given information on three phase metering transformer components, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe on three phase metering transformer components in the workplace.

Employer assessment of performance is required for each task.



LINE E: ELECTRICAL THEORY

Competency: E-6 Read Meters

Learning Objectives:

2. The learner will be able to accurately read three phase meters.
3. The learner will select and install three phase meters

LEARNING TASKS	CONTENT
2. Read various types of meters	<ul style="list-style-type: none"> • Self contained • Transformer • Rotation and Phase sequence • Current transformer hazards • Potential transformer polarity
3. Install and perform meter socket safety checks	<ul style="list-style-type: none"> • Potential and current in three phase transformers • Primary and secondary metering • Use of low voltage rubber gloves, eye protection
4. Select proper meters for various installations	<ul style="list-style-type: none"> • Three phase meter operation • Self contained • Transformer • Rotation and Phase sequence
5. Select proper sized CTs and PTs for various installations	<ul style="list-style-type: none"> • Current transformers • Potential transformers
6. Install and wire various meter installations	<ul style="list-style-type: none"> • 400 A single phase • Canadian electrical code

Workplace Achievement Criteria

Given workplace situations, the learner must select, install and accurately read three phase meters in the workplace.

Employer assessment of performance is required for each task.



LINE E: ELECTRICAL THEORY

Competency: E-8 Describe Substation Operations, System Operations and System Protection

Learning Objectives:

1. The learner will be able to identify and describe components of a substation.
2. The learner will be able to describe methods for operation and protection of a substation.
3. The learner will be able to describe methods of system operation.

LEARNING TASKS	CONTENT
1. Describe substation components	<ul style="list-style-type: none"> • Types of transformers used in station protection • Current, potential, grounding • Circuit breaker types and operation • Relay operation and annunciators • Circuit reclosures • Bus bar arrangements in stations • Transfer bus
2. Describe substation operation	<ul style="list-style-type: none"> • Main functions of substations • Simple substation schematics • Station service
3. Describe system protection	<ul style="list-style-type: none"> • Fuses and fuse coordination • Fused switch operation • Isolation or de-energization devices • Gang operated air break switches • Single solid blade disconnects • Field pot head disconnects and sectionalizers • Load and non-load break switches and cut outs • Surge lightning arrestors (types, rating, basic characteristics, application)

**LEARNING TASKS**

4. Describe system operation

CONTENT

- Field switching order requirements
- Conditions/procedures for field paralleling of distribution feeders
- Conditions/procedures for field separating of parallel distribution feeders

Achievement Criteria

Given information on substation components, operation, protection and system operation, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe substation components, describe substation operation and protection, and describe system operation in the workplace.

Employer assessment of performance is required for each task.



LINE E: ELECTRICAL THEORY

Competency: E-9 Perform System Switching

Learning Objectives:

1. The learner will be able to perform system switching.

LEARNING TASKS

1. Perform various switching exercises

CONTENT

- Types of transformers used in station protection
- Current, potential, grounding
- Circuit breaker types and operation
- Relay operation and annunciators
- Circuit reclosures
- Bus bar arrangements in stations
- Transfer bus
- Main functions of substations
- Simple substation schematics
- Station service
- Fuses and fuse coordination
- Fused switch operation
- Isolation or de-energization devices
- Gang operated air break switches
- Single solid blade disconnects
- Field pot head disconnects and sectionalizers
- Load and non-load break switches and cut outs
- Surge lightning arrestors (types, rating, basic characteristics, application)
- Field switching order requirements
- Conditions/procedures for field paralleling of distribution feeders
- Conditions/procedures for field separating of parallel distribution feeders



Workplace Achievement Criteria

Given workplace situations, the learner must perform system switching in the workplace.

Employer assessment of performance is required for each task.



LINE E: ELECTRICAL THEORY

Competency: E-10 Describe Voltage Regulators and Capacitors

Learning Objectives:

1. The learner will be able to identify and describe voltage regulators and capacitors.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Describe voltage regulators 	<ul style="list-style-type: none"> • Voltage regulator construction • Types and ratings of voltage regulators • Operation of voltage regulators • Power factor with respect to voltage regulators
<ol style="list-style-type: none"> 2. Describe installation of a step voltage regulator 	<ul style="list-style-type: none"> • Electrical procedures and precautions for installing or removing a step voltage regulator from service
<ol style="list-style-type: none"> 3. Describe inspection and maintenance procedures for voltage regulators 	<ul style="list-style-type: none"> • Inspection and maintenance procedures for voltage regulators
<ol style="list-style-type: none"> 4. Describe capacitors 	<ul style="list-style-type: none"> • Characteristics of capacitors • Operation of capacitors • 3 types of field capacitor installations • Fused capacitors • Switch capacitors • Switching and grounding of capacitors • Power factor with respect to capacitors

Achievement Criteria

Given information on voltage regulators and capacitors, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.



Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe voltage regulators and capacitors in the workplace.

Employer assessment of performance is required for each task.



LINE E: ELECTRICAL THEORY

Competency: E-11 Demonstrate the Installation, Operation and Removal of Voltage Regulators and Capacitors

Learning Objectives:

1. The learner will be able to demonstrate the installation and removal of voltage regulators and capacitors.
2. The learner will be able to demonstrate the operation of voltage regulators and capacitors.

LEARNING TASKS	CONTENT
1. Demonstrate installation of a step voltage regulator	<ul style="list-style-type: none"> • Types and ratings of voltage regulators • Operation of voltage regulators • Power factor with respect to voltage regulators • Electrical procedures and precautions for installing or removing a step voltage regulator from service
2. Demonstrate adjustment of band widths of voltage regulators	<ul style="list-style-type: none"> • Inspection and maintenance procedures for voltage regulators
3. Put regulator into service	<ul style="list-style-type: none"> • Inspection and maintenance procedures for voltage regulators
4. Remove regulator from service	<ul style="list-style-type: none"> • Inspection and maintenance procedures for voltage regulators
5. Demonstrate installation and removal of a switched capacitor bank	<ul style="list-style-type: none"> • Characteristics of capacitors • Operation of capacitors • 3 types of field capacitor installations • Switch capacitors
6. Demonstrate installation and removal of a fused capacitor bank	<ul style="list-style-type: none"> • Fused capacitors



LEARNING TASKS

7. Demonstrate grounding of a capacitor bank

8. Perform 3 phase power factor calculations with respect to voltage regulators and capacitors

CONTENT

- Switching and grounding of capacitors

- Power factor with respect to capacitors

Workplace Achievement Criteria

Given workplace situations, the learner must install, operate and remove voltage regulators and capacitors in the workplace.

Employer assessment of performance is required for each task.



LINE F: EQUIPMENT

Competency: F-5 Describe the Equipment and Procedures for Stringing Transmission Lines

Learning Objectives:

1. The learner will be able to identify and describe the equipment and procedures for stringing transmission lines.

LEARNING TASKS

1. Describe the use and care of equipment used for stringing transmission lines

CONTENT

- Reel trailers (stands)
- Hydraulic bull wheel wire tensioners
- Pullers for transmission lines
- Pulling lines (types) and accessories (swivels, kellum grips etc.)
- Pilot lines
- Stringing sheaves and blocks
- Proper sizing of stringing sheaves
- Hold downs (conductor/hard line)
- Pay out and take up reels for transmission lines
- Types of finger lines
- Puller and tension site set ups for transmission lines
- Proper grounding and bonding at puller and tension sites for transmission lines
- Grounding procedures devices and grounding mats
- Running grounds
- Specialized equipment (ride a rail, track machines, helicopters, boats/barges and mobile cranes)
- Equipment made for specific jobs



LEARNING TASKS

CONTENT

2. Explain the concepts and principles of transmission line stringing

- Control span
- Ruling span
- Equi-potential zone
- Equi-potential bonding
- Grounding
- USL
- Clipping
- Dead/ending
- Mandatory tension stringing procedures
- Pre-sagging
- Creep correction
- Ground snubs
- Offsets used when clipping
- Back snubs

3. Describe transmission tension stringing

- Site
- Sagging boards
- Procedures for stringing and sagging transmission lines
- Standard sagging procedures and methods
- Conductor tension

Achievement Criteria

Given information on the equipment and procedures for stringing transmission lines, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe the equipment and procedures for stringing transmission lines in the workplace. Employer assessment of performance is required for each task.



LINE F: EQUIPMENT

Competency: F-6 Demonstrate Stringing Transmission Lines

Learning Objectives:

1. The learner will be able to demonstrate procedures for stringing transmission lines.

LEARNING TASKS

1. Demonstrate the use and operation of stringing equipment

CONTENT

- Reel trailers (stands)
- Hydraulic bull wheel wire tensioners
- Pullers for transmission lines
- Pulling lines (types) and accessories (swivels, kellum grips etc.)
- Pilot lines
- Stringing sheaves and blocks
- Proper sizing of stringing sheaves
- Hold downs (conductor/hard line)
- Pay out and take up reels for transmission lines
- Types of finger lines
- Puller and tension site set ups for transmission lines
- Proper grounding and bonding at puller and tension sites for transmission lines
- Grounding procedures devices and grounding mats
- Running grounds
- Specialized equipment (ride a rail, track machines, helicopters, boats/barges and mobile cranes)
- Equipment made for specific jobs

**LEARNING TASKS**

2. Calculate line sag

3. Select major components required to complete a portion of conductor to be installed

CONTENT

- Site
- Sagging boards
- Procedures for stringing and sagging transmission lines
- Standard sagging procedures and methods
- Conductor tension

- Control span
- Ruling span
- Equi-potential zone
- Equi-potential bonding
- Grounding
- USL
- Clipping
- Dead/ending
- Mandatory tension stringing procedures
- Pre-sagging
- Creep correction
- Ground snubs
- Offsets used when clipping
- Back snubs

Workplace Achievement Criteria

Given workplace situations, the learner must use the appropriate equipment and procedures for stringing transmission lines in the workplace. Employer assessment of performance is required for each task.



LINE G: RIGGING

Competency: G-8 Describe Lifting Components for Transmission

Learning Objectives:

1. The learner will be able to identify and describe lifting equipment, resources and components for transmission lines.

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Identify hardware, equipment, tackle and slings used in standard rigging practices for transmission 	<ul style="list-style-type: none"> • Approved hardware • Drop forged shackles and hooks • WLL and size stamps
<ol style="list-style-type: none"> 2. Identify resource materials for rigging 	<ul style="list-style-type: none"> • Worksafe regulations • Riggers handbook • Rigging for the line trade • Manufacturers and engineering specifications • Load weights of transmission conductors • Manufacturer's UTS
<ol style="list-style-type: none"> 3. Describe the characteristics, construction and types of wire rope used for lifting transmission lines 	<ul style="list-style-type: none"> • How wire rope is made • Wire rope lay
<ol style="list-style-type: none"> 4. Describe the use care and maintenance of wire rope used for lifting transmission lines 	<ul style="list-style-type: none"> • Shackle sizing for wire rope • Sockets, thimbles, clips used • Calculating WLL for wire rope • WLL of common wire rope sizes
<ol style="list-style-type: none"> 5. Identify correct slinging methods for transmission lines 	<ul style="list-style-type: none"> • Regular blocks for transmission lines • Snatch blocks for transmission lines



Achievement Criteria

Given information on lifting equipment, resources and components for transmission lines, the learner must correctly answer a series of multiple-choice tests with 70% accuracy.

Workplace Achievement Criteria

Given workplace situations, the learner must identify and describe lifting equipment, resources and components for transmission lines in the workplace.
Employer assessment of performance is required for each task.



LINE G: RIGGING

Competency: G-9 Demonstrate the Use of Lifting Components for Transmission

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Calculate using common rigging formulas for weights and forces 	<ul style="list-style-type: none"> • Rigging calculations • Riggers handbook • Manufacturers and engineering specifications • Load weights of transmission conductors • Manufacturer's UTS
<ol style="list-style-type: none"> 2. Demonstrate the use of knots bends and hitches 	<ul style="list-style-type: none"> • Rigging for the line trade
<ol style="list-style-type: none"> 3. Determine the correct size and type of sling to be used on a specific job 	<ul style="list-style-type: none"> • Rigging calculations • Riggers handbook • Manufacturers and engineering specifications • Load weights of transmission conductors • Manufacturer's UTS
<ol style="list-style-type: none"> 4. Inspect chains and slings 	<ul style="list-style-type: none"> • Approved hardware • Drop forged shackles and hooks • WLL and size stamps • Wire rope lay • Shackle sizing for wire rope • Sockets, thimbles, clips used • Calculating WLL for wire rope • WLL of common wire rope sizes
<ol style="list-style-type: none"> 5. Calculate correct loads on slings 	<ul style="list-style-type: none"> • Regular blocks for transmission lines • Snatch blocks for transmission lines



LEARNING TASKS

6. Calculate the correct loads on blocks (load block angle factor)

CONTENT

- Rigging calculations
- Riggers handbook
- Manufacturers and engineering specifications
- Load weights of transmission conductors



LINE G: RIGGING

Competency: G-10 Describe Live Line Transmission Rigging

LEARNING TASKS	CONTENT
1. Describe rigging tasks	<ul style="list-style-type: none"> • 138 kV timber change • 230 kV dead end insulator change • 138 kV wish bone timber change • 138 kV medium angle insulator string change
2. Calculate the weights and forces acting on live line tools and equipment when performing specific tasks	<ul style="list-style-type: none"> • Calculate the weights and forces • 138 kV timber change • 230 kV dead end insulator change • 138 kV wish bone timber change • 138 kV medium angle insulator string change
3. Describe rigging procedures for specific tasks	<ul style="list-style-type: none"> • Rigging procedures • 138 kV timber change • 230 kV dead end insulator change • 138 kV wish bone timber change • 138 kV medium angle insulator string change
4. Describe the tools and equipment required to perform specific tasks	<ul style="list-style-type: none"> • Rigging • 138 kV timber change • 230 kV dead end insulator change • 138 kV wish bone timber change • 138 kV medium angle insulator string change



LINE G: RIGGING

Competency: G-11 Demonstrate Live Line Transmission Rigging

LEARNING TASKS

1. Demonstrate rigging for the following four tasks

CONTENT

- 138 kV timber change
- 230 kV dead end insulator change
- 138 kV wish bone timber change
- 138 kV medium angle insulator string change



LINE H: OVERHEAD DISTRIBUTION

Competency: H-8 Describe the Installation and Operation of OD Electrical Apparatus

LEARNING TASKS

1. Describe the installation, operation and maintenance of OD electrical apparatus

CONTENT

- Gang operated air brake switches
- Circuit reclosers
- Sectionalizers
- Capacitors
- Voltage regulators
- Circuit breakers
- Supervisory operated switches



LINE H: OVERHEAD DISTRIBUTION

Competency: H-9 Install, Operate and Maintain OD Electrical Apparatus

LEARNING TASKS

1. Install, operate and maintain electrical apparatus

CONTENT

- Gang operated air brake switches
- Circuit reclosures
- Sectionalizers
- Capacitors
- Voltage regulators



LINE H: OVERHEAD DISTRIBUTION

Competency: H-10 Describe the Maintenance of Distribution Lines (up to and Including 3 Phase)

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Describe checking and inspection methods used for maintenance of distribution lines
 2. Describe maintenance procedures for distribution lines | <ul style="list-style-type: none"> • Public safety checks • Line patrols (ground and climbing) • X-arm checks (broken, rot, cracked, burnt) • Hardware checks (loose, damaged) • Guy, anchor and pole ground checks (guy guards, damage, corrosion) • Insulator checks (leaking, damage) • Conductor checks (damage)
 • Pole changes • Changing of x-arms and insulators • Conductor repairs • Tightening and replacement of hardware • Guy, anchor and pole ground repair and replacement |
|---|---|



LINE H: OVERHEAD DISTRIBUTION

Competency: H-11 Maintain Distribution Lines

LEARNING TASKS	CONTENT
<p>1. Perform maintenance checks on poles, x-arms, hardware, guy wires, anchors and insulators</p>	<ul style="list-style-type: none"> • Public safety checks • Line patrols (ground and climbing) • X-arm checks (broken, rot, cracked, burnt) • Hardware checks (loose, damaged) • Guy, anchor and pole ground checks (guy guards, damage, corrosion) • Insulator checks (leaking, damage)
<p>2. Perform inspections on conductors (damage)</p>	<ul style="list-style-type: none"> • Conductor checks (damage) • Conductor repairs
<p>3. Perform repair and replacement of x-arms, insulators and hardware</p>	<ul style="list-style-type: none"> • Changing of x-arms and insulators • Tightening and replacement of hardware • Guy, anchor and pole ground repair and replacement
<p>4. Perform pole changes</p>	<ul style="list-style-type: none"> • Pole changes



LINE H: OVERHEAD DISTRIBUTION

Competency: H-13 Describe Troubleshooting of System Components (Overhead, UG, Transmission)

LEARNING TASKS

1. Describe troubleshooting process

CONTENT

- One line diagrams and local maps
- Line/circuit number
- Area/location of trouble
- Area/customers affected
- Isolation points and switching locations
- Type of trouble (primary, secondary, apparatus) (feeder outage, radial feeder outage, loop feed)
- Potential hazards (public, personnel, personal safety)
- Materials and personnel requirements
- Isolation and switching procedures
- Tagging and lock-out procedures
- Grounding procedures
- Emergency and permanent line repairs
- Transformation troubleshooting methods
- Common causes of trouble (weather, customer, mva, animal/birds, trees, water, equipment failure, dig-in)



LINE H: OVERHEAD DISTRIBUTION

Competency: H-14 Troubleshoot System Components

LEARNING TASKS	CONTENT
1. Demonstrate alertness and good judgment during troubleshooting	<ul style="list-style-type: none"> • Situational awareness
2. Identify cause of trouble (weather, customer, mva, animal/birds, trees)	<ul style="list-style-type: none"> • Common causes of trouble (weather, customer, mva, animal/birds, trees, water, equipment failure, dig-in) • One line diagrams and local maps
3. Perform emergency line patrol	<ul style="list-style-type: none"> • Type of trouble (primary, secondary, apparatus) (feeder outage, radial feeder outage, loop feed) • Potential hazards (public, personnel, personal safety)
4. Perform isolation and switching procedures	<ul style="list-style-type: none"> • Isolation points and switching locations • Isolation and switching procedures
5. Demonstrate tagging and lock-out procedures	<ul style="list-style-type: none"> • Tagging and lock-out procedures
6. Demonstrate proper grounding procedures	<ul style="list-style-type: none"> • Grounding procedures
7. Perform emergency or permanent line repairs	<ul style="list-style-type: none"> • Emergency and permanent line repairs
8. Restore service	<ul style="list-style-type: none"> • Area/location of trouble • Area/customers affected • Line/circuit number • Materials and personnel requirements



LEARNING TASKS

9. Demonstrate transformation troubleshooting
10. Locate and identify faults

CONTENT

- Transformation troubleshooting methods
- Types of faults



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-8 Describe the Installation, Operation and Maintenance of UD Electrical Apparatus

LEARNING TASKS

CONTENT

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Describe the installation, operation and maintenance of switching apparatus for UD
 2. Describe the installation, operation and maintenance of UD transformers | <ul style="list-style-type: none"> • Installation procedures for UD switching apparatus • Operation of UD switching apparatus • Maintenance procedures for UD switching apparatus
 • Live fronts • Dead fronts • Pad mount • Submersible • Single phase • Three phase) |
|---|--|



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-9 Install, Operate and Maintain UD Electrical Apparatus

LEARNING TASKS	CONTENT
<p>1. Install, operate and maintain UD switching apparatus</p>	<ul style="list-style-type: none"> • Installation procedures for UD switching apparatus • Operation of UD switching apparatus • Maintenance procedures for UD switching apparatus
<p>2. Install, operate and maintain UD Transformers</p>	<ul style="list-style-type: none"> • Live fronts • Dead fronts • Pad mount • Submersible • Single phase • Three phase)
<p>3. Install, operate and maintain VISTAS (SF6 switching kiosks)</p>	<ul style="list-style-type: none"> • VISTAS operations and maintenance • SF6 switching kiosks
<p>4. Install, operate and maintain Live Front sectionalizing switching apparatus</p>	<ul style="list-style-type: none"> • Live front sectionalizing switching apparatus



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-10 Describe Maintenance of UD Conductors

LEARNING TASKS	CONTENT
1. Describe public safety checks	<ul style="list-style-type: none"> • Public safety protocol
2. Describe maintenance inspections	<ul style="list-style-type: none"> • Vaults • Junction boxes • Terminal poles • Underground confined spaces (manholes) • UD apparatus (transformers, kiosks, and switches) • Maintenance reports



LINE I: UNDERGROUND DISTRIBUTION (UD)

Competency: I-11 Maintain UD Conductors

LEARNING TASKS	CONTENT
<ol style="list-style-type: none"> 1. Perform maintenance inspections of UD lines and apparatus 	<ul style="list-style-type: none"> • Public safety protocol • Vaults • Junction boxes • Terminal poles • Underground confined spaces (manholes) • UD apparatus (transformers, kiosks, and switches)
<ol style="list-style-type: none"> 2. Record and file inspection reports 	<ul style="list-style-type: none"> • Inspection report procedures
<ol style="list-style-type: none"> 3. Plan work to be done from maintenance reports 	<ul style="list-style-type: none"> • Work planning
<ol style="list-style-type: none"> 4. Select materials and apparatus required 	<ul style="list-style-type: none"> • Job specific
<ol style="list-style-type: none"> 5. Perform maintenance work 	<ul style="list-style-type: none"> • Maintenance reports • Public safety protocol • Vaults • Junction boxes • Terminal poles • Underground confined spaces (manholes) • UD apparatus (transformers, kiosks, and switches)



LINE J: TRANSMISSION

Competency: J-1 Describe Transmission Materials

LEARNING TASKS	CONTENT
1. Describe pole/structure materials	<ul style="list-style-type: none"> • Wood • Steel
2. Identify and describe pole classes	<ul style="list-style-type: none"> • Pole classes
3. Identify materials and hardware for wood pole transmission lines of various voltages and structure configurations (types)	<ul style="list-style-type: none"> • 60 kV triangular construction • 138 kV wishbone construction
4. Identify material and hardware for steel/aluminum structure transmission lines of various voltages and configurations (types)	<ul style="list-style-type: none"> • 230 kV – guyed Y • 500 kV self supporting A
5. Identify suspension and dead-ending material/hardware for various voltages and structure types	<ul style="list-style-type: none"> • Suspension and dead-ending material and hardware
6. Identify various insulator types	<ul style="list-style-type: none"> • Pin • Post • Ball & socket • kV, kg rating
7. Identify types and sizes of conductors used for transmission line voltages	<ul style="list-style-type: none"> • Transmission conductor sizes and types
8. Identify types of connectors	<ul style="list-style-type: none"> • Compression • Bolted



LEARNING TASKS

CONTENT

9. Identify types of sleeves used for splicing

- Compression
- Explosive

10. Describe wire dead-ending methods

- Clamps
- Compression
-

11. Select materials for specified job

- Material selection steps



LEARNING TASKS

3. Describe the risks and hazards associated with the construction of transmission lines

4. Describe procedures and methods of transmission line construction

CONTENT

- Sources of induction
- Step and touch potential
- Proper grounding procedures (running grounds, ground mats)

- Clipping/tying in of conductor to insulator (various structure types)
- Dead-ending procedures and methods
- Application of connectors and/or taps
- Use of other working platforms (on towers, suspended) e.g. D/E boards
- Conductor buggies
- Tower footings
- Layout and assembly of towers
- Erection of towers (types)
- Plumbing of guyed towers
- Installation of guy wires to structure and anchors with the proper tension
- Spacer dampers
- Vibration dampers and conductor weights
- Marker balls



LINE J: TRANSMISSION

Competency: J-3 Construct Transmission Lines

LEARNING TASKS	CONTENT
1. Demonstrate the use of stake sheets and construction drawings	<ul style="list-style-type: none"> • Basic survey equipment • Pole/structure selection • Job plan • Stake sheets • Construction drawings • Blueprints
2. Deliver hardware and materials	<ul style="list-style-type: none"> • Conductor size, type, single or bundled • Identify crossings (road or rail)
3. Demonstrate framing poles on the ground (drilling holes, mounting hardware and materials)	<ul style="list-style-type: none"> • Framing poles on the ground (drilling holes, mounting hardware and materials)
4. Demonstrate blueprint reading for assembly and fabrication drawings	<ul style="list-style-type: none"> • Construction drawings • Blueprints
5. Demonstrate reading data sheets	<ul style="list-style-type: none"> • Job plan • Stake sheets
6. Demonstrate reading line profiles	<ul style="list-style-type: none"> • Line profiles
7. Demonstrate pole setting with line truck, crane truck or other equipment	<ul style="list-style-type: none"> • Digging pole holes (proper depth etc) • Pole setting with line truck, crane truck or other equipment • Setting of poles by helicopter •



LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>8. Demonstrate framing and installing hardware and material on set poles</p> | <ul style="list-style-type: none"> • Use of other working platforms (on towers, suspended) e.g. D/E boards • Framing and installing hardware and material on set poles |
| <p>9. Install anchors for poles and towers</p> | <ul style="list-style-type: none"> • Installation of material and hardware by helicopter • Anchor types and installations (poles, towers) • Installation of rider poles • Plumbing a pole (rake if necessary) • Guy wire size and materials • Fabrication of guy wires • Installation of armour rod • Tower footings • Layout and assembly of towers • Erection of towers (types) |
| <p>10. Install hardware on towers</p> | <ul style="list-style-type: none"> • Spacer dampers • Vibration dampers and conductor weights • Marker balls |
| <p>11. Demonstrate plumbing a pole (rake if necessary)</p> | <ul style="list-style-type: none"> • Plumbing of guyed towers |
| <p>12. Demonstrate the installation of guy wires</p> | <ul style="list-style-type: none"> • Installation of guy wires to structure and anchors with the proper tension |
| <p>13. Demonstrate proper handling and transport of conductor cables</p> | <ul style="list-style-type: none"> • Conductor buggies |
| <p>14. Demonstrate proper grounding procedures (running grounds, ground mats)</p> | <ul style="list-style-type: none"> • Sources of induction • Step and touch potential • Proper grounding procedures (running grounds, ground mats) |



LEARNING TASKS

15. Demonstrate clipping/tying in of conductor to insulators (various structure types)
16. Demonstrate dead-ending procedures and methods
17. Perform final inspection acceptance patrol

CONTENT

- Clipping/tying in of conductor to insulator (various structure types)
- Dead-ending procedures and methods
- Application of connectors and/or taps
- Final line inspection procedures



LINE J: TRANSMISSION

Competency: J-4 Describe Installation, Operation and Maintenance of Electrical Apparatus for Transmission

LEARNING TASKS

CONTENT

1. Describe the installation, operation and maintenance of electrical apparatus for transmission

- Gang operated air brake switches for transmission lines
- Other apparatus that may be installed on/in transmission lines
- Supervisory controlled breakers
- Ground switches
- Capacitor stations
- Insulator pressure washing
- Submarine and underground transmission cable
- Grid interconnections



LINE J: TRANSMISSION

Competency: J-5 Install, Operate and Maintain Electrical Apparatus for Transmission.

LEARNING TASKS

1. Install gang operated air brake switches and/or other apparatus that may be installed on/in transmission lines

CONTENT

- Gang operated air brake switches for transmission lines
- Other apparatus that may be installed on/in transmission lines
- Supervisory controlled breakers
- Ground switches
- Capacitor stations
- Insulator pressure washing
- Submarine and underground transmission cable
- Grid interconnections



LINE J: TRANSMISSION

Competency: J-6 Describe Maintenance of Transmission Lines

LEARNING TASKS

1. Describe checking and inspection methods for transmission lines

2. Describe maintenance procedures for transmission lines

CONTENT

- Public safety checks
- Line patrols (ground, aerial, climbing)
- Structure site inspections (access, ground movement)
- Pole check (rot, damage, security)
- Timber checks (rot, damage)
- Hardware checks (loose, damaged)
- Guy wire and anchor checks (damage, guards, corrosion)
- Insulator checks (broken, damaged)
- Visual conductor checks

- Pole changes (various line voltages)
- Timber or X-arm changes on various structure types (wood, steel, various lines voltages)
- Guy and anchor replacement on various structure types (wood, steel, various lines voltages)
- Describe conductor repair (patch and splice) on single conductor, bundled conductor of various sizes and line voltages
- Describe hardware tightening and replacement on various structure types (wood, steel, various lines voltages)



LINE J: TRANSMISSION

Competency: J-7 Maintain Transmission Lines

LEARNING TASKS	CONTENT
1. Perform line patrols, including structure site inspections, pole checks, timber checks and hardware checks	<ul style="list-style-type: none"> • Public safety checks • Line patrols (ground, aerial, climbing) • Structure site inspections (access, ground movement) • Pole check (rot, damage, security) • Timber checks (rot, damage) • Hardware checks (loose, damaged)
2. Perform guy wire and anchor checks	<ul style="list-style-type: none"> • Guy wire and anchor checks (damage, guards, corrosion)
3. Perform insulator checks and visual conductor inspection	<ul style="list-style-type: none"> • Insulator checks (broken, damaged) • Visual conductor checks
4. Prepare a patrol report	<ul style="list-style-type: none"> • Pole reports
5. Perform pole changes (various line voltages)	<ul style="list-style-type: none"> • Pole changes (various line voltages)
6. Perform timber and X-arm changes (various line voltages)	<ul style="list-style-type: none"> • Timber or X-arm changes on various structure types (wood, steel, various lines voltages)
7. Perform insulator changes on various structure types (wood and steel) (various line voltages)	<ul style="list-style-type: none"> • Insulator changes on various structure types (wood and steel) (various line voltages)
8. Perform guy wire and anchor replacement on various structure types (wood and steel) (various line voltages)	<ul style="list-style-type: none"> • Guy and anchor replacement on various structure types (wood, steel, various lines voltages)



LEARNING TASKS

CONTENT

- | | |
|--|--|
| <p>9. Demonstrate conductor repair (patch and splice) on single conductor, bundled conductor, of various sizes and line voltages</p> | <ul style="list-style-type: none"> • Describe conductor repair (patch and splice) on single conductor, bundled conductor of various sizes and line voltages |
| <p>10. Describe hardware tightening and replacement on various structure types (wood, steel, various lines voltages)</p> | <ul style="list-style-type: none"> • Describe hardware tightening and replacement on various structure types (wood, steel, various lines voltages) |
| <p>11. Demonstrate proper live line procedures</p> | <ul style="list-style-type: none"> • Live line procedures |
| <p>12. Demonstrate proper grounding and bonding procedures</p> | <ul style="list-style-type: none"> • Grounding and bonding procedures |



LINE K: COMMUNICATION IN THE WORKPLACE

Competency: K-11 Describe Communication with Apprentices

LEARNING TASKS

1. Describe Communication with Apprentices

2. Describe teaching, coaching and mentoring apprentices

CONTENT

- Assess apprentice capabilities
- Listen to and assist with problems
- Supervise apprentices

- Teaching techniques
- Coaching techniques
- Mentoring techniques
- Demo on the job tasks
- Assess and record ongoing progress of apprentice's performance



LINE K: COMMUNICATION IN THE WORKPLACE

Competency: K-12 Communicate with Apprentices

LEARNING TASKS

1. Describe Communication with Apprentices

2. Describe teaching, coaching and mentoring apprentices

CONTENT

- Assess apprentice capabilities
- Listen to and assist with problems
- Supervise apprentices

- Teaching techniques
- Coaching techniques
- Mentoring techniques
- Demo on the job tasks
- Assess and record ongoing progress of apprentice's performance



SECTION THREE

TRAINING PROVIDER STANDARDS



RECOMMENDED REFERENCE MATERIALS

The following list of textbooks and learning materials may be needed to enhance the technical training component of the Power Line Technician Apprenticeship program.

Required

1. WorkSafe BC Regulations Online
2. Delmar's Standard Textbook of Electricity – Current Edition; S.L. Delmar, Thompson Delmar Learning
3. The Lineworker's Rigging Handbook – Current Edition; Alexander Publications
4. Transformation for Live Line Workers – Current Edition; Alexander Publications
5. Live Line Work Practices – Current Edition; Alexander Publications
6. Underground Distribution – Current Edition; Alexander Publications
7. The Lineman's and Cableman's Handbook; Shoemaker and Mack, McGraw Hill
8. Field Manual for Powerline Workers; Solman

Recommended

1. Distribution Transformer Handbook; Alexander Publications



TRAINING FACILITIES STANDARDS

Classroom:

- 900 sq. ft. classroom
- 14 networked computer workstations + 1 for the instructor
- Instructional media to include multimedia projector, projection screen, DVD player, flipchart and whiteboard

Instructor's work space:

- 80 sq. ft. per instructor, with a desk, chairs and materials storage / filing system

Indoor Lab Training Area:

- 450 sq. ft. for each class
 - Low voltage simulator
 - Primary metering installations
- 900 sq. ft. for each class
 - Underground distribution equipment
 - Cable termination
 - Splicing
- Well heated and ventilated
- Lighting appropriate to detailed work

Outdoor Training Yard:

- 3 acres (approx) for a class of 14 students
- Simulated overhead power distribution system
- Simulated overhead power transmission system
- Simulated underground distribution system
- Simulated substation

Storage:

- 800 sq. ft. indoor materials storage
- 5,000 sq. ft. outdoor storage
 - Pole bunks
 - Parking for specialized vehicles and equipment



INSTRUCTOR QUALIFICATIONS

A Power Line Technician Instructor will have the following combination of qualifications and experience:

- Power Line Technician Red Seal certification, plus
- 2 years of hands-on working experience as a Power Line Technician after earning Red Seal certification, plus
- Demonstrated effectiveness of communication skills, instructional and interpersonal
- Experienced user of relevant software
- Certifications and qualifications appropriate to the tools, equipment and systems involved in specific lessons or modules
- For specialized topics, an instructor who may not meet the criteria above will have equivalent levels of appropriate certification and experience

Also preferred for a Power Line Technician Instructor:

- Provincial (BC) Instructor Diploma or completion of a similar Trainer Training / Instructional Methods program, plus



Tools and Equipment

Hand Tools:

Allen keys	Funnel
Binoculars	Hack saw
Bolt cutters	Hammers
Brace and bits	Hand saw
Broom	Knives
Brushing rakes	Levels
Buck saw	Pliers – nine inch
Cable cutters	Pliers – needle-nose
Cable Jacks	Nut drivers
Cant hook	Nylon straps
Chain jacks	Peavey
Chisel	Pick
Compression tools (M-D6, Y-35, Y-45, etc.)	Plumb bob
Crow bar	Screwdrivers
Digging bar	Shovel
Digging spade	Sledge hammer
Drill bits	Spot light
Files	Vice
Flashlight	Wire cutters
	Wrenches

Personal Protective Equipment:

Climbing gear	Hearing protection
Face shield	Insulated gloves
Fire retardant clothing	Leather gloves
Flash glasses	Rubber gloves
Goggles	Safety glasses
Hard hat and two point chin strap	Safety-toe footwear
Harness to meet WorkSafe BC regs	Safety vest

Safety Equipment:

Arrow boards	Flares
Barricades	Fume and toxic gas detector
Breathing protection	Grounding devices
Bucket / tower rescue and descent equipment	Grounding mat
Caution tape	Insulated gloves
Cones	Life lines
Conductive clothing	Plastic line guards
Confined space evacuation equipment	Plastic pole guards
Fire blankets	Pole top rescue equipment
Fire extinguisher	Rubber protective cover-up
First-aid equipment	Traffic caution signage
	Wheel chocks



Live Line Tools:

Auxiliary arm and insulators	Insulator support
By-pass jumper	Live line cutters
Cut-out covers	Load break tool
Elbow puller	Spiral link sticks
Hot sticks-clamp, grip all, P-2	Sticks
Insulated web hoist	

Electrical Measuring Equipment:

Continuity tester	Ohm meter
Current leakage meter	Potential testing meter
Digital recording amp meter	Rotation meter
Digital recording volt meter	Time domain reflectometer
Energized insulator tester	Transformer tester
Ground resistance tester	Voltage / amp meters
High voltage phasing sticks	

Power Tools:

Battery drill	Hydraulic drill
Chain saw	Hydraulic / electric press (Y-35, Y-45)
Gas drill	Jack hammer
Hammer drill	Pneumatic drill
Hydraulic cutters	Portable generator

Specialty Tools and Equipment:

Air compressor	Infrared gun
Cable locator	Insulated telescopic (40 ft.) work stick
Cable stripper	Oil sample test kit
Core sampling tool	Reel jacks
Explosive actuated tool	Running grounds
Feed through device	Sag board
Gaff gauge	Silicon cloth
Ground rod driver	Tool bucket

Aerial Work Platforms:

Fibreglass ladders	Material Handling Aerial Device (MHAD)
Insulated pole platform (diving board)	



Rigging, Hoisting and Lifting Equipment:

Block and tackle
Boom truck (RBD)
Capstan hoist
Dynamometer
Hand line
Hoists

Pike pole
Pole jack
Power reel trailer
Slings / grips
Tension machine
Wire mesh cable grip

Communication Equipment:

Cellular phone
Computer
Fax machine
Pager

Printer
Telephone
Two-way radio



APPENDIX A

ASSESSMENT GUIDELINES



APPENDIX A ASSESSMENT GUIDELINES

Program: **Power Line Technician**

Training providers delivering Power Line Technician apprenticeship in-school technical training are required to enter the following information in ITA Direct Access for each apprentice:

- An in-school mark in the form of a percentage
(Minimum 70% is required for a pass)

Training Provider Component: **In-School Technical Training**

The in-school mark for each level is derived from a combination of theory and practical assessments. This mark is then combined with the ITA Standard Level Examination to determine a final mark for the level.

Calculation tables showing the subject competencies, level percentage weightings and level examination weightings are shown in the Grading Sheet: "Subject Competencies and Weightings" section of this document.

Power Line Technician Level 1 & 2 in-school marks are calculated by:

- Totaling the level *theory* competency results as noted in the competencies and weightings tables and multiplying the total by 60% or Level 1 & 2 to produce a weighted theory result;
- Totaling the level *practical* competency results as noted in the competencies and weightings tables and multiplying the total by 40% for Level 1 & 2 to produce a weighted practical result;
- Adding the theory and practical competency results together to determine the final in-school result.

Successful completion of the in-school training for each level is defined as an in-school mark of 70% or greater.

Power Line Technician Level 3 in-school marks are calculated by:

- Totaling the level *theory* competency results as noted in the competencies and weightings tables and multiplying the total by 50% for Level 3 to produce a weighted theory result;
- Totaling the level *practical* competency results as noted in the competencies and weightings tables and multiplying the total by 50% for Level 3 to produce a weighted practical result;
- Adding the theory and practical competency results together to determine the final in-school result.

Successful completion of the in-school training for each level is defined as an in-school mark of 70% or greater.

**ITA Component: ITA Standardized Level Examinations - Level 1, 2 & 3**

ITA Direct Access (ITADA) automatically calculates the final mark for a level once the in-school training and standard level exam marks are entered into the system. This mark is calculated by blending the standardized exam percentage score and the in-school technical training percentage score to determine the final mark for the level.

In-school technical training (combined theory & practical) is weighted at 80% and the ITA standardized exam is weighted at 20%. These two scores are combined to determine the final level mark. This result is the final mark that is recorded in ITA Direct Access.

- A mark of 70% or greater is required to pass the level when combining the final in-school percentage score and the final ITA standardized level exam percentage score.

Interprovincial Red Seal Exam

In order to achieve certification with the Red Seal Endorsement, Power Line Technician apprentices are required to write the Power Line Technician Interprovincial Red Seal exam after completing all levels of in-school technical training. Apprentices must have passed all levels of in-school technical training or be approved challengers to sit the exam. A score of 70% or greater is required for a pass.

Interprovincial Red Seal exams should be requested by training providers via the usual ITA procedure.

The ITA will administer and invigilate Interprovincial Red Seal exams and score and record exam results in ITA Direct Access.



Grading Sheets: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING: ITA DIRECT ACCESS CODE:		Power Line Technician LEVEL 1 0041LI	
LINE	TRAINING TOPICS & SUGGESTED TIME ALLOCATION	THEORY WEIGHTING	PRACTICAL WEIGHTING
A	Safety and Safe Work Practices	17%	14%
B	Climbing	12 %	14%
C	Policy and Regulations	8%	0%
D	Tools and Instruments	9%	14%
E	Electrical Theory	15%	10%
F	Equipment	0%	9%
G	Rigging	10%	5%
H	Overhead Distribution	16%	14%
I	Underground Distribution	8%	5%
K	Communication in the Workplace	5%	14%
	Total	100%	100%
Calculated by the Training Provider Power Line Technician in-school theory & practical subject competency weighting		60%	40%
Training Provider enters final in-school mark into ITA Direct Access		X%	

Calculated by ITA: In-school Mark ITA Direct Access calculates the percentage weighting once the in-school mark is entered. Combined theory and practical subject competency multiplied by	80%
Calculated by ITA: Standard Level Exam Mark ITA Direct Access will calculate the percentage weighting once the standard level exam marks have been entered. The exam score is multiplied by	20%
Calculated by ITA: Final Mark The final mark for determining credit is calculated by ITA Direct Access.	FINAL%



PROGRAM: IN-SCHOOL TRAINING: ITA DIRECT ACCESS CODE:		Power Line Technician LEVEL 2 0041LI	
LINE	TRAINING TOPICS & SUGGESTED TIME ALLOCATION	THEORY WEIGHTING	PRACTICAL WEIGHTING
D	Tools and Instruments	9%	8%
E	Electrical Theory	17%	8%
F	Equipment	10%	8%
G	Rigging	16%	16%
H	Overhead Distribution	24%	23%
L	Underground Distribution	16 %	23%
K	Communication in the Workplace	8%	14%
	Total	100%	100%
Calculated by the Training Provider Power Line Technician in-school theory & practical subject competency weighting		60%	40%
Training Provider enters final in-school mark into ITA Direct Access		X%	

Calculated by ITA: In-school Mark ITA Direct Access calculates the percentage weighting once the in-school mark is entered. Combined theory and practical subject competency multiplied by	80%
Calculated by ITA: Standard Level Exam Mark ITA Direct Access will calculate the percentage weighting once the standard level exam marks have been entered. The exam score is multiplied by	20%
Calculated by ITA: Final Mark The final mark for determining credit is calculated by ITA Direct Access.	FINAL%



PROGRAM: IN-SCHOOL TRAINING: ITA DIRECT ACCESS CODE:		Power Line Technician LEVEL 3 0041LI	
LINE	TRAINING TOPICS & SUGGESTED TIME ALLOCATION	THEORY WEIGHTING	PRACTICAL WEIGHTING
E	Electrical Theory	20%	27%
F	Equipment	12%	9%
G	Rigging	18%	18%
H	Overhead Distribution	22%	27%
I	Underground Distribution	16%	18%
J	Transmission	12%	0%
	Total	100%	100%
Calculated by the Training Provider Power Line Technician in-school theory & practical subject competency weighting		50%	50%
Training Provider enters final in-school mark into ITA Direct Access		X%	

Calculated by ITA: In-school Mark ITA Direct Access calculates the percentage weighting once the in-school mark is entered. Combined theory and practical subject competency multiplied by	80%
Calculated by ITA: Standard Level Exam Mark ITA Direct Access will calculate the percentage weighting once the standard level exam marks have been entered. The exam score is multiplied by	20%
Calculated by ITA: Final Mark The final mark for determining credit is calculated by ITA Direct Access.	FINAL%