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# Newfoundland and Labrador Curriculum Standard Tower Crane Operator



Government of Newfoundland and Labrador  
Department of Immigration, Skills and Labour  
Apprenticeship and Trades Certification Division

November 2016

# PLAN OF TRAINING

## Tower Crane Operator

NOVEMBER 2016



**Government of Newfoundland and Labrador  
Department of Advanced Education, Skills and Labour  
Apprenticeship and Trades Certification Division**

Approved by:

A handwritten signature in blue ink, appearing to read "Dave Hill".

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Chairperson, Provincial Apprenticeship and Certification Board

Date: Nov 17, 2016

### Preface

This curriculum standard is aligned with the 2013 edition of the National Occupational Analysis (NOA) for the Tower Crane Operator trade. It describes the curriculum content for the Tower Crane Operator apprenticeship training program.

### Acknowledgements

The Provincial Trade Advisory Committee (PTAC), industry representatives, instructors and apprenticeship staff provided valuable input to the development of this provincial plan of training. Without their dedication to quality apprenticeship training, this document could not have been produced.

We offer you a sincere thank you.

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## Plan of Training – Tower Crane Operator

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<b>Document Status</b>	<b>Date Distributed</b>	<b>Mandatory Implementation Date</b>	<b>Comments</b>
Final	November 2016	January 2017	Update to align with 2 unique national harmonization levels.
Final	June 2020	June 2020	Updated Essential Skills (Related) courses to 2019 versions

**Table of Contents**

**A. NOA Comparison Table**

<b>NOA 2012 Tasks</b>		<b>2016 POT</b>	
<b>Task 1 – Performs safety related functions.</b>			
1.01	Uses personal protective equipment (PPE) and safety equipment.	LC1040	Shop Fundamentals for Crane Operators
		LC1110	Crane Maintenance
		LC1100	Crane Operation Safety
1.02	Maintains safe work environment.	LC1100	Crane Operation Safety
<b>Task 2 – Contributes to workplace organization.</b>			
2.01	Communicates with others.	LC1130	Crane Operations
		LC1260	Rigging for Crane Operators
2.02	Uses documentation.	LC1100	Crane Operation Safety
		LC1110	Crane Maintenance
<b>Task 3 – Performs pre-operational checks and regular inspections.</b>			
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3.02	Inspects mechanical components	TC1140	Mechanical Systems
		LC1110	Crane Maintenance
3.03	Inspects lines and wire ropes.	LC1260	Rigging for Crane Operators
3.04	Inspects hydraulic system components.	LC1200	Hydraulics and Applications to Crane Control Systems
		LC1110	Crane Maintenance
3.05	Inspects electrical system components.	TC1130	Electrical Systems
3.06	Inspects support components.	TC1110	Tower Crane Components
3.07	Inspects track travel components.	TC1110	Tower Crane Components
3.08	Inspects cab components.	TC1110	Tower Crane Components
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3.10	Completes inspection documentation.	LC1110	Crane Maintenance
		LC1100	Crane Operation Safety
<b>Task 4 – Performs Continual Checks.</b>			
4.01	Monitors site conditions.	LC1100	Crane Operation Safety
4.02	Monitors lines and wire ropes.	LC1260	Rigging for Crane Operators
4.03	Monitors equipment performance and conditions.	LC1100	Crane Operation Safety
4.04	Monitors structural and support components.	LC1100	Crane Operation Safety

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NOA 2012 Tasks		2016 POT	
<b>Task 5 – Performs minor crane maintenance.</b>			
5.01	Maintains mechanical components.	LC1110	Crane Maintenance
		TC1140	Mechanical Systems
5.02	Lubricates wire ropes and crane components	TC1110	Tower Crane Components
<b>Task 6 – Participates in tower crane assembly and disassembly.</b>			
6.01	Participates in crane assembly.	TC1160	Assembly and Disassembly
6.02	Participates in crane disassembly.	TC1160	Assembly and Disassembly
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6.04	Participates in assembly and disassembly of self-erecting tower cranes.	TC1160	Assembly and Disassembly
<b>Task 7 – Plans lifts.</b>			
7.01	Interprets load charts.	LC1130	Crane Operations
		TC1150	Tower Crane Load Charts
7.02	Plans work procedures.	LC1130	Crane Operations
		TC1150	Tower Crane Load Charts
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		LC1260	Rigging for Crane Operators
<b>Task 8 – Inspects and maintains rigging equipment.</b>			
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8.02	Lubricates slings and hardware.	LC1260	Rigging for Crane Operators
8.03	Stores rigging equipment.	LC1260	Rigging for Crane Operators
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9.02	Rigs load.	LC1260	Rigging for Crane Operators
9.03	Monitors rigging.	LC1260	Rigging for Crane Operators
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10.02	Confirms limits.	TC1170	Pre-lift Planning
<b>Task 11 – Operates tower cranes.</b>			
11.01	Trolleys carriage.	LC1130	Crane Operations
		TC1190	Specialty Crane Operations
11.02	Booms (luffs) up and down.	LC1130	Crane Operations
11.03	Swings (slews) jib.	LC1130	Crane Operations
11.04	Hoists load.	LC1130	Crane Operations
11.05	Travels crane.	LC1130	Crane Operations
		TC1190	Specialty Crane Operations
11.06	Performs functions simultaneously.	LC1130	Crane Operations
<b>Task 12 – Climbs (raises) tower cranes.</b>			
12.01	Performs bottom-climbing procedures.	TC1180	Climbing and Lowering
12.02	Performs top-climbing procedures.	TC1180	Climbing and Lowering
<b>Task 13 – Performs specialty tower crane operations</b>			
13.01	Participates in multi-crane lifts.	TC1190	Specialty Crane Operations

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<b>NOA 2012 Tasks</b>		<b>2016 POT</b>	
13.02	Operates in multi-crane site.	TC1190	Specialty Crane Operations
13.03	Hoists personnel.	TC1190	Specialty Crane Operations
<b>Task 14 – Shuts down and secures tower cranes.</b>			
14.01	Secures crane while leaving controls.	LC1130	Crane Operations
14.02	Secures crane while unattended.	LC1130	Crane Operations
14.03	Secures crane for extended periods.	LC1130	Crane Operations

## B. Program Structure

For each and every course, a formal assessment is required for which 70% is the pass mark. A mark of 70% must be attained in both the theory examination and the practical project assignment, where applicable

The order of course delivery within each level can be determined by the educational agency, as long as pre-requisite conditions are satisfied.

Upon completion of an entry-level program, individuals may be required to complete other certifications (employer or job site specific) in order to gain employment.

To articulate with National Harmonization topic sequencing, this plan of training is separated into 2 unique sections. Each section corresponds with a level of training in the sequencing plan.

<b>LEVEL I</b>				
<b>Course No.</b>	<b>IPG No.</b>	<b>Course Name</b>	<b>Hours</b>	<b>Pre-Requisite(s)</b>
<i>Section 1</i>				
TS1510	-	Occupational Health and Safety	6	None
TS1520	-	WHMIS	6	None
TS1530	-	Standard First Aid	14	None
LC1040	CRA-025 CRA-030	Shop Fundamentals for Crane Operators	60	None
LC1100	CRA-005	Crane Operation Safety	75	None
LC1130	CRA-065	Crane Operations	60	LC1100 LC1110 LC1200
LC1200	TCO-210	Hydraulics and Applications to Crane Control	15	LC1040
LC1260	CRA-035 CRA-040 CRA-045 CRA--085	Rigging for Crane Operators	60	None
TC1100	TCO-100	Introduction to Tower Cranes	3	None
TC1110	TCO-200	Tower Crane Components	30	TC1100
TC1120	TCO-205	Access Equipment	30	TC1100
TC1160	TCO-230	Assembly and Disassembly	30	TC1260



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<b>LEVEL I</b>				
<b>Course No.</b>	<b>IPG No.</b>	<b>Course Name</b>	<b>Hours</b>	<b>Pre-Requisite(s)</b>
TC1170	TCO-240	Pre-lift Planning	6	TC1160
AM1000	-	Introduction to Essential Skills	9	
*AM1101	-	Math Essentials	42	None
AM1341	-	Hoisting Math Fundamentals	42	AM1100
MC1062	-	Computer Essentials	15	None
Section Total			503	
<i>Section 2</i>				
LC1110	TCO-220	Crane Maintenance	60	None
TC1130	TCO-215	Electrical Systems	15	TC1110 TC1120
TC1140	TCO-220	Mechanical Systems	15	TC1110 TC1120
TC1150	TCO-225	Tower Crane Load Charts	60	TC1130 TC1140
TC1180	TCO-265	Climbing and Lowering	6	TC1170
TC1190	TCO-270	Specialty Crane Operations	6	TC1170
TC1200	TCO-250 TCO-255 TCO-260	Tower Crane Profiles	9	TC1170
AP1102	-	Introduction to Apprenticeship	12	None
CM2161	-	Communication Essentials	36	None
SD1761	-	Workplace Essentials	24	None
Section Total			243	
Total Level Hours			746	

**REQUIRED WORK EXPERIENCE**

\*A student who can meet the mathematics requirement through an ACUPLACER® test may be exempted from AM1101 - Math Essentials. Please check with your training institution.

## SECTION I

### TS1510 Occupational Health and Safety

#### **Learning Outcomes:**

- Demonstrate knowledge of how to prevent accidents and illnesses.
- Demonstrate knowledge of improve health and safety conditions in the workplace.

**Duration:** 6 Hours

**Pre-Requisite(s):** None

#### **Objectives and Content:**

1. Interpret the Occupational Health and Safety Act laws and regulations.
  - i. explain the scope of the act
    - application of the Act
    - Federal/Provincial jurisdictions
    - Canada Labour Code
    - rules and regulations
    - private home application
    - conformity of the Crown by the Act
2. Explain responsibilities under the Act and Regulations.
  - i. duties of employer, owner, contractors, sub-contractors, employees, and suppliers
3. Explain the purpose of joint health and safety committees.
  - i. formation of committee
  - ii. functions of committee
  - iii. legislated rights
  - iv. health and safety representation
  - v. reporting endangerment to health
  - vi. appropriate remedial action
  - vii. investigation of endangerment

- viii. committee recommendation
  - ix. employer's responsibility in taking remedial action
4. Examine right to refuse dangerous work.
- i. reasonable grounds for refusal
  - ii. reporting endangerment to health
  - iii. appropriate remedial action
  - iv. investigation of endangerment
  - v. committee recommendation
  - vi. employer's responsibility to take appropriate remedial action
  - vii. action taken when employee does not have reasonable grounds for refusing dangerous work
  - viii. employee's rights
  - ix. assigning another employee to perform duties
  - x. temporary reassignment of employee to perform other duties
  - xi. collective agreement influences
  - xii. wages and benefits
5. State examples of work situations where one might refuse work.
6. Describe discriminatory action.
- i. definition
  - ii. filing a complaint procedure
  - iii. allocated period of time a complaint can be filed with the Commission
  - iv. duties of an arbitrator under the Labour Relations Act
  - v. order in writing inclusion
  - vi. report to commission allocated period of time to request arbitrator to deal with the matter of the request
  - vii. notice of application
  - viii. failure to comply with the terms of an order
  - ix. order filed in the court
7. Explain duties of commission officers.
- i. powers and duties of officers
  - ii. procedure for examinations and inspections
  - iii. orders given by officers orally or in writing
  - iv. specifications of an order given by an officer to owner of the place of employment, employer, contractor, sub-contractor, employee, or supplier

- v. service of an order
  - vi. prohibition of persons towards an officer in the exercise of his/her power or duties
  - vii. rescinding of an order
  - viii. posting a copy of the order
  - ix. illegal removal of an order
8. Interpret appeals of others.
- i. allocated period of time for appeal of an order
  - ii. person who may appeal order
  - iii. action taken by commission when person involved does not comply with the order
  - iv. enforcement of the order
  - v. notice of application
  - vi. rules of court
9. Explain the process for reporting of accidents.
- i. application of act
  - ii. report procedure
  - iii. reporting notification of injury
  - iv. reporting accidental explosion or exposure
  - v. posting of act and regulations

### **Practical Requirements:**

- 1. Conduct an interview with someone in your occupation on two or more aspects of the act and report results.
- 2. Conduct a safety inspection of shop area.

## TS1520 Workplace Hazardous Materials Information System (WHMIS)

### Learning Outcomes:

- Demonstrate knowledge of interpreting and applying the Workplace Hazardous Materials Information System (WHMIS) Regulation under the Occupational Health and Safety Act.

**Duration:** 6 Hours

**Pre-Requisite(s):** None

### Objectives and Content:

1. Define WHMIS safety.
  - i. rationale and key elements
  - ii. history and development of WHMIS
  - iii. WHMIS legislation
  - iv. WHMIS implementation program
  - v. definitions of legal and technical terms
  
2. Examine hazard identification and ingredient disclosure.
  - i. prohibited, restricted and controlled products
  - ii. classification and the application of WHMIS information requirements
  - iii. responsibilities for classification
    - the supplier
    - the employer
    - the worker - Classification: rules and criteria
    - information on classification
    - classes, divisions and subdivision in WHMIS
    - general rules for classification
    - class A - compressed gases
    - class B - flammable and combustible materials
    - class C - oxidizing material
    - class D - poisonous and infectious material
    - class E - corrosive material
    - class F - dangerously reactive material

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

**Practical Requirements:**

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

TS1530 Standard First Aid

**Learning Outcomes:**

- Demonstrate knowledge of recognizing situations requiring emergency action.
- Demonstrate knowledge of making appropriate decisions concerning first aid.

**Duration:** 14 Hours

**Pre-Requisite(s):** None

Complete a **St. John Ambulance or Canadian Red Cross** Standard First Aid Certificate course.



## LC1040 Shop Fundamentals for Crane Operators

### Learning Outcomes:

- Demonstrate knowledge of various shop tools and equipment and their applications.
- Demonstrate knowledge of safety regulations in the operation and maintenance of shop tools.
- Demonstrate knowledge of the use of shop tools in a safe and competent manner.
- Demonstrate knowledge of operating oxy-fuel heating and cutting equipment.

**Duration:** 60 Hours

**Pre-Requisite(s):** None

### Objectives and Content:

1. Shop Safety.
  - i. explain the importance of safe work habits
  - ii. identify the required personal safety equipment for crane operators
  - iii. explain the importance of implementing exhaust control procedures
  - iv. explain the effects of excessive noise on hearing
  - v. identify factors that contribute to spontaneous combustion
  - vi. identify potential hazards to personal safety
  - vii. identify unsafe work conditions
  - viii. explain the importance of reporting accidents
2. Fasteners.
  - i. identify fasteners such as rivets, nails, wood screws, sheet metal screws, bolts, nuts, washers, masonry anchors, and shields
  - ii. describe specific sizes for each fastener
  - iii. identify sizes of fasteners
  - iv. identify bolt grades
  - v. identify miscellaneous anchoring devices

3. Describe the procedures to select, safely use, and maintain the following hand tools.
  - i. screwdrivers
    - standard
    - phillips
    - robertson
    - torx
  - ii. pliers
    - combination
    - gripping
    - cutting
    - vise-grips
    - snap ring
    - needle nose
  - iii. special hose clamp tools
  - iv. wrenches
    - open-end
    - box ends
    - ratcheting box ends
    - special purpose (box)
    - adjustable
    - pipe
    - spanner
    - Allen and multi-spline (metric and imperial)
  - v. sockets and drives (metric and imperial)
    - drive sizes
    - socket points
    - deep sockets
    - flexible sockets
    - drive handles
    - speed handles
    - ratchets
    - universal joints
    - adapters
    - extensions
  - vi. hammers
    - ball peen
    - cross peen

- plastic tip
    - brass-headed
    - rubber mallets
    - dead blow
    - sledge hammers
    - hammer handles
  - vii. punches
    - starting
    - pin
    - centre
    - aligning
  - viii. torque wrenches
    - types
    - sizes
    - purpose
  - ix. torque multiplier
  - x. hacksaws
    - types and designs
    - blade classification and selection
  - xi. files
4. Describe the procedures to select, safely use and maintain the following power tools.
- i. portable
  - ii. cleaning equipment
  - iii. drilling equipment
  - iv. metal cutting
  - v. grinders
5. Identify types of compressors.
6. Describe the procedures to select, safely use, and maintain compressors.
7. Describe the procedures to select, safely use, and store the following shop equipment.
- i. jacks
  - ii. shop cranes
  - iii. chain hoists

- iv. steam cleaners
  - v. solvent cleaning tanks
8. Describe the procedures to select, safely use, and maintain the following measuring tools.
- i. calipers
  - ii. measuring tapes
  - iii. wire rope gauges
  - iv. sheave gauges
  - v. anemometers
  - vi. feeler gauges
10. Describe procedures to operate oxy-fuel heating and cutting equipment to industrial safety standards for the removal and/or installation of parts.
- i. follows safety precautions
    - safety apparel
    - storage and handling of welding gases
    - pre-operational inspection
  - ii. setting up equipment
    - cylinders
    - gauges
    - regulators
    - valves-flame arrestor
    - torches and tips
    - hoses
    - testing for leaks
  - iii. operating the torch
    - lighting procedures
    - types of flames and effect on materials
    - shutting down procedures
11. Describe procedures to perform braze welding using oxy-acetylene equipment.
12. Describe procedures to perform flame cutting with oxy-acetylene equipment.

**Practical Requirements:**

1. Use and maintain personnel protective equipment.
2. Complete a shop safety inspection.
3. Implement exhaust control procedures in a shop.
4. Use hand tools.
5. Use and maintain various cutting tools.
6. Use various fasteners.
7. Use power tools.
8. Use compressed air systems.
9. Use and store of shop equipment.
10. Pre-check, light and adjust oxy-fuel welding and cutting equipment.
11. Perform flame cutting with oxy-fuel equipment.
12. Perform proper shut down procedures with oxy-fuel welding and cutting equipment.

## LC1100 Crane Operation Safety

### Learning Outcomes:

- Demonstrate knowledge of various codes and regulations required for the safe operation of cranes.
- Demonstrate knowledge of good safety practices in crane operations.
- Obtain the following certificates:
  - Professional Driver Improvement
  - Transportation of Dangerous Goods
  - Powerline Hazards
  - Traffic Control and Flagging

**Duration:** 75 Hours

**Pre-requisite(s):** None

### Objectives and Content:

1. Personnel Protective Equipment.
  - i. identify the compulsory personnel protective equipment required for Crane Operators and state its purpose
  - ii. state the minimum or C.S.A. codes for compulsory safety gear
  - iii. explain when safety items should be replaced
2. Warning signs, symbols and danger tags.
  - i. locate and identify, using operator's manual or the actual machine, any warning tag or warning symbol
  - ii. correctly match symbols to corresponding meanings
  - iii. state the steps to follow when a warning tag or symbol is discovered or when an operator is required to attach a warning tag or symbol to a machine

3. Mount and dismount equipment.
  - i. identify, from diagrams or from the actual machine, all safety grab-irons, handrails, steps, and foot-pegs used when mounting or dismounting equipment
4. Safe clearance in work areas.
  - i. state the minimum safe operating clearance for the overhead, sides, forward and rearward clearance of obstacles
  - ii. state the conditions for determining equipment operating clearances on the job
5. Dangerous operating situations.
  - i. identify factors that lead to dangerous operating situations: physiological (body), psychological (mental) mechanical failures, meteorological (weather) and terrestrial (land) conditions
  - ii. identify operational malpractice and poor habits that lead to accidents
6. Enclosed areas.
  - i. explain the safety procedures to use when running an engine in an enclosed area
  - ii. identify the toxic fumes that are associated with engine exhaust gases
  - iii. identify hoses and attachments needed to connect the engine exhaust pipe to a central ventilation system in a maintenance shop
  - iv. identify devices used to control exhaust fumes from engines when working in an underground work site
7. Fire prevention.
  - i. identify the components of the fire triangle
  - ii. identify types of fire extinguishers and explain how they work
8. Environmental concerns and safe practices regarding work site.
  - i. state the provincial regulations governing exhaust flame or spark arrestor while operating machinery in the forest
  - ii. list overhead/underground services that may be found on federal, provincial, municipal, and private lands
  - iii. identify the issues the operator should have knowledge of before actual set-up
  - iv. state the importance of containing and reporting spills
  - v. state the procedure for containment and reporting spills

**Practical Requirements:**

1. Clean and inspect safety gear.
2. Adjust and fasten fall arrest equipment (seat belts & safety

harnesses).

3. Mount/dismount equipment.
4. Demonstrate the use of a fire extinguisher.



## LC1130 Crane Operations

### **Learning Outcomes:**

- Demonstrate knowledge of various codes and regulations required for operating cranes.
- Demonstrate knowledge of good safety practices when operating cranes.
- Demonstrate knowledge of conservation and environmental issues related to crane operations.
- Demonstrate knowledge of new crane technology.
- Demonstrate knowledge of computer assisted safety devices, LMI/Load Indicators and procedures for use.

**Duration:** 60 Hours

**Pre-Requisites:** LC1100, LC1110, LC1200

### **Objectives and Content:**

1. Describe the crane operation occupation in terms of the work of a crane operator.
  - i. the crane operator's working conditions
  - ii. the responsibilities of the various parties involved with crane operation
2. Describe cranes.
  - i. identify types and uses of cranes
  - ii. describe various crane attachments
3. State the characteristics of hydraulic boom and lattice boom cranes.
4. Explain the principles of leverage associated with crane operation.
  - i. leverage and stability
  - ii. forward and backward stability factors
  - iii. rotation of upperworks (leverage and capacity)
  - iv. leverage calculations

5. Describe the purpose and applications of signaling.
  - i. identify all hand signals used in crane operations
  - ii. identify other construction hand signals which may cause confusion for crane operation
  - iii. interpret signals
  - iv. identify audible signals for cranes
6. Define quadrants of operation.
  - i. define quadrants and sweep area
  - ii. explain division of sweep area into quadrants
7. Interpret load charts for pre-lift planning and hoisting operations.
  - i. describe configuration of crane bases and booms
  - ii. describe quadrants of operation and their effects on load charts
  - iii. describe boom lengths and their effects on load charts
  - iv. describe effects on values of boom angle, boom length, and load radius for chart listings
8. Define jib and jib offset.
  - i. fixed jibs
  - ii. luffing jibs
9. State the differences between gross capacity versus net capacity load on a crane.
  - i. identify the purpose of range diagrams
  - ii. describe how to use range diagrams
10. Describe boom extension types and lengths.
  - i. full power telescopic
  - ii. pinned telescopic booms
11. State the factors that reduce capacity.
  - i. effects of increased load radius
  - ii. effects of rapid swing rate
  - iii. effects of impact loading and rapid acceleration or deceleration of load
  - iv. effects of high wind speeds
  - v. duty cycle operations
12. Discuss safety considerations for short-term and long-term shutdowns.

13. Describe structural failure and stability failure.
14. Determine conditions of a load chart.
  - i. calculate parts of line
  - ii. calculate weight of line
  - iii. weight of hook block
15. Determine main boom capacities.
  - i. list capacity deductions
  - ii. calculate net capacities
16. Describe the principles of crane operation.
  - i. define leverage and stability
  - ii. perform leverage calculation
  - iii. describe changes in crane leverage and capacity during rotation of upper works.
  - iv. describe forward and backward stability factors
  - v. describe structural failure
  - vi. describe wire rope safety factors for crane running and stationary ropes
17. Describe main boom gross capacity.
  - i. lattice boom
  - ii. hydraulic boom
  - iii. pinned telescopic boom
  - iv. jibs and/or boom extension(s) installed for all crane types
18. Determine main boom capacities with jibs or boom extensions installed.
  - i. determine the effective weight of jibs and boom extensions
  - ii. list capacity deductions
  - iii. calculate net capacities
19. Determine jib and boom extension capacities for lattice booms.
  - i. determine effective weight of jib
  - ii. list capacity deductions
  - iii. calculate net jib capacities using each method
20. Determine jib and boom extension capacities for full telescopic booms.
  - i. calculate boom extension capacities

- ii. calculate jib capacities
  - iii. calculate boom extension and jib combination capacities
21. Determine jib and boom extension capacities for pinned telescopic booms.
- i. calculate boom extension capacities
  - ii. calculate jib capacities
  - iii. calculate boom extension and jib combination capacities
22. Describe inspection procedures for a crane carrier.
23. Describe the procedures for starting, moving, and proper shut down of a crane carrier.
24. Describe the procedures to transport and operate cranes.
- i. safety pre-cautions for preparing and travelling cranes
  - ii. identify municipal considerations for travelling cranes
  - iii. define the operator's responsibility to prevent accidents, and the need for safety when travelling and operating cranes
  - iv. identify manufacturer's recommendations or special precautions regarding travelling of cranes to and from job sites
  - v. determine the maximum allowable ground speed while travelling, corresponding to the cranes that are selected
  - vi. identify what warning sign(s) if any, must be attached to cranes while travelling to and from job sites
  - vii. determine clearances required for transporting and operating cranes
25. Describe conditions which prohibit crane operation.
- i. identify machine configurations that do not meet specifications
  - ii. describe improper use of outriggers
  - iii. state the importance of the crane being level and the potential danger of instability
  - iv. describe crane leveling procedures
  - v. describe ground conditions and blocking procedures
  - vi. identify what weather and atmospheric conditions that can restrict crane operation
  - vii. describe eccentric reeving

26. Plan for performing a lift.
  - i. identify and evaluate work to be performed
  - ii. describe considerations influencing lifting procedures
  - iii. analyze factors influencing equipment selection
  - iv. interpret an engineered lift
  - v. plan a multiple crane lift
  
27. Identify and describe new model cranes.
  - i. range of capacities available
  - ii. range of boom lengths available
  - iii. manufacturers
  - iv. advantages/disadvantages
  
28. Describe the upper structure characteristics of new model cranes.
  - i. boom technology
  - ii. telescoping and pinning systems
  - iii. heavy lift attachments

### **Practical Requirements:**

1. Prepare and perform a multi-crane lift.
  - i. receive and respond to signals in an actual crane operation
  
2. Inspect, start-up and shut down a crane carrier.

## LC1200 Hydraulics and Applications to Crane Control

### **Learning Outcomes:**

- Demonstrate knowledge of the principles of hydraulic systems.
- Demonstrate knowledge required for inspecting and maintaining crane hydraulic systems.
- Demonstrate knowledge of good safety practices when inspecting and maintaining hydraulic systems.
- Demonstrate knowledge of conservation and environmental issues.

**Duration:** 15 Hours

**Pre-Requisite(s):** LC1040

### **Objectives and Content:**

1. Describe the principles of power transfer through hydraulic systems.
  - i. basic principles of hydraulics
  - ii. how a hydraulic system works
  - iii. open and closed systems
  - iv. implications for crane hydraulics
2. Describe the transmission of engine power to hydraulic power through such functions as:
  - i. swinging/slewing
  - ii. boom/up/down
  - iii. boom extension and retraction of hydraulic booms
  - iv. hydraulic pumps and motors
3. Describe the construction and operation of a basic hydraulic system.

4. Describe how hydraulic fluid is used in the operation of:
  - i. different types of valves
  - ii. different types of pumps
    - displacement of pumps
  - iii. different types of hydraulic cylinders
    - piston cylinders
    - cylinders on cranes
  
5. Describe the operation of the following hydraulic system components.
  - i. motors
  - ii. accumulators
  - iii. filters
  - iv. reservoirs
  - v. monitoring devices
  - vi. hoses and fittings
  - vii. adapters
  - viii. SAE O-ring
  - ix. flangeheads
  - x. seals
  
6. Describe the qualities required for hydraulic fluids.
  - i. properties of fluids
  
7. Describe the effect of cold weather and contaminants in a system.
  
8. Describe the maintenance of fluid levels and precautions when checking.
  
9. Describe the relationship of electric systems to hydraulic systems.
  
10. Identify the following components and describe how they are tested.
  - i. controls
  - ii. basic components
    - solenoids
    - relays
  - iii. components and spools

11. Identify hydraulic systems used for all types of cranes.
  - i. closed centre systems
  - ii. open centre systems
  - iii. speed-o-matic system (Link Belt)
  - iv. hydraulically-powered (lattice boom cranes)
  - v. independent systems
  - vi. combined systems
  - vii. independent clutch
  - viii. independent steering
  - ix. hydraulic systems (Grove Cranes)
    - boom lift system-hydraulic boom
    - boom extension system
    - swing system
    - hoist system
    - outrigger system
    - hydraulic counter-weight exterior system
  - x. lattice boom crane upperworks
    - independent hydraulic system (gantry operation)
    - independent hydraulic system (boom operation)
    - independent hydrostatic drive system

### **Practical Requirements:**

1. Perform routine maintenance and inspections for crane hydraulic systems:
  - i. safety practices on a hydraulic system
  - ii. general safety precautions
  - iii. cleanliness and inspection
  - iv. reservoir inspection
  - v. inspection for leaks
  - vi. leakdown
    - outrigger
    - boom hoist cylinders
    - boom extension cylinders
2. Test and replace defective components: controls, solenoids, relays and spools.



## LC1260 Rigging for Crane Operators

### Learning Outcomes:

- Demonstrate knowledge of the procedures to use safety harnesses.
- Demonstrate knowledge of the procedures to perform rigging operations.

**Course Duration:** 60 Hours

**Pre-Requisite(s):** None

### Objectives and Content:

1. Describe the responsibilities of riggers.
2. Identify and describe the composition of wire rope.
  - i. wire
  - ii. strand
  - iii. core
    - fibre
    - wire
    - strand
3. Interpret and describe rope lay.
  - i. regular
  - ii. lang
  - iii. right and left
  - iv. alternate
  - v. herringbone
  - vi. twin strand
  - vii. specialty ropes
4. Identify specialty ropes and how/where they are used including limitations.
5. Describe and interpret sizes, grades and construction of all types of rigging and hoisting ropes.
6. Identify and compare preformed vs. non-preformed types of ropes.
7. Identify and describe the fatigue and abrasion resistance of wire ropes.

8. Identify safety factors for:
  - i. rigging slings (IWRC and anti-rotation)
  - ii. running ropes
  - iii. standing ropes
  - iv. hoisting personnel
9. Calculate safe working loads.
10. Identify the classification group.
11. Identify and describe uses for non-rotation and rotating resistant ropes.
12. Describe proper installation procedures for all types of wire rope.
13. Explain the importance of lubricating and cleaning wire ropes.
14. Identify end fittings and connections and explain how they are installed.
15. Identify the minimum rope wraps on a drum that is to be maintained.
16. Identify grades of chain including.
  - i. strength
  - ii. inspection
  - iii. care and use
17. Describe reeving.
18. Determine the parts of line required.
19. Describe the effect of winch diameter for:
  - i. multi-layer (wire rope)
  - ii. line speed vs. torque
20. Compare the SWL of rope vs. line pull.
21. Describe the effect of sheave friction during a lift.
22. Identify the mechanical advantage of reeving.

23. Describe wire block reeving methods.

- i. lacing
- ii. square or angle
- iii. skip

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24. Identify and describe types and configurations for slings including.

- i. wire rope
- ii. synthetic web
- iii. jacketed round synthetic
- iv. metal mesh
- v. chain
- vi. sling configurations
- vii. single vertical hitch
- viii. bridle hitch
- ix. single and double basket hitch
- x. double wrap basket hitch
- xi. single and double choker hitch
- xii. double wrap choker hitch
- xiii. endless slings or grommet
- xiv. braided
- xv. sling angles
- xvi. safe working loads

25. Read and interpret manufacturer identification tags.

26. Describe rigging precautions when using synthetic and specialty slings.

27. Explain the importance of removing frayed, cut, damaged and worn equipment from service.

28. Describe rigging procedures and perform rigging calculations.

29. Determine load weights.

30. Determine the centre of gravity for various loads.

31. Determine tensions on sling legs.

32. Identify the hand signals used for hoisting operations.

**Practical Requirements:**

1. Plan rigging operations.
2. Calculate safe working loads and sling angles.
3. Calculate loads on equalizer beams.
4. Demonstrate proper signaling for hoisting procedures.
5. Demonstrate installation of multiple parts of line.
  - i. lacing
  - ii. reeving (square or angle/skip)
6. Demonstrate proper installation and procedures for all types of wire rope.
7. Inspect, use, handle and maintain wire rope.
  - i. lubrication
  - ii. cleaning
8. Install wire rope wedge socket end termination.
9. Demonstrate the use of:
  - i. drums and winches
  - ii. sheaves
  - iii. hooks
  - iv. rings, links and swivels
  - v. shackles
  - vi. eye bolts and lugs
  - vii. turnbuckles
  - viii. come-a-long and chain hoist
  - ix. spreader and equalizer beams
  - x. crane blocks
  - xi. wire rope blocks
  - xii. snatch block
  - xiii. block and tackle

xiv. wire rope clips

10. Assemble rigging in a safe and efficient manner.
11. Select appropriate rigging hardware for a given job.
12. Perform maintenance and properly store rigging.
13. Demonstrate proper rigging procedures and calculations.
14. Plan and demonstrate various rigging operations.

## TC1100 Introduction to Tower Cranes

### **Learning Outcomes:**

- Demonstrate knowledge of tower cranes, their characteristics and applications.
- Demonstrate knowledge of the procedures used to configure tower cranes and their components.

**Duration:** 3 Hours

**Pre-Requisite(s):** None

### **Objectives and Content:**

1. Define terminology associated with tower cranes.
2. Identify hazards and describe safe work practices pertaining to tower cranes.
3. Identify types of tower cranes and describe their characteristics and applications.
  - i. hammerhead
  - ii. luffing
  - iii. self-erecting
  - iv. stationary
  - v. traveling
  - vi. climbing
4. Identify types of tower crane jibs and describe their characteristics and applications.
  - i. hammerhead/fixed
  - ii. luffing
5. Identify types of tower crane masts and describe their characteristics and applications.
  - i. Mono
  - ii. Transitional
  - iii. inner/outer
  - iv. top/bottom climbers

- v. telescopic
6. Identify types of tower crane bases and describe their characteristics and applications.
- i. base slab
  - ii. rail mounted
  - iii. crawler mounted
  - iv. truck mounted
  - v. outrigger
  - vi. cruciform
7. Describe the procedures used to configure tower cranes and their components.
8. Describe the procedures used to inspect and maintain tower cranes.

**Practical Requirements:**

None.

## TC1110 Tower Crane Components

### Learning Outcomes:

- Demonstrate knowledge of tower crane components, their characteristics and applications.
- Demonstrate knowledge of procedures used to troubleshoot, maintain, inspect and store tower crane components.

**Duration:** 30 Hours

**Pre-Requisite(s):** TC1100

### Objectives and Content:

1. Define terminology associated with tower crane components.
  - i. hammerhead
  - ii. luffing
  - iii. self-erecting
2. Identify hazards and describe safe work practices pertaining to tower crane components.
3. Interpret codes, standards and regulations pertaining tower crane components.
  - i. manufacturers' specifications
  - ii. CSA Z248
  - iii. jurisdictional regulations
4. Identify types of tower crane components and describe their characteristics and applications.
  - i. structural
  - ii. support
  - iii. track or travel
  - iv. cab
  - v. safety/access



5. Describe the procedures used to inspect connections of tower crane components and their accessories.
6. Describe the procedures used to troubleshoot tower crane components and accessories for various configurations.
7. Describe the procedures used to inspect, maintain and store tower crane components and their accessories.

**Practical Requirements:**

1. Locate and identify tower crane components.
2. Complete an inspection of a tower crane.
  - i. pre-operational
  - ii. post-operational
3. Maintain tower crane components.
4. Store tower crane components.

## TC1120 Access Equipment

### Learning Outcomes:

- Demonstrate knowledge of access equipment, their applications, limitations and procedures for use.
- Demonstrate knowledge of procedures used to inspect and maintain access equipment.

**Duration:** 30 Hours

**Pre-Requisite(s):** TC1100

### Objectives and Content:

1. Define terminology associated with access equipment.
2. Identify hazards and describe safe work practices pertaining to access equipment.
3. Identify codes, standards and regulations pertaining to access equipment.
  - i. training and certification requirements
  - ii. jurisdictional requirements
4. Identify types of access equipment and describe their characteristics and applications.
  - i. ladders
  - ii. catwalks
  - iii. scaffolding
5. Identify types of fall protection and fall arrest equipment and describe their applications and procedures for use.
6. Describe the procedures used to erect and dismantle access equipment.
  - i. manufacturers' specifications
  - ii. professional engineer specifications

7. Describe the procedures used to inspect and maintain access equipment.
  - i. manufacturers' specifications

**Practical Requirements:**

1. Perform proper use of access equipment.

## TC1160 Assembly and Disassembly

### Learning Outcomes:

- Demonstrate knowledge of tower cranes and their associated components.
- Demonstrate knowledge of the procedures used for the assembly and disassembly of tower cranes and their components.

**Duration:** 30 Hours

**Pre-Requisite(s):** TC1260

### Objectives and Content:

1. Define terminology associated with the assembly and disassembly of tower cranes.
2. Identify hazards and describe safe work practices pertaining to the assembly and disassembly of tower cranes.
3. Identify tools and equipment relating to the assembly and disassembly of tower cranes and describe their applications and procedures for use.
4. Interpret codes, standards and regulations pertaining to the assembly and disassembly of tower cranes.
  - i. permits
5. Interpret charts, drawings and specifications relating to the assembly and disassembly of tower cranes.
  - i. manufacturers' specifications
  - ii. professional engineer specifications
6. Identify tower crane components requiring assembly and disassembly.
  - i. mast/tower
  - ii. boom/trolley
  - iii. counter-jib
  - iv. counter-weight

- v. apex/tower top
- 7. Describe the procedures used to assemble tower cranes and their components.
- 8. Describe the procedures used to disassemble tower cranes and their components.
- 9. Describe the procedures used for the assembly and disassembly of specialty equipment and their attachments.
- 10. Describe the procedures used to transport tower crane components and self-erecting tower cranes.

**Practical Requirements:**

- 1. Perform a function test.
- 2. Perform a load test.

## TC1170 Pre-lift Planning

### Learning Outcomes:

- Demonstrate knowledge of the steps required for pre-lift activities.
- Demonstrate knowledge of procedures used to perform pre-lift (warm-up) activities.
- Demonstrate knowledge of the procedures used to prepare worksite for tower crane operations.

**Duration:** 6 Hours

**Pre-Requisite(s):** TC1160

### Objectives and Content:

1. Define terminology associated with pre-lift planning.
2. Identify hazards and describe safe work practices pertaining to pre-lift planning.
3. Identify tools and equipment relating to pre-lift planning and activities and describe their applications and procedures for use.
4. Interpret codes, standards and regulations pertaining to pre-lift planning.
  - i. jurisdictional requirements
  - ii. job site/company policies
5. Interpret information pertaining to lifting operations found on drawings and specifications.
  - i. lift plans
  - ii. manufacturers' specifications
6. Identify the considerations and requirements for completing pre-lift planning.
  - i. risk assessment (job site hazard analysis)
  - ii. site assessment
    - site/soil conditions

- crane access
  - obstructions
  - electrical hazards
- iii. worksite preparation
7. Describe the procedures used to prepare worksite for crane operations.
8. Describe the procedures used to perform final site inspection.

**Practical Requirements.**

None.

## AM1000 Introduction to Essential Skills

### Learning Outcomes:

- Demonstrate knowledge of the nine nationally recognized essential skills.
- Demonstrate knowledge of the essential skills levels of complexity.
- Demonstrate knowledge of the essential skills required for the learners chosen trade.
- Demonstrate an awareness of essential skills assessments.

**Duration:** 9 Hours

**Pre-Requisite(s):** None

### Objectives and Content:

1. Identify and describe the essential skills recognized by the Government of Canada through the Office of Literacy and Essential Skills (OLES).
  - i. reading
  - ii. document use
  - iii. numeracy
  - iv. writing
  - v. oral communication
  - vi. working with others
  - vii. thinking
  - viii. computer use
  - ix. continuous learning
2. Describe the Levels of Complexity measurement assigned to essential skills.
3. Identify the essential skills, along with their complexity level, identified as necessary for the learner's trade.
  - i. RSOS / NOA content<sup>1</sup>
  - ii. OLES Essential Skills Profiles<sup>2</sup>
  - iii. OLES tools and support for apprentices and tradespersons<sup>3</sup>
4. Describe the nature and purpose of essential skills assessment.
  - i. self-assessment & formal assessment tools
  - ii. indicators of deficiencies
  - iii. suggestions for improvement
5. Describe the benefits of essential skills improvement.
  - i. confidence at work
  - ii. employability



- iii. success in apprenticeship
- iv. wage & job advancement

**Practical Requirements:**

1. Complete an essential skills self-assessment addressing numeracy, document use and reading. The online **Government of Canada Essential Skills Indicator<sup>4</sup>** and **Essential Skills Self-Assessment for the Trades<sup>5</sup>** are to be used unless the instructor provides a similar assessment tool or tools.
2. Participate in a group discussion about the impact of gaps in essential skills that may be revealed by the self-assessments completed, and the value of improving essential skills.

Students are graded complete or incomplete on this practical work, no grade is permitted for self-assessment performance. However, completion of the practical requirements is mandatory for completion of this unit.

**Resources:**

All footnotes are in the companion document, Resources for Introduction to Essential Skills, which is available online from Apprenticeship and Trades Certification.

## AM1101 Math Essentials

Note: It is recommended that AM1101 be delivered in the first semester of the Pre-employment program.

### Learning Outcomes:

- Demonstrate knowledge of essential numeracy skills.
- Demonstrate knowledge of mathematics as a critical element of the trade environment.
- Demonstrate knowledge of mathematical principles in trade problem solving situations.
- Demonstrate the ability to solve simple mathematical word problems.

**Duration:** 42 Hours

**Pre-Requisite(s):** None

### Objectives and Content:

Wherever possible, the instructor is expected to use trade specific examples to reinforce the course objectives.

1. Describe whole number operations.
  - i. read, write, count, round off, add, subtract, multiply and divide whole numbers
2. Describe the application of the order of operations in math problems.
3. Describe fraction and mixed number operations.
  - i. read, write, add, subtract, multiply and divide fractions
4. Describe decimal operations.
  - i. read, write, round off, add, subtract, multiply and divide decimals

5. Describe percent/decimal/fraction conversion and comparison.
  - i. convert between fractions, decimals and percents
6. Identify percentage operations.
  - i. read and write percentages
  - ii. calculate base, rates and percentages
7. Identify ratio and proportion operations.
  - i. use a ratio comparing two quantities with the same units
  - ii. use a proportion comparing two ratios
8. Describe the use of the imperial measurement system in math problems.
  - i. identify units of measurement
    - length
    - mass
    - area
    - volume
    - capacity
9. Describe the use of the metric measurement system in math problems.
  - i. identify units of measurement
    - length
    - mass
    - area
    - volume
    - capacity
10. Identify angles, lines and geometric shapes.
  - i. use a protractor to measure angles
  - ii. determine whether an angle is right, acute or obtuse
  - iii. identify parallel, perpendicular, horizontal and vertical lines
  - iv. identify types of triangles, quadrilaterals, and 3-dimensional shapes
11. Describe estimation strategies.
  - i. estimate a linear measure using a referent
  - ii. estimate length, area and volume of objects in metric and imperial systems
12. Describe problem solving that involves linear measurement using instruments such as rulers or tape measures, in the metric and imperial systems.

**Practical Requirements:**

1. To emphasize or further develop specific knowledge objectives, students will be required to complete practical demonstrations which confirm proper application of mathematical theory to job skills.

## AM1341 Hoisting Math Fundamentals

### Learning Outcomes:

- Demonstrate knowledge of mathematical concepts in the performance of trade practices.
- Demonstrate knowledge of mathematics as a critical element of the trade environment.
- Solve mathematical word problems.
- Demonstrate knowledge of mathematical principles for the purposes of problem solving, job and materials estimation, measurement, calculation, system conversion, diagram interpretation and scale conversions, formulae calculations, and geometric applications.

**Duration:** 42 Hours

**Pre-Requisite(s):** AM1101

### Objectives and Content:

The instructor is required to use trade specific examples to reinforce the course objectives.

1. Describe percent/decimal/fraction conversions and comparisons in trade specific situations.
2. Describe ratios and proportions as they relate to trade specific problems.
3. Describe the use of the Imperial and Metric measurement systems in trade specific applications.
4. Describe Imperial and Metric conversions in trade specific situations.
  - i. convert between imperial and metric measurements
  - ii. convert to another unit within the same measurement system
5. Describe how to manipulate formulas using cross multiplication, dividing throughout, elimination, and substitution to solve trade specific problems.
  - i. right angle triangles
  - ii. area
  - iii. volume
  - iv. perimeter
  - v. density
6. Identify calculations involving geometry that are relevant to the trade.

- i. angle calculations
  - ii. circle calculations
7. Identify math processes used to complete administrative trade tasks.
- i. material estimation
  - ii. material costing
  - iii. time & labour estimates
  - iv. taxes & surcharges
  - v. markup & projecting revenue

### **Practical Requirements:**

1. To emphasize or further develop specific knowledge objectives, students will be asked to complete practical demonstrations which confirm proper application of mathematical theory to job skills.

Note: This course is **non-transferable** to other trades programs, and **not eligible for prior learning assessment**. Students completing training in this trade program are required to complete this math course. Apprentice transfers under Provincial / Territorial Mobility agreements may be exempt from this requirement.

## MC1062 Computer Essentials

### Course Outcomes:

- Demonstrate knowledge of desktop/laptop and mobile computers and their operation.
- Demonstrate knowledge of word processing and spreadsheet software, internet browsers and their applications.
- Demonstrate knowledge of e-mail applications and procedures.
- Demonstrate an awareness of security issues related to computers.
- Demonstrate an awareness of online learning using computers.

**Duration:** 15 Hours

**Pre-Requisite(s):** None

### Objectives and Content:

When possible, the instructor is expected to use trade specific examples to reinforce the course objectives.

1. Identify computer types used in the workplace, and the characteristics of each.
  - i. desktop/laptop computers
  - ii. tablets
  - iii. smartphones
2. Identify common desktop and mobile operating systems.
  - i. Windows
  - ii. Mac OS
  - iii. iOS
  - iv. Android
3. Describe the use of Windows operating system software.
  - i. start and end a program
  - ii. use the help function
  - iii. use the find function
  - iv. maximize and minimize a window
  - v. open and scroll through multiple windows
  - vi. use the task bar
  - vii. adjust desktop settings such as screen savers, screen resolution, and backgrounds
  - viii. shut down a computer

4. Identify the skills necessary to perform file management commands.
  - i. create folders
  - ii. copy files and folders
  - iii. move files and folders
  - iv. rename files and folders
  - v. delete files and folders
  
5. Describe the use of word processing software to create documents.
  - i. enter & edit text
  - ii. indent and tab text
  - iii. change text attributes
    - bold
    - underline
    - font
  - iv. change layout format
    - margins
    - alignment
    - line spacing
  - v. spell check and proofread
  - vi. save, close & reopen a document
  - vii. print document
  
6. Describe the use of spreadsheet software to create documents.
  - i. enter data in cells
  - ii. format data in cells
  - iii. create formulas to add, subtract, multiply and divide
  - iv. save, close & reopen a spreadsheet
  - v. print spreadsheet
  
7. Describe the use of the internet in the workplace.
  - i. web browsers
  - ii. search engines
  - iii. security issues
  - iv. personal responsibility for internet use at work
  
8. Describe the role of e-mail.
  - i. e-mail etiquette
    - grammar and punctuation
    - privacy issues when sharing and forwarding e-mail
    - work appropriate content
    - awareness of employer policies
  - ii. managing e-mail
    - using folders
    - deleting, forwarding, replying
  - iii. adding attachments to e-mail



- iv. view e-mail attachments
  - v. printing e-mail
9. Describe computer use for online learning.
- i. online training
  - ii. level exams
  - iii. study guides
  - iv. practice exams

**Practical requirements:**

1. Create, save and print a document using word processing software.
2. Create, save and print a document using spreadsheet software.
3. Send and receive an e-mail with an attachment.

## SECTION 2

### LC1110 Crane Maintenance

#### Learning Outcomes:

- Demonstrate knowledge of various codes and regulations required for inspecting and maintaining cranes.
- Demonstrate knowledge of good safety practices when maintaining cranes.
- Demonstrate knowledge of conservation and environmental issues when maintaining cranes.

**Duration:** 60 Hours

**Pre-Requisite(s):** None

#### Objectives and Content:

1. Service manuals.
  - i. identify the various sections of service manuals
    - maintenance
    - servicing
    - lubrication procedures
  - ii. interpret information in the manual
  - iii. explain the importance of complying with service manuals
2. Ordering parts.
  - i. locate the machine serial number or Vehicle Identification Number (VIN)
  - ii. locate the engine specifications plate and serial number
  - iii. complete a sample order form
3. Lubricants and their purposes.
  - i. locate the various components of the lubrication system and list the servicing period for each
  - ii. identify the various grades of oils to use under various temperature conditions
  - iii. identify correct greases
  - iv. identify the performance of grease under extreme load and heat

- v. state the functions of engine oil
  - vi. identify the various additives used in engine oil and the advantages and disadvantages of each
  - vii. identify the characteristics of gear lubricants
  - viii. define the Engine Service Classification as presented by the American Petroleum Institute (A.P.I)
4. Crane log book.
    - i. locate and state the purpose of the service meter
  5. Servicing and charging batteries.
    - i. identify the rules pertaining to the care and maintenance of batteries
    - ii. explain the procedure to clean and service a battery
    - iii. explain how to measure battery electrolyte with a hydrometer
    - iv. explain how to connect a charger to battery terminals
  6. Maintaining fuel systems.
    - i. identify the components of a fuel system
    - ii. explain how to prime a fuel system
    - iii. state the procedure used to service a fuel system
    - iv. state the procedure to follow in refueling a machine
    - v. state the precautions to be followed during refueling
  7. Maintaining cooling systems.
    - i. identify the components of the cooling system
    - ii. select a coolant for a given machine
    - iii. explain the process used to test anti-freeze solution
    - iv. explain the importance of and ways to maintain a cooling system by checking for plugged radiator core or bent fan blades
  8. Identify start-up and shut down procedures as prescribed in the service manual.
  9. Identify the various attachments available, the purpose and maintenance of each attachment.
  10. Describe the maintenance and adjustments required for tracks, tires and wheels.

**Practical Requirements:**

1. Follow a maintenance procedure.
2. Assist in changing lubricating fuels and filters.
  - i. select correct grease
  - ii. load a grease gun
  - iii. grease a piece of equipment
  - iv. assist in changing engine oil and a filter on a piece of equipment
  - v. assist in changing transmission fluid and filter on a piece of equipment
  - vi. adhere to the regulations pertaining to storage and disposal fluids
3. Affix a warning sign where it can be easily recognized on a piece of equipment.
4. Assist in priming and servicing a fuel system.
  - i. drain water from tank and sediment bowl
  - ii. change fuel filters
  - iii. change a water separator
5. Refuel a machine.
6. Service and charge a storage battery.
  - i. follow rules pertaining to the care and maintenance of batteries
  - ii. clean and service a battery
  - iii. measure battery electrolyte with a hydrometer
  - iv. connect a charger to battery terminals

## TC1130 Electrical Systems

### Learning Outcomes:

- Demonstrate knowledge of electrical systems, their purpose and operation.
- Demonstrate knowledge of electrical system components, their characteristics and applications.
- Demonstrate knowledge of procedures used to inspect, maintain and troubleshoot electrical systems and their components.

**Duration:** 15 Hours

**Pre-Requisite(s):** TC1110, TC1120

### Objectives and Content:

1. Define terminology associated with electrical systems.
2. Identify hazards and describe safe work practices pertaining to electrical systems and their components.
3. Identify tools and equipment relating to electrical systems and components and describe their applications and procedures for use.
4. Interpret codes, standards and regulations pertaining to electrical systems.
  - i. training and certification requirements
  - ii. manufacturers' specifications
5. Identify types of electrical systems and describe their purpose and operation.
  - i. digital
  - ii. analog
  - iii. control voltage
  - iv. supply voltage
6. Identify electrical system components and describe their applications.
  - i. limit switches
  - ii. grounding

- iii. supply cables
  - iv. disconnect switches
  - v. strain relief devices (power cable supports)
  - vi. power supply
  - vii. motors
  - viii. digital drives
7. Describe the procedures used to troubleshoot electrical systems and their components.
8. Describe the procedures used to maintain electrical systems and their components.
9. Describe the procedures used to inspect electrical systems and their components.

### **Practical Requirements:**

1. Inspect, maintain and troubleshoot electrical systems and their components.

## TC1140 Mechanical Systems

### Learning Outcomes:

- Demonstrate knowledge of mechanical systems, their purpose and operation.
- Demonstrate knowledge of mechanical system components, their characteristics and applications.
- Demonstrate knowledge of procedures used to inspect, maintain and troubleshoot mechanical systems and their components.

**Duration:** 15 Hours

**Pre-Requisite(s):** TC1110, TC1120

### Objectives and Content:

1. Define terminology associated with mechanical systems.
2. Identify hazards and describe safe work practices pertaining to mechanical systems and their components.
3. Identify tools and equipment relating to mechanical systems and components and describe their applications and procedures for use.
4. Interpret codes, standards and regulations pertaining to mechanical systems.
5. Identify types of mechanical systems and describe their purpose and operation.
6. Identify mechanical system components and describe their applications.
  - i. winches
  - ii. sheaves
  - iii. slewing drives
  - iv. brakes
  - v. gear boxes
  - vi. mechanical safety devices
  - vii. trolley components

7. Describe the procedures used to troubleshoot mechanical systems and their components.
8. Describe the procedures used to maintain mechanical systems and their components.
  - i. lubricate
  - ii. torque bolts
  - iii. mark bolts
9. Describe the procedures used to inspect mechanical systems and their components.

**Practical Requirements:**

1. Inspect, maintain and troubleshoot mechanical systems and their components.



## TC1150 Tower Crane Load Charts

### Learning Outcomes:

- Demonstrate knowledge of tower crane load charts, their characteristics and applications.
- Demonstrate knowledge of tower crane capacity, tower crane component capacity and working radius for lifting operations.

**Duration:** 60 Hours

**Pre-Requisite(s):** TC1130, TC1140

### Objectives and Content:

1. Define terminology associated with tower crane load charts.
2. Explain the principles of tower crane load charts.
  - i. CSA Z248
  - ii. jurisdictional regulations
3. Identify parts of a tower crane load chart and describe their characteristics and applications.
  - i. notes
  - ii. capacity charts
  - iii. range diagram
  - iv. technical data
  - v. factors reducing capacity
4. Interpret data from tower crane load charts required to plan lifts.
  - i. reeving requirements
  - ii. parts of line
  - iii. quadrants of operation
  - iv. capacity reductions for various configurations

5. Identify factors (i.e. weather) that influence tower crane capacity in lifting operations and describe their impact.
  - i. size and/or weight of load
  - ii. environmental conditions

**Practical Requirements:**

1. Interpret load chart data and calculate tower crane capacities for various configurations.

## TC1180 Climbing and Lowering

### **Learning Outcomes:**

- Demonstrate knowledge of climbing and lowering components and their applications.
- Demonstrate knowledge of the procedures used for climbing and lowering operations.

**Duration:** 6 Hours

**Pre-Requisite(s):** TC1170

### **Objectives and Content:**

1. Define terminology associated with climbing and lowering.
2. Identify hazards and describe safe work practices pertaining to climbing and lowering.
3. Interpret codes, standards and regulations pertaining to climbing and lowering.
4. Interpret charts, drawings and specifications relating to climbing and lowering.
5. Identify types of climbing and lowering components and describe their applications.
6. Identify the considerations and requirements for climbing and lowering tower cranes according to manufacturer's specifications..
7. Describe the procedures used to perform bottom-climbing operations.
8. Describe the procedures used to perform top-climbing operations.
9. Describe the procedures used to perform lowering operations

**Practical Requirements.**

None.

## TC1190 Specialty Crane Operations

### Learning Outcomes:

- Demonstrate knowledge of specialty crane operations, their characteristics and applications.
- Demonstrate knowledge of the procedures used to perform specialty crane operations.

**Duration:** 6 Hours

**Pre-Requisite(s):** TC1170

### Objectives and Content:

1. Define terminology associated with specialty crane operations.
2. Identify hazards and describe safe work practices pertaining to specialty crane operations.
3. Interpret codes, standards and regulations pertaining to specialty crane operations.
4. Interpret charts, drawings and specifications pertaining to specialty crane operations.
5. Identify specialty crane operations and describe their characteristics and applications.
  - i. multi-crane lifts
  - ii. hoisting personnel
  - iii. evacuation procedures
  - iv. critical capacity lifts
  - v. professional engineer specifications
  - vi. travels crane

6. Describe the procedures used to attach equipment to cranes for specialty operations.
7. Describe the procedures used to perform specialty crane operations.

**Practical Requirements.**

None.

## TC1200 Tower Crane Profiles

### Learning Outcomes:

- Demonstrate knowledge of hammer head, luffing jib and self-erecting tower cranes, their applications and operation.
- Demonstrate knowledge of the procedures used to operate hammer head, luffing jib and self-erecting tower cranes and their attachments.

**Duration:** 9 Hours

**Pre-Requisite(s):** TC1170

### Objectives and Content:

1. Define terminology associated with hammer head, luffing jib and self-erecting tower crane operations.
2. Identify hazards and describe safe work practices pertaining to hammer head, luffing jib and self-erecting tower crane operations.
  - i. personnel
  - ii. equipment
  - iii. environmental
3. Interpret codes, standards and regulations pertaining to hammer head, luffing jib and self-erecting tower crane operations.
  - i. site-specific
  - ii. jurisdictional regulations
4. Interpret charts, drawings and specifications pertaining to hammer head, luffing jib and self-erecting tower crane operations.
  - i. lift plans
  - ii. manufacturers' specifications
5. Describe the procedures used to operate hammer head, luffing jib and self-erecting tower cranes and their attachments.

**Practical Requirements.**

None.



## AP1102 Introduction to Apprenticeship

### Learning Outcomes:

- Demonstrate knowledge of how to become a registered apprentice.
- Demonstrate knowledge of the steps to complete an apprenticeship program.
- Demonstrate knowledge of various stakeholders in the apprenticeship process.
- Demonstrate knowledge of the Red Seal Program.

**Duration:** 12 Hours

**Pre-Requisite(s):** None

### Objectives and Content:

1. Define terminology associated with apprenticeship.
  - i. apprentice
  - ii. registered apprentice
  - iii. trade qualifier
  - iv. journeyperson
  - v. certified journeyperson
  - vi. Certificate of Apprenticeship
  - vii. Certificate of Qualification
  - viii. dual certification
  - ix. compulsory trades
2. Explain the roles and responsibilities of those involved in the apprenticeship system in Newfoundland and Labrador.
  - i. registered apprentice
  - ii. training institution
  - iii. employer
  - iv. journeyperson
  - v. mentor
  - vi. Department of Immigration, Skills and Labour
    - Industrial Training section
    - Standards and Curriculum section
  - vii. Provincial Trade Advisory Committees (PTAC)
  - viii. Provincial Apprenticeship and Certification Board (PACB)
3. Describe the training components of an apprenticeship.
  - i. in-school
    - Pre-employment / Level 1
    - advanced levels
  - ii. workplace experience

4. Explain the steps in the registered apprenticeship process.
  - i. meet entrance requirements
    - education
    - employment
    - Recognition of Prior Learning (RPL) - if applicable
  - ii. complete the registration process
    - application
    - required documents
  - iii. complete the Memorandum of Understanding (MOU)
    - contract responsibilities
    - probation period
    - cancellation
  - iv. maintain Record of Occupational Progress (Logbook)
    - sign off skills
    - record hours
    - update Apprenticeship Program Officer (APO) on progress
  - v. class calls
    - hour requirements
    - EI eligibility
    - training schedule
  - vi. level examinations - if applicable
  - vii. progression schedule
    - apprenticeship level
    - wage rates
  - viii. certification examinations
    - Provincial
    - Interprovincial
      - written
      - practical - if applicable
  - ix. certification
    - Certificate of Apprenticeship
    - Certificate of Qualification
    - Provincial journeyman - Blue Seal
    - Interprovincial journeyman - Red Seal endorsement (RSE)
5. Identify the Conditions Governing Apprenticeship.
6. Discuss cancellation of apprenticeship.
  - i. failure to notify of address change
  - ii. extended periods of unemployment
  - iii. lack of contact with an APO for an extended period
  - iv. failure to respond to class calls
  - v. declining of multiple class calls
7. Explain the Interprovincial Standards Red Seal program.

- i. designated Red Seal trades
  - ii. the Red Seal Occupational Standard (RSOS)
  - iii. relationship of RSOS to IP examination
  - iv. national qualification recognition and mobility
8. Identify the current financial incentives available to apprentices.
  - i. Federal
  - ii. Provincial
9. Explain the Provincial / Territorial Apprentice Mobility Guidelines.
  - i. temporary mobility
  - ii. permanent mobility
10. Describe Atlantic and National Harmonization initiatives.

### **Practical Requirements:**

1. Use the Provincial Apprenticeship and Trades Certification website at [www.gov.nl.ca/aesl/app/](http://www.gov.nl.ca/aesl/app/).
  - i. locate, download, and complete the Application for Apprenticeship and Memorandum of Understanding (MOU)
  - ii. locate the address of the Industrial Training office closest to this campus
  - iii. locate the training schedule and identify the start date of the next class call for this trade
  - iv. locate and review the learning resources applicable to this trade
    - Study Guide
    - Exam Preparation Guide
    - Plan of Training
2. Use the Plan of Training applicable to this trade.
  - i. locate the hours for the trade
    - total in-school
    - total required for certification
  - ii. locate the number of levels
  - iii. locate the courses in each level
  - iv. locate the hours required for progression to a Level II apprentice and the wage percentage of that level

## CM2161 Communication Essentials

### Learning Outcomes:

- Demonstrate knowledge of the importance of well-developed writing and oral communication skills in the workplace.
- Demonstrate knowledge of the principles of effective workplace writing.
- Demonstrate knowledge of the purpose of various types of workplace documentation and workplace meetings.
- Demonstrate knowledge of the importance of effective interpersonal skills in the workplace.
- Demonstrate knowledge of effective job search techniques.

**Duration:** 36 Hours

**Pre-Requisite(s):** None

### Objectives and Content:

Wherever possible, the instructor is expected to use trade specific examples to reinforce the course objectives.

1. Define communications terminology used in the trade.
2. Identify the principles of effective workplace writing.
  - i. grammar, punctuation, mechanics
  - ii. sentence and paragraph construction
  - iii. tone, language, and word choice
  - iv. the writing process
    - planning
    - writing
    - editing/revising
3. Identify sources of information used to communicate in the workplace.
  - i. regulations
  - ii. codes
  - iii. OH&S requirements
  - iv. prints, drawings and specifications
  - v. company and client documentation
4. Identify types and purposes of informal workplace documents.
  - i. reports
    - incident
    - process

- progress
  - ii. common trade specific forms
  - iii. primary and secondary methods of information gathering
  - iv. accuracy and completeness in reports and forms
- 5. Demonstrate an understanding of interpersonal communications in the workplace.
  - i. recognize group dynamics
  - ii. contribute information and expertise
  - iii. individual learning styles
    - audible
    - visual
    - experiential
    - theoretical
  - iv. recognize respectful and open communication
  - v. accept and provide feedback
  - vi. interpret non-verbal communication cues
    - body language
    - signals
- 6. Demonstrate an understanding of effective oral communication skills.
  - i. listening
    - receiving, understanding, remembering, reflecting, evaluating, paraphrasing, and responding
  - ii. speaking
    - using clear and proper words
    - tone, style, and vocabulary
    - brevity
  - iii. common workplace oral communication situations
    - introducing self and others
    - telephone conversations
    - tool box/safety talks
    - face-to-face conversations
    - communicating with co-workers, supervisors, clients, and other trades people
- 7. Identify common practices related to workplace meetings.
  - i. meeting formats
  - ii. meeting preparation
  - iii. agendas and minutes
  - iv. roles, responsibilities, and etiquette of meeting participants
- 8. Identify acceptable workplace use of communication technologies.
  - i. cell / smart phone etiquette
  - ii. voice mail
  - iii. e-mail

- iv. texting / messaging through social media
  - v. teleconferencing / videoconferencing for meetings and interviews
  - vi. social networking
  - vii. other emerging technologies
9. Demonstrate an understanding of effective job search techniques.
- i. employment trends, opportunities, and sources of employment
  - ii. job ads and the importance of fitting qualifications to job requirements
  - iii. resumes
    - characteristics of effective resumes
    - types of resumes
    - principles of resume formatting
  - iv. effective cover letters
  - v. job interview process
    - pre-interview preparation
    - interview conduct
    - post-interview follow up

### **Practical Requirements:**

1. Write a well-developed, coherent, unified paragraph.
2. Complete a trade-related form.
3. Prepare an agenda for a toolbox safety talk.
4. Participate in a simulated oral workplace communication situation.
5. Prepare a resume.

## SD1761 Workplace Essentials

Note: It is recommended that SD1761 be delivered in the second half of Pre-Employment training.

### **Learning Outcomes:**

- Demonstrate a knowledge of workplace requirements in the areas of personal responsibility, unions, workers compensation, workers' rights, and human rights.
- Demonstrate a knowledge of quality customer service.

**Duration:** 24 Hours

**Pre-Requisite(s):** None

### **Objectives and Content:**

Wherever possible, the instructor is expected to use trade specific examples to reinforce the course objectives.

1. Identify personal responsibilities and attitudes that contribute to on-the-job success.
  - i. asking questions
  - ii. working safely
  - iii. accepting constructive feedback
  - iv. time management & punctuality
  - v. respect for authority
  - vi. stewardship of materials, tools and properties
2. Define unions and identify their role in the workplace.
  - i. purpose of unions
  - ii. common union structure
  - iii. unions in this trade
3. Demonstrate an understanding of the Worker's Compensation process.
  - i. aims, objectives, and benefits of the Workplace Health, Safety and Compensation Commission
  - ii. role of the workers advisor
  - iii. internal review process
4. Demonstrate an understanding of worker's rights.
  - i. labour standards

- ii. regulations, including:
  - hours of work & overtime
  - termination of employment
  - minimum wages & allowable deductions
  - statutory holidays, vacation time, and vacation pay
  
- 5. Demonstrate an understanding of human rights issues.
  - i. awareness of the Human Rights Code and the role of the Human Rights Commission
  - ii. categories of discrimination and strategies for prevention
    - direct
    - systemic
    - adverse effect
  - iii. types of discrimination
    - race
    - ethnic origin
    - colour
    - religion
    - age
    - gender identify
    - sexual orientation
    - marital status
    - family status
    - disability
    - criminal conviction that has been pardoned
  - iv. conduct that constitutes harassment and discrimination
    - objectionable conduct
    - comments or displays made either on a one-time or continuous basis that demeans, belittles, or causes personal humiliation or embarrassment to the recipient
  - v. the value of diversity in the workplace
    - culture
    - gender identify
    - sexual orientation
  
- 6. Demonstrate an understanding of quality customer service.
  - i. importance of quality service
  - ii. barriers to quality service
    - physical and physiological
    - cultural
    - technological
  - iii. customer needs & common methods for meeting them
  - iv. characteristics & importance of a positive attitude
  - v. interactions with challenging customers
  - vi. addressing complaints and resolve conflict



**Practical Requirements:**

None.

## C. Conditions Governing Apprenticeship Training

### 1.0 General

The following general conditions apply to all apprenticeship training programs approved by the Provincial Apprenticeship and Certification Board (PACB) in accordance with the *Apprenticeship Training and Certification Act (1999)*. If an occupation requires additional conditions, these will be noted in the specific Plan of Training for the occupation. In no case should there be a conflict between these conditions and the additional requirements specified in a certain Plan of Training. All references to Memorandum of Understanding will also apply to Letter of Understanding (LOU) agreements.

### 2.0 Entrance Requirements

#### 2.1 Entry into the occupation as an apprentice requires:

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

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

#### 2.3 At the discretion of the Director of Apprenticeship and Trades Certification, credit toward the apprenticeship program may be awarded to an apprentice for previous work experience and/or training as validated through prior learning assessment.

#### 2.4 An Application for Apprenticeship form must be duly completed along with a Memorandum of Understanding as applicable to be indentured into an Apprenticeship. The Memorandum of Understanding must contain signatures of an authorized employer representative, the apprentice and an official representing the Provincial Apprenticeship and Certification Board to be valid.

#### 2.5 A new Memorandum of Understanding must be completed for each change in an employer during the apprenticeship term.

### **3.0 Probationary Period**

The probationary period for each Memorandum of Understanding will be six months or 900 employment credit hours. Within that period the memorandum may be terminated by either party upon giving the other party and the PACB one week notice in writing.

### **4.0 Termination of a Memorandum of Understanding**

After the probationary period referred to in Section 3.0, the Memorandum of Understanding may be terminated by the PACB by mutual consent of the parties involved, or cancelled by the PACB for proper and sufficient cause in the opinion of the PACB, such as that stated in Section 14.

### **5.0 Apprenticeship Progression Schedule, Wage Rates and Advanced Training Criteria**

## Progression Schedule

Tower Crane Operator-3000 Hours			
APPRENTICESHIP LEVEL AND WAGES			
Year	Wage Rate At This Level	Requirements for progression to next level of apprenticeship	When requirements are met, the apprentice will progress to...
1 <sup>st</sup>	60%	<ul style="list-style-type: none"> <li>▪ Completion of Level 1 training</li> <li>▪ Pass Level 1 Exam</li> <li>▪ Minimum 1000 hours of combined relevant work experience and training</li> </ul>	2 <sup>nd</sup> Year
2 <sup>nd</sup>	75%	<ul style="list-style-type: none"> <li>▪ Minimum 2000 hours of combined relevant work experience and training</li> </ul>	3 <sup>rd</sup> Year
3 <sup>rd</sup>	90%	<ul style="list-style-type: none"> <li>▪ Minimum 3000 hours of combined relevant work experience and training</li> <li>▪ Sign-off of all workplace skills in the apprentice logbook</li> <li>▪ Pass certification exam</li> </ul>	Journeyman Certification

**Wage Rates**

- Rates are percentages of the prevailing journeyman's wage rate in the place of employment of the apprentice.
- Rates must not be less than the wage rate established by the Labour Standards Act (1990), as now in force or as hereafter amended, or by other order, as amended from time to time replacing the first mentioned order.
- Rates must not be less than the wage rate established by any collective agreement which may be in force at the apprentice's workplace.
- Employers are free to pay wage rates above the minimums specified.

**Level Exams**

- This program may **not** currently contain Level Exams, in which case this requirement will be waived until such time as Level Exams are available.

**Direct Entry Apprentice**

- Must complete Level 1 courses through PLA and / or in school training.
- Level 1 training is to be completed via class calls; up to 16 weeks of training per calendar year.

## **6.0 Tools**

Apprentices shall be required to obtain their own hand tools applicable for the designated occupation of registration or tools as specified by the PACB.

## **7.0 Periodic Examinations and Evaluation**

- 7.1 Every apprentice shall submit to such occupational tests and examinations as the PACB shall direct. If after such occupational tests and examinations the apprentice is found to be making unsatisfactory progress, his/her apprenticeship level and rate of wage shall not be advanced as provided in Section 5 until his/her progress is satisfactory to the Director of Apprenticeship and Trades Certification and his/her date of completion shall be deferred accordingly. Persistent failure to pass required tests shall be a cause for revocation of his/her Memorandum of Understanding.
- 7.2 Upon receipt of reports of accelerated progress of the apprentice, the PACB may shorten the term of apprenticeship and advance the date of completion accordingly.
- 7.3 For each and every course, a formal assessment is required for which 70% is the pass mark. A mark of 70% must be attained in both the theory examination and the practical project assignment, where applicable as documented on an official transcript.
- 7.4 Course credits may be granted through the use of a PACB approved matrix which identifies course equivalencies between designated trades and between current and historical Plans of Training for the same trade.

## **8.0 Granting of Certificates of Apprenticeship**

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

## **9.0 Hours of Work**

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

## **10.0 Copies of the Registration for Apprenticeship**

The Director of Apprenticeship and Trades Certification shall provide copies of the Registration for Apprenticeship form to all signatories to the document.

## **11.0 Ratio of Apprentices to Journeypersons**

Under normal practice, the ratio of apprentices to journeypersons shall not exceed two apprentices to every one journeyperson employed. Other ratio arrangements would be determined and approved by the PACB.

## **12.0 Relationship to a Collective Bargaining Agreement**

Where applicable in Section 5 of these conditions, Collective Agreements take precedence.

## **13.0 Amendments to a Plan of Apprenticeship Training**

A Plan of Training may be amended at any time by the PACB.

## **14.0 Employment, Re-Employment and Training Requirements**

- 14.1 The Plan of Training requires apprentices to regularly attend their place of employment.
- 14.2 The Plan of Training requires apprentices to attend training for that occupation as prescribed by the PACB.
- 14.3 Failure to comply with Sections 14.1 and/or 14.2 will result in cancellation of the Memorandum of Understanding. Apprentices may have their MOUs reinstated by the PACB but would be subject to a commitment to complete the entire program as outlined in the General Conditions of Apprenticeship. Permanent cancellation in the said occupation is the result of non-compliance.
- 14.4 Cancellation of the Memorandum of Understanding to challenge journeyperson examinations, if unsuccessful, would require an apprentice to serve a time penalty of two (2) years before reinstatement as an apprentice or qualifying to receive a class call to training as a registered Trade Qualifier. Cancellation must be mutually agreed upon by the employer and the apprentice.

- 14.5 An employer shall ensure that each apprentice is under the direct supervision of an approved journeyman supervisor who is located at the same worksite as the apprentice, and that the apprentice is able to communicate with the journeyman with respect to the task, activity or function that is being supervised.
- 14.6 Under the Plan of Training the employer is required to keep each apprentice employed as long as work is available, and if the apprentice is laid off due to lack of work, to give first opportunity to be hired before another is hired.
- 14.7 The employer will permit each apprentice to attend training programs as prescribed by the PACB.
- 14.8 Apprentices who cannot acquire all the workplace skills at their place of employment will have to be evaluated in a simulated work environment at a PACB authorized training institution and have sign-off done by instructors to meet the requirements for certification.

### **15.0 Appeals to Decisions Based on Conditions Governing Apprenticeship Training**

Persons wishing to appeal any decisions based on the above conditions must do so in writing to the Minister of Immigration, Skills and Labour within 30 days of the decision.

#### D. Requirements for Red Seal Endorsement

1. Evidence the required work experiences outlined in this Plan of Training have been obtained. This evidence must be in a format clearly outlining the experiences and must be signed by an appropriate person or persons attesting that these experiences have been obtained to the level required.
2. Successful completion of all required courses in the program.
3. A combination of training from an approved training program and suitable work experience totaling 3000 hours.
4. Completion of a National Red Seal examination, to be set at a place and time determined by the Apprenticeship and Trades Certification Division.



## E. Roles and Responsibilities of Stakeholders in the Apprenticeship Process

The apprenticeship process involves a number of stakeholders playing significant roles in the training of apprentices. This section outlines these roles and the responsibilities resulting from them.

### **The Apprentice:**

- completes all required technical training courses as approved by the PACB.
- finds appropriate employment.
- completes all required work experiences in combination with the required hours.
- ensures work experiences are well documented.
- approaches apprenticeship training with an attitude and commitment that fosters the qualities necessary for a successful career as a qualified journeyman.
- obtains the required hand tools as specified by the PACB for each period of training of the apprenticeship program.

### **The Employer:**

- provides high quality work experiences in an environment conducive to learning.
- remunerates apprentices as set out in the Plan of Training or Collective Agreements.
- provides feedback to training institutions, Apprenticeship and Trades Certification Division and apprentices in an effort to establish a process of continuous quality improvement.
- where appropriate, releases apprentices for the purpose of returning to a training institution to complete the necessary technical courses.
- ensures work experiences of the apprentice are documented.
- ensures a certified journeyperson is currently on staff in the same trade area as the apprentice and whose certification is recognized by the NL Department of Immigration, Skills and Labour.

### **The Training Institution:**

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

### **The Apprenticeship and Trades Certification Division:**

- establishes and maintains program advisory committees under the direction of the PACB.
- promotes apprenticeship training as a viable career option to prospective apprentices and other appropriate persons involved, such as career guidance counsellors, teachers, parents, etc.
- establishes and maintains a protocol with training institutions, employers and other appropriate stakeholders to ensure the quality of apprenticeship training programs.
- ensures all apprentices are appropriately registered and records are maintained as required.
- schedules all necessary technical training periods for apprentices to complete requirements for certification.
- administers block, provincial and interprovincial examinations.

### **The Provincial Apprenticeship and Certification Board:**

- sets policies to ensure the provisions of the *Apprenticeship and Certification Act (1999)* are implemented.
- ensures advisory and examination committees are established and maintained.
- accredits institutions to deliver apprenticeship training programs.
- designates occupations for apprenticeship training and/or certification.