

Pre-Employment Plan of Training



PLAN OF TRAINING

Pre-Employment

Tower Crane Operator

March 2024



**Government of Newfoundland and Labrador
Department of Immigration, Population Growth and Skills
Apprenticeship and Trades Certification Division**

Approved by:

A handwritten signature in black ink, appearing to read "Homer Harnen", written over a horizontal line.

Chairperson, Provincial Apprenticeship and Certification Board

Date:

A handwritten date "July 9, 2024" in black ink, written over a horizontal line.

Preface

This curriculum standard is aligned with the 2023 Red Seal Occupational Standard (RSOS) 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.

Contact Information

Department of Education and Early Childhood Development
Apprenticeship and Trades Certification Division
Tel: 709-729-2729 / 1-877-771-3737
Email: app@gov.nl.ca
Web: www.gov.nl.ca/atcd

Document Status	Date Distributed	Mandatory Implementation Date	Comments
Approved - Final	May 2024	September 2024	Update to align with 2023 RSOS and National Harmonization Sequencing

Table of Contents

A.	RSOS Comparison Chart	5
B.	Program Structure	8
SECTION I	10
TS1510	Occupational Health and Safety	10
TS1520	Workplace Hazardous Materials Information System (WHMIS).....	13
TS1530	Standard First Aid	16
LC1040	Shop Fundamentals for Crane Operators	17
LC1100	Crane Operation Safety	21
LC1130	Crane Operations.....	23
LC1200	Hydraulics and Applications to Crane Control	27
LC1260	Rigging for Crane Operators	30
TC1100	Introduction to Tower Cranes	34
TC1110	Tower Crane Components	36
TC1120	Access Equipment	38
TC1160	Assembly and Disassembly	39
TC1210	Crane Reconfiguration	41
TC1170	Pre-lift Planning	42
AM1001	Introduction to Skills for Success	44
AM1101	Math Essentials	46
AM1341	Hoisting Math Fundamentals	49
MC1062	Computer Essentials.....	51
SECTION 2	54
TC1220	Self-Erecting Cranes.....	54
LC1110	Crane Maintenance.....	56
TC1130	Electrical Systems.....	58
TC1140	Mechanical Systems	60
TC1150	Tower Crane Load Charts.....	62
TC1180	Climbing and Lowering	63
TC1190	Specialty Crane Operations	64
TC1200	Tower Crane Profiles	66
TC1300	Workplace Mentoring.....	67
AP1102	Introduction to Apprenticeship.....	69
CM2161	Communication Essentials.....	72
SD1761	Workplace Essentials.....	75
C.	Conditions Governing Apprenticeship Training.....	78
D.	Requirements for Red Seal Endorsement	84
E.	Roles and Responsibilities of Stakeholders in the Apprenticeship Process	85

A. RSOS Comparison Chart

RSOS 2023 Tasks		2024 POT	
Task 1 – Performs safety related functions.			
1.01	Maintains safe work environment.	LC1040	Shop Fundamentals for Crane Operators
1.02	Uses personal protective equipment (PPE) and safety equipment.	LC1100	Crane Operation Safety
		LC1110	Crane Maintenance
		LC1100	Crane Operation Safety
1.03	Uses documentation	LC1100	Crane Operation Safety
		LC1110	Crane Maintenance
Task 2 – Uses communication and mentoring techniques			
2.01	Uses communication techniques	LC1130	Crane Operations
		LC1260	Rigging for Crane Operators
2.02	Uses mentoring techniques	TC1300	Workplace Mentoring
Task 3 – Performs pre-operational checks and regular inspections.			
3.01	Inspects structural components	TC1110	Tower Crane Components
3.02	Inspects mechanical components	TC1140	Mechanical Systems
		LC1110	Crane Maintenance
3.03	Inspects lines, wire ropes and hoisting system components	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 (rail) travel components	TC1110	Tower Crane Components
3.08	Inspects cab components	TC1110	Tower Crane Components
3.09	Inspects safety and access components	TC1110	Tower Crane Components
3.10	Completes inspection documentation	LC1110	Crane Maintenance
		LC1100	Crane Operation Safety
Task 4 – Performs Continual Checks.			
4.01	Monitors weather conditions	LC1100	Crane Operation Safety
4.02	Monitors site conditions	LC1100	Crane Operation Safety
4.03	Monitors lines, wire ropes and hoisting system components	LC1260	Rigging for Crane Operators
4.04	Monitors equipment performance and conditions	LC1100	Crane Operation Safety
4.05	Monitors structural and support components	LC1100	Crane Operation Safety

RSOS 2023 Tasks		2024 POT	
Task 5 – Performs minor crane maintenance			
5.01	Maintains mechanical components	LC1110	Crane Maintenance
		TC1140	Mechanical Systems
5.02	Lubricates wire ropes and crane components	TC1110	Tower Crane Components
Task 6 – Participates in tower crane assembly, disassembly and transportation			
6.01	Participates in crane assembly	TC1160	Assembly and Disassembly
6.02	Participates in crane disassembly	TC1160	Assembly and Disassembly
6.03	Transports self-erecting tower crane	TC1220	Self Erecting Cranes
6.04	Participates in assembly and disassembly of self-erecting tower cranes	TC1220	Self Erecting Cranes
Task 7 – Participates in tower crane climbing and reconfigurations			
7.01	Participates in bottom-climbing procedures	TC1180	Climbing and Lowering
7.02	Participates in top-climbing procedures	TC1180	Climbing and Lowering
7.03	Participates in crane reconfiguration	TC1210	Crane Reconfiguration
Task 8 – Plans lifts			
8.01	Determines load weights	LC1130	Crane Operations
		TC1150	Tower Crane Load Charts
8.02	Interprets load charts	LC1130	Crane Operations
		TC1150	Tower Crane Load Charts
8.03	Plans work procedures	LC1130	Crane Operations
		TC1150	Tower Crane Load Charts
8.04	Prepares for specialty lifts	LC1130	Crane Operations
		LC1260	Rigging for Crane Operators
Task 9 – Inspects, maintains and stores rigging equipment			
9.01	Identifies deficiencies in slings and hardware	LC1260	Rigging for Crane Operators
9.02	Lubricates slings and hardware	LC1260	Rigging for Crane Operators
9.03	Stores rigging equipment	LC1260	Rigging for Crane Operators
Task 10 – Follows rigging procedures			
10.01	Selects required rigging equipment and configuration	LC1260	Rigging for Crane Operators
10.02	Rigs load	LC1260	Rigging for Crane Operators
10.03	Monitors rigging	LC1260	Rigging for Crane Operators
Task 11 – Performs pre-lift (warm-up) activities			
11.01	Performs function test	TC1170	Pre-lift Planning
11.02	Confirms limits	TC1170	Pre-lift Planning
Task 12 – Operates tower cranes			
12.01	Moves trolley in and out	LC1130	Crane Operations
		TC1190	Specialty Crane Operations
12.02	Booms (luffs) up and down	LC1130	Crane Operations
12.03	Swings (slews) jib	LC1130	Crane Operations
12.04	Hoists load	LC1130	Crane Operations

RSOS 2023 Tasks		2024 POT	
12.05	Travels crane	LC1130	Crane Operations
		TC1190	Specialty Crane Operations
12.06	Performs functions simultaneously	LC1130	Crane Operations
Task 13 – Performs specialty tower crane operations			
13.01	Participates in multi-crane lifts	TC1190	Specialty Crane Operations
13.02	Operates in multi-crane site	TC1190	Specialty Crane Operations
13.03	Hoists personnel	TC1190	Specialty Crane Operations
Task 14 – Shuts down and secures tower cranes.			
14.01	Secures crane while leaving controls (short term).	LC1130	Crane Operations
14.02	Secures crane while out of service	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.

Course No.	Course Name	Hours	Pre-Requisite(s)
Section 1			
TS1510	Occupational Health and Safety	6	None
TS1520	WHMIS	6	None
TS1530	Standard First Aid	14	None
LC1040	Shop Fundamentals for Crane Operators	60	None
LC1100	Crane Operation Safety	75	None
LC1130	Crane Operations	60	LC1100 LC1110 LC1200
LC1200	Hydraulics and Applications to Crane Control	15	LC1040
LC1260	Rigging for Crane Operators	60	None
TC1100	Introduction to Tower Cranes	3	None
TC1110	Tower Crane Components	30	TC1100
TC1120	Access Equipment	30	TC1100
TC1160	Assembly and Disassembly	30	TC1260
TC1210	Crane Reconfiguration	6	None
TC1170	Pre-lift Planning	6	TC1160

Course No.	Course Name	Hours	Pre-Requisite(s)
AM1001	Introduction to Skills for Success	9	None
*AM1101	Math Essentials	42	None
AM1341	Hoisting Math Fundamentals	42	AM1101
MC1062	Computer Essentials	15	None
Section Total		509	
Section 2			
TC1220	Self-Erecting Cranes	6	TC1160
LC1110	Crane Maintenance	60	None
TC1130	Electrical Systems	15	TC1110 TC1120
TC1140	Mechanical Systems	15	TC1110 TC1120
TC1150	Tower Crane Load Charts	60	TC1130 TC1140
TC1180	Climbing and Lowering	6	TC1170
TC1190	Specialty Crane Operations	6	TC1170
TC1200	Tower Crane Profiles	9	TC1170
TC1300	Workplace Mentoring	6	None
AP1102	Introduction to Apprenticeship	12	None
CM2161	Communication Essentials	36	None
SD1761	Workplace Essentials	24	None
Section Total		255	
Level Total		764	

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 interpreting the Occupational Health and Safety Act, laws and regulations.
- Demonstrate knowledge of understanding the designated responsibilities within the laws and regulations such as the right to refuse dangerous work; and the importance of reporting accidents.
- 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. rational 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 SDS 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

1. 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. Describe shop safety practices.
 - i. safe work habits
 - ii. required personal safety equipment for crane operators
 - iii. implementing exhaust control procedures
 - iv. effects of excessive noise on hearing
 - v. factors that contribute to spontaneous combustion
 - vi. potential hazards to personal safety
 - vii. unsafe work conditions
 - viii. importance of reporting accidents
2. Identify fasteners.
 - i. types
 - rivets
 - nails
 - wood screws
 - sheet metal screws
 - bolts
 - nuts
 - washers
 - masonry anchors
 - shields
 - ii. fastener sizes
 - iii. bolt grades
 - iv. miscellaneous anchoring devices

3. Describe the procedures to select, use, and maintain 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 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 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 measuring tools.
 - i. calipers
 - ii. measuring tapes
 - iii. wire rope gauges
 - iv. sheave gauges
 - v. anemometers
 - vi. feeler gauges
- 9. Describe procedures to operate oxy-fuel heating and cutting equipment to remove and/or install parts.
 - i. safety precautions
 - safety apparel
 - storage and handling of welding gases
 - pre-operational inspection
 - ii. equipment set up

- cylinders
 - gauges
 - regulators
 - valves-flame arrestor
 - torches and tips
 - hoses
 - testing for leaks
- iii. operate the torch
 - lighting procedures
 - types of flames and effect on materials
 - shutting down procedures

10. Describe procedures to perform braze welding using oxy-acetylene equipment.

11. 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. Use and store tools.
 - i. hand tool
 - ii. cutting tool
 - iii. power tool
 - iv. compressor air system
4. Attach fastener.
5. Use oxy-fuel welding and cutting equipment.
 - i. pre-check, light and adjust
 - ii. perform flame cutting
 - iii. shut down procedures

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.

Duration: 75 Hours

Pre-requisite(s): None

Objectives and Content:

1. Identify PPE required for crane operators.
 - i. C.S.A. codes for compulsory safety gear
 - ii. replacement of safety items
2. Identify warning signs, symbols and danger tags.
 - i. location and identification
 - ii. procedure warning tag or symbol is discovered or when an operator is required to attach a warning tag or symbol to a machine
3. Describe procedure to mount and dismount equipment.
 - i. safety grab-irons
 - ii. handrails
 - iii. steps
 - iv. foot-pegs
4. Describe safe clearance in work areas.
 - i. minimum safe operating clearance for the overhead, sides, forward and rearward clearance of obstacles
 - ii. conditions for determining equipment operating clearances on the job
5. Describe dangerous operating situations.
 - i. factors that lead to dangerous operating situations:
 - physiological (body)
 - psychological (mental)
 - mechanical failures,
 - meteorological (weather)
 - terrestrial (land) conditions
 - ii. operational malpractice and poor habits that lead to accidents
6. Describe the safety procedures when running an engine in an enclosed area.

- i. toxic fumes from engine exhaust gases
 - ii. hoses and attachments connecting engine exhaust pipe to central ventilation system
 - iii. devices to control exhaust fumes in underground work site
- 7. Fire prevention.
 - i. fire triangle
 - ii. types of fire extinguishers
- 8. Environmental concerns and safe practices regarding work site.
 - i. provincial regulations governing exhaust flame or spark arrestor
 - ii. overhead/underground services found on federal, provincial, municipal, and private lands
 - iii. containing and reporting spills

Practical Requirements:

- 1. Obtain certificates.
 - i. Professional Driver Improvement
 - ii. Transportation of Dangerous Goods
 - iii. Powerline Hazards
 - iv. Traffic Control and Flagging
- 2. Clean and inspect safety gear.
- 3. Adjust and fasten fall arrest equipment (seat belts & safety harnesses).
- 4. Mount/dismount equipment.
- 5. 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 operator occupation.
 - i. working conditions
 - ii. responsibilities of all 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 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. crane hand signals
 - ii. construction hand signals
 - iii. interpret signals
 - iv. audible signals for cranes

6. Define quadrants of operation.
 - i. division of sweep area into quadrants
7. Interpret load charts for pre-lift planning and hoisting operations.
 - i. configuration of crane bases and booms
 - ii. quadrants of operation and their effects on load charts
 - iii. boom lengths and their effects on load charts
 - iv. 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. Identify the differences between gross capacity versus net capacity load on a crane.
 - i. range diagrams
10. Identify 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
11. Describe safety considerations for short-term and long-term shutdowns.
12. Describe structural failure and stability failure.
13. Identify conditions of a load chart.
 - i. calculate parts of line
 - ii. calculate weight of line
 - iii. weight of hook block
14. Identify main boom capacities.
 - i. list capacity deductions
 - ii. calculate net capacities
15. 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

16. Describe inspection procedures for a crane carrier.
17. Describe procedures for starting, moving, and proper shut down of a crane carrier.
18. Describe procedures to transport and operate cranes.
 - i. safety pre-cautions for preparing and travelling cranes
 - ii. municipal considerations for travelling cranes
 - iii. operator's responsibility to prevent accidents, and the need for safety when travelling and operating cranes
 - iv. manufacturer's recommendations or special precautions regarding travelling of cranes to and from job sites
 - v. maximum allowable ground speed while travelling, corresponding to the cranes that are selected
 - vi. warning sign(s) attached to cranes while travelling to and from job sites
 - vii. clearances required for transporting and operating cranes
19. Describe conditions which prohibit crane operation.
 - i. machine configurations that do not meet specifications
 - ii. proper use of outriggers
 - iii. crane levelling and the potential danger of instability
 - iv. crane leveling procedures
 - v. ground conditions and blocking procedures
 - vi. weather and atmospheric conditions that restrict crane operation
 - vii. eccentric reeving
20. Plan for performing a lift.
 - i. evaluate work to be performed
 - ii. considerations influencing lifting procedures
 - iii. analyze factors influencing equipment selection
 - iv. interpret an engineered lift
 - v. plan a multiple crane lift
21. Identify and describe new model cranes.
 - i. range of capacities available
 - ii. range of boom lengths available
 - iii. manufacturers
 - iv. advantages/disadvantages
22. Describe the upper structure characteristics of new model cranes.
 - i. boom technology
 - ii. telescoping and pinning systems

Practical Requirements:

1. Inspect, start-up and shut down a crane.
2. Prepare and perform a crane lift.

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. hydraulic system operation
 - iii. open and closed systems
 - iv. implications for crane hydraulics
2. Describe the transmission of engine power to hydraulic power.
 - i. swinging/slewing
 - ii. boom/up/down
 - iii. hydraulic pumps and motors
3. Describe the construction and operation of a basic hydraulic system.
4. Describe how hydraulic fluid is used in operations.
 - i. valves
 - ii. pumps
 - displacement of pumps
 - iii. hydraulic cylinders
 - piston cylinders
 - cylinders on cranes
5. Describe the operation of 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 and properties of hydraulic 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 crane 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
 - boom lift system-hydraulic boom
 - 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. general safety precautions
 - ii. cleanliness and inspection
 - iii. reservoir inspection
 - iv. inspection for leaks
 - v. leakdown
 - outrigger
 - boom hoist cylinders
 - boom extension cylinders
2. Test and replace components.
 - i. controls
 - ii. solenoids
 - iii. relays
 - iv. 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, their use and limitations.
5. Describe and interpret sizes, grades and construction 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.
 - i. rigging slings (IWRC and anti-rotation)
 - ii. running ropes
 - iii. standing ropes
 - iv. hoisting personnel
9. Calculate safe working loads.
10. Identify rope classification groups.
11. Identify and describe uses for non-rotation and rotating resistant ropes.
12. Describe installation procedures for all types of wire rope.
13. Explain the importance of lubricating and cleaning wire ropes.
14. Identify characteristics and installation procedures for end fittings and connections.
15. Identify the minimum rope wraps on a drum that is to be maintained.
16. Identify grades of chain.
 - i. strength
 - ii. inspection
 - iii. care and use
17. Describe reeving.
18. Identify the parts of line required.
19. Describe the effect of winch diameter.
 - 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

24. Identify and describe types and configurations for slings.
 - 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. Describe manufacturer identification tags.
26. Describe rigging precautions when using synthetic and specialty slings.
27. Describe 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. Identify the centre of gravity for various loads.
31. Identify tensions on sling legs.

Practical Requirements:

1. Plan a rigging operation.
 - i. calculate safe working loads and sling angles
 - ii. calculate loads on equalizer beams
2. Signal a hoisting procedure.
3. Install multiple parts of line.
 - i. lacing
 - ii. reeving (square or angle/skip)

4. Inspect, use, handle, maintain and install a wire rope.
 - i. lubricate
 - ii. clean
5. Install wire rope wedge socket end termination.
6. Use crane components.
 - 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
7. Select and assemble rigging for a job.
8. Maintain and store rigging.
9. Complete a rigging calculation and perform a rigging procedure.

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. 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.

Practical Requirements:

1. Use 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 related 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 related 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.

TC1210 Crane Reconfiguration

Learning Outcomes:

- Demonstrate knowledge of tower cranes, their components, characteristics applications and operation
- Demonstrate knowledge of performing crane reconfiguration
- Demonstrate knowledge of regulatory requirements pertaining to crane reconfiguration

Duration: 6 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Identify standards and regulations pertaining to crane reconfiguration.
2. Identify tools and equipment used to perform crane reconfiguration, and describe their procedures for use.
3. Identify hazards and describe safe work practices to perform crane reconfiguration.
4. Describe procedures to verify that reconfiguration is allowable by manufacturer or professional engineer.
5. Describe procedures to perform crane reconfiguration.
6. Describe effects of weather conditions on crane reconfiguration

Practical Requirements:

None.

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.

AM1001 Introduction to Skills for Success

Learning Outcomes:

- Demonstrate knowledge of the nine nationally recognized Skills for Success.
- Demonstrate knowledge of the Skills for Success / Essential Skills required for the learners chosen trade.
- Demonstrate an awareness of Skills for Success / Essential Skills assessments.

Duration: 9 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Describe the new Skills for Success model and its relationship to the previous Essential Skills model¹.
2. Identify and describe the Skills for Success recognized by the Government of Canada through the Office of Skills for Success (OSS).
 - i. adaptability
 - ii. collaboration
 - iii. communication
 - iv. creativity and innovation
 - v. digital
 - vi. numeracy
 - vii. problem solving
 - viii. reading
 - ix. writing
3. Identify the Skills for Success / Essential Skills, along with their complexity level, identified as necessary for the learner's trade.
 - i. RSOS / NOA content²
 - ii. OSS Essential Skills Profiles³
 - iii. OSS tools and support for apprentices and tradespersons⁴
4. Describe the nature and purpose of Skills for Success assessment.
 - i. self-assessment & formal assessment tools
 - ii. indicators of deficiencies
 - iii. suggestions for improvement

5. Describe the benefits of Skills for Success improvement.
 - i. confidence at work
 - ii. employability
 - iii. success in apprenticeship
 - iv. wage & job advancement

Practical Requirements:

1. Complete a Skills for Success / Essential Skills self-assessment. The apprentice will use the online Skills and Competencies Canada Self Test⁵ and Essential Skills Self-Assessment for the Trades⁶ tools, or similar assessment tools as provided by the instructor.
2. Participate in a group discussion about the impact of gaps in Skills for Success / Essential Skills that may be revealed by the self-assessments completed, and the value of improving Skills for Success.

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 Skills for Success, 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

TC1220 Self-Erecting Cranes

Learning Outcomes:

- Demonstrate knowledge of self-erecting tower cranes, their components, characteristics, applications and operation
- Demonstrate knowledge of training and certification requirements pertaining to transportation of self-erecting tower cranes
- Demonstrate knowledge of regulatory requirements pertaining to transportation of self-erecting tower cranes
- Demonstrate knowledge of procedures to transport self-erecting tower cranes
- Demonstrate knowledge of procedures for assembly and disassembly of self-erecting tower cranes

Duration: 6 Hours

Pre-Requisites: TC1160

Objectives and Content:

1. Identify self-erecting tower cranes and their components, and describe their characteristics and applications.
2. Identify standards, restrictions and regulations pertaining to assembly , disassembly and transportation of self-erecting tower cranes.
3. Identify hazards and describe safe work practices to assemble, disassemble and transport self-erecting tower cranes.
4. Identify tools and equipment used to assemble and disassemble self-erecting tower cranes, and describe their procedures for use.
5. Identify training and certification requirements pertaining to assembly, disassembly and transportation of self-erecting tower cranes.
6. Interpret information pertaining to self-erecting tower cranes and their components found in specifications.
7. Interpret charts, drawings and specifications relating to self-erecting crane transportation.

8. Identify types of map tools used for pre-trip planning, and describe their characteristics and applications.
9. Identify factors for selecting transportation routes.
10. Describe procedures to secure self-erecting tower cranes.
11. Describe procedures to transport self-erecting tower cranes.
12. Describe procedures to assemble and disassemble self-erecting tower cranes.
13. Describe operating principles of self-erecting tower cranes.

Practical Requirements:

None

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. Describe service manuals.
 - i. sections
 - maintenance
 - servicing
 - lubrication procedures
 - ii. interpreting information
 - iii. complying with service manuals
2. Describe the procedure to order parts.
 - i. locate machine serial number or Vehicle Identification Number (VIN)
 - ii. locate engine specifications plate and serial number
 - iii. complete order form
3. Identify lubricants and describe their purposes.
 - i. lubrication system components and servicing periods
 - ii. oil grades and uses under various temperature conditions
 - iii. grease types and performance under extreme load and heat
 - iv. functions of engine oil
 - v. advantages and disadvantages of additives used in engine oil
 - vi. characteristics of gear lubricants
 - vii. American Petroleum Institute (A.P.I) Engine Service Classification
4. Describe the crane log book.
 - i. service meter
5. Describe the procedures to service and charge batteries.
 - i. care and maintenance
 - ii. clean and service
 - iii. measure electrolyte

- iv. charger connections
- 6. Describe the procedures to maintain fuel systems.
 - i. components
 - ii. priming
 - iii. servicing
 - iv. refueling process and precautions
- 7. Describe the procedures to maintain cooling systems.
 - i. components
 - ii. classification of coolant
 - iii. testing coolant
- 8. Identify start-up and shut down procedures as prescribed in the service manual.
- 9. Identify attachments available, and their purpose and maintenance.
- 10. Describe the procedures to maintain and adjust tracks, tires and wheels.

Practical Requirements:

- 1. Follow a maintenance procedure.
- 2. Assist in changing transmission fluid, engine oil and related filters.
- 3. Select tools and grease a piece of equipment.
- 4. Affix a warning sign where it can be easily recognized on a piece of equipment.
- 5. Assist in priming and servicing a fuel system, then refuel a machine.
- 6. Service and charge a storage battery.

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 an electrical system and its 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
 - viii. lines and ropes
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.
10. Describe the procedures used to inspect structural and support components.

Practical Requirements:

1. Inspect a mechanical system and its 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. Interpret codes, standards and regulations pertaining to 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.

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.

TC1300 Workplace Mentoring

Learning Outcomes:

- Demonstrate knowledge of strategies for learning skills in the workplace.
- Demonstrate knowledge of strategies for teaching workplace skills.

Duration: 6 Hours

Pre-Requisite(s): None

Objectives and Content:

1. Describe the importance of individual experience.
2. Describe the shared responsibilities for workplace learning.
3. Describe the importance of determining individual learning preferences and how these relate to learning new skills.
4. Identify different learning styles.
 - i. seeing it
 - ii. hearing it
 - iii. trying it
5. Identify different learning needs and strategies to meet learning needs.
 - i. learning disabilities
 - ii. learning preferences
 - iii. language proficiency
6. Identify strategies to assist in learning a skill.
 - i. developing coaching skills
 - ii. being mature and patient
 - iii. providing feedback
7. Identify different roles played by a workplace mentor.
8. Identify importance of a lesson to the mentoring process.
 - i. determine the point of a lesson.
 - ii. choose a good time to present a lesson
 - iii. link the lesson to trade knowledge and skills
9. Describe the importance of different types of skills in the workplace.

10. Identify the components of a skill (context) and describe considerations in setting up opportunities for skill practice.
11. Explain the importance of providing feedback and identify techniques for giving effective feedback.
12. Describe a skills assessment and identify methods of assessing progress.

Practical Objectives:

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 Jobs, Immigration and Growth
 - 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
 - Red Seal
 - written
 - practical - if applicable
 - ix. certification
 - Certificate of Apprenticeship
 - Certificate of Qualification
 - Provincial journeyperson - Blue Seal
 - Red Seal Journeyperson - 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 Red Seal program.

- i. designated Red Seal trades
 - ii. the Red Seal Occupational Standard (RSOS)
 - iii. relationship of RSOS to Red Seal 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/atcd/.
 - 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 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 st	60%	<ul style="list-style-type: none"> Completion of Level 1 training Pass Level 1 Exam Minimum 1000 hours of combined relevant work experience and training 	2 nd Year
2 nd	75%	<ul style="list-style-type: none"> Minimum 2000 hours of combined relevant work experience and training 	3 rd Year
3 rd	90%	<ul style="list-style-type: none"> Minimum 3000 hours of combined relevant work experience and training Sign-off of all workplace skills in the apprentice logbook Pass certification exam 	Journeyperson Certification
<p>Wage Rates</p> <ul style="list-style-type: none"> Rates are percentages of the prevailing journeyperson'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. <p>Level Exams</p> <ul style="list-style-type: none"> This program may not currently contain Level Exams, in which case this requirement will be waived until such time as Level Exams are available. 			

Tower Crane Operator-3000 Hours		
Class Calls (After Apprenticeship Registration)		
Call Level	Requirements for Class Call	Hours Awarded for In-School Training
Direct Entry Level 1	<ul style="list-style-type: none"> Minimum of 1800 hours of relevant work experience Prior Learning Assessment (PLA) at designated college (if applicable) 	420
<p>Class Calls at Minimum Hours:</p> <ul style="list-style-type: none"> Class calls may not always occur at the minimum hours indicated. Some variation is permitted to allow for the availability of training resources and apprentices. 		

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 journeyperson supervisor who is located at the same worksite as the apprentice, and that the apprentice is able to communicate with the journeyperson 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 Education and Early Childhood Development 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 journeyman is currently on staff in the same trade area as the apprentice and whose certification is recognized by the NL Department of Education and Early Childhood Development.

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 level, provincial and Red Seal 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.

