
Plan of Training

IRONWORKER (GENERALIST)



Government of Newfoundland and Labrador
Department of Education
Institutional and Industrial Education Division

September 2009

PLAN OF TRAINING

IRONWORKER

SEPTEMBER 2009



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Approved by:

A handwritten signature in cursive script, appearing to read "Paula Good", written over a horizontal line.

Chairperson, Provincial Apprenticeship and Certification Board

Date: Sept 23/09

The Joint Planning Committee (JPC) recognizes this Interprovincial Program Guide as the national curriculum for the occupation of Ironworker (Generalist).

Preface

This Apprenticeship Standard is based on the 1993 edition of the National Occupational Analysis for the Ironworker (Generalist) trade.

This document describes the curriculum content for the Ironworker (Generalist) apprenticeship training program and outlines each of the technical training units necessary for the completion of apprenticeship.

Acknowledgements

Advisory committees, industry representatives, instructors and apprenticeship staff provided valuable input to the development of this Apprenticeship Curriculum Standard. 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
Institutional and Industrial Education Division
Tel: 709-729-2729 / 1-877-771-3737
Email: app@gov.nl.ca
Web: www.gov.nl.ca/app

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A. 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 certain Plan of Training.

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 particular Plan of Training. Mature students, at the discretion of the Director of Institutional and Industrial Education, may be registered. A mature student is defined as one who has reached the age of 19 and who can demonstrate the ability and the interest to complete the requirements for certification.

2.3 At the discretion of the Director of Institutional and Industrial Education, credit 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.

3.0 Probationary Period

The probationary period for each Memorandum of Understanding will be six months. Within that period the memorandum may be terminated by either party upon giving the other party and the 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.

5.0 Apprenticeship Progression Schedule and Wage Rates

5.1 Progression Schedule

7200 Hour Programs	Requirements for Progression	Progress To
First Year Apprentice	Completion of entry level (Block 1) courses, plus relevant work experience totaling a minimum of 1800 hours *	Second Year
Second Year Apprentice	Completion of advanced level (Block 2) courses, plus relevant work experience totaling a minimum of 3600 hours	Third Year
Third Year Apprentice	Completion of advanced level (Block 3) courses, plus relevant work experience totaling a minimum of 5400 hours	Fourth Year
Fourth Year Apprentice	Completion of advanced level (Block 4) courses and (Blocks 5 & 6) <i>if applicable</i> , plus sign-off of workplace skills required for certification totaling a minimum of 7200 hours**	Write Certification Examination

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5400 Hour Programs	Requirements for Progression	Progress To
First Year Apprentice	Completion of entry level (Block 1) courses, plus relevant work experience totaling a minimum of 1800 hours *	Second Year
Second Year Apprentice	Completion of advanced level (Block 2) courses, plus relevant work experience totaling a minimum of 3600 hours	Third Year
Third Year Apprentice	Completion of advanced level (Block 3) courses, plus sign-off of workplace skills required for certification totaling a minimum of 5400 hours	Write Certification Examination

4800 Hour Programs	Requirements for Progression	Progress To
First Year Apprentice	Completion of entry level courses (Block 1) courses, plus relevant work experience totaling a minimum of 1600 hours *	Second Year
Second Year Apprentice	Completion of advanced level (Block 2) courses, plus relevant work experience totaling a minimum of 3200 hours	Third Year
Third Year Apprentice	Completion of advanced level (Block 3) courses, plus sign-off of workplace skills required for certification totaling a minimum of 4800 hours	Write Certification Examination

* All direct entry apprentices must meet the **Requirements for Progression** either through Prior Learning Assessment and Recognition or course completion before advancing to the next year.

** Apprentices in a 7200 hour program which incorporates more than four blocks of training are considered fourth year apprentices pending completion of 100% course credits and workplace skills requirements.

5.2 For the duration of each Apprenticeship Training Period, the apprentice who is not covered by a collective agreement, shall be paid a progressively increased schedule of wages.

Program Duration	Wage Rates		Comments
7200 Hours	1 st Year	60%	These wage rates are percentages of the prevailing journey person's wage rate in the place of employment of the apprentice. No apprentice shall be paid less than the wage rate established by the Labour Standards Act (1988), as now in force or as hereafter amended, or by other Order, as amended from time to time replacing the first mentioned Order.
	2 nd Year	70%	
	3 rd Year	80%	
	4 th Year	90%	
5400 Hours and 4800 Hours	1 st Year	60%	
	2 nd Year	75%	
	3 rd Year	90%	
4000 Hours			(Hairstylist Program) - The apprentice shall be paid no less than the minimum wage for hours worked and a commission agreed upon between the apprentice and the employer.

6.0 Tools

Apprentices shall be required to obtain hand tools as and when specified by the 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 rate of wage shall not be advanced as provided in Section 5 until his/her progress is satisfactory to the Director of Institutional and Industrial Education and his/her date of completion shall be deferred accordingly. Persistent failure to pass required tests shall be a cause for revocation of his/her Memorandum of Understanding.

- 7.2 Upon receipt of reports of accelerated progress of the apprentice, the 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. At the discretion of the instructor, the summative mark may be for completion of a theory examination or a combination of the theory examination and an assigned practical project.

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

11.0 Ratio of Apprentices to Journeypersons

The ratio of apprentices to journeypersons shall not exceed two apprentices to every one journeyperson employed, with the condition that one of these be a final year apprentice.

12.0 Relationship to a Collective Bargaining Agreement

Collective agreements take precedence over the conditions outlined in the Plan of Training.

13.0 Amendments to a Plan of Apprenticeship Training

A plan of training may be amended at any time by the 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 regularly attend training programs 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. An apprentice will be required to pay a reinstatement fee. Permanent cancellation in the said occupation is the result of non-compliance.
- 14.4 Cancellation of the Memorandum of Understanding to challenge journeyman examinations, if unsuccessful, would require an apprentice to serve a time penalty of two (2) years before reinstatement as an apprentice or registering as a Trade Qualifier.
- 14.5 Under the Plan of Training the employer is required to keep each apprentice employed as long as work is available, and if the apprentice is laid off due to lack of work, to give first opportunity to be hired before another is hired.
- 14.6 The employer will permit each apprentice to regularly attend training programs as prescribed by the PACB.

- 14.7 Apprentices who cannot acquire all the workplace skills at their place of employment will have to be evaluated in a simulated work environment at a training institution and have sign-off done by instructors to meet the requirements for certification.

15.0 Appeals to Decisions Based on Conditions Governing Apprenticeship Training

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

B. Requirements for Red Seal Certification

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 program.
3. A combination of training from an approved training program and suitable work experience totalling 7200 hours.

OR

A total of 9000 hours of suitable work experience.

4. Completion of a National Red Seal examination, to be set at a place and time determined by the Institutional and Industrial Education Division.
5. Payment of the appropriate examination fee.

C. 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, Institutional and Industrial Education 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.

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 Institutional and Industrial Education 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 provincial/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.

D. Program Outcomes

Upon successful completion of the Ironworker (Generalist) Program, apprentices will have the knowledge and skills required to perform the following tasks:

- Task 1 Practices safety and maintains a safe work environment.
- Task 2 Plan jobs in accordance with drawings, work site requirements and specifications.
- Task 3 Coordinates delivery and installation of materials and equipment as job progresses.
- Task 4 Prepare wire, fibre rope and tackle.
- Task 5 Rig and move loads.
- Task 6 Assemble, erect, jump and dismantle tower cranes.
- Task 7 Assemble, erect, jump and dismantle various derrick types.
- Task 8 Assemble and dismantle conventional and hydraulic cranes.
- Task 9 Assemble, erect, jump and dismantle material and personnel hoists.
- Task 10 Install support structures, framework and related structural and mechanical equipment for conveying systems and material handling systems.
- Task 11 Erects structural steel for buildings, bridges and towers.
- Task 12 Erect metal, bins and hoppers.
- Task 13 Assembles and erect pre-engineered buildings.
- Task 14 Assemble and install curtain walls, window walls, doorways, store fronts, revolving doors, mantraps, etc., in and on all buildings.

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- Task 15 Install ornamental and miscellaneous ironwork and nonferrous components, such as stairways, railings, panels, catwalks, fences, sound barriers, vehicle guardrails, etc.
- Task 16 Erect structural and architectural precast concrete components for buildings, bridges, towers and other structures.
- Task 17 Inspect of test structures and equipment for deterioration, defects, non-compliance with specifications or regulations, and unsafe conditions during of after construction.
- Task 18 Dismantle building framework, bridges, tanks, silos or other structures made of metal, precast concrete and laminated timbers.
- Task 19 Position and secure steel bar of wire mesh reinforcing in forms prior to the pouring of concrete for grade beams, footings, walls, floors, columns, caissons and other components.
- Task 20 Post-tension tendon steel cables or rods in cast-in-place or precast concrete for reinforcement purposes.
- Task 21 Erect and install robotic equipment for material handling and automated mechanical systems.
- Task 22 Erect temporary frame of tube scaffolds, false work, shoring, etc.
- Task 23 Suspend scaffolds from structures.
- Task 24 Erect structural wood material for buildings such as, mine product storage, churches, schools, pedestrian bridges and walkways.

E. Program Structure

For each and every course, a formal assessment is required for which 70% is the pass mark. At the discretion of the instructor, the summative mark may be for completion of a theory examination or a combination of the theory examination and an assigned practical project.

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

Entry Level Courses - Block 1			
NL Course No.	Course Name	Hours	Pre-Requisite
TS1510	Occupational health and Safety	6	None
TS1530	Standard First Aid	14	None
TS1520	WHMIS	6	None
RK1100	Safety	30	None
RK1110	Tools and Equipment	60	RK1100
RK1120	Blueprint Reading 1 (Principles)	30	None
RK1150	Oxy-Fuel and Plasma Arc Cutting	45	RK1110
RK1160	Electric Arc Welding and Arc Air Gouging	90	RK1110
RK1170	Rigging 1 (Hardware)	30	RK1110
RK1180	Rigging 2 (Procedures)	30	RK1170
RK1200	Conventional and Hydraulic Cranes	60	RK1190
RK1190	Rigging 3 (Load handling)	30	RK1180
RK1130	Blueprint Reading 2 (Structural)	60	RK1120
RK2130	Job Planning, Coordination and Site Preparation	60	RK1110; RK1120; RK1200
RK2150	Post-tensioning	45	RK1140; RK1180

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Entry Level Courses - Block 1			
NL Course No.	Course Name	Hours	Pre-Requisite
RK2210	Reinforced Concrete 1 (Principles)	60	RK1140; RK1190; RK2130
RK2110	Structural Steel 2 (Erection)	120	RK2100
RK2190	Tower Cranes	30	RK1200
RK2100	Structural Steel 1 (Preparation)	30	RK1110; RK1130; RK1200; RK2130
RK1140	Blueprint Reading 3 (Rebar)	45	RK1110
AP1100	Introduction to Apprenticeship	15	None
CM2150	Workplace Communications	45	None
MR1220	Customer Service	30	None
SP2330	Quality Assurance/Quality Control	30	None
MC1050	Introduction to Computers	30	None
SD1700	Workplace Skills	30	None
SD1710	Job Search Techniques	15	None
SD1720	Entrepreneurial Awareness	15	None
Total Entry Level Hours		1091	

Required Work Experience

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Block 2			
NL Course No.	Course Name	Hours	Pre-Requisite
RK2201	Derricks and Electric Overheads Travelling (EOT) Cranes	10	RK1200
RK2180	Pre-Cast Concrete	30	RK1200; RK2190; RK1160
RK2160	Robotic Equipment	15	RK1120; RK1200
RK2170	Ornamental and Miscellaneous Ironwork	120	RK1130; RK1200; RK1150; RK1160
RK2220	Reinforced Concrete 2 (Pre-assembly and installation)	60	RK1130; RK1200; RK1150; RK1160
Total Hours		235	

Required Work Experience

Block 3			
NL Course No.	Course Name	Hours	Pre-Requisite
RK2230	Temporary Access Structures and Working Platforms	60	RK1110; RK1120; RK1180
RK2140	Dismantling	60	RK1130; RK1200; RK2120
RK2120	Structural Steel 3 (Plumbing and Securing)	60	RK2110; RK2230
RK2280	Falsework	30	RK1130; RK1200; RK2230

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RK1210	Decking and Grating	30	RK1130; RK1170; RK2110
Total Hours		240	

Required Work Experience

Block 4			
NL Course No.	Course Name	Hours	Pre-Requisite
RK2251	Pre-Engineered Buildings	45	RK1120; RK1200; RK1190
RK2260	Wooden Structures	15	RK1120; RK1200; RK2230
RK2270	Reinforced Concrete 3 (Fabrication)	60	RK1140; RK1200; RK2230
RK2290	Curtain Walls	60	RK1130; RK1200; RK2190; RK2201
RK2240	Storage Tanks, Bins and Hoppers	30	RK1120; RK1200; RK2230
Total Hours		210	

Total Course Credit Hours	1776
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Entry Level – Block 1

TS1510 Occupational Health and Safety

Description:

This course is designed to give participants the knowledge and skills necessary to interpret the Occupational Health and Safety Act, laws and regulations; understand the designated responsibilities within the laws and regulations; the right to refuse dangerous work; and the importance of reporting accidents.

Pre-Requisites: None

Course Outcomes:

Upon successful completion of this unit, the apprentice will be able to:

- prevent accidents and illnesses
- improve health and safety conditions in the workplace

Theory:

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:

- 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.

TS1530 Standard First Aid

Description:

This course is designed to give the apprentice the ability to recognize situations requiring emergency action and to make appropriate decisions concerning first aid.

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

Pre-Requisites: None

TS1520 Workplace Hazardous Materials Information System (WHMIS)

Description:

This course is designed to give participants the knowledge and skills necessary to define WHMIS, examine hazard identification and ingredient disclosure, explain labeling and other forms of warning, and introduce material safety data sheets (MSDS).

Pre-Requisites: None

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- interpret and apply the Workplace Hazardous Materials Information System (WHMIS) Regulation under the Occupational Health and Safety Act

Required Knowledge and Skills:

1. Define WHMIS safety.
 - i. rational and key elements
 - ii. history and development of WHMIS
 - iii. WHMIS legislation
 - iv. WHMIS implementation
 - 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 subdivisions in WHMIS

- general rules for classification
 - class A – compresses 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 WHMIS label
 - supplier label
 - workplace label
 - other means of identification
 - ii. responsibilities 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:

Practical skills enhance the apprentices' ability to meet the objectives of this course. The learning objectives outlined below are mandatory in Newfoundland and Labrador, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

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.

SUGGESTED RESOURCES:

1. WHMIS Regulation.
2. Sample MSDS sheets.

RK1100 Safety

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis task 1.

Pre-Requisites: None

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- practice safety and maintain a safe work environment

Theory:

PERSONAL PROTECTIVE EQUIPMENT

1. Identify types of personal protective equipment and describe their purpose and use.
 - i. hearing protection
 - ii. dust mask
 - iii. respirator
 - iv. safety glasses
 - v. protective clothing
 - vi. guards and shields

2. Identify types of equipment used for working at heights and describe their safe use and maintenance.
 - i. fall arrest systems
 - safety nets
 - safety ropes
 - ii. life lines
 - iii. lanyards
 - iv. anchor points

3. Describe the procedures used to install, maintain and inspect fall protection systems.

SAFETY REGULATIONS

1. Identify relevant safety regulations and describe their application to the Ironworker (Generalist) trade.
 - i. federal
 - ii. WHMIS
 - iii. provincial
 - iv. Workers Compensation Board
 - v. code of practice
 - vi. industry standards
 - vii. municipal

WORKPLACE SAFETY

1. Describe potential work hazards on-site.
2. Describe employer/employee responsibilities for workplace safety.
3. Describe the safety requirements for working in confined spaces.
4. Describe safety practices when working in or near trenches and excavations.
5. Describe the purpose of lockout/tag-out procedures and their application to the work site.
6. Define the term proximity work and describe its associated safety procedures.
 - i. barriers and barricades
 - ii. adjacent perimeter areas
 - iii. public safety
7. Identify types of ladders and scaffolding and describe their applications, use and inspection procedures.

FIRE SAFETY

1. Identify the classes of fires and their associated fire extinguishers.
2. Identify various flammable materials and describe the precautions to be taken to prevent combustion.

Practical:

Practical skills enhance the apprentices' ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

RK1110 Tools and Equipment

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis task 1.

Pre-Requisites: RK1100

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of hand tools, their use and care
- demonstrate knowledge of power tools, their use and care
- demonstrate knowledge of the ironworker machine, its operating principles and procedures for use and care

Theory:

1. Identify types of hand tools and describe their characteristics, applications, use and care.
 - i. wrenches and sockets
 - ii. cutting
 - iii. screwdrivers
 - iv. pliers
 - v. hammers
 - vi. clamping
 - vii. grinding and sharpening
 - viii. bending
 - ix. measurement, layout and alignment
 - x. lifting
 - xi. plumbing and levelling
 - xii. prying and dismantling
 - xiii. punching, boring and drilling
 - xiv. securing and assembling

2. Identify portable and stationary power tools and describe their characteristics, applications, safe use and care.
 - i. compressors and generators
 - ii. grinders
 - iii. hydraulic jacks and pumps
 - iv. benders
 - v. pneumatic and electric
 - vi. impact
 - vii. reamers
 - viii. rivet gun
 - ix. magnetic drills

3. Describe drilling procedures.
 - i. sizing
 - ii. sharpening
 - iii. centre punching
 - iv. speed and feed rates
 - v. selection of cutting fluids
 - vi. countersinking
 - vii. selection of accessories

4. Identify types of levelling and alignment instruments and describe their purpose and procedures for use.
 - i. transit level
 - ii. laser level
 - iii. optical level

5. Describe the ironworker machine, its components, operating principles, applications and procedures for use.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Cope and heat-bend angle-iron.

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2. Lay out framework.
3. Select and use hand tools.
4. Select and use power tools.

RK1120 Blueprint Reading 1 (Principles)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis task 2.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the conventions and basic operations associated with blueprints and drawings used in construction

Pre-Requisites: None

Theory:

1. Describe the functions of blueprints and drawings and their use.
2. Describe the various types of plans and drawings.
3. Identify and interpret the lines and symbols used on prints.
4. Describe the procedures used to construct an isometric, orthographic and multi-view drawing.
5. Describe the procedures used to take dimensions using:
 - i. architects' scale rule
 - ii. mathematical calculations from construction blueprints
6. Describe the purpose and use of specifications for blueprints and drawings.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Construct an isometric, orthographic and multi-view drawing.
2. Take dimensions using:
 - i. architects' scale rule
 - ii. mathematical calculations from construction blueprints

RK1150 Oxy-fuel and Plasma Arc Cutting

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis throughout the document.

Pre-Requisites: RK1110

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of oxy-fuel cutting equipment and procedures for their use and care
- demonstrate knowledge of plasma arc cutting equipment and procedures for

Theory:

1. Define terminology associated with cutting.
2. Describe safety practices for use in cutting operations.
 - i. clothing
 - ii. location
3. Describe the purpose, principles and applications of oxy-fuel/plasma arc cutting.
4. Identify the material, tools and equipment used in oxy-fuel/plasma arc cutting.
5. Identify metals that can be cut using oxy-fuel/plasma arc cutting equipment.
6. Describe the various styles and designs of standard cutting torches.
7. Identify the various cutting tips and describe their care and maintenance.
 - i. sizes and styles
 - ii. indexing
 - iii. accessories
 - iv. tip cleaners

8. Describe the various types of cutting flames and procedures used for flame adjustment.
 - i. oxidizing
 - ii. carburizing
 - iii. neutral
9. Describe work processes and sequences associated with oxy-fuel/plasma arc cutting.
10. Describe oxy-fuel cutting techniques.
11. Describe oxy-fuel/plasma arc cutting procedures.
 - i. free hand
 - ii. straight edge
 - iii. track cutting
12. Identify common cutting faults and describe their causes and remedies.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Set up cutting equipment.
2. Perform free hand, track and straight edge oxy-fuel cutting.
3. Perform free hand and straight edge plasma arc cutting.
4. Shut down and disassemble cutting equipment.

RK1160 Electric Arc Welding and Arc Air Gouging

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis throughout the document.

Pre-Requisites: RK1110

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of electric arc welding and arc air gouging equipment and procedures for their use
- set up equipment and weld using the FCAW process
- set up equipment and weld using the SMAW process

Theory:

1. Describe basic electrical welding principles.
2. Identify equipment used in welding processes and describe its use.
 - i. FCAW
 - ii. SMAW
 - iii. gouging
 - iv. stud welding
3. Describe machine controls and settings.
4. Describe consumables, their characteristics, classifications, applications, care and use.
5. Describe the various types of welds and basic joints.
6. Identify welding symbols and describe their use.

7. Identify types of weld faults and describe their causes and remedies.
8. Describe the procedures used to weld.
 - i. FCAW
 - ii. SMAW
 - iii. arc air gouging
 - iv. stud welding

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Set up equipment and perform a plate weld using the SMAW process.
2. Set up equipment and perform a plate weld using the FCAW process.
3. Set up equipment and perform arc air gouging.
4. Set up equipment and perform stud welding.

RK1170 Rigging 1 (Hardware)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis task 4.

Pre-Requisites: RK1110

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- select and inspect, use and care for synthetic, wire rope, fibre rope and chain slings
- select and inspect, use and care for hoist ropes and tackle

Theory:

1. Identify hand signals and describe their purpose and applications.

FIBRE ROPES

1. Identify the types of fibre ropes and describe their parts, characteristics and applications.
 - i. breaking strengths
 - ii. working load limits (WLL)
 - iii. measuring
 - iv. knots
 - v. bends
 - vi. hitches
2. Describe the procedures used to make various splices in fibre ropes.
3. Identify the various types of end connections used with fibre ropes and describe their characteristics and applications.

4. Describe the procedures used to inspect fibre ropes.
 - i. identify deterioration
 - ii. criteria for removal from service
5. Describe the method to measure and cut fibre rope.

WIRE ROPES

1. Identify the types of wire ropes and describe their parts, characteristics and applications.
 - i. composition
 - ii. lays
 - iii. classification system
 - iv. core types
 - v. measurement
 - vi. breaking strengths
 - vii. working load limits (WLL)
2. Describe the procedures used to make various splices in wire rope.
3. Identify the types of cable clips and describe their characteristics, applications and procedures for installation.
 - i. spacing clips
 - ii. safety factors
4. Identify the types of turnbuckles and describe their characteristics, applications and procedures for use.
5. Describe the procedure used to inspect wire rope.
 - i. identify deterioration
 - ii. criteria for removal from service
6. Describe the method used to measure and cut wire rope.

SLINGS

1. Describe the various configurations of slings, their applications and working load limits.
 - i. single vertical hitch
 - ii. basket hitch
 - iii. bridle hitch
 - iv. choker hitch

2. Identify basic types of chain slings and describe their characteristics, applications and procedures for use.
 - v. safety precautions
 - vi. grades of steel
 - vii. working load limit

3. Describe the procedures used to inspect slings.
 - i. identify deterioration
 - ii. criteria for removal from service

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Rig materials using basic equipment and techniques.
2. Demonstrate placement and use of slings.
3. Inspect, measure and cut wire and fibre ropes.
4. Inspect rigging equipment.

RK1180 Rigging 2 (Procedures)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 4 and 5.

Pre-Requisites: RK1170

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the criteria and calculations necessary to select and plan rigging equipment and methods
- demonstrate knowledge of rigging procedures and their use

Theory:

1. Review hand signals and describe their purpose and applications.
2. Describe the procedures used to calculate appropriate formulae relating to rigging equipment.
 - i. weight estimations
 - ii. wire rope clips
 - iii. drum capacities
 - iv. hooks
 - v. shackles
 - vi. sheaves
 - vii. spreader and equalizer beams
3. Describe reeving and lacing, their purpose and associated procedures used.
 - i. advantages and disadvantages
 - ii. friction
 - iii. mechanical advantage
 - iv. efficiencies
 - v. applications

4. Describe the procedures for using temporary lashing.
 - i. working load limits (WLL)
 - clips
 - ii. turnbuckles
 - iii. shackles

5. Describe the procedures used to fabricate and install guy wires.
 - i. working load limits (WLL)
 - ii. breaking strength
 - iii. clip spacing
 - iv. thimble size
 - v. turnbuckle

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Estimate weight of loads and working load limits (WLL).
2. Perform reeving and lacing of blocks.
3. Select and install turnbuckles, thimbles and cable clips.
4. Assemble and operate block and tackle.
5. Perform temporary lashing of load.

RK1200 Conventional and Hydraulic Cranes

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 7, 8 and 17.

Pre-Requisites: RK1190

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of crane assembly and disassembly
- demonstrate knowledge of load rigging and lifting procedures using cranes

Theory:

PRINCIPLES OF LEVERAGE

1. Describe the basic principles of leverage associated with cranes.

ASSEMBLY

1. Identify the common types of crane equipment and describe their characteristics and applications.
 - i. hydraulic
 - ii. conventional
 - crawler
 - carrier mounted
 - rough terrain
 - i. high capacity
 - ringer
 - sky horse
2. Describe the procedures used to prepare a site for crane assembly.
 - i. off-loading inventory

- ii. required equipment
 - iii. crane components and layout
3. Describe crane erection sequence.
- i. boom/jib assembly
 - ii. counterweight
 - iii. reeving
4. Describe the procedure used to level and plumb crane and set outriggers.
- i. conventional cranes
 - crawlers
 - carriers
 - ii. hydraulic cranes

RIGGING AND LOAD HANDLING

1. Describe the use of calculations, tables and charts to lift and move loads.
2. Describe the procedures used to attach headache ball to the whip line.

INSPECTION AND DISASSEMBLY

1. Describe the procedure used to perform visual inspection of crane components.
 - i. conventional cranes
 - ii. hydraulic cranes
2. Describe the procedures used to dismantle cranes.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

RK1190 Rigging 3 (Load Handling)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis task 5.

Pre-Requisites: RK1180

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of hoisting and conveyancing equipment, their components, applications and procedures for use
- rig and move loads

Theory:

MOVING AND HOISTING EQUIPMENT

1. Identify various types of moving and hoisting equipment and describe their applications and procedures for use.
 - i. come-alongs
 - ii. grip action hoist (turfors)
 - iii. chain block hoist
 - iv. hydraulic jacks
 - v. fork lift
 - vi. stringers
 - vii. rollers
 - viii. bents
 - ix. dunnage (hardwood blocking)
 - x. tuggers
 - xi. winches
 - xii. beam trolleys

2. Describe the procedures used to identify the center of gravity of a load.

PLACEMENT OF LOADS

1. Describe the procedures used to determine and plan placement of loads.
 - i. drawings
 - ii. precautions
 - iii. storage

SIGNALLING

1. Describe the purpose and applications of signalling.
2. Identify crane signals and describe their meaning and procedures for use.
 - i. raising loads
 - ii. moving loads
 - iii. lowering loads

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Plan and execute a mock lift.

RK1130 Blueprint Reading 2 (Structural)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis task 2.

Pre-Requisites: RK1120

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of structural drawings and their use

Theory:

1. Describe the component parts of steel structures.
2. Define the terminology related to the materials and processes used.
3. Identify basic structural materials and shapes.
4. Identify and interpret the symbols used on blueprints for steel structures.
5. Describe the procedures used to compile a materials take-off.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Verify fabricated structural steel for layout prior to erection.
2. Verify anchor bolt layout.
3. Compile a materials take-off.

RK2130 Job Planning, Coordination and Site Preparation

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 2 and 3.

Pre-Requisites: RK1110; RK1120; RK1200

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of planning requirements and procedures
- demonstrate knowledge of job-site preparation and coordination of tasks

Theory:

PRELIMINARIES

1. Define terminology associated with job-site preparation.
2. Describe procedures used to prepare work site.
 - i. interpretation of plan drawings
 - ii. site drawings
 - iii. fabrication drawings
 - iv. detail drawings
 - v. erection drawings
 - vi. field sketches
3. Describe the set up and procedures for use of site instruments.
 - i. transit level
 - ii. optical level
 - iii. level
 - iv. laser leveling devices
 - v. plumb bob
 - vi. chalk line
 - vii. piano wire

- viii. square
- 4. Describe site-specific hazards, precautions and safe practices.
- 5. Describe the procedures used to identify lay-down areas.
 - i. prefab site
 - ii. obstructions
- 6. Describe the procedure used to lay-out grid lines.
- 7. Describe the procedure used to check existing grid lines.
- 8. Describe relevant federal, provincial and local standards, codes and regulations.

MATERIALS

- 1. Describe inventory procedures.
- 2. Describe material lists, their purpose and use.
- 3. Describe the procedures used to coordinate delivery of materials to the job site.

JOB SITE PREPARATION

- 1. Describe the procedures used to prepare job site for storage of material and equipment.
- 2. Describe the procedures used to off-load steel members and other construction materials.
- 3. Describe procedures used to check symbols or marks to sort steel members and other construction materials.
- 4. Describe the procedures used for material movement and storage in a safe and orderly manner after delivery.
 - i. use of crane

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- ii. rigging
 - iii. hooking on to structural member
 - iv. placement
 - v. load management
5. Describe the procedures to visually inspect job site.

EQUIPMENT

1. Describe the procedures used to receive, move and position equipment.
2. Describe selection and installation procedures for various types of equipment.
3. Describe the erection planning procedures.
 - i. structural steel buildings
 - ii. bridges steel and concrete
 - iii. cranes and derricks
4. Describe the procedures used to develop and adjust construction schedules.

PERSONNEL

1. Describe the procedures used to determine manpower requirements for job site.
2. Describe the importance of site roles and communication.
 - i. ironworker responsibilities
 - ii. coordination of work with other trades

REPORTS

1. Describe reports, their purpose and use.
 - i. interim
 - ii. check list
 - iii. Non-Conformance Reports (NCR)
 - iv. Mill test specifications

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Set up and use site equipment.

RK2150 Post-tensioning

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis task 20.

Pre-Requisites: RK1140; RK1180

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of post-tensioning tendons in cast-in place and pre-cast concrete
- demonstrate knowledge of inspection and testing of post-tensioned structures

Theory:

PREPARATION

1. Identify the tools and equipment required for post-tension work and describe their use.
2. Describe the procedures used to prepare for post-tension work.
 - i. site layout and preparation
 - ii. notifications
 - iii. use of drawings
 - iv. pre-stress
 - v. fabrication drawings

PROCEDURES

1. Describe the procedures used to verify and mark tendon locations on concrete forms.

2. Describe the procedures used to verify correct locations of holes in forms for anchoring systems.
3. Describe the procedures used to position and secure anchorage and bursting steel.
4. Describe the procedures used to mark the profile of the tendon.
5. Describe the procedures used to cut, position and secure supports and conduit at specified locations.
6. Describe the procedures used to place and fasten tendon according to specifications.
 - i. selection
 - ii. cutting
 - iii. lay out
 - iv. connection to anchorages
 - v. protection of exposed tendons
 - vi. exclusion of concrete
 - vii. securing dead ends
7. Describe the procedures used to verify components remain stable during concrete pour.
8. Describe the procedures used to remove pocket-forming devices.
9. Describe the procedures used to install wedges.
10. Describe the procedures used to mark tendon to determine elongation.
11. Describe the procedures used to stress structure.
 - i. determine stressing sequence
 - ii. tension and elongation
 - iii. document elongation and gauge pressure on tendon
 - iv. locking tendon
12. Describe the procedures used to disengage stressing equipment.

13. Describe approved methods used to de-stress tendon and their associated procedures if over-stressed.
14. Describe finishing off procedures.
 - i. cut off excess tendon
 - ii. install grease cup and patch pockets
 - iii. apply grout to voids in ducts

INSPECTION

1. Describe the procedures used to verify all steps in the post-tensioning sequence.
2. Identify the tools and equipment used for inspection and testing and describe the procedures for their calibration and use.
3. Describe the procedures used to repair surface damage.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

RK2210 Reinforced Concrete 1 (Principles)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 17 and 19.

Pre-Requisites: RK1140; RK1190; RK2130

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of reinforced concrete, its components and construction

Theory:

1. Define terminology associated with reinforcing concrete.
2. Describe the purpose and composition of reinforced structural concrete.
3. Identify types of reinforcing steel and describe their characteristics and applications.
4. Describe the interpretation and use of drawings and prints.
 - i. detail sheets
 - ii. shop drawings
 - iii. working drawings and sketches
5. Identify types of ties, their characteristics and applications.
6. Describe the safety guidelines in regards to placing and tying reinforcing steel.
7. Describe the procedures used to tie reinforcing steel.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Tie reinforcing steel.

RK2110 Structural Steel 2 (Erection)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 11 and 17.

Pre-Requisites: RK2100

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of erecting and securing structural steel

Theory:

1. Describe the procedures used for material movement and storage in a safe and orderly manner.
 - i. use of crane
 - ii. rigging
 - iii. hooking on
 - iv. placement
 - v. planning of access and temporary structures

2. Describe the procedures used to accept and secure structural members into position.
 - i. use of cranes
 - ii. use of drawings
 - iii. layout of structural members prior to erection
 - iv. bracing
 - v. fastening
 - vi. selection of tools
 - vii. climbing with fall arrest systems
 - viii. shims

3. Identify tools and fasteners used to align components and describe their installation according to specifications.
 - i. pins
 - ii. bolts
 - iii. reamers
 - iv. hammers
4. Describe the procedures used to weld structures according to specifications.
5. Describe the procedures used to inspect structural steel after erection according to standards.
 - i. visual
 - ii. mechanical

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Develop a work site plan.
2. Erect and secure structural steel members.

RK2190 Tower Cranes

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 6 and 17.

Pre-Requisites: RK1200

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of tower cranes and procedures used to assemble, erect, jump and dismantle.

Theory:

PRINCIPLES OF LEVERAGE

1. Describe the basic principles of leverage associated with tower cranes.

ASSEMBLY

1. Identify different types of tower cranes and describe their characteristics and applications.
2. Describe the procedures used to prepare for assembly.
 - i. off-loading parts
 - ii. inventories
 - iii. laying out components
3. Describe the procedures used to erect tower cranes in accordance with manufacturer's specifications.
 - i. level and plumb base section of the mast
 - ii. install jacking section
 - iii. install turntable

- iv. install counterjib
- v. install jib sections/pennant lines on booms
- vi. secure counterweight
- vii. use built-in jacking systems
- viii. reeve blocks and sheaves along masts and booms
- ix. install trolleys and adjust lines
- x. jump crane

INSPECTION AND DISASSEMBLY

1. Describe the procedures used to perform visual inspection of crane components.
2. Describe the sequence and procedures used to dismantle and store crane components as per crane specifications.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

RK2100 Structural Steel 1 (Preparation)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 11 and 17.

Pre-Requisites: RK1110; RK1130; RK1200; RK2130

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of structural steel members, their identification and handling

Theory:

1. Define terminology associated with steel erection.
2. Identify the types of steel structures and describe their components.
 - i. buildings
 - ii. bridges
 - iii. towers
3. Describe the safety guidelines for erecting structural steel.
 - i. industry standards
 - ii. codes of practice
 - iii. government regulations
4. Describe the tools and equipment required to erect structural steel.
5. Describe the procedures used to receive, verify, sort and store structural steel members.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

RK1140 Blueprint Reading 3 (Rebar)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis task 2.

Pre-Requisites: RK1110

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of rebar drawings and their use

Theory:

1. Define the terminology and symbols related to the materials and processes used with reinforcing steel.
2. List the component parts of reinforced concrete and identify their associated symbols and abbreviations.
3. Identify basic reinforced materials and shapes.
4. Describe the procedures used to compile a materials take-off for reinforcing steel.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Compile a materials take-off.

AP1100 Introduction to Apprenticeship

Description:

This course is designed to give participants the knowledge base and skills necessary to understand and successfully navigate the apprenticeship/red seal program.

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- identify the requirements for registering in an Apprenticeship Program
- describe the registration process
- explain the steps to complete the Apprenticeship Program
- articulate the roles of the Apprentice, Journeyperson, Training Institutions, Industry and Governing Bodies in the Apprentice Program
- explain the significance of the Red Seal Program

Pre-Requisites: None

Objective and Content:

1. Define apprenticeship.
 - i. define Apprenticeship and Red Seal Certification
 - ii. discuss the definition of Apprenticeship and Red Seal Certification
 - iii. distinguish between Red Seal and Provincial Certification
2. Explore how apprenticeship is governed and administered.
 - i. explain who is responsible for administering apprenticeship
 - Department of Education
 - Provincial Apprenticeship and Certification Board
3. Explore the roles and responsibilities of those involved in the apprenticeship process.
 - i. apprentice
 - ii. employer/journeyperson
 - iii. Industrial Training Division

- explain when and where to take the in-class portion of advance training
 - discuss class calls
 - iv. Training Institutions
 - various delivery methods
 - v. Provincial Apprenticeship and Certification Board
- 4. List and explain the steps in the apprenticeship process.
 - i. explain the registration process
 - ii. describe apprenticeship as an agreement between employee, employer and Provincial government
 - iii. review a Memorandum of Understanding
 - iv. legal document
 - v. review an application of apprenticeship
 - original high school certificate or equivalent
 - original transcript from the applicant's training institution
 - vi. describe the roles of Institutional and Industrial Education Division of the Department of Education in apprenticeship
 - vii. explain the role of the Program Development Officer
 - define probation period
 - discusses what constitutes a cancellation of apprenticeship
 - explain the consequences of an apprenticeship cancellation
 - discuss the purpose of the Record of Occupational Progress (Log Book)
 - explore how to maintain your log book
 - discuss who is responsible for tracking and signing-off on trade skills
 - explain how and where to record hours worked
 - identify the importance of updating your file with the Program Development Officer
 - viii. differentiate between provincial and interprovincial exams
- 5. Describe the training and education requirements.
 - i. discuss the factors affecting on-the-job and in class portions of your training
 - ii. define in school and on the job training
 - review a Plan of Training
 - identify the percentage of on-the-job and in class training time

- current labour market implications on completing an apprenticeship program
6. Explain Plans of Training.
 - i. identify what is included in the Plan of Training
 - entrance requirements
 - duration of in-school and on-the-job training
 - course content
 - entry level or advanced level
 - ii. explain how a Journeyperson Certificate is achieved
 - discuss Certificate of Qualification.
 - discuss Certificate of Apprenticeship.
 - discuss Red Seal endorsement
 7. Discuss the Red Seal Program.
 - i. define designated trade
 - ii. explore the National Occupational Analysis for your trade
 - iii. explain Interprovincial Standards Red Seal Program and how it works.
 - labor mobility
 - qualification recognition
 - iv. discuss the range of careers possible in your chosen trade
 8. Explain apprenticeship progression schedule and wage rates.
 - i. review a Record of Occupational Progress (Log Book)
 - ii. hours per program
 - iii. requirements for progression
 - iv. wage rates per year of apprenticeship
 9. Identify the examinations and evaluation process used in Apprenticeship.
 - i. discuss occupational tests and examinations as directed by the Provincial Apprenticeship and Certification Board
 - theory
 - practical
 - ii. explain formal assessment and the pass mark of 70%
 10. Examine some of the financial incentives available to apprentices.
 - i. Employment Insurance (E.I.) Benefits

- ii. government sponsored student loans
 - iii. apprenticeship incentive Federal and Provincial
 - iv. scholarships
11. Continuing training outside the Province of Newfoundland Labrador.
- i. training in other provinces and territories
 - procedure for registration and recognition of hours and skills in other provinces
 - ii. options for dual certification
 - transfer of credits
12. Review and define the following terms:
- i. Apprenticeship Program Accreditation
 - ii. Cancellation of Apprenticeship
 - iii. Certificate of Apprenticeship
 - iv. Certificate of Qualification
 - v. Certification Renewal
 - vi. Criteria for Eligibility
 - vii. Journeyperson
 - viii. Practical Examination
 - ix. Prior Learning
 - x. Record of Occupational Progress (Logbook)
 - xi. Red Seal Certification
 - xii. Registered Apprentice
 - xiii. Theoretical Examination
 - xiv. National Occupational Analysis (NOA)
 - xv. Class Call
 - xvi. Dual certification

Practical:

1. Review the Provincial Apprenticeship web site: www.gov.nl.ca/app.
 - i. identify the requirements for registering as an apprentice and the registration process
 - ii. explain the steps to complete an apprenticeship program
 - iii. identify who is responsible for tracking and signing-off on trade skills
 - iv. identify the nearest Industrial Training Office to your community
 - v. identify the current incentives available to apprentices

2. Review a plan of training on the Provincial Apprenticeship web site.
 - i. identify the hours for your trade (in-school and on-the-job)
 - ii. explain the roles and responsibilities of the following stakeholders in the apprenticeship process: employer, apprentice, training institution and the Industrial Training Division

3. Visit the Red Seal Web site <http://www.red-seal.ca>, review the National Occupational Analyses for your trade.
 - i. review the scope of work for your occupation and identify the industry sectors and job types requiring your trade
 - ii. identify the trends of your trade
 - iii. provide a list of personal protective equipment required for your trade

CM2150 Workplace Communications

Description:

This course is designed to introduce students to the principles of effective communication including letters, memos, short report writing, oral presentations and interpersonal communications.

Course Outcomes:

Upon completion of the course, students will be able to:

- understand and apply communication skills as outlined in the Employability Skills 2000, Conference Board of Canada
- understand the importance of well-developed writing skills in business and in career development
- understand the purpose of the various types of business correspondence
- examine the principles of effective business writing
- examine the standard formats for letters and memos
- write effective letters and memos
- examine the fundamentals of informal reports and the report writing procedure
- produce and orally present an informal report
- examine effective listening skills and body language in communication

Pre-Requisites: None

Objectives and Content:

1. Apply rules and principles for writing clear, concise, complete sentences which adhere to the conventions of grammar, punctuation, and mechanics.
2. Explain the rules of subject-verb agreement.

3. Define and describe the major characteristics of an effective paragraph.
4. Examine the value of business writing skills.
 - i. describe the importance of effective writing skills in business
 - ii. describe the value of well-developed writing skills to career success as referenced in the Employability Skills
5. Examine principles of effective business writing.
 - i. discuss the rationale and techniques for fostering goodwill in business communication, regardless of the circumstances
 - ii. review the importance of revising and proofreading
 - iii. differentiate between letter and memo applications in the workplace and review samples
 - iv. identify the parts of a business letter and memo
 - v. review the standard formats for business letters and memos
 - vi. examine samples of well-written and poorly written letters and memos
 - vii. memos
 - viii. examine guidelines for writing sample letters and memos which convey: acknowledgment, routine request, routine response, complaint, refusal, persuasive request and letters of appeal
6. Examine the fundamentals of informal business reports.
 - i. identify the purpose of the informal report
 - ii. identify the parts and formats of an informal report
 - iii. identify methods of information gathering
 - iv. describe the methods of referencing documents
 - v. review the importance of proof reading and editing
7. Examine types of presentations.
 - i. review and discuss components of an effective presentation
 - ii. review and discuss delivery techniques
 - iii. review and discuss preparation & use of audio/visual aids
 - iv. discuss and participate in confidence building exercises used to prepare for giving presentations
8. Interpersonal communications.
 - i. examine and apply listening techniques
 - ii. discuss the importance of body language

Practical:

1. Write well-developed, coherent, unified paragraphs which illustrate the following: a variety of sentence arrangements; conciseness and clarity; and adherence to correct and appropriate sentence structure, grammar, punctuation, and mechanics.
2. Write sample letters and memos which convey: acknowledgment, routine request, routine response, complaint, refusal, persuasive request and letters of appeal.
3. Gather pertinent information, organize information into an appropriate outline and write an informal report with documented resources.
 - i. edit, proofread, and revise the draft to create an effective informal report and present orally using visual aids
 - ii. participate in confidence building exercises
4. Present an effective presentation.
5. Evaluate presentations.

MR1220 Customer Service

Description:

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

Course Outcomes:

Upon successful completion of this course, students will be able to:

- define customer service
- explain why service is important
- describe the relationship between “service” and “sales”
- demonstrate an understanding of the importance of a positive attitude.
- demonstrate methods of resolving customer complaints.

Pre-Requisites: None

Objectives and Content:

1. Define quality service.
 - i. identify and discuss elements of customer service
 - ii. explain the difference between service vs. sales or selling
 - iii. explain why quality service is important
 - iv. identify the various types of customers and challenges they may present
 - v. describe customer loyalty
 - vi. examine barriers to quality customer service

2. Explain how to determine customer's wants and needs.
 - i. identify customer needs
 - ii. explain the difference between customer wants and needs
 - iii. identify ways to ensure repeat business

3. Demonstrate an understanding of the importance of having a positive attitude.
 - i. identify & discuss the characteristics of a positive attitude
 - ii. explain why it is important to have a positive attitude
 - iii. explain how a positive attitude can improve a customer's satisfaction
 - iv. define perception and explain how perception can alter us and customers
 - v. describe methods of dealing with perception

4. Communicating effectively with customers.
 - i. describe the main elements in the communication process
 - ii. identify some barriers to effective communication
 - iii. explain why body language is important
 - iv. define active listening and state why it is important
 - v. identify and discuss the steps of the listening process
 - vi. identify and discuss questioning techniques

5. Demonstrate using the telephone effectively.
 - i. explain why telephone skills are important
 - ii. describe the qualities of a professional telephone interaction

6. Demonstrate an understanding of the importance of asserting oneself.
 - i. define assertiveness
 - ii. discuss assertive techniques
 - iii. explain the use of assertiveness when dealing with multiple customers

7. Demonstrate techniques for interacting with challenging customers in addressing complaints and resolving conflict.
 - i. examine and discuss ways to control feelings
 - ii. examine and discuss ways to interact with an upset customer
 - iii. examine and discuss ways to resolve conflict/customer criticism

- iv. examine and discuss ways to prevent unnecessary conflict with customers

Practical:

1. Participate in activities to demonstrate knowledge of the course objectives.

SP2330 Quality Assurance/Quality Control

Description:

This course is designed to give students an understanding of the concepts and requirements of QA/QC such as, interpreting standards, controlling the acceptance of raw materials, controlling quality variables and documenting the process. It includes information on quality concepts, codes and standards, documentation, communications, human resources, company structure and policy, teamwork and responsibilities.

Course Outcomes:

Upon completion of this course, students will be able to:

- develop the skills and knowledge required to apply quality assurance/quality control procedures as related to the trade
- develop an awareness of quality principles and processes
- apply quality assurance/quality control procedures in a shop project

Pre-Requisites: None

Objectives & Content:

1. Describe the reasons for quality assurance and quality plans.
2. Explain the relationship between quality assurance and quality control.
3. Describe quality control procedures as applied to the production and checking of specifications and processes in applicable occupations.
4. Describe quality control procedures as applied to the acceptance and checking of raw materials.
5. Explain the role of communications in a quality environment.

6. Explain why it is important for all employees to understand the structure of the company and its production processes.
7. Explain how human resource effectiveness is maximized in a quality managed organization.
8. Explain the role of company policy in quality management.
9. Explain the purpose of codes and standards in various occupations.
10. Explain the concepts of quality.
 - i. cost of quality
 - ii. measurement of quality
 - iii. elements of quality
 - iv. elements of the quality audit
 - v. quality standards
 - vi. role expectations and responsibilities
11. Explain the structure of quality assurance and quality control.
 - i. describe organizational charts
 - ii. identify the elements of quality assurance system such as ISO, CSA, WHMIS, Sanitation Safety Code (SSC)
 - iii. explain the purpose of the quality assurance manual
 - iv. describe quality assurance procedures
12. Examine quality assurance/quality control documentation.
 - i. describe methods of recording reports in industry
 - ii. describe procedures of traceability (manual and computer-based recording)
 - iii. identify needs for quality control procedures

Practical:

1. Apply quality control to a project
 - i. follow QA/QC procedures for drawings, plans and specifications in applicable occupations
 - ii. calibrate measuring instruments and devices in applicable occupations.
 - iii. interpret required standards
 - iv. follow QA/QC procedures for accepting raw materials
 - v. carry out the project
 - vi. control the quality elements (variables)
 - vii. complete QA/QC reports

MC1050 Introduction to Computers

Description:

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

Course Outcomes:

Upon completion of this course, students will have a basic understanding of:

- computer systems and their operation
- popular software packages, their applications
- security issues of computers

Pre-Requisites: None

Objectives & Content:

1. Identify the major components of microcomputer system hardware and software system.
2. Describe the functions of the microprocessor.
 - i. describe and give examples of I/O DEVICES
 - ii. describe primary storage (RAM, ROM, Cache)
 - iii. define bit, byte, code and the prefixes k.m. and g.
 - iv. describe secondary storage (diskettes and hard disks, CD ROMS, Zip drives, etc.)
 - v. describe how to care for a computer and its accessories
3. Describe microcomputer software.
 - i. define software
 - ii. describe types of operational and application software
 - iii. define file and give the rules for filenames and file extensions

4. Describe windows software.
 - i. start and quit a program
 - ii. demonstrate how to use the help function
 - iii. locate a specific file using the find function
 - iv. identify system settings: wall paper, screen saver, screen resolution, background
 - v. start a program by using the run command
 - vi. shutting down your computer

5. Identify file management commands.
 - i. create folders
 - ii. maximize and minimize a window
 - iii. describe windows task bar

6. Describe keyboards.
 - i. identify and locate alphabetic and numeric keys
 - ii. identify and locate function key & special keys

7. Describe word processing.
 - i. describe windows components
 - ii. menu bar
 - iii. menu indicators
 - iv. document window
 - v. the status bar
 - vi. the help feature
 - vii. insertion point movements

8. Describe the procedure used to develop a document.
 - i. enter text
 - ii. change the display

9. Describe the procedure for opening, saving and exiting documents.
 - i. saving a document
 - ii. closing a document.
 - iii. starting a new document Window
 - iv. opening a document
 - v. exiting word processor

10. Describe the procedure for editing a document.
 - i. adding new text
 - ii. deleting text
 - iii. using basic format enhancement (split and join paragraphs, insert text)

11. Describe the main select features.
 - i. identify a selection
 - ii. moving a selection
 - iii. copying a selection
 - iv. deleting a selection
 - v. saving a selection

12. Explain how to change layout format.
 - i. changing layout format: (margins, spacing, alignment, paragraph indent, tabs, line spacing, page numbering)

13. Explain how to change text attributes.
 - i. changing text attributes: (bold, underline, font, etc.)

14. Describe the auxiliary tools.
 - i. using spell check and thesaurus

15. Describe print features.
 - i. selecting the print feature: (i.e. number of copies and current document)
 - ii. document)
 - iii. identifying various options in print screen dialogue box

16. Examine and discuss electronic spreadsheet.
 - i. spreadsheet basics
 - ii. the worksheet window

17. Describe menus.
 - i. menu bar
 - ii. control menu
 - iii. shortcut menu
 - iv. save, retrieve form menus

18. Describe the components of a worksheet.
 - i. entering constant values and formulas
 - ii. using the recalculation feature

19. Describe use ranges.
 - i. typing a range for a function
 - ii. pointing to a range for a function
 - iii. selecting a range for toolbar and menu commands

20. Describe how to print a worksheet.
 - i. printing to the screen
 - ii. printing to the printer
 - iii. printing a selected range

21. Describe how to edit a worksheet.
 - i. replacing cell contents
 - ii. inserting & deleting rows and columns
 - iii. changing cell formats
 - iv. changing cell alignments
 - v. changing column width
 - vi. copying and moving cells

22. State major security issues in using computers.
 - i. pass words
 - ii. accessing accounts
 - iii. viruses and how they can be avoided
 - iv. identity theft and ways to protect personal information
 - v. demonstrate how to view directory structure and folder content
 - vi. organize files and folders
 - vii. copy, delete, and move files and folders

23. Describe how to use electronic mail.
 - i. e-mail etiquette
 - ii. e-mail accounts
 - iii. e-mail messages
 - iv. e-mail message with attachments
 - v. e-mail attachments
 - vi. print e-mail messages

- vii. deleting e-mail messages
24. Explain the internet and its uses.
- i. the world wide web(www)
 - ii. accessing web sites
 - iii. internet web browsers
 - iv. internet search engines
 - v. searching techniques
 - vi. posting documents on-line

Practical:

1. Create a document using word processing.
2. Complete word processing exercises to demonstrate proficiency in word processing.
3. Prepare and send e-mails with attachments.
4. Retrieve documents and e-mail attachments and print copies.
5. Develop and print a spread sheet.
6. Post a document on-line.

SD1700 Workplace Skills

Description:

This course involves participating in meetings, information on formal meetings, unions, workers' compensation, employment insurance regulations, workers' rights and human rights.

Course Outcomes:

Upon completion of this course, students will be able to:

- participate in meetings
- define and discuss basic concepts of:
 - unions
 - workers' compensation
 - employment insurance
 - workers' rights
 - human rights
 - workplace diversity
 - gender sensitivity

Pre-Requisites: None

Objectives & Content:

1. Meetings.
 - i. identify and discuss meeting format and preparation required for a meeting
 - ii. explain the purpose of an agenda
 - iii. explain the roles and responsibilities of meeting participants
 - iv. explain the purpose of motions and amendments and withdrawals
 - v. explain the procedure to delay discussion of motions
 - vi. explain the voting process

2. Unions.

- i. state why unions exist
- ii. give a concise description of the history of Canadian labour
- iii. explain how unions function
- iv. explain labour's structure
- v. describe labour's social objectives
- vi. describe the relationship between Canadian labour and the workers
- vii. describe the involvement of women in unions

3. Worker's Compensation.

- i. describe the aims, objectives, benefits and regulations of the Workplace Health, Safety and Compensation Commission
- ii. explain the internal review process

4. Employment Insurance.

- i. explain employment insurance regulations
- ii. describe how to apply for employment insurance
- iii. explain the appeal process
- iv. identify the components of a letter of appeal

5. Worker's Rights.

- i. define labour standards
- ii. explain the purpose of the Labour Standards Act
- iii. identify regulations pertaining to:
 - hours of work
 - minimum wages
 - employment of children
 - vacation pay
- iv. explain the purpose of the Occupational Health & Safety Act as it refers to workers' rights

6. Human Rights.

- i. describe what information cannot be included on an employment application
- ii. describe what information cannot be included in an interview
- iii. examine the Human Rights Code and explain the role of the Human Rights Commission

- iv. define harassment in various forms and identify strategies for prevention
7. Workplace diversity.
- i. define and explore basic concepts and terms related to workplace inclusively including age, race, culture, religion, socio-economic, sexual orientation with an emphasis on gender issues and gender stereotyping.
8. Gender Sensitivity.
- i. explore gender and stereotyping issues in the workplace by identifying strategies for eliminating gender bias

Practical:

1. Prepare an agenda.
2. Participate in a meeting.
3. Analyze a documented case of a human rights complaint with special emphasis on the application, time frame, documentation needed, and legal advice available.

SD1710 Job Search Techniques

Description:

This course is designed to give students an introduction to the critical elements of effective job search techniques.

Course Outcomes:

Upon completion of this course, students will be able to:

- demonstrate effective use of job search techniques

Pre-Requisites: None

Objectives and Content:

1. Identify and examine employment trends and opportunities.
2. Identify sources that can lead to employment.
3. Access and review information on the Newfoundland and Labrador Apprenticeship and Certification Web site and the Apprenticeship Employment Gateway.
4. Analyze job ads and discuss the importance of fitting qualifications to job requirements.
5. Identify and discuss employability skills as outlined by the Conference Board of Canada.
6. Discuss the necessity of fully completing application forms.
7. Establish the aim/purpose of a resume.

8. Explore characteristics of effective resumes, types of resumes, and principles of resume format.
9. Explore characteristics of an effective cover letter.
10. Identify commonly asked questions in an interview.
11. Explore other employment related correspondence.
12. Explore the job market to identify employability skills expected by an employer.
13. Conduct a self-analysis and compare with general employer expectations.
14. Discuss the value of establishing and maintaining a portfolio.

Practical:

1. Complete sample application forms.
2. Write a resume.
3. Write an effective cover letter.
4. Establish a portfolio.
5. Write out answers to commonly asked questions asked during interviews.
6. Identify three potential employers from the Apprenticeship Employment Gateway, Apprenticeship and Certification website.

SD1720 Entrepreneurial Awareness

Description:

This course is designed to introduce the student to the field of entrepreneurship, including the characteristics of the entrepreneur, the pros and cons of self-employment, and some of the steps involved in starting your own business.

Course Outcomes:

Upon completion of this course, the student will be able to:

- identify the various types of business ownership, the advantages and disadvantages of self-employment and identify the characteristics of an entrepreneur
- state the purpose and identify the main elements of a business plan

Pre-Requisites: None

Objectives and Content:

1. Explore self-employment: An alternative to employment.
 - i. identify the advantages and disadvantages of self-employment vs. regular employment
 - ii. differentiate between an entrepreneur and a small business owner
 - iii. evaluate present ideas about business people
2. Identify and discuss various types of business ownership.
 - i. explore the characteristics of entrepreneurs
 - ii. identify characteristics common to entrepreneurs
 - iii. compare one's own personal characteristics with those of entrepreneurs
 - iv. examine one's present ideas about business people
3. Identify business opportunities.
 - i. distinguish between an opportunity and an idea

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- ii. examine existing traditional and innovative business ventures
 - iii. identify and summarize the role of various agencies that support business development
4. Review the entrepreneurial process.
- i. explain the entrepreneurial process
 - ii. describe the purpose of a business plan

Block 2

RK2201 Derricks and Electric Overhead Travelling (EOT) Cranes

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 7 and 17.

Pre-Requisites: RK1200

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of derricks and electric overhead travelling cranes

Theory:

DERRICKS

1. Describe the basic principles of leverage associated with derricks.
2. Identify different types of derricks and describe their characteristics, components and applications.

ELECTRIC OVERHEAD TRAVELLING (EOT) CRANES

1. Identify different types of electric overhead travelling cranes and describe their characteristics, components and applications.
2. Identify the types of operating controls for electric overhead travelling cranes and describe their use.
 - i. cab operated
 - ii. remote
 - iii. pendants

3. Describe the procedures used to assemble and install electric overhead travelling cranes components.
 - i. crane rails
 - ii. trucks (wheels)
 - iii. bridge girders
 - iv. hoist and trolleys
 - v. crane stop
 - vi. load blocks
 - vii. cab

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

RK2180 Pre-cast Concrete

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 16 and 17.

Pre-Requisites: RK1200; RK2190; RK1160

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of erection and installation of pre-cast concrete components.

Theory:

1. Describe the procedures used to prepare for erection of pre-cast concrete members and components.
 - i. site preparation
 - ii. selection and set up of equipment
 - iii. interpretation of drawings and prints
 - iv. calculation of weight
 - v. rigging procedures
 - vi. material handling
 - vii. layout
2. Describe the procedures used to verify location and condition of embedment.
3. Describe the procedures used to erect pre-cast members.
 - i. support clips
 - ii. bearing pads
 - iii. aligning, leveling and plumbing
 - iv. fastening
 - v. installing gaskets
 - vi. packing

- vii. caulking
 - viii. air sealing
 - ix. welding
4. Describe the procedures for cosmetic finishing.
- i. patching
 - ii. grouting
 - iii. removing lugs
 - iv. grinding
 - v. painting

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Develop a work site plan.

RK2160 Robotic Equipment

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 17 and 21.

Pre-Requisites: RK1120; RK1200

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the inspection, erection and installation of robotic equipment for material handling and automated mechanical systems.

Theory:

1. Define terminology associated with robotic equipment.
2. Identify types of robotic equipment and describe their characteristics, components, and applications.
3. Describe the procedures used to inspect components and remove shipping stays.
4. Describe the procedures used to assemble robotic equipment and bring to point of installation according to specifications.
 - i. pre-assemble components
 - ii. secure anchorage
 - iii. install supports

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

RK2170 Ornamental and Miscellaneous Ironwork

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 15 and 17.

Pre-Requisites: RK1130; RK1200; RK1150; RK1160

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of ornamental and miscellaneous ironwork and procedures for installation and finishing

Theory:

1. Identify types of ornamental and miscellaneous ironwork and describe their components.
 - i. stairways
 - ii. railings
 - iii. panels
 - iv. catwalks
 - v. fences
 - vi. sound barriers
 - vii. vehicle guard rails
 - viii. vault work
 - ix. prison doors

2. Describe the procedures used to plan and prepare for installation of various types of ironwork.
 - i. site preparation
 - ii. material handling and movement
 - iii. equipment
 - iv. rigging
 - v. interpretation of drawings and prints

3. Describe the procedures used in the field to fabricate miscellaneous materials.
4. Describe the procedures used for finishing.
 - i. grinding
 - ii. painting
 - iii. filling procedures
 - iv. cladding procedures
 - v. installing caps
 - vi. polishing

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Fabricate and install:
 - i. handrails
 - ii. stairways
 - iii. door frames
 - iv. roof opening

RK2220 Reinforced Concrete 2 (Pre-assembly and Installation)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of the National Occupational Analysis tasks 17 and 19.

Pre-Requisites: RK1130; RK1200; RK1150; RK1160

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the procedures used to pre-assemble and install reinforcing steel

Theory:

1. Review the interpretation and use of drawings and prints.
 - i. detail sheets
 - ii. shop drawings
 - iii. working drawings and sketches
2. Describe the procedures used to mark location of reinforcing bar on form surfaces.
3. Identify types of bar supports and describe their applications.
 - i. chairs
 - ii. beam balusters
 - iii. slab spacers
 - iv. bar spacers
4. Describe the procedure used to pre-assemble steel bars and wire mesh.
5. Describe the procedures used to install steel bar and wire mesh at predetermined locations.
6. Identify clearances associated with reinforcing steel.

7. Describe the procedures used to make splices.
8. Identify the bends standardized by:
 - i. CSA Standard G30, 18-m1992
 - ii. 16-1967 and the American Concrete Institute
9. Describe the procedures used to cut and bend material to specifications.
10. Describe the various methods used to cut rebar and their associated procedures.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Install and tie rebar.
2. Cut and bend materials according to specifications.
3. Perform splicing procedures.

Block 3

RK2230 Temporary Access Structures and Working Platforms

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 17, 22 and 23.

Pre-Requisites: RK1110; RK1120; RK1180

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of temporary access structures, their assembly, erection and disassembly
- demonstrate knowledge of temporary working platforms, their assembly, erection and disassembly

Theory:

1. Identify types of temporary working platforms and describe their components, applications and procedures used to install.
 - i. power elevated working platforms
 - ii. suspended scaffolds
2. Identify types of temporary access structures and describe their components, applications and procedures used for installation.
 - i. floats
 - ii. scaffolds
 - iii. man lifts
 - iv. stairs
 - v. ladders

3. Describe lay-out and erection procedures for frame and tube scaffolds.
4. Identify and interpret relevant government regulations.
5. Describe the procedures used to evaluate conditions and suitability of base.
6. Describe requirements for inspection of temporary access structures and working platforms.
7. Describe the procedures and sequence for dismantling temporary access structures and working platforms.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Erect and dismantle a scaffold using tube and clamp for bracing.
2. View a demonstration of a power elevated working platform and its operation.

RK2140 Dismantling

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis task 18.

Pre-Requisites: RK1130; RK1200; RK2120

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of planning requirements for demolition
- demonstrate knowledge of equipment and procedures used in demolition
- demonstrate knowledge of material storage and disposal

Theory:

1. Identify the tools and equipment required for demolition and describe their use.
2. Describe the procedures to have utilities disconnected.
 - i. gas
 - ii. electricity
3. Describe the procedures used to handle steel members and other construction materials.
 - i. identification and sorting
 - ii. match marking
4. Describe the procedures used to dismantle miscellaneous structural components.
 - i. use of drawings
 - ii. planning of sequence
 - iii. disconnection
5. Describe the procedures used to move materials.
 - i. selection of equipment

- ii. weight calculation
 - iii. rigging
 - iv. lifting strain
6. Describe the procedures used to dispose of material.
- i. preparing material for shipment
 - ii. storage of material

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Develop a work site plan.
2. Dismantle structural steel.

RK2120 Structural Steel 3 (Plumbing and Securing)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 11 and 17.

Pre-Requisites: RK2110; RK2230

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of plumbing and securing steel structures
- test and inspect steel structures

Theory:

1. Identify the tools used to plumb up and align structures and describe their procedures for use.
 - i. plumb bob
 - ii. transit
 - iii. level
 - iv. turnbuckles
 - v. guy lines
2. Identify tools used for impacting and describe their applications and procedures for use.
 - i. impact wrenches
 - ii. pneumatic
 - iii. electric
 - iv. torque wrenches
 - v. reamers
3. Describe the procedures used to remove temporary bracing.

4. Describe the procedures used to test and inspect structural steel after erection according to standards.
 - i. visual
 - ii. mechanical

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Develop a work site plan.
2. Plumb, align and secure steel structures.
3. Test and inspect steel structures.

RK2280 Falsework

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 17 and 22.

Pre-Requisites: RK1130; RK1200; RK2230

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of falsework, its installation and dismantling

Theory:

1. Describe false-work, its components and applications.
2. Describe the lay-out and erection procedures for false-work.
3. Identify and interpret relevant government regulations.
4. Describe the procedures used to evaluate conditions and suitability of base.
5. Describe the procedures and sequence used for shoring up structural components.
6. Describe requirements for inspection of false-work.
7. Describe the procedures and sequence for dismantling false-work.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

RK1210 Decking and Grating

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis task 15.

Pre-Requisites: RK1130; RK1170; RK2110

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of decking and grating, its components and installation

Theory:

1. Define terminology associated with decking and grating.
2. Describe the components of decking and grating.
3. Identify types of tools and equipment required to install decking and
 - i. grating.
4. Identify types of fasteners used in decking and grating.
5. Describe procedures used to interpret blueprints for decking and grating.
6. Describe procedures used to install decking and grating.
7. Describe placement of bundles of decking and grating.
 - i. safety
 - ii. installation

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick:

1. Theory only.

Block 4

RK2251 Pre-Engineered Buildings

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 13 and 17.

Pre-Requisites: RK1120; RK1200; RK1190

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of planning, pre-assembly and erection of pre-engineered structures

Theory:

PREPARATION

1. Define terminology associated with pre-engineered structures.
2. Identify types of pre-engineered structures and describe their components, characteristics and applications.
3. Describe the procedures used to plan and prepare for erection of pre-engineered structures.
 - i. selection of tools and equipment
 - ii. identification, receiving and storage of components
 - iii. bills of lading
 - iv. materials list
 - v. manufacturer's handling specifications
 - vi. movement of materials
 - rigging
 - placement

ERECTION

1. Describe the procedures used to install pre-engineered structures as per manufacturers' specifications.
 - i. roofing
 - ii. cladding
 - iii. insulation
 - iv. doors
 - v. personnel
 - vi. roll-up
 - vii. windows
 - viii. panels

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

RK2260 Wooden Structures

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 17 and 24.

Pre-Requisites: RK1120; RK1200; RK2230

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of wooden structures and their erection

Theory:

1. Describe the procedures used to prepare for erection of wooden structures.
 - i. identification and sorting of materials
 - ii. receiving and inventory
 - iii. off-loading structural wood material
 - iv. storage of wood materials
2. Identify the assembly sequence and methods and associated procedures.
 - i. specifications and drawings
3. Describe erection methods and associated procedures.
 - i. lifting and spotting (positioning) components
 - ii. plumbing and levelling
 - iii. establishing elevations
 - iv. bracing and framing
 - v. complete alignment
 - vi. fastening
 - vii. removal of plumb cables

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

RK2270 Reinforced Concrete 3 (Fabrication)

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 17 and 19.

Pre-Requisites: RK1140; RK1200; RK2230

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of procedures used to fabricate reinforcing steel
- demonstrate knowledge of inspection procedures

Theory:

1. Describe the procedures used to prepare for reinforcing concrete.
 - i. site preparation
 - ii. interpretation of drawings and prints
 - iii. symbols
 - iv. selection and set up of equipment
 - v. off-loading steel
 - vi. interpretation of detail sheets and bar codes

2. Describe the procedures used to reinforce concrete.
 - i. calculations
 - ii. pre-assembly
 - iii. bar placement
 - iv. interpretation and use of drawings and prints
 - v. fabrication
 - vi. bending and cutting
 - vii. splicing
 - viii. identify tolerances

3. Describe the procedures used to verify that installation meets specifications.

4. Describe the procedures used to verify that bar assemblies remain stable during concrete pour.
5. Describe the procedures used to verify clearances after concrete pour.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Fabricate slab and beam.
2. Fabricate double wall.
3. Fabricate two columns.

RK2290 Curtain Walls

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis task 14.

Pre-Requisites: RK1130; RK1200; RK2190; RK2201

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of the layout and installation of curtain walls and window walls
- demonstrate knowledge of the procedures used to glaze wall openings

Theory:

PLANNING AND PREPARATION

1. Describe assembly and erection procedures and sequence.
 - i. determine lay-down and assembly area
 - ii. interpret drawings
 - iii. off-load materials
 - iv. identify components
 - v. select and set up equipment
 - vi. select materials
 - vii. rig loads
 - viii. handle finished materials

2. Describe the procedures used to lay-out curtain walls and window walls.

INSTALLATION

1. Describe the procedures used to erect curtain walls and window walls.

2. Identify and interpret the information provided by drawings and prints.

- i. structural blueprint
 - ii. detail drawings
 - iii. plan sequence
 - iv. architectural drawings.
3. Describe the procedures used to verify location of embedment.
4. Describe the procedures used to assemble sections to be installed.
5. Describe the procedures used for installation.
 - i. interlock section with standing sections
 - ii. align and level assembled sections
 - iii. apply back-beading to curtain wall
 - iv. verify alignment and secure
 - v. install flashing

FASTENING

1. Identify and interpret the information provided by the structural blueprint.
2. Describe lay-out procedures.
3. Describe the procedures used to drill holes.
4. Describe the procedures used to install support clips on structures.
5. Describe the procedures used to fasten wall sections.
6. Describe the procedures used to rig assembled sections.
 - i. equipment
 - ii. safety
 - iii. signals
 - iv. sequence

GLAZING

1. Describe the equipment, techniques and procedures used to cut glass and plastic.
 - i. consult drawings, manufacturer's specifications

- ii. verify materials
 - iii. verify alignment
 - iv. cutting technique
2. Describe the procedures used to install and secure glass and plastic.
 3. Describe the procedures used to apply sealer or sealant around glass according to specifications.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.

RK2240 Storage Tanks, Bins and Hoppers

NOA Reference:

The material covered satisfies in whole or in part, the requirements of National Occupational Analysis tasks 12 and 17.

Pre-Requisites: RK1120; RK1200; RK2230

Course Outcomes:

Upon successful completion of this course, the apprentice will be able to:

- demonstrate knowledge of assembly and erection of storage tanks, bins and hoppers

Theory:

1. Identify tools and equipment and describe their applications.
 - i. key plates
 - ii. pins
 - iii. strong backs
 - iv. dogs
 - v. wedges
2. Describe preparation and planning for erection and assembly.
 - i. receiving, identifying and sorting components
3. Describe the procedures used to prepare components for assembly and erection.
 - i. welding and cutting
 - ii. grinding
 - iii. joint preparation
 - iv. gouging
4. Describe the procedures used to erect and assemble components.
 - i. interpret specifications
 - ii. bolting and welding
 - iii. scaffolding

- iv. rigging
 - v. hoisting
 - vi. placement
 - vii. temporary fastening
 - viii. aligning and levelling
5. Identify the types of sealants used for storage tanks, bins and hoppers and describe the methods used to seal joints.
6. Describe the different methods used to test and inspect structures and joints.
7. Describe the procedures used to repair and finish surfaces.

Practical:

Practical skills enhance the apprentice's ability to meet the objectives of this course. The learning objectives outlined below are **mandatory** in Newfoundland, but are provided as suggestions for Nova Scotia, Prince Edward Island and New Brunswick.

1. Theory only.