



**IRONWORKER (STRUCTURAL/ORNAMENTAL)**

**2017**

Based on the CCDA Harmonization Recommendations and  
the Interprovincial Program Guide  
(pg. 10 for Program Structure)



## Preface

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This Apprenticeship Curriculum Standard is intended to assist instructional staff in the design and delivery of technical, in-class training in support of the Ironworker (Structural/Ornamental) Apprenticeship Program.

This document contains all of the technical training elements required to complete the apprenticeship program and has been developed based on the 2015 National Occupational Analysis (NOA) and the Interprovincial Program Guide (IPG). The NOA and IPG can be found on the Red Seal website ([www.red-seal.ca](http://www.red-seal.ca)),

Implementation of this Apprenticeship Curriculum Standard for apprenticeship training is outlined in the following table.

<b>Level</b>	<b>Implementation Effective</b>
Level 1	2016-2017
Level 2	2017-2018
Level 3	2018-2019

*\*\* The above implementation schedule was current at time of printing. Please **confirm** with Apprenticeship Staff prior to commencing training.*

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## **Introduction**

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Jurisdictions have long recognized the benefit of pooling resources in the development and maintenance of apprenticeship training standards. A successful example of this is the Interprovincial Standards Red Seal Program, which is administered by the Canadian Council of Directors of Apprenticeship (CCDA). Essential to the establishment of standards is the development of suitable training systems and programs which enable tradespeople to acquire certification based on these standards. While certification is the responsibility of Apprenticeship administrators throughout Canada, the development and delivery of technical training is the responsibility of jurisdictions.

With the support of Employment Services and Development Canada (ESDC), the provinces and territories have been working collaboratively to harmonize apprenticeship training programs across Canada. Four main areas of harmonization include:

- Use of the Red Seal trade name
- Consistent total training hours
- Same number of training levels
- Consistent sequencing of training content (at each level) using the most recent Red Seal Occupational Standard/National Occupational Analysis for the trade

This Apprenticeship Curriculum Standard is in alignment with the national CCDA harmonization recommendations.

### Provincial-Territorial Apprentice Mobility Agreement and Protocol

The provincial-territorial apprenticeship mobility agreement and protocol obligates Apprenticeship Authorities across Canada to recognize hours worked and technical training successfully completed by apprentices, regardless of the jurisdiction in which they were completed. The protocol applies to apprentices moving permanently or temporarily, and to recent graduates of college trades program.

## User Guide

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Apprenticeship Curriculum Standards are developed based on the National Occupational Analysis (NOA) or Red Seal Occupational Standard (RSOS) for the trade, the Interprovincial Program Guide (IPG), if available, and extensive industry consultation. This document represents the minimum content to be delivered for the Apprenticeship Training Program.

The document includes a Level Structure that aligns with trade harmonization recommendations to facilitate mobility for apprentices moving from one jurisdiction to another.

### Structure

The content of the Apprenticeship Curriculum Standard is divided into units. Unit codes are used as a means of identification and are not intended to convey the order of delivery. It is at the discretion of the training provider to deliver the content in the required logical sequence of delivery within the level. Jurisdictions are free to deliver units one at a time or concurrently within a level, provided all outcomes are met.

The Learning Outcomes describe what the apprentice should know or be able to do at the end of training. Wording of the Learning Outcomes, “Demonstrate knowledge of...” acknowledges the broad spectrum of ways in which knowledge can be assessed (i.e. practical projects, multiple choice testing, presentations, etc.) by instructional staff within the training.

The National Occupational Analysis (NOA)/Red Seal Occupational Standard (RSOS) to Apprenticeship Curriculum Standard Comparison chart outlines the relationship between each NOA/RSOS sub-task and ACS units. NOA/RSOS References have also been detailed in each unit to highlight the direct link between the unit and relevant sub-tasks.

The theoretical objectives represent the material that is to be covered during the technical training in order to convey the required knowledge to the apprentice. Training providers are encouraged to use practical demonstration and opportunities for hands-on learning whenever possible.

Detailed content for each objective has not been developed. Where detail is required for clarity, content has been provided.

## Glossary of Terms

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These definitions are intended as a guide to how language is used in the document.

<b>ADJUST</b>	To put in good working order; regulate; bring to a proper state or position.
<b>APPLICATION</b>	The use to which something is put and/or the circumstance in which you would use it.
<b>CHARACTERISTIC</b>	A feature that helps to identify, tell apart, or describe recognizably; a distinguishing mark or trait.
<b>COMPONENT</b>	A part that can be separated from or attached to a system; a segment or unit.
<b>DEFINE</b>	To state the meaning of (a word, phrase, etc.).
<b>DESCRIBE</b>	To give a verbal account of; tell about in detail.
<b>DIAGNOSE</b>	To analyze or identify a problem or malfunction.
<b>EXPLAIN</b>	To make plain or clear; illustrate; rationalize.
<b>IDENTIFY</b>	To point out or name objectives or types.
<b>INTERPRET</b>	To translate information from observation, charts, tables, graphs, and written material.
<b>MAINTAIN</b>	To keep in a condition of good repair or efficiency.
<b>METHOD</b>	A means or manner of doing something that has procedures attached to it.
<b>OPERATE</b>	How an object works; to control or direct the functioning of.
<b>PROCEDURE</b>	A prescribed series of steps taken to accomplish an end.
<b>PURPOSE</b>	The reason for which something exists or is done, made or used.

## Glossary of Terms *(continued)*

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<b>SERVICE</b>	<p>Routine inspection and replacement of worn or deteriorating parts.</p> <p>An act or business function provided to a customer in the course of one's profession. (e.g., haircut).</p>
<b>TECHNIQUE</b>	<p>Within a procedure, the manner in which technical skills are applied.</p>
<b>TEST</b>	<p>v. To subject to a procedure that ascertains effectiveness, value, proper function, or other quality.</p> <p>n. A way of examining something to determine its characteristics or properties, or to determine whether or not it is working correctly.</p>
<b>TROUBLESHOOT</b>	<p>To follow a systematic procedure to identify and locate a problem or malfunction and its cause.</p>

## Essential Skills Profiles

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Through extensive research, the Government of Canada and other national and international agencies have identified and validated key essential skills for the workplace. These skills are used in nearly every job and at different levels of complexity. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.

Essential Skills Profiles describe how workers in various occupations use each of the key essential skills. They include:

- A brief description of the occupation;
- Examples of tasks that illustrate how each essential skill is applied; and,
- Complexity ratings that indicate the level of difficulty of the example tasks.

Essential Skills profiles can be found on the Employment and Social Development Canada (ESDA) website at [www.esdc.gc.ca/eng/jobs/les/profiles/index.shtml](http://www.esdc.gc.ca/eng/jobs/les/profiles/index.shtml)

The development and improvement of these Essential Skills is inherent throughout the apprenticeship training program as apprentices work towards achieving journeyperson status.



## Profile Chart

<b>OCCUPATIONAL SKILLS</b>			
IRS-100 Safety Awareness	IRS-105 Tools and Equipment	IRS-110 Communication and Trade Documentation	IRS-115 Oxy-fuel Cutting
IRS-120 Plasma Arc Cutting	IRS-125 Welding 1	IRS-140 Introduction to Drawings	IRS-145 Temporary Access Equipment
IRS-200 Structural Drawings	IRS-205 Work Planning	IRS-300 Welding 2	
<b>RIGGING AND HOISTING</b>			
IRS-130 Hoisting, Lifting and Rigging 1	IRS-215 Hoisting, Lifting and Rigging 2	IRS-305 Hoisting, Lifting and Rigging 3	
<b>CRANES</b>			
IRS-135 Introduction to Cranes	IRS-220 Hydraulic and Conventional Cranes	IRS-310 Tower Cranes	IRS-315 Electric Overhead Travelling Cranes
<b>ERECTION, ASSEMBLY AND INSTALLATION</b>			
IRS-150 Structural Components	IRS-155 Structural Steel 1	IRS-210 Structural Steel 2	IRS-225 Pre-Engineered Structures 1
IRS-230 Pre-Cast Concrete 1	IRS-235 Machinery and Equipment 1	IRS-240 Ornamental Ironwork 1	IRS-335 Machinery and Equipment 2
IRS-340 Ornamental Ironwork 2	IRS-345 Ornamental Ironwork 3		
<b>MAINTENANCE AND UPGRADING</b>			
IRS-325 Pre-Engineered Structures 2	IRS-320 Structural Steel 3	IRS-330 Pre-Cast Concrete 2	

## Program Structure – Nova Scotia Apprenticeship Program

The courses listed below are required technical training in the Nova Scotia Ironworker (Reinforcing) Apprenticeship Program. Apprentices are required to complete all courses in Levels 1 & 2.

Nova Scotia Course No.	Nova Scotia Course Name	Nova Scotia Prerequisites	Units to be Covered			
			Unit #	Unit Title	Sugg. Hrs	Pg.
<b>Level 1 (8 weeks)</b>						
MENT-1801	Integrated Milestone	None	MENT-1801	Workplace Mentoring I		18
IRWA-1801	Safety / Tools & Equipment	None	IRS-100	Safety Awareness	14	19
			IRS-105	Tools and Equipment	14	21
			IRS-110	Communication and Trade Documentation	3	23
IRWA-1831	Cutting and Welding	IRWA-1801	IRS-115	Oxy-fuel Cutting	6	25
			IRS-120	Plasma Arc Cutting	2	27
			IRS-125	Welding 1	22	29
IRWA-1856	Rigging and Cranes 1 *3 week course	IRWA-1801	IRS-130	Hoisting, Lifting and Rigging I	60	31
			IRS-135	Introduction to Cranes	30	34
IRWA-1851	Introduction to Drawings	IRWA-1801	IRS-140	Introduction to Drawings	30	36
IRWA-1852	Temporary Access Equipment and Structural Components	IRWA-1856	IRS-145	Temporary Access Equipment	24	38
			IRS-150	Structural Components	15	40
IRWA-1857	Structural Steel 1	IRR-1801, 1852	IRS-155	Structural Steel 1	20	43

Nova Scotia Course No.	Nova Scotia Course Name	Nova Scotia Prerequisites	Units to be Covered			
			Unit #	Unit Title	Sugg. Hrs	Pg.
<b>Level 2 (6 Weeks)</b>						
IRWA-1858	Structural Drawings and Work Planning	IRWA -1851	IRS-200	Structural Drawings	20	47
			IRS-205	Work Planning	10	48
IRWA-1859	Structural Steel 2	IRWA- 1857	IRS-210	Structural Steel 2	30	49
IRWA-1860	Rigging and Cranes 2 *2 week course	IRWA-1850	IRS-215	Hoisting, Lifting and Rigging 2	30	52
			IRS-220	Hydraulic and Conventional Cranes	30	54
IRWA-1861	Introduction to Pre-engineered and Pre-Cast Structures	IRWA-1801, 1851	IRS-225	Pre-engineered Structures 1	15	56
			IRS-230	Pre-cast Concrete 1	15	58
IRWA-1862	Introduction to Machinery and Ornamental Ironwork	IRWA-1801, 1851	IRS-235	Machinery and Equipment 1	15	60
			IRS-240	Ornamental Ironwork 1	15	61
<b>Level 3 (7 Weeks)</b>						
MENT-1802	Integrated Milestone	MENT-1801	MENT-1802	Workplace Mentoring II		64
IRWA-1863	Advanced Welding	IRWA-1831	IRS-300	Welding 2	30	65
IRWA-1864	Rigging and Cranes 3	IRWA-1860	IRS-305	Hoisting, Lifting & Rigging 3	20	68
			IRS-310	Tower Cranes	5	70
			IRS-315	Electric Overhead Travelling Cranes	5	72
IRWA-1865	Structural Steel 3	IRWA-1859	IRS-320	Structural Steel 3	30	74
IRWA-1866	Pre-engineered and Pre-Cast Structures	IRWA-1861	IRS-325	Pre-engineered Structures 2	15	77
			IRS-330	Pre-cast Concrete 2	15	79
IRWA-1867	Machinery and Equipment	IRWA-1862	IRS-335	Machinery and Equipment 2	20	82
IRWA-1868	Ornamental Ironwork	IRWA-1862	IRS-340	Ornamental Ironwork 2	20	84
			IRS-345	Ornamental Ironwork 3	20	86
IRWA-1830	Program Review	Entire Program	IRS-350	Program Review	30	88
Nova Scotia Ironworker (Structural/Ornamental) Apprenticeship Program: All Courses are Required.						

## 2015 Ironworker (Structural/Ornamental) - NOA Sub-task to Unit Comparison

NOA Sub-task		Unit	
<b>Task 1 - Interprets occupational documentation.</b>			
1.01	Interprets drawings and specifications.	IRS-140	Introduction to Drawings
		IRS-200	Structural Drawings
1.02	Interprets standards, regulations and procedures.	IRS-110	Communication and Trade Documentation
<b>Task 2 - Communicates in the workplace.</b>			
2.01	Communicates with co-workers.	IRS-110	Communication and Trade Documentation
2.02	Communicates with others.	IRS-110	Communication and Trade Documentation
2.03	Communicates with apprentices.	IRS-110	Communication and Trade Documentation
2.04	Uses hand signals.	IRS-130	Hoisting, Lifting and Rigging 1
		IRS-200	Hoisting, Lifting and Rigging 2
2.05	Communicates electronically.	IRS-110	Communication and Trade Documentation
		IRS-130	Hoisting, Lifting and Rigging 1
		IRS-215	Hoisting, Lifting and Rigging 2
		IRS-305	Hoisting, Lifting and Rigging 3
<b>Task 3 - Uses and maintains tools and equipment.</b>			
3.01	Uses hand tools and measuring equipment.	IRS-105	Tools and Equipment
3.02	Uses power tools.	IRS-105	Tools and Equipment
3.03	Uses powder-actuated tools.	IRS-105	Tools and Equipment
3.04	Uses aerial work platforms	IRS-145	Temporary Access Equipment
3.05	Uses ladders.	IRS-145	Temporary Access Equipment
3.06	Uses scaffolding.	IRS-145	Temporary Access Equipment
3.07	Uses personal protective equipment (PPE).	IRS-100	Safety Awareness
3.08	Uses surveying equipment.	IRS-105	Tools and Equipment
		IRS-155	Structural Steel 1
		IRS-210	Structural Steel 2
		IRS-225	Pre-Engineered Structures 1
		IRS-230	Pre-Cast Concrete 1
		IRS-320	Structural Steel 3
IRS-325	Pre-Engineered Structures 2		

NOA Sub-task		Unit	
		IRS-330	Pre-Cast Concrete 2
3.09	Uses Welding equipment	IRS-125	Welding 1
		IRS-300	Welding 2
3.10	Uses thermal and oxy-fuel cutting equipment.	IRS-115	Oxy-fuel Cutting
		IRS-120	Plasma Arc Cutting
<b>Task 4 - Organizes work.</b>			
4.01	Organizes materials and supplies.	IRS-110	Communication and Trade Documentation
		IRS-205	Work Planning
4.02	Marks layouts.	IRS-150	Structural Components
		IRS-155	Structural Steel 1
		IRS-210	Structural Steel 2
		IRS-225	Pre-Engineered Structures 1
		IRS-230	Pre-Cast Concrete 1
		IRS-320	Structural Steel 3
		IRS-325	Pre-Engineered Structures 2
4.03	Maintains safe work environment.	IRS-330	Pre-Cast Concrete 2
4.03	Maintains safe work environment.	IRS-100	Safety Awareness
4.04	Assesses site hazards.	IRS-100	Safety Awareness
4.05	Plans work tasks.	IRS-205	Work Planning
<b>Task 5 - Selects rigging equipment.</b>			
5.01	Matches load to lift capability.	IRS-130	Hoisting, Lifting and Rigging 1
		IRS-215	Hoisting, Lifting and Rigging 2
		IRS-305	Hoisting, Lifting and Rigging 3
5.02	Inspects rigging equipment.	IRS-130	Hoisting, Lifting and Rigging 1
		IRS-215	Hoisting, Lifting and Rigging 2
		IRS-305	Hoisting, Lifting and Rigging 3
5.03	Maintains rigging equipment.	IRS-130	Hoisting, Lifting and Rigging 1
		IRS-215	Hoisting, Lifting and Rigging 2
		IRS-305	Hoisting, Lifting and Rigging 3
<b>Task 6 - Uses hoisting and lifting equipment.</b>			
6.01	Uses hoisting equipment.	IRS-130	Hoisting, Lifting and Rigging 1
		IRS-215	Hoisting, Lifting and Rigging 2
		IRS-305	Hoisting, Lifting and Rigging 3
6.02	Uses lifting equipment.	IRS-130	Hoisting, Lifting and Rigging 1
		IRS-215	Hoisting, Lifting and Rigging 2
		IRS-305	Hoisting, Lifting and Rigging 3
6.03	Attaches rigging to load.	IRS-130	Hoisting, Lifting and Rigging 1
		IRS-215	Hoisting, Lifting and Rigging 2
		IRS-305	Hoisting, Lifting and Rigging 3

NOA Sub-task		Unit	
<b>Task 7 - Assembles and erects cranes.</b>			
7.01	Assesses crane site limitations.	IRS-135	Introduction to Cranes
		IRS-220	Hydraulic and Conventional Cranes
		IRS-310	Tower Cranes
7.02	Determines crane position.	IRS-135	Introduction to Cranes
		IRS-220	Hydraulic and Conventional Cranes
		IRS-310	Tower Cranes
		IRS-315	Electric Overhead Travelling Cranes
7.03	Prepares bases.	IRS-135	Introduction to Cranes
		IRS-220	Hydraulic and Conventional Cranes
7.04	Erects cranes and components.	IRS-135	Introduction to Cranes
		IRS-220	Hydraulic and Conventional Cranes
		IRS-310	Tower Cranes
		IRS-315	Electric Overhead Travelling Cranes
<b>Task 8 - Disassembles cranes.</b>			
8.01	Disassembles crane components.	IRS-135	Introduction to Cranes
		IRS-220	Hydraulic and Conventional Cranes
		IRS-310	Tower Cranes
		IRS-315	Electric Overhead Travelling Cranes
8.02	Prepares crane for transport.	IRS-135	Introduction to Cranes
		IRS-220	Hydraulic and Conventional Cranes
		IRS-310	Tower Cranes
<b>Task 9 – Installs primary and secondary structural members.</b>			
9.01	Erects falsework.	IRS-150	Structural Components
9.02	Attaches structural members.	IRS-150	Structural Components
		IRS-155	Structural Steel 1
		IRS-210	Structural Steel 2
		IRS-225	Pre-Engineered Structures 1
		IRS-230	Pre-Cast Concrete 1
		IRS-320	Structural Steel 3
		IRS-325	Pre-Engineered Structures 2
IRS-330	Pre-Cast Concrete 2		

NOA Sub-task		Unit	
9.03	Levels, plumbs and aligns structural members	IRS-155	Structural Steel 1
		IRS-210	Structural Steel 2
		IRS-225	Pre-Engineered Structures 1
		IRS-230	Pre-Cast Concrete 1
		IRS-320	Structural Steel 3
		IRS-325	Pre-Engineered Structures 2
		IRS-330	Pre-Cast Concrete 2
9.04	Completes installation of structural members.	IRS-155	Structural Steel 1
		IRS-210	Structural Steel 2
		IRS-225	Pre-Engineered Structures 1
		IRS-230	Pre-Cast Concrete 1
		IRS-320	Structural Steel 3
		IRS-325	Pre-Engineered Structures 2
		IRS-330	Pre-Cast Concrete 2
<b>Task 10 – Installs ornamental components and systems.</b>			
10.01	Installs curtain walls and window walls.	IRS-240	Ornamental Ironwork 1
		IRS-345	Ornamental Ironwork 3
10.02	Installs miscellaneous components.	IRS-240	Ornamental Ironwork 1
		IRS-340	Ornamental Ironwork 2
<b>Task 11 – Installs conveyors, machinery and equipment.</b>			
11.01	Installs material handling systems.	IRS-235	Machinery and Equipment 1
		IRS-335	Machinery and Equipment 2
11.02	Aligns material handling systems.	IRS-235	Machinery and Equipment 1
		IRS-335	Machinery and Equipment 2
11.03	Places machinery and equipment.	IRS-235	Machinery and Equipment 1
		IRS-335	Machinery and Equipment 2
<b>Task 12 – Repairs components.</b>			
12.01	Accesses current condition of components.	IRS-210	Structural Steel 2
		IRS-320	Structural Steel 3
		IRS-325	Pre-Engineered Structures 2
		IRS-330	Pre-Cast Concrete 2
12.02	Field fabricates components.	IRS-210	Structural Steel 2
		IRS-320	Structural Steel 3
		IRS-325	Pre-Engineered Structures 2
		IRS-330	Pre-Cast Concrete 2
12.03	Replaces components.	IRS-210	Structural Steel 2
		IRS-320	Structural Steel 3
		IRS-325	Pre-Engineered Structures 2
		IRS-330	Pre-Cast Concrete 2
12.04	Performs preventative maintenance.	IRS-210	Structural Steel 2

NOA Sub-task		Unit	
		IRS-320	Structural Steel 3
		IRS-325	Pre-Engineered Structures 2
		IRS-330	Pre-Cast Concrete 2
<b>Task 13 – Decommissions, disassembles and removes structural, mechanical and miscellaneous components.</b>			
13.01	Ensures decommissioning of structure or components.	IRS-210	Structural Steel 2
		IRS-320	Structural Steel 3
		IRS-325	Pre-Engineered Structures 2
		IRS-330	Pre-Cast Concrete 2
13.02	Plans sequence of disassembly.	IRS-210	Structural Steel 2
		IRS-320	Structural Steel 3
		IRS-325	Pre-Engineered Structures 2
		IRS-330	Pre-Cast Concrete 2
13.03	Removes components.	IRS-210	Structural Steel 2
		IRS-320	Structural Steel 3
		IRS-325	Pre-Engineered Structures 2
		IRS-330	Pre-Cast Concrete 2



# LEVEL 1

**MENT-1801**

**Workplace Mentoring I**  
(Nova Scotia Unit of Instruction)

**Learning Outcomes:**

- Identify and explain strategies for learning workplace skills.
- Demonstrate strategies to assist in learning skills in the workplace.

**Objectives and Content:**

*Theoretical Objectives*

1. Describe the importance of your own experiences.
2. Identify the partners involved in apprenticeship.
3. Describe the shared responsibilities for workplace learning.
4. Determine your own learning preferences and explain how these relate to learning new skills.
5. Describe the importance of different types of skills in the workplace.
6. Describe the importance of essential skills in the trade.
7. Identify different ways of learning.
8. Identify your learning preferences.
9. Identify different learning needs and strategies to meet learning needs.
10. Identify techniques for effective communication.
11. Identify strategies to assist in learning a skill.

**Resource:**

- Recommended resource to use in the delivery of this unit:  
[www.apprenticeship.nsc.ca/mentoring/apprentice.htm](http://www.apprenticeship.nsc.ca/mentoring/apprentice.htm)

## IRS-100                      Safety Awareness

### Learning Outcomes:

- Demonstrate knowledge of safety equipment, their applications, maintenance and procedures for use.
- Demonstrate knowledge of safe work practices.
- Demonstrate knowledge of regulatory requirements pertaining to safety.

### National Occupational Analysis Reference:

- 3.07 Uses personal protective equipment (PPE).
- 4.03 Maintains safe work environment.
- 4.04 Assesses site hazards.

### Suggested Hours:

14 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Identify types of personal protective equipment (PPE) and clothing and describe their applications and limitations.
2. Describe the procedures used to care for and maintain PPE.
3. Identify hazards and describe safe work practices.
  - i) personal
  - ii) workplace
    - lockout / tag out
    - confined space awareness
    - trenches and excavations
    - fire
    - heights (fall arrest and protection)
    - marine
  - iii) environmental

4. Identify and describe workplace safety and health regulations.
  - i) federal
    - Workplace Hazardous Material Information System (WHMIS)
  - ii) provincial/territorial
    - occupational health and safety
    - training and certification requirements
  - iii) worksite specific requirements

## **IRS-105                      Tools and Equipment**

### **Learning Outcomes:**

- Demonstrate knowledge of tools and equipment, their applications, maintenance and procedures for use.

### **National Occupational Analysis Reference:**

- 3.01    Uses hand tools and measuring equipment.
- 3.02    Uses power tools.
- 3.03    Uses powder-actuated tools.
- 3.08    Uses surveying equipment.

### **Suggested Hours:**

14 Hours

### **Objectives and Content:**

#### Theoretical Objectives

1.        Identify types of hand tools and describe their applications and procedures for use.
2.        Describe the procedures used to inspect, maintain and store hand tools.
3.        Identify types of power tools and describe their applications and procedures for use.
  - i)        electric
  - ii)       hydraulic
  - iii)      pneumatic
  - iv)      gas
4.        Describe the procedures used to inspect, maintain and store power tools.
5.        Identify types of measuring and layout tools and equipment and describe their applications and procedures for use.

6. Describe the procedures used to inspect, maintain and store measuring and layout tools and equipment.
7. Identify types of leveling and alignment instruments and describe their applications and procedures for use.
8. Describe the procedures used to inspect, maintain and store leveling and alignment instruments.
9. Identify types of powder actuated equipment and describe their applications.
  - i) certification requirements

## IRS-110

## Communication and Trade Documentation

### Learning Outcomes:

- Demonstrate knowledge of effective communication practices.
- Demonstrate knowledge of trade related documentation and its use.
- Demonstrate knowledge of the procedures used to prepare and complete trade documentation.

### National Occupational Analysis Reference:

- 1.02 Interprets standards, regulations and procedures.
- 2.01 Communicates with co-workers.
- 2.02 Communicates with others.
- 2.03 Communicates with apprentices.
- 2.05 Communicates electronically.
- 4.01 Organizes materials and supplies. (Introduction)
- 4.05 Plans work tasks. (Introduction)

### Suggested Hours:

3 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Describe effective verbal and non-verbal communication.
  - i) other tradespersons
  - ii) co-workers/colleagues
  - iii) supervisors
  - iv) apprentices
2. Identify types of communication devices and describe their applications and operation.
  - i) cellular
  - ii) two-way radio
  - iii) computer

3. Describe the importance of communicating with others to organize materials and supplies on site and effectively plan work tasks.
4. Identify types of trade related documentation and describe their applications and procedures for use.
  - i) manufacturers' specifications
  - ii) codes and standards
  - iii) manuals
  - iv) drawings
  - v) shipping documentation
  - vi) safety documentation
5. Describe the procedures used to prepare and complete trade related documentation.



## IRS-115            Oxy-fuel Cutting

### Learning Outcomes:

- Demonstrate knowledge of oxy-fuel equipment and accessories.
- Demonstrate knowledge of the procedures used to cut with oxy-fuel equipment.

### National Occupational Analysis Reference:

3.10 Uses thermal and oxy-fuel cutting equipment.

### Suggested Hours:

6 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with oxy-fuel cutting.
2. Identify hazards and describe safe work practices pertaining to oxy-fuel cutting.
  - i) personal
  - ii) shop/facility
  - iii) equipment
  - iv) ventilation
  - v) storage/handling
3. Identify and interpret codes and regulations pertaining to oxy-fuel equipment.
4. Identify oxy-fuel equipment and accessories and describe their applications.
5. Identify types of fuels and gases used in oxy-fuel cutting operations and describe their characteristics and applications.

6. Identify types of cutting flames and describe their application and the procedures for flame adjustment.
  - i) oxidizing
  - ii) carburizing
  - iii) neutral
7. Describe the procedures used to set-up, adjust and shut-down oxy-fuel equipment.
8. Describe the procedures used to inspect, maintain and store oxy-fuel equipment.
9. Describe the procedures used to cut materials using oxy-fuel equipment.
10. Identify common cutting faults and describe the procedures to prevent and correct them.
11. Set-up, operate and shut-down oxy-fuel equipment.

## IRS-120

## Plasma Arc Cutting

### Learning Outcomes:

- Demonstrate knowledge of plasma arc cutting equipment and accessories.
- Demonstrate knowledge of procedures used to cut with plasma arc cutting equipment.

### National Occupational Analysis Reference:

3.10 Uses thermal and oxy-fuel cutting equipment.

### Suggested Hours:

2 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with plasma arc cutting.
2. Identify hazards and describe safe work practices pertaining to plasma arc cutting.
  - i) personal
  - ii) shop/facility
  - iii) equipment
  - iv) ventilation
  - v) storage/handling
3. Describe the plasma arc cutting process and its applications.
4. Identify plasma arc cutting equipment and accessories and describe their applications.
5. Describe the procedures used to set-up, adjust and shut-down plasma arc cutting equipment.

6. Describe the procedures used to inspect, maintain and store plasma arc cutting equipment.
7. Describe the procedures used to cut using plasma arc cutting equipment.
  - i) free hand
  - ii) straight edge
8. Identify common cutting faults and describe the procedures used to prevent and correct them.
9. Set-up, operate and shut-down plasma arc cutting equipment.

## IRS-125

## Welding 1

### Learning Outcomes:

- Demonstrate knowledge of Shielded Metal Arc Welding (SMAW) equipment, consumables and accessories.
- Demonstrate knowledge of SMAW welding processes.

### National Occupational Analysis Reference:

3.09 Uses welding equipment.

### Suggested Hours:

22 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with SMAW welding.
2. Interpret information pertaining to SMAW welding found on drawings.
  - i) symbols
  - ii) abbreviations
3. Identify hazards and describe safe work practices pertaining to SMAW welding.
  - i) personal
  - ii) shop/facility
  - iii) equipment
  - iv) ventilation
  - v) storage/handling
4. Identify codes and standards pertaining to welding.
  - i) Canadian Welding Bureau (CWB)
5. Identify the SMAW welding processes and describe their characteristics and basic applications.

6. Identify SMAW welding equipment, consumables and accessories and describe their application.
7. Describe the procedures used to set-up and adjust SMAW welding equipment.
8. Describe the procedures used to inspect and maintain SMAW welding equipment.
9. Identify types of welds performed using SMAW welding equipment.
10. Identify welding positions and describe their applications.
11. Describe the procedures used to weld using SMAW welding equipment.
12. Identify common weld faults and describe the procedures to prevent and correct them.
13. Set-up, operate and shut-down SMAW welding equipment

## IRS-130

## Hoisting, Lifting and Rigging 1

### Learning Outcomes:

- Demonstrate knowledge of hoisting, lifting and rigging equipment, their applications, limitations and procedures for use.
- Demonstrate knowledge of the procedures used to rig material and equipment for hoisting and lifting.
- Demonstrate knowledge of the procedures used to perform basic hoisting and lifting operations.
- Demonstrate knowledge of the procedures used to communicate during hoisting and lifting operations.

### National Occupational Analysis Reference:

2.04	Uses hand signals.
2.05	Communicates electronically.
5.01	Matches load to lift capability.
5.02	Inspects rigging equipment.
5.03	Maintains rigging equipment.
6.01	Uses hoisting equipment.
6.02	Uses lifting equipment.
6.03	Attaches rigging to load.

### Suggested Hours:

60 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with hoisting, lifting and rigging.
2. Identify hazards and describe safe work practices pertaining to hoisting, lifting and rigging.
3. Identify codes and regulations pertaining to hoisting, lifting and rigging.

4. Identify types of rigging equipment and accessories and describe their limitations, applications and procedures for use.
5. Perform calculations pertaining to rigging equipment.
  - i) safe working loads
  - ii) breaking strength
6. Identify types of hoisting and lifting equipment and accessories and describe their applications and procedures for use.
7. Describe the procedures used to inspect, maintain and store hoisting, lifting and rigging equipment.
8. Identify types of knots, hitches and bends and describe their applications and the procedures used to tie them.
9. Describe the procedures used to rig material/equipment for hoisting and lifting.
10. Describe the procedures used to ensure the work area is safe for hoisting and lifting.
  - i) supervision of lift
  - ii) securing work area
  - iii) communication
11. Identify and describe procedures used to communicate during hoisting, lifting and rigging operations.
  - i) hand signals
  - ii) electronic communications
  - iii) audible/visual
  - iv) relay of signals
12. Perform hand signals used in hoisting, lifting and rigging operations.
13. Identify the factors to consider when selecting rigging equipment.
  - i) load characteristics
  - ii) environment



14. Describe the procedures used to perform a basic lift.
  - i) secure work area
  - ii) load determination
  - iii) selection of rigging hardware
  - iv) communication methods
  - v) pre-lift checks
  - vi) placement of load
  - vii) post-lift inspection

## IRS-135

## Introduction to Cranes

### Learning Outcomes:

- Demonstrate knowledge of cranes, their applications and limitations.
- Demonstrate knowledge of crane lifting operations.

### National Occupational Analysis Reference:

- 7.01 Assesses crane site limitations.
- 7.02 Determines crane position.
- 7.03 Prepares bases.
- 7.04 Erects cranes and components.
- 8.01 Disassembles crane components.
- 8.02 Prepares crane for transport.

### Suggested Hours:

30 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with cranes and crane lifting operations.
2. Identify hazards and describe safe work practices pertaining to cranes and crane lifting operations.
3. Explain the principles of leverage and their application to cranes.
4. Interpret codes and regulations pertaining to cranes and crane lifting operations.
5. Interpret information pertaining to crane lifting operations found on drawings and specifications.

6. Interpret tables and charts to lift and move loads.
  - i) crane limitations
    - tipping/stability failure
    - structural failure
  
7. Identify types of cranes and describe their components, characteristics and applications.
  - i) hydraulic
  - ii) conventional
  - iii) tower
  - iv) electric overhead travelling (EOT)
  - v) crawler
  - vi) carrier mounted
  - vii) rough terrain
  - viii) all terrain
  - ix) high capacity
  - x) knuckle boom
  - xi) boom truck
  
8. Identify the considerations for crane assembly and disassembly.
  - i) site hazard assessment
    - overhead powerlines
    - underground services
    - obstructions
    - soil/ground conditions
  - ii) crane position
    - crane radius/swing area
    - headroom
  - iii) crane and components
    - assembly
    - disassembly
    - transport

## IRS-140

## Introduction to Drawings

### Learning Outcomes:

- Demonstrate knowledge of drawings and their applications.
- Demonstrate knowledge of the procedures to interpret and extract information from drawings.

### National Occupational Analysis Reference:

1.01 Interprets drawings and specifications.

### Suggested Hours:

30 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with drawings.
2. Identify types of drawings and describe their applications.
  - i) civil/site/plot
  - ii) architectural
  - iii) mechanical
  - iv) structural
  - v) shop/detail drawings
  - vi) sketches
3. Identify drawing projections and views and describe their applications.
  - i) orthographic
  - ii) oblique
  - iii) isometric
  - iv) section
  - v) auxiliary

4. Interpret and extract information from drawings.
  - i) lines
  - ii) legend
  - iii) welding symbols
  - iv) abbreviations
  - v) title block
  - vi) notes and specifications
  - vii) tolerances/allowances
  - viii) bill of materials
  - ix) schedules
  - x) metric and imperial dimensioning
  - xi) revisions
  - xii) scales

## IRS-145                      Temporary Access Equipment

### Learning Outcomes:

- Demonstrate knowledge of temporary access equipment, their applications, limitations and procedures for use.

### National Occupational Analysis Reference:

- 3.04 Uses aerial work platforms.
- 3.05 Uses ladders.
- 3.06 Uses scaffolding.

### Suggested Hours:

24 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with temporary access equipment.
2. Identify hazards and describe safe work practices pertaining temporary access equipment.
3. Identify codes and regulations pertaining to temporary access equipment.
4. Identify types of temporary access equipment and describe their characteristics and applications.
  - i) aerial work platforms
  - ii) ladders
  - iii) scaffolding
5. Identify types of work positioning, fall arrest and protection equipment and describe their applications and procedures for use.
6. Describe the procedures used to position aerial work platforms.

7. Describe the procedures used to erect, secure and dismantle ladders and scaffolding.
8. Describe the procedures used to inspect and maintain ladders, scaffolding and aerial work platforms.

## IRS-150                      Structural Components

### Learning Outcomes:

- Demonstrate knowledge of structural components, their characteristics and applications.
- Demonstrate knowledge of fastening methods relating to structural steel erection.
- Demonstrate knowledge of falsework, their characteristics and applications.
- Demonstrate knowledge of the procedures used to erect and dismantle falsework.

### National Occupational Analysis Reference:

- 4.02 Marks layouts.
- 9.01 Erects falsework.
- 9.02 Attaches structural members.

### Suggested Hours:

15 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with structural components.
2. Identify hazards and describe safe work practices pertaining to structural components.
3. Interpret codes, regulations and standards pertaining to structural components.
  - i) industry standards
  - ii) codes of practice
  - iii) government regulations
4. Interpret information pertaining to structural components found on drawings and specifications.



5. Identify types of structures and describe their characteristics.
6. Identify structural steel shapes and describe their designations, characteristics and applications.
  - i) I-beam
  - ii) H-beam
  - iii) wide flange
  - iv) welded wide flange
  - v) angle
  - vi) channel
  - vii) tee
  - viii) hollow structural steel (HSS)
  - ix) miscellaneous shapes
7. Identify types of structural components and their purpose.
  - i) columns
  - ii) girders
  - iii) beams
  - iv) trusses
  - v) joists
  - vi) secondary steel
  - vii) decking
  - viii) girts
  - ix) purlins
  - x) sag rods
  - xi) bracing
  - xii) bridging
  - xiii) lintels
  - xiv) pre-cast
  - xv) glued laminated timber products
  - xvi) composite
8. Identify fastening methods associated with structural steel and describe their characteristics, applications and limitations.
  - i) install fasteners/bolts
  - ii) welding
9. Describe the procedures used to install fasteners for securing structural steel members.

10. Identify types of falsework and describe their characteristics and applications.
11. Describe the procedures used to erect and dismantle falsework.

## IRS-155 Structural Steel 1

### Learning Outcomes:

- Demonstrate knowledge of structural steel members and components, their characteristics and applications.
- Demonstrate knowledge of the procedures to plan and prepare for structural steel erection.

### National Occupational Analysis Reference:

- 3.08 Uses surveying equipment.
- 4.02 Marks layouts.
- 9.02 Attaches structural members.
- 9.03 Levels, plumbs and aligns structural members.
- 9.04 Completes installation of structural members.

### Suggested Hours:

20 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with structural steel erection.
2. Identify hazards and describe safe work practices pertaining to structural steel erection.
  - i) hot work permits
  - ii) JHA (job hazard analysis)
  - iii) PPE
  - iv) lock-out, tag-out
3. Interpret information pertaining to structural steel erection of members and components found on drawings and specifications.

4. Identify tools and equipment relating to structural steel erection of members and components and describe their applications and procedures for use.
  - i) erection
  - ii) aligning
  - iii) fastening
  - iv) revision/fabrication
  
5. Identify structural steel shapes and describe their designations, characteristics and applications.
  - i) I-beam
  - ii) H-beam
  - iii) wide flange
  - iv) welded wide flange
  - v) angle
  - vi) channel
  - vii) tee
  - viii) hollow structural steel (HSS)
  - ix) miscellaneous shapes
  
6. Identify materials used for structural components and describe their characteristics and applications.
  - i) steel
    - stainless
    - galvanized
    - alloys
  - ii) aluminum
  - iii) wood

7. Identify structural steel members and components and describe their characteristics and applications.
  - i) columns/piers
  - ii) girders
  - iii) beams
  - iv) trusses
  - vi) joists
  - vi) secondary steel
  - vii) decking and grating
  - viii) girts
  - ix) purlins
  - x) sag rods
  - xi) bracing
  - xii) bridging
  - xv) lintels
  - xvi) pre-cast
  - xv) glued laminated timber products
  - xvi) composite
  - xvii) foundations
  - xviii) walls
  - xix) grillage
  - xx) falsework
8. Describe the procedures used to unload, handle and store structural steel materials and components.
9. Identify types of plates associated with structural steel members and components and describe their characteristics and applications.
10. Identify types of connections for structural components and components and describe their characteristics and applications.
11. Describe the procedures used to plan and prepare for structural steel erection.

## **LEVEL 2**

## IRS-200

## Structural Drawings

### Learning Outcomes:

- Demonstrate knowledge of structural drawings and their applications.
- Demonstrate knowledge of the procedures to interpret and extract information from structural drawings.

### National Occupational Analysis Reference:

1.01 Interprets drawings and specifications.

### Suggested Hours:

20 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with structural drawings.
2. Identify types of structural drawings and describe their applications.
3. Identify structural drawing projections and views and describe their applications.
4. Interpret and extract information from structural drawings.
  - i) lines
  - ii) legend
  - iii) symbols and abbreviations
  - iv) title block
  - v) notes and specifications
  - vi) tolerances/allowances
  - vii) bill of materials
  - viii) schedules
  - ix) metric and imperial dimensioning
  - x) revisions
  - xi) scales

## IRW-205            Work Planning

### Learning Outcomes:

- Demonstrate knowledge of the procedures used to plan and organize work tasks and handle work materials.

### National Occupational Analysis Reference:

- 4.01 Organizes materials and supplies.
- 4.05 Plans work tasks.

### Suggested Hours:

10 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Identify sources of information relevant to work task planning.
  - i) documentation
  - ii) drawings
  - iii) related professionals
  - iv) clients
2. Describe the procedures used to plan work tasks.
  - i) scheduling
  - ii) material/equipment selection
  - iii) weight calculation
  - iv) bar place order/sequence
3. Describe the procedures used to organize and store tools, equipment, materials and supplies on-site.
  - i) select location for material lay down
  - ii) offload/unload and sort materials and supplies
  - iii) set up equipment



## IRS-210

## Structural Steel 2

### Learning Outcomes:

- Demonstrate knowledge of the procedures used to erect and install structural steel members and components.
- Demonstrate knowledge of the procedures used to repair and replace structural steel members.
- Demonstrate knowledge of the procedures used to dismantle and remove structural steel members and components.

### National Occupational Analysis Reference:

3.08	Uses surveying equipment.
4.02	Marks layouts.
9.02	Attaches structural members.
9.03	Levels, plumbs and aligns structural members.
9.04	Completes installation of structural members.
12.01	Assess current condition of components.
12.02	Field-fabricates components.
12.03	Replaces components.
12.04	Performs preventative maintenance.
13.01	Ensures decommissioning of structure or components.
13.02	Plans sequence of disassembly.
13.03	Removes components.

### Suggested Hours:

30 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with structural steel erection and dismantling of members and components.

2. Identify hazards and describe safe work practices pertaining to structural steel erection and dismantling of members and components.
  - i) temporary bracing
  - ii) environmental conditions
  - iii) sequence
  
3. Interpret codes, regulations and standards pertaining to structural steel erection and dismantling of members and components.
  - i) industry standards
  - ii) codes of practice
  - iii) government regulations
  
4. Interpret information pertaining to structural steel erection and dismantling found on drawings and specifications.
  
5. Identify tools and equipment relating to structural steel erection and dismantling of members and components and describe their applications and procedures for use.
  - i) erection
  - ii) aligning
  - iii) fastening
  - iv) inspecting
  - v) revision/fabrication
  
6. Identify structural steel members and components and describe their characteristics and applications.
  - i) columns/piers
  - ii) girders
  - iii) beams
  - iv) trusses
  - v) joists
  - vi) decking and grating
  - vii) girts
  - viii) purlins
  - ix) sag rods
  - x) bracing
  - xi) bridging
  - xii) lintels

7. Identify types of plates associated with structural steel members and describe their characteristics and applications.
8. Identify types of connections for structural components and describe their characteristics and applications.
9. Describe the procedures used to erect and install structural steel members and components.
10. Describe the procedures used to level, plumb and align structural steel members and components.
11. Describe the procedures used to inspect erected structural steel to ensure conformity to standards.
  - i) visual
  - ii) mechanical
12. Describe the procedures used to repair and replace structural steel members and components.
13. Describe the procedures used to dismantle and remove structural steel members and components.

## IRS-215

## Hoisting, Lifting and Rigging 2

### Learning Outcomes:

- Demonstrate knowledge of the procedures used to rig material and equipment for hoisting and lifting.
- Demonstrate knowledge of the procedures used to perform hoisting and lifting operations.
- Demonstrate knowledge of calculations required when performing hoisting and lifting operations.

### National Occupational Analysis Reference:

- |      |                                  |
|------|----------------------------------|
| 2.04 | Uses hand signals.               |
| 2.05 | Communicates electronically.     |
| 5.01 | Matches load to lift capability. |
| 5.02 | Inspects rigging equipment.      |
| 5.03 | Maintains rigging equipment.     |
| 6.01 | Uses hoisting equipment.         |
| 6.02 | Uses lifting equipment.          |
| 6.03 | Attaches rigging to load.        |

### Suggested Hours:

30 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Perform calculations pertaining to rigging equipment.
  - i) safe working loads
  - ii) breaking strength
2. Calculate sling tension and sling angle when preparing for hoisting and listing operations.

3. Describe the procedures used to determine the weight and weight distribution of loads.
  - i) reference load charts
  - ii) determine types of loads
  - iii) engineered lifts
  
4. Identify the factors to consider when selecting rigging equipment.
  - i) load characteristics
    - weight
    - size
    - shape
    - center of gravity
  - ii) environment
  
5. Describe the procedures used to perform a lift.
  - i) secure work area
  - ii) load determination
  - iii) selection of rigging hardware
  - iv) communication methods
  - v) pre-lift checks
  - vi) placement of load
  - vii) post-lift inspection

**Learning Outcomes:**

- Demonstrate knowledge of hydraulic and conventional cranes, their components and accessories.
- Demonstrate knowledge of the procedures used to erect, set-up and disassemble hydraulic and conventional cranes.

**National Occupational Analysis Reference:**

- 7.01 Assesses crane site limitations.
- 7.02 Determines crane position.
- 7.03 Prepares bases.
- 7.04 Erects cranes and components.
- 8.01 Disassembles crane components.
- 8.02 Prepares crane for transport.

**Suggested Hours:**

30 Hours

**Objectives and Content:**Theoretical Objectives

1. Define terminology associated with hydraulic and conventional cranes.
2. Identify and describe the procedures used to communicate during hydraulic and conventional crane operations.
  - i) hand signals
  - ii) electronic communications
  - iii) audible/visual
3. Identify hydraulic crane components, accessories and attachments and describe their characteristics and applications.
4. Identify conventional crane components, accessories and attachments and describe their characteristics and applications.

5. Identify the considerations for hydraulic and conventional crane assembly/installation on-site.
  - i) site hazard assessment
    - overhead powerlines
    - underground services
    - obstructions
    - soil/ground conditions
    - environmental conditions
  - ii) crane position
    - crane radius/swing area
    - quadrants of operation
    - headroom
6. Describe the procedures used to assemble and set-up hydraulic cranes.
7. Describe the procedures used to assemble and set-up conventional cranes.
8. Describe the procedures used to disassemble hydraulic cranes, their components, accessories and attachments.
9. Describe the procedures used to disassemble conventional cranes, their components, accessories and attachments.
10. Describe the procedures used to prepare hydraulic cranes for transport.
11. Describe the procedures used to prepare conventional cranes for transport.

## IRS-225

## Pre-Engineered Structures 1

### Learning Outcomes:

- Demonstrate knowledge of pre-engineered structures and their components.
- Demonstrate knowledge of the procedures used to erect pre-engineered structures.

### National Occupational Analysis Reference:

3.08	Uses surveying equipment.
4.02	Marks layouts.
9.02	Attaches structural members.
9.03	Levels, plumbs and aligns structural members.
9.04	Completes installation of structural members.

### Suggested Hours:

15 hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with pre-engineered structures erection.
2. Identify hazards and describe safe work practices pertaining to pre-engineered structures erection.
3. Interpret codes and regulations pertaining to pre-engineered structures erection.
4. Interpret information pertaining to pre-engineered structures erection found on drawings and specifications.
5. Identify tools and equipment relating to pre-engineered structures erection and describe their applications and procedures for use.



6. Identify types of pre-engineered structures and describe their characteristics and applications.
  - i) tapered beam
  - ii) single-span rigid frame
  - iii) multi-span rigid frame
  - iv) single span and continuous trusses
  - v) lean-to
7. Identify pre-engineered structure components and describe their characteristics and applications.
8. Describe the procedures used to plan and prepare for the erection of pre-engineered structures.
9. Describe the procedures used to erect pre-engineered structures and their components.

## IRS-230 Pre-Cast Concrete 1

### Learning Outcomes:

- Demonstrate knowledge of pre-cast concrete members and components.
- Demonstrate knowledge of the procedures to plan and prepare for the erection of pre-cast concrete members and components.

### National Occupational Analysis Reference:

3.08	Uses surveying equipment
4.02	Marks layouts.
9.02	Attaches structural members
9.03	Levels, plumbs and aligns structural members.
9.04	Completes installation of structural members.

### Suggested Hours:

15 hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with pre-cast concrete erection.
2. Identify hazards and describe safe practices pertaining to pre-cast concrete erection.
3. Interpret codes and regulations pertaining to pre-cast concrete erection and dismantling.
4. Interpret information pertaining to pre-cast concrete erection found on drawings and specifications.
5. Identify tools and equipment relating to fabricating and handling pre-cast concrete members and components and describe their applications and procedures for use.

6. Identify types of pre-cast concrete members and components and describe their characteristics and applications.
  - i) panels
    - horizontal
    - vertical
  - ii) beams
  - iii) joists
  - iv) columns
  - v) single tees
  - vi) twin tees
  
7. Describe the procedures used to plan and prepare for the erection of pre-cast concrete members and components.
  - i) site preparation
  - ii) equipment set-up
  - iii) determine weight
  - iv) rigging procedures
  - v) material handling
  - vi) layout

## IRS-235 Machinery and Equipment 1

### Learning Outcomes:

- Demonstrate knowledge of machinery and equipment, their components and operation.

### National Occupational Analysis Reference:

- 11.01 Installs material handling systems.
- 11.02 Aligns material handling systems.
- 11.03 Places machinery and equipment.

### Suggested Hours

15 hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with machinery and equipment.
2. Identify hazards and describe safe work practices pertaining to machinery and equipment.
3. Interpret codes and regulations pertaining to machinery and equipment.
4. Interpret information pertaining to machinery and equipment found on drawings and specifications.
5. Identify tools and equipment relating to machinery and equipment and describe their applications and procedures for use.
6. Identify types of machinery and equipment installed and removed by ironworkers and describe their components and operation.
  - i) conveyors
  - ii) storage tanks
  - iii) bins
  - iv) hoppers

## IRS-240

## Ornamental Ironwork 1

### Learning Outcomes:

- Demonstrate knowledge of ornamental components and systems.
- Demonstrate knowledge of the procedures to plan and prepare for the installation of ornamental components and systems.

### National Occupational Analysis Reference:

10.01 Installs curtain walls and window walls

10.02 Installs miscellaneous components.

### Suggested Hours:

15 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with ornamental ironwork.
2. Identify hazards and describe safe work practices pertaining to ornamental ironwork.
3. Interpret codes and regulations pertaining to ornamental ironwork.
4. Interpret information pertaining to ornamental ironwork found on drawings and specifications.
5. Identify tools and equipment relating to ornamental ironwork and describe their applications and procedures for use.

6. Identify types of ornamental ironwork and describe their components, characteristics and applications.
  - i) curtain walls
  - ii) window walls
  - iii) sloped wall systems
  - iv) skylights
  - v) entranceways
  - vi) doors
7. Describe the procedures used to assemble and handle ornamental ironwork.
8. Describe the procedures to plan and prepare for the installation of ornamental components and systems.

# **LEVEL 3**

## MENT-1802

## Workplace Mentoring II (Nova Scotia Unit of Instruction)

### Learning Outcomes:

- Identify and explain strategies for teaching workplace skills.
- Demonstrate strategies to assist in teaching skills in the workplace

### Objectives and Content:

#### Theoretical Objectives

1. Describe the impact of your own experiences in teaching skills.
2. Identify the different roles played by a workplace mentor.
3. Describe the six-step approach to teaching skills.
4. Explain the importance of identifying the point of the lesson.
5. Identify how to choose a good time to present a lesson.
6. Explain the importance of linking the lessons.
7. Identify the components of the skill (the context).
8. Describe considerations for demonstrating a skill.
9. Identify types of skill practice.
10. Describe considerations in setting up opportunities for skill practice.
11. Explain the importance of providing feedback.
12. Identify techniques for giving effective feedback.
13. Describe a skill assessment.
14. Identify methods of assessing progress.
15. Explain how to adjust a lesson to different situations.

### Resource:

- Recommended resource to use in the delivery of this unit:  
[www.apprenticeship.nsc.ca/mentoring/apprentice.htm](http://www.apprenticeship.nsc.ca/mentoring/apprentice.htm)



## IRS-300

## Welding 2

### Learning Outcomes:

- Demonstrate knowledge of welding and gouging equipment, consumables and accessories.
- Demonstrate knowledge of the procedures to weld using Flux core arc welding (FCAW) equipment.
- Demonstrate knowledge of the procedures to weld using stud welding equipment.
- Demonstrate knowledge of the procedures to gouge using arc-air gouging equipment.

### National Occupational Analysis Reference:

3.09 Uses welding equipment

### Suggested Hours:

30 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with welding and gouging.
2. Interpret information pertaining to welding found on drawings and welding procedures.
  - i) symbols
  - ii) abbreviations
3. Identify hazards and describe safe work practices pertaining to welding and gouging.
  - i) personal
  - ii) shop/facility
  - iii) equipment
  - iv) ventilation
  - v) storage/handling

4. Identify and interpret codes and standards pertaining to welding and gouging.
  - i) Canadian Welding Bureau (CWB)
  
5. Identify welding processes and describe their characteristics and applications.
  - i) shielded metal arc welding (SMAW)
  - ii) gas metal arc welding (GMAW)
  - iii) gas tungsten arc welding (GTAW)
  - iv) flux core arc welding (FCAW)
  - v) stud welding
  - vi) arc-spot welding (ASW)
  - vii) submerged arc welding (SAW)
  
6. Identify welding equipment, consumables and accessories and describe their applications.
  - i) FCAW
  - ii) stud welding
  
7. Describe the procedures used to set-up and adjust welding equipment.
  - i) FCAW
  - ii) stud welding
  
8. Describe the procedures used to inspect, maintain and store welding equipment.
  - i) FCAW
  - ii) stud welding
  
9. Identify types of welds and joints performed using welding equipment.
  
10. Identify welding positions and describe their applications.
  
11. Describe the procedures used to weld using welding equipment.
  - i) FCAW
  - ii) stud welding
  
12. Identify arc-air gouging equipment, consumables and accessories and describe their applications.
  
14. Demonstrate the procedures used to gouge using arc-air gouging equipment.
  
15. Identify common weld faults and describe the procedures to prevent and correct them.

**Performance Outcomes:**

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

1. Set-up and adjust welding equipment.
2. Weld using welding equipment.

## IRS-305

## Hoisting, Lifting and Rigging 3

### Learning Outcomes:

- Demonstrate knowledge of the procedures used to perform complex/critical hoisting and lifting operations.
- Demonstrate knowledge of calculations required when performing complex/critical hoisting and lifting operations.

### National Occupational Analysis Reference:

2.04	Uses hand signals.
2.05	Communicates electronically.
5.01	Matches load to lift capability.
5.02	Inspects rigging equipment.
5.03	Maintains rigging equipment.
6.01	Uses hoisting equipment.
6.02	Uses lifting equipment.
6.03	Attaches rigging to load.

### Suggested Hours:

10 hours

### Objectives and Content:

#### Theoretical Objectives

- i) Identify hazards and describe safe work practices pertaining to complex/critical hoisting, lifting and rigging operations.
2. Identify regulations pertaining to hoisting, lifting and rigging.
  - i) heavy mobile equipment
  - ii) training and certification requirements

3. Identify complex/critical lifts and describe their application and operation.
  - i) multi-crane lifts
  - ii) load transferring
  - iii) lifts that involve personnel
  - iv) lifts over personnel
  - v) unbalanced load and positioning load
  - vi) engineered lifts
4. Explain the procedures to perform complex/critical lifts and positioning.
5. Perform calculations pertaining to rigging, hoisting, lifting and positioning.
  - i) sling tension and sling angle
  - ii) load/weight
  - iii) center of gravity
6. Identify documentation required for engineered lifts.

## IRS-310                      Tower Cranes

### Learning Outcomes:

- Demonstrate knowledge of tower cranes, their components and accessories.
- Demonstrate knowledge of the procedures used to erect, set-up and disassemble tower cranes.

### National Occupational Analysis Reference:

- 7.01    Assesses crane site limitations.
- 7.04    Erects cranes and components.
- 8.01    Disassembles crane components.
- 8.02    Prepares crane for transport.

### Suggested Hours:

5 hours

### Objectives and Content:

#### Theoretical Objectives

1.     Define terminology associated with tower cranes.
2.     Identify and describe the procedures used to communicate during tower crane operations.
  - i)     hand signals
  - ii)    electronic communications
  - iii)   audible/visual
3.     Identify types of tower cranes and describe their characteristics and applications.
  - i)     stationary
    - fixed
    - slewing
  - ii)    mobile
4.     Identify tower crane components, accessories and attachments and describe their characteristics and applications.

5. Identify the considerations for tower crane assembly/installation on-site.
  - i) site hazard assessment
    - overhead powerlines
    - obstructions
  - ii) crane position
    - crane radius/swing area
6. Describe the procedures used to erect, set-up and climb/jump tower cranes.
7. Describe the procedures used to disassemble tower cranes, their components, accessories and attachments.
8. Describe the procedures used to prepare tower cranes for transport.

## IRS-315                      Electric Overhead Travelling Cranes

### Learning Outcomes:

- Demonstrate knowledge of electric overhead travelling (EOT) cranes, their components and accessories.
- Demonstrate knowledge of the procedures to assemble and install EOT cranes.

### National Occupational Analysis Reference:

- 7.02              Determines crane position.
- 7.04              Erects cranes and components.
- 8.01              Disassembles crane components.

### Suggested Hours:

5 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with EOT cranes.
2. Identify and describe the procedures used to communicate during EOT crane operations.
  - i) hand signals
  - ii) electronic communications
  - iii) audible/visual
3. Identify hazards and describe safe work practices pertaining to EOT cranes and EOT crane operations.
  - i) bus bar



4. Identify EOT crane components, accessories and attachments and describe their characteristics and applications.
  - i) crane rails
  - ii) end trucks
  - iii) wheels
  - iv) bridge girders
  - v) hoist and trolleys
  - vi) crane stop
  - vii) load blocks
  - viii) cab
  - ix) bus bar
  
5. Identify types of EOT controls and describe their characteristics and applications.
  - i) cab operated
  - ii) remote operated
  - iii) pendant
  
6. Describe the procedures used to assemble and install EOT cranes.

**Performance Outcomes:**

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

1. Assemble and install EOT cranes.

## IRS-320 Structural Steel 3

### Learning Outcomes:

- Demonstrate knowledge of advanced structural steel members and components, their characteristics and applications.
- Demonstrate knowledge of the procedures used to erect and install advanced structural steel members and components.
- Demonstrate knowledge of the procedures used to repair and replace advanced structural steel members.
- Demonstrate knowledge of the procedures used to dismantle and remove advanced structural steel members and components.

### National Occupational Analysis Reference:

3.08	Uses surveying equipment.
4.02	Marks layouts.
9.02	Attaches structure members.
9.03	Levels, plumbs and aligns structural members.
9.04	Completes installation of structural members.
12.01	Assess current condition of components.
12.02	Field-fabricates components.
12.03	Replaces components.
12.04	Performs preventative maintenance.
13.01	Ensures decommissioning of structure or components.
13.02	Plans sequence of disassembly.
13.03	Removes components.

### Suggested Hours:

30 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with advanced structural steel erection and dismantling of members and components.

2. Identify hazards and describe safe work practices pertaining to advanced structural steel erection and dismantling of members and components.
  - i) temporary bracing
  - ii) environmental conditions
  - iii) sequence
  
3. Interpret codes, regulations and standards pertaining to advanced structural steel erection and dismantling of members and components.
  - i) industry standards
  - ii) codes of practice
  - iii) government regulations
  
4. Interpret information pertaining to advanced structural steel erection and dismantling found on drawings and specifications.
  
5. Identify tools and equipment relating to advanced structural steel erection and dismantling of members and components and describe their applications and procedures for use.
  - i) erection
  - ii) aligning
  - iii) fastening
  - iv) inspecting
  - v) revision/fabrication
  
6. Identify advanced structural steel members and components and describe their characteristics and applications.
  - i) tower sections
  - ii) bridge girders
  - iii) bridge beams
  - iv) composite materials
  - vi) bridge deck
  - vi) modular structure
  - vii) track systems
  - viii) conveyor systems
  - ix) bins and hoppers

7. Identify types of connections for advanced structural components and describe their characteristics and applications.
  - i) adhesives and sealants
  - ii) bevel washers
  - iii) pins and bushings
8. Describe the procedures used to erect and install advanced structural steel members and components.
9. Describe the procedures used to level, plumb and align advanced structural steel members and components.
10. Describe the procedures used to inspect erected advanced structural steel to ensure conformity to standards.
  - i) visual
  - ii) mechanical
11. Describe the procedures used to repair and replace advanced structural steel members and components.
12. Describe the procedures used to dismantle and remove advanced structural steel members and components.

## IRS-325

## Pre-Engineered Structures 2

### Learning Outcomes:

- Demonstrate knowledge of the procedures used to erect complex configurations of pre-engineered structures.
- Demonstrate knowledge of the procedures used to repair and renovate pre-engineered structures.

### National Occupational Analysis Reference:

3.08	Uses surveying equipment
4.02	Marks layouts.
9.02	Attaches structural members
9.03	Levels, plumbs and aligns structural members.
9.04	Completes installation of structural members.
12.01	Assesses current condition of components.
12.02	Field-fabricates components.
12.03	Replaces components.
12.04	Performs preventative maintenance.
13.01	Ensures decommissioning of structure or components.
13.02	Plans sequence of disassembly.
13.03	Removes components.

### Suggested Hours:

15 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with pre-engineered structures.
2. Identify hazards and describe safe work practices pertaining to pre-engineered structures.
3. Interpret codes and regulations pertaining to pre-engineered structures.

4. Interpret information pertaining to pre-engineered structures found on drawings and specifications.
5. Identify tools and equipment relating to pre-engineered structures and describe their applications and procedures for use.
6. Identify types of pre-engineered structures and describe their characteristics and applications.
  - i) tapered beam
  - ii) single-span rigid frame
  - iii) multi-span rigid frame
  - iv) single span and continuous trusses
  - v) lean-to
7. Identify pre-engineered structure components and describe their characteristics and applications.
8. Describe the procedures used to plan and prepare for erection of complex configurations of pre-engineered structures.
9. Describe the procedures used to erect complex configurations of pre-engineered structures and their components.
10. Describe the procedures used to repair common problems and failures of existing pre-engineered structures and their components.
11. Describe the procedures used to renovate and add-on to existing pre-engineered structures.

**Performance Outcomes:**

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

1. Erect pre-engineered structures and their components.
2. Repair and renovate pre-engineered structures and their components.

## IRS-330

## Pre-Cast Concrete 2

### Learning Outcomes:

- Demonstrate knowledge of the procedures used to erect pre-cast concrete.
- Demonstrate knowledge of the procedures to finish pre-cast concrete.
- Demonstrate knowledge of the procedures to dismantle and remove pre-cast concrete.

### National Occupational Analysis Reference:

3.08	Uses surveying equipment.
4.02	Marks layouts.
9.02	Attaches structural members.
9.03	Levels, plumbs and aligns structural members.
9.04	Completes installation of structural members.
12.01	Assesses current condition of components.
12.02	Field-fabricates components.
12.03	Replaces components.
12.04	Performs preventative maintenance.
13.01	Ensures decommissioning of structure or components.
13.02	Plans sequence of disassembly.
13.03	Removes components.

### Suggested Hours:

15 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with pre-cast concrete erection and dismantling.
2. Identify hazards and describe safe practices pertaining to pre-cast concrete erection and dismantling.
3. Interpret codes and regulations pertaining to pre-cast concrete erection and dismantling.

4. Interpret information pertaining to pre-cast concrete erection and dismantling found on drawings and specifications.
5. Identify tools and equipment relating to pre-cast concrete erection and dismantling and describe their applications and procedures for use.
6. Identify types of pre-cast concrete members and components and describe their characteristics and applications.
  - i) panels
    - horizontal
    - vertical
  - ii) beams
  - iii) joists
  - iv) columns
  - v) single tees
  - vi) twin tees
7. Describe the procedures used to plan and prepare for the erection of pre-cast concrete members and components.
  - i) site preparation
  - ii) equipment set-up
  - iii) determine weight
  - iv) rigging procedures
  - v) material handling
  - vi) layout
8. Describe the procedures used for the erection of pre-cast concrete members and components.
  - i) attaching to support clips
  - ii) aligning, leveling and plumbing
  - iii) fastening
    - welding
    - bolting
  - iv) grouting



9. Describe the procedures used to finish pre-cast concrete.
  - i) removing lugs
  - ii) grinding
  - iii) painting
  - iv) packing
  - v) caulking
  - vi) installing gaskets
  - vii) air sealing
  - viii) grouting
  
10. Describe the procedures used to dismantle and remove pre-cast concrete members.

**Performance Outcomes:**

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

1. Prepare for the erection of pre-cast concrete members and components.
2. Erect pre-cast concrete members and components.
3. Finish pre-cast concrete.
4. Dismantle and remove pre-cast concrete members.

## IRS-335

## Machinery and Equipment 2

### Learning Outcomes:

- Demonstrate knowledge of the procedures used to install and remove machinery and equipment.

### National Occupational Analysis Reference:

- 11.01 Installs material handling systems.
- 11.02 Aligns material handling systems.
- 11.03 Places machinery and equipment.

### Suggested Hours:

20 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with machinery and equipment installation and removal.
2. Identify hazards and describe safe work practices pertaining to installation and removal of machinery and equipment.
3. Interpret codes and regulations pertaining to installation and removal of machinery and equipment.
4. Interpret information pertaining to installation and removal of machinery and equipment found on drawings and specifications.
5. Identify tools and equipment relating to installation and removal of machinery and equipment and describe their applications and procedures for use.

6. Identify types of machinery and equipment installed and removed by ironworkers and describe their characteristics.
  - i) conveyors
  - ii) storage tanks
  - iii) bins
  - iv) hoppers
  
7. Describe the procedures used to install machinery and equipment.
  - i) move/transport
  - ii) assemble
  - iii) erect
  - iv) level
  - v) align
  - vi) support
  - vii) secure
  
8. Describe the procedures used to remove machinery and equipment.
  
9. Perform calculations related to machinery and equipment set-up.
  - i) ratio
  - ii) area
  - iii) volume
  - iv) perimeter
  - v) circumference

**Performance Outcomes:**

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

1. Install and remove machinery and equipment.
2. Perform calculations related to machinery and equipment set-up.

## IRS-340

## Ornamental Ironwork 2

### Learning Outcomes:

- Demonstrate knowledge of ornamental ironwork.
- Demonstrate knowledge of the procedures used to fabricate ornamental ironwork.
- Demonstrate knowledge of the procedures used to layout and install ornamental ironwork.
- Demonstrate knowledge of the procedures used to remove and repair ornamental ironwork.

### National Occupational Analysis Reference:

10.02 Installs miscellaneous components

### Suggested Horus:

20 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with ornamental ironwork.
2. Identify hazards and describe safe work practices pertaining to ornamental ironwork.
3. Interpret codes and regulations pertaining to ornamental ironwork.
4. Interpret information pertaining to ornamental ironwork found on drawings and specifications.
5. Identify tools and equipment relating to ornamental ironwork and describe their applications and procedures for use.

6. Identify types of ornamental ironwork and describe their components, characteristics and applications.
  - i) stairs
  - ii) ladders and platforms
  - iii) railings
  - iv) catwalks
  - v) fences
  - vi) grates
  
7. Describe the procedures used to fabricate ornamental ironwork.
  - i) shop
  - ii) field
  
8. Describe the procedures used to layout and install ornamental ironwork.
  - i) site preparation
  - ii) material handling and movement
  - iii) layout
  - iv) install and secure items
  
9. Describe the procedures used to finish ornamental ironwork.
  - i) grinding
  - ii) painting
  - iii) filling procedures
  - iv) polishing
  
10. Describe the procedures used to remove ornamental ironwork.
  
11. Describe the procedures used to repair ornamental ironwork.

## IRS-345

## Ornamental Ironwork 3

### Learning Outcomes:

- Demonstrate knowledge of curtain and window walls, their characteristics and applications.
- Demonstrate knowledge of the procedures used to layout and install curtain walls.
- Demonstrate knowledge of the procedures used to glaze curtain walls
- Demonstrate knowledge of the procedures used to layout and install window walls.

### National Occupational Analysis Reference:

10.02 Installs curtain walls and window walls.

### Suggested Horus:

20 Hours

### Objectives and Content:

#### Theoretical Objectives

1. Define terminology associated with curtain and window walls.
2. Identify hazards and describe safe work practices pertaining to curtain and window walls.
3. Interpret codes and regulations pertaining to curtain and window walls.
4. Interpret information pertaining to curtain and window walls found on drawings and specifications.
5. Identify tools and equipment relating to the layout and installation of curtain and window walls and describe their applications and procedures for use.

6. Identify types of curtain walls and describe their characteristics and applications.
  - i) stick systems
  - ii) unitized systems
7. Identify types of window walls and describe their characteristics and applications.
8. Describe the procedures used to layout and install curtain walls.
9. Identify glazing methods and describe their procedures.
10. Describe the procedures used to layout and install window walls.

## **IRS-350 Program Review**

### **Learning Outcomes:**

- Demonstrate knowledge of the National Occupational Analysis and its relationship to the Interprovincial Red Seal Examination.
- Demonstrate knowledge of overall comprehension of the trade in preparation for the Interprovincial Red Seal Examination.

### **2015 National Occupational Analysis Reference:**

Entire National Occupational Analysis (NOA)

### **Suggested Hours:**

30 Hours

### **Objectives and Content:**

#### Theoretical Objectives

1. Define terminology associated with an NOA.
  - i) blocks
  - ii) tasks
  - iv) sub-tasks
2. Explain how an NOA is developed and the link it has with the Interprovincial Red Seal Examination.
  - i) development
  - ii) validation
  - iii) block and task weighting
  - iv) examination breakdown (pie-chart)
3. Identify Red Seal products and describe their use for preparing for the Interprovincial Red Seal Examination.
  - i) Red Seal website
  - ii) examination preparation guide
  - iii) sample questions
  - iv) examination counselling sheets



4. Explain the relationship between the NOA and the Apprenticeship Curriculum Standard.
5. Review Occupational Skills for the Ironworker (Structural/Ornamental) trade as identified in the NOA.
  - i) safety awareness
    - personal protective equipment (PPE)
    - safety work environment
    - site hazards
  - ii) tools and equipment
    - hands tools and measuring equipment
    - surveying equipment
    - power tools
    - powder-actuated tools
    - cutting and welding equipment
  - iii) access equipment
    - aerial work platforms
    - ladders
    - scaffolding
  - iv) communication and trade documentation
    - drawings and specifications
    - standards, regulations and procedures
    - communication
    - electronic communication
  - v) organizes work
6. Review Rigging and Hoisting for the Ironworker (Structural/Ornamental) trade as identified in the NOA.
  - i) hand signals
  - ii) load to lift capacity
  - iii) rigging equipment
  - iv) hoisting equipment
  - v) lifting equipment
  - vi) rigging/load

7. Review Cranes for the Ironworker (Structural/Ornamental) trade as identified in the NOA.
  - i) site hazards
  - ii) crane position
  - iv) base position
  - v) cranes and components
    - hydraulic and conventional
    - tower
    - electric overhead travelling
  - vi) assembly
  - vii) disassembly
  - vi) transport
  
8. Review Erection, Assembly and Installation for the Ironworker (Structural/Ornamental) trade as identified in the NOA.
  - i) structural members
  - ii) ornamental components and systems
  - iii) conveyors, machinery and equipment
  
9. Review Maintenance and Upgrading for the Ironworker (Structural/Ornamental) trade as identified in the NOA.
  - i) preventative maintenance
  - ii) repair and replace components
  - iii) decommission, disassemble and remove structural, mechanical and miscellaneous components

## Nova Scotia Document Evaluation Form

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Thank you for your interest in the development and revision of this document. Upon review of the document, please record your feedback in relation to the following items:

- course division and organization
- relevancy of the content
- errors or omissions
- other suggestions for improvement and consideration

Overall comments are to be entered on this evaluation form and specific changes are to be entered directly on the document in the relevant area(s). When making proposed corrections(s) in the document, please use red ink. When all feedback has been recorded, return this evaluation form along with the document to the Apprenticeship Office noted at the bottom of the page.

(PLEASE PRINT)

Trade: Ironworker (Structural/Ornamental)

Full Name: \_\_\_\_\_

Type of Position: (Trade Practitioner, Instructor, etc.): \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Comments: (Use a separate sheet of paper if necessary)

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