



Ironworker (Reinforcing)

Guide to Course Content

2024

Online: www.saskapprenticeship.ca

Recognition:

To promote transparency and consistency, this document has been adapted from the 2015 Ironworker (Reinforcing) National Occupational Analysis (Employment and Social Development Canada).

A complete version of the Occupational Standard can be found at www.red-seal.ca.



STRUCTURE OF THE GUIDE TO COURSE CONTENT

To facilitate understanding of the occupation, this guide to course content contains the following sections:

Task Matrix: a chart which outlines graphically the major work activities, tasks and sub-tasks of this standard detailing the essential skills and the level of training where the content is covered. The Task Matrix is broken down into the following:

Major Work Activity: the largest division within the standard that is comprised of a distinct set of trade activities.

Task: distinct actions that describe the activities within a major work activity.

Sub-task: distinct actions that describe the activities within a task.

Training Profile Chart: a chart which outlines the model for Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training.

Technical Training Course Content for the Ironworker (Reinforcing) trade: a chart which outlines the model for SATCC technical training sequencing. For the harmonized level of training, a cross reference to the Harmonized apprenticeship technical training sequencing, at the learning outcome level, is provided.

TRAINING REQUIREMENTS FOR THE IRONWORKER (REINFORCING) TRADE

To graduate from each level of the apprenticeship program, an apprentice must successfully complete the required technical training and compile enough on-the-job experience to total at least 1800 hours each year. Total trade time required is 3600 hours and at least 2 years in the trade.

There are two levels of technical training delivered by Iron Workers Local Union 771 in Regina:

Level One: 7 weeks
Level Two: 7 weeks

The information contained in this pamphlet serves as a guide for employers and apprentices. The pamphlet briefly summarizes the training delivered at each level of apprenticeship training. An apprentice spends approximately 15% of the apprenticeship term in a technical training institute learning the technical and theoretical aspects of the trade. The hours and percentages of technical and practical training may vary according to class needs and progress.

The content of the technical training components is subject to change without notice.

Entrance Requirements for Apprenticeship Training

Your grade twelve transcripts (with no modified classes) or GED 12 is your guarantee that you meet the educational entrance requirements for apprenticeship in Saskatchewan. In fact, employers prefer and recommend apprentices who have completed high school. This ensures the individual has all of the necessary skills required to successfully complete the apprenticeship program and receive journeyman certification.

Individuals with “modified” or “general” classes in math or science do not meet our entry requirements. These individuals are required to take an entrance assessment prescribed by the SATCC.

English is the language of instruction in all apprenticeship programs and is the common language for business in Saskatchewan. Before admission, all apprentices and/or “upgraders” must be able to understand and communicate in the English language. Applicants whose first language is not English must have a minimum Canadian Language Benchmark Assessment of six (CLB6).

Note: A CLB assessment is valid for a one-year period from date of issue.

Designated Trade Name	Math Credit at the Indicated Grade Level❶	Science Credit at Grade Level
Ironworker (Reinforcing)	Grade 10	Grade 10
<p>❶ - (One of the following) WA – Workplace and Apprenticeship; or F – Foundations; or P – Pre-calculus, or a Math at the indicated grade level (Modified and General Math credits are not acceptable.).</p> <p>*Applicants who have graduated in advance of 2015-2016, or who do not have access to the revised Science curricula will require a Science at the minimum grade level indicated by trade.</p> <p>For information about high school curriculum, including Math and Science course names, please see: http://www.curriculum.gov.sk.ca</p> <p>Individuals not meeting the entrance requirements will be subject to an assessment and any required training.</p>		

IRONWORKER (REINFORCING) TASK MATRIX CHART

This chart outlines the major work activities, tasks, and sub-tasks from the 2015 Ironworker (Reinforcing) National Occupational Analysis (NOA). Each sub-task details the corresponding essential skill and level of training where the content is covered.

* Sub-tasks with numbers in the boxes is where the content will be delivered in training.

A - Occupational Skills

16%

A-1 Interprets occupational documentation	1.01 Interprets drawings and specifications (In-Context)	1.02 Interprets standards, regulations and procedures (In-Context)			
A-2 Communicates in the workplace	2.01 Communicates with co-workers 1	2.02 Communicates with others 1	2.03 Communicates with apprentices 1	2.04 Uses hand signals 1, 2	2.05 Communicates electronically 1
A-3 Uses and maintains tools and equipment	3.01 Uses hand tools and measuring equipment 1	3.02 Uses surveying equipment 1	3.03 Uses power tools 1	3.04 Uses bending tools and equipment 1	3.05 Uses aerial work platforms 1
	3.06 Uses ladders 1	3.07 Uses scaffolding 1	3.08 Uses personal protective equipment (PPE) 1	3.09 Uses welding equipment 1	3.10 Uses oxy-fuel cutting equipment 1
A-4 Organizes work	4.01 Organizes materials and supplies 2	4.02 Marks layouts 1	4.03 Maintains safe work environment 1	4.04 Assesses site hazards 1	4.05 Plans work tasks 2

B - Rigging and Hoisting

23%

B-5 Selects rigging equipment	5.01 Matches load to lift capability 1, 2	5.02 Inspects rigging equipment. 1, 2	5.03 Maintains rigging equipment 1, 2
B-6 Uses hoisting and lifting equipment	6.01 Uses hoisting equipment 1, 2	6.02 Uses lifting equipment 1, 2	6.03 Attaches rigging to load 1, 2

C - Cranes

5%

C-7 Selects, assembles and erects cranes and components	7.01 Assesses crane site limitations 2	7.02 Determines crane position 2	7.03 Erects cranes and components 2
C-8 Disassembles cranes	8.01 Disassembles crane components 2	8.02 Prepare crane and components for transport 2	

D - Reinforcing

48%

D-9 Fabricates on-site	9.01 Cuts material 1, 2	9.02 Bends material 1, 2
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D-10 Installs reinforcing material	10.01 Places reinforcing material 1, 2	10.02 Ties material 1, 2	10.03 Joins material 1, 2
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E – Pre-Stresses/Post-Tensions

8%

D-11 Places pre- stressed/post-tensioning systems	11.01 Lays out profile 1, 2	11.02 Places tendons and accessories 1, 2	11.03 Installs bursting steel and anchorages 1, 2	11.04 Connects tendons to anchors 1, 2	11.05 Protects exposed tendons 1, 2
D-12 Stresses tendons	12.01 Sets up stressing equipment 1, 2	12.02 Tensions tendons 1, 2	12.03 Cuts and caps tendons 1, 2	12.04 Removes stressing equipment 1, 2	12.05 De-stresses tendons 1, 2
D-13 Grouts tendons	13.01 Sets up grouting equipment 1, 2	13.02 Installs grouts 1, 2			

TRAINING PROFILE CHART

This Training Profile Chart represents Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training at the topic level.

SATCC Level One	Transcript Code	Hours
Safety Awareness and Access Equipment	SFTY 137	14
Communication and Trade Documentation	COM 112	21
Draw Interpretations and Work Plan	BPRT 106	35
Tools and Equipment	EQPT 175	14
Rigging for Ironworkers	RIGG 122	25
Welding and Cutting	WLDR 129	30
Introduction to Cranes	EQPT 174	16
Structural Components	STRU 102	14
Reinforcing I	STRU 103	20
Forklift Training	MATE 101	7
Ironworker Mathematics (Exceeds)	MATH 137	14
		210

SATCC Level Two	Transcript Code	Hours
Drawing Interpretation and Trade Mathematics	BPRT 203	38
Reinforcing II	STRU 206	45
Pre-Stressed/Post-Tensioning Systems	STRU 207	30
Hydraulic and Tower Cranes	EQPT 205	67
Surveying	SRVY 207	10
Ironworker Mathematics (Exceeds)	MATH 202	20
		210

TECHNICAL TRAINING COURSE CONTENT

This chart outlines the model for Saskatchewan Apprenticeship and Trade Certification Commission (SATCC) technical training sequencing. For the harmonized level of training, a cross reference to the Red Seal National Occupational Analysis (NOA) apprenticeship technical training sequencing, at the learning outcome level, is provided.

Sub-tasks listed are the minimum to be covered in a topic. Related sub-tasks not listed may be used as a reference and taught “in context” in other topics.

Level One	7 weeks	210 hours
Safety Awareness and Access Equipment		14 hours
<ul style="list-style-type: none">• discuss industry and government regulatory requirements pertaining to safety• describe Personal Protective Equipment (PPE) requirements and use• describe the use of ladders, scaffolding, and aerial lifts• discuss fall protection, fall arrest, confined space, and tag out/lockout procedures		
NOA topics covered in this section of training:		
A-3 Uses and maintains tools and equipment		
A-3.08 Uses personal protective equipment (PPE)		
A-4 Organizes work		
A-4.03 Maintains safe work environment		
A-4.04 Assesses site hazards.		
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Communication and Trade Documentation		21 hours
<ul style="list-style-type: none">• demonstrate effective communication practices• demonstrate the procedures used to prepare and complete trade documentation• identify job site barriers and signage requirements• describe requirements of team members• demonstrate appropriate means to offer and accept criticism		
NOA topics covered in this section of training:		
A-2 Communicates in the workplace		
A-2.01 Communicates with co-workers		
A-2.02 Communicates with others		
A-2.03 Communicates with apprentices		
A-2.04 Uses hand signals		
A-2.05 Communicates electronically		
A-4 Organizes work		
A-4.01 Organizes materials and supplies		
A-4.05 Plans work tasks		

Drawing Interpretations and Work Plan

35 hours

- identify types of drawings and their applications
- explain the procedures used to interpret and extract information from drawings
- prepare trade related documentation
- organise work tasks to facilitate effective handling of work materials

NOA topics covered in this section of training:

A-1 Interprets occupational documentation

A-1.01 Interprets drawings and specifications

Tools and Equipment

14 hours

- identify types of hand, electric, hydraulic, pneumatic and gasoline powered tools
- describe use of levelling and aligning tools
- demonstrate use of power actuated tools
- demonstrate the care and use of tools and equipment

NOA topics covered in this section of training:

A-3 Uses and maintains tools and equipment

A-3.01 Uses hand tools and measuring equipment

A-3.02 Uses surveying equipment

A-3.03 Uses power tools

A-3.04 Uses bending tools and equipment

A-3.09 Uses welding equipment

Rigging for Ironworkers

25 hours

- describe hoisting, lifting, and rigging equipment, their applications, limitations, and procedures for use
- discuss the procedures used to perform hoisting and lifting operations
- perform calculations required when hoisting and lifting
- demonstrate international crane hand signals

NOA topics covered in this section of training:

A-2 Communicates in the workplace

A-2.04 Uses hand signals

B-5 Selects rigging equipment

B-5.01 Matches load to lift capacity

B-5.02 Inspects rigging equipment

B-5.03 Maintains rigging equipment

B-6 Uses hoisting and lifting equipment

B-6.01 Uses hoisting equipment

B-6.02 Uses lifting equipment

B-6.03 Attaches rigging to load.

Welding and Cutting

30 hours

- describe oxy-fuel equipment, operation, and safety concerns.
- perform oxy-fuel cutting
- perform zip cutting
- describe SMAW equipment, operation, and safety concerns
- perform SMAW welding
- describe GMAW equipment, operation, and safety concerns
- perform GMAW welding

NOA topics covered in this section of training:

A-3 Uses and maintains tools and equipment

A-3.09 Uses welding equipment

A-3.10 Uses oxy-fuel cutting equipment

Introduction to Cranes

16 hours

- describe types of cranes, their applications, and limitations
- interpret basic load charts
- use appropriate terminology to communicate with the crane operator

NOA topics covered in this section of training:

C-7 Selects, assembles, and erects cranes and components

C-7.01 Assesses crane site limitations

C-7.02 Determines crane position

C-7.03 Erects cranes and components

C-8 Disassembles cranes

C-8.01 Disassembles crane components

C-8.02 Prepare crane and components for transport

Structural Components

14 hours

- describe structural shapes and components, their characteristics and applications
- describe fastening methods relating to structural steel erection

NOA topics covered in this section of training:

A-4 Organizes work

A-4.02 Marks layouts

Reinforcing 1

20 hours

- describe the properties of reinforcing steel and concrete
- describe the forces and stresses associated with reinforced concrete
- explain reinforcing standards and identification systems
- describe the procedures used to prepare for reinforcing concrete and joining rebar
- demonstrate use of equipment and tools related to reinforcing including material accessories

NOA topics covered in this section of training:

D-9 Fabricates on-site

D-9.01 Cuts material

D-9.02 Bends material

D-10 Installs reinforcing material

D-10.01 Places reinforcing material

D-10.02 Ties material

D-10.03 Joins material

Forklift Training

7 hours

- identify lift truck types and capacities
- describe lift truck safety considerations
- operate lift trucks

NOA topics covered in this section of training:

- This section of training exceeds the minimum sequencing as set out in the Ironworker (Reinforcing) NOA.

Ironworker Mathematics

14 hours

- calculate lineal dimensions and weights
- perform trade related conversions and comparisons with fractions, decimals, and percentages
- perform calculations and conversions with the metric and imperial systems
- calculate area, volume, and averages
- calculate the solutions to basic worksite problems

NOA topics covered in this section of training:

- This section of training exceeds the minimum sequencing as set out in the Ironworker (Reinforcing) NOA

Level One topics from the NOA that are taught in-context:

A-1 Interprets occupational documentation

A-2 Communicates in the workplace

B-5 Selects rigging equipment

B-6 Uses hoisting and lifting equipment

C-7 Selects, assembles, and erects cranes and components

E-11 Places pre-stressed/post-tensioning systems

E-12 Stresses tendons

E-13 Grouts tendons

For details regarding the In-Context Topics, see page 17.

Level Two

7 weeks

210 hours

Drawing Interpretation and Work Planning

38 hours

- interpret complex shop drawings
- interpret drawings
- interpret trade documents
- develop work plans

NOA topics covered in this section of training:

A-4 Organizes work

A-4.01 Organizes materials and supplies

A-4.05 Plans work tasks

D-10 Installs reinforcing material

D-10.01 Interprets placing drawings

Reinforcing 2

45 hours

- discuss the principles of stresses and deflection in concrete
- prepare reinforcing components for assembly and placement
- fabricate reinforcing material
- demonstrate the ability to sort, cut, place and tie reinforcing steel

NOA topics covered in this section of training:

D-9 Fabricates on-site

D-9.01 Cuts material

D-9.02 Bends material

D-10 Installs reinforcing material

D-10.01 Places reinforcing material

D-10.02 Ties material

D-10.03 Joins material

Pre-Stressed/Post-Tensioning Systems

30 hours

- describe the purpose and effects of pre-stressed systems for manufacturing pre-cast members
- describe placement of strands and accessories
- describe pre-stressed and post-tension operations and installations
- describe prepping, stressing, grouting and finishing equipment and materials

NOA topics covered in this section of training:

E-11 Places pre-stressed/post-tensioning systems.

E-11.01 Lays out profile

E-11.02 Places tendons and accessories

E-11.03 Installs bursting steel and anchorages

E-11.04 Connects tendons to anchors

E-11.05 Protects exposed tendons

E-12 Stresses Tendons

E-12.01 Sets up stressing equipment

E-12.02 Tensions tendons

E-12.03 Cuts and caps tendons

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E-12.04 Removes stressing equipment
E-12.05 De-stresses tendons

E-13 Grouts tendons

E-13.01 Sets up grouting equipment
E-13.02 Installs grout

Hydraulic and Tower Cranes

67 hours

- define terminology associated with cranes and lifting operations
- describe safe work practices pertaining to cranes and crane lifting operations
- interpret codes and regulations pertaining to cranes and crane lifting operations
- interpret information pertaining to crane lifting operations
- interpret load tables and charts
- explain the principle of leverage and the application to cranes
- identify the considerations for on-site crane assembly and operation

NOA topics covered in this section of training:

C-7 Selects, assembles, and erects cranes and components

C-7.01 Assesses crane site limitations
C-7.02 Determines crane position
C-7.03 Erects cranes and components

C-8 Disassembles cranes

C-8.01 Disassembles crane components
C-8.02 Prepare crane and components for transport

Surveying

10 hours

- demonstrate knowledge in setting up a laser level
- describe laser level safety
- demonstrate the use of a laser level

NOA topics covered in this section of training:

A-3 Uses and maintains tools and equipment

A-3.02 Uses surveying equipment

Ironworker Mathematics

20 hours

- perform conversions and comparisons using percentile, rates, ratios and proportions
- calculate angles
- apply geometric solutions to trade problems

NOA topics covered in this section of training:

- This section of training exceeds the minimum sequencing as set out in the Ironworker (Reinforcing) NOA.

Level Two topics from the NOA that are taught in-context:

A-1 Interprets occupational documentation

A-2 Communicates in the workplace

B-5 Selects rigging equipment

B-6 Uses hoisting and lifting equipment

C-7 Selects, assembles, and erects cranes and components

E-11 Places pre-stressed/post-tensioning systems

E-12 Stresses tendons

E-13 Grouts tendons

For details regarding the In-Context Topics, see page 17.



In-Context Topics

In-context means learning that has already taken place and is being applied to the applicable task. Learning outcomes for in-context topics are accomplished in other topics in that level.

A-1 Interprets occupational documentation

A-1.01 Interprets placing drawings

A-2 Communicates in the workplace

A-2.04 Uses hand signals

B-5 Selects rigging equipment

B-5.01 Matches load to lift capacity

B-5.02 Inspects rigging equipment

B-5.03 Maintains rigging equipment

B-6 Uses hoisting and lifting equipment

B-6.01 Uses hoisting equipment

B-6.02 Uses lifting equipment

B-6.03 Attaches rigging to load

C-7 Selects, assembles, and erects cranes and components

C-7.01 Assesses crane site limitations

C-7.02 Determines crane position

E-11 Places pre-stressed/post-tensioning systems

E-11.01 Lays out profile

E-11.02 Places tendons and accessories

E-11.03 Installs bursting steel and anchorages

E-11.04 Connects tendons to anchors

E-11.05 Protects exposed tendons

E-12 Stresses Tendons

E-12.01 Sets up stressing equipment

E-12.02 Tensions tendons

E-12.03 Cuts and caps tendons

E-12.04 Removes stressing equipment

E-12.05 De-stresses tendons

E-13 Grouts tendons

E-13.01 Sets up grouting equipment

E-13.02 Installs grout

