

Apprenticeship and Industry Training

Apprenticeship Curriculum Guide

Electrician



Apprenticeship
and Industry
Training

Alberta 

Acknowledgements

Apprenticeship and Industry Training (AIT) wishes to express sincere appreciation for the contribution of the many tradespersons, industrial establishments, professional associations, labour organizations, provincial and territorial government departments and agencies, and all others who contributed to this publication.

Special thanks to the following subject matter experts for sharing their knowledge and insights, which were instrumental in developing the standard:

Jeff Bailey	Andrew Barnes
Dave Bates	Kurt Bittner
Colin Bishop	Robin Bobocel
Todd Buchart	Larry Cantelo
Bobbi Craig-Sparkes	Scott Crichton
Gord Christensen	Todd Chrunik
Tyler Davidson	Sam Davidson
Richard Elhard	Kyle Forrest
Amanda Hennessey	Scott Letwin
Hyungjun Lim	Patricia Luedee
Chris Marshall	Alan MacLean
Dave McCallum	Lisa McRae
Barry Moore	Neil Moffatt
Lee Myer	Melody Rain
Angelo Rinaldi	Mark Rochon
Charles Sanderson	Neil Schlosser
Rose Strymecki	Darcy Tangedal
Tim Van Staden	Sean Wilde
Brad Wilson	Kenton Woodall
Jason Wright	Justin Wynder

Additionally, AIT would like to extend its appreciation to the following organizations for their valuable contributions and expert advice throughout the development of the standard:

CLI College Canada	Electrical Contractors Association of Alberta
Electrical Industry Training Centres of Alberta	International Brotherhood of Electrical Workers
Keyano College	Lakeland College
Lethbridge Polytechnic	Medicine Hat College
Northern Alberta Institute of Technology	Northwestern Polytechnic
Northern Lakes College	Portage College
Red Deer Polytechnic	Southern Alberta Institute of Technology



Program Guide

Description of the Trade	02
Apprenticeship Education Entrance Requirements	02
What to Expect	03
Apprenticeship Pathway to Certification	04
Core Competences	05
Determining Success	05
Thriving	05
Defined Learning	06
Course Content Overview	08
Period One Course Content	16
Period Two Course Content	21
Period Three Course Content	25
Period Four Course Content	29
Taxonomy Verb List	34

Description of the Trade

Electricians install, alter, repair, and maintain electrical systems designed to provide heat, light, power, control, signal or fire alarms for all types of buildings, structures and premises.

A journeyperson electrician is an individual who may be able to:

- Read and interpret electrical, mechanical, and architectural drawings, specifications, and applicable codes,
- Install, maintain, and repair cables, raceways, enclosures, and fittings,
- Install, maintain, and repair distribution and control equipment such as switches, relays, panel boards, and fuse enclosures,
- Install, maintain, and repair electrical and communication systems and related equipment,
- Install, maintain, and repair electrical generation sources and related equipment,
- Splice, join and connect wire to form circuits, and
- Test circuits to ensure integrity and safety.

Apprenticeship Education Entrance Requirements



Apprenticeship education entrance requirements will **NOT** prevent an individual from registering into an apprentice education program as an apprentice, however they will restrict that individual's ability to register for the in-classroom training portion of the training until those requirements have satisfied the education entrance requirement for that trade. The minimum education entrance requirements for the Electrician are:

- English 20-2, Math 20-3 and Science 10
- OR a pass mark in all five Canadian General Educational Development (GED) tests or Canadian Adult Education Credential tests
- OR an Apprenticeship and Industry Training entrance examination.

To increase an individual's chances of success in classroom instruction for the Electrician Apprenticeship Education Program, successful completion of English 30-2, Math 30-3, Physics 30 OR Chemistry 30 OR Science 30 and related Career and Technology Studies (CTS) courses are recommended.

What to Expect

Apprenticeship is a training program that combines on-the-job and in-classroom training for a specific profession designated as a trade.

It may be a new form or model of learning to some individuals, however, has been the cornerstone to large portions of Alberta's industry training and economy for almost a century.

In the process of progressing through an apprenticeship education program, the learner experiences both the theoretical and practical components of their chosen discipline and will be assessed in both the classroom and working environments.

The following flow chart presents a visual representation of what a learner can expect while progressing through the Electrician program.

Apprentice Pathway to Certification

Apply

Register (Pre-Apprenticeship)

- Choose a program.
- Meet the apprenticeship eligibility requirements.
- Complete the application and include any Prior Learning Assessments



Learn

Meet education entrance requirements or successfully complete the entrance exam.

On-the-job

Electrician Period 1

- 1560 hours

Electrician Period 2

- 1560 hours

Electrician Period 3

- 1500 hours

Electrician Period 4

- 1500 hours

Apprentices must have an Apprenticeship Education Agreement with a sponsor to earn on-the-job hours.

Classroom Instruction

Electrician Period 1

- 240 hours

Electrician Period 2

- 240 hours

Electrician Period 3

- 300 hours

Electrician Period 4

- 300 hours

Apprentices must meet minimum education requirements prior to entrance in classroom instruction.

Competence-based Assessments

Each period, apprentices are assessed:

- on-the-job (by mentors)
- in the classroom (by instructors)
- through period exams (by Apprenticeship and Industry Training)

Earn

Certification

- Post Secondary Education Credential
- Journeyman Certificate



Core Competences

The foundation of an apprenticeship education program is defined by its core competences. These competences are what the training will focus on as the learner progresses through the Electrician Apprenticeship Education Program.

A core competence is an observable skill that is demonstrated by the learner. Competences are identified by industry subject matter experts and cover the job-related tasks and activities that an Electrician will be required to perform in the course of their employment.

Determining Success

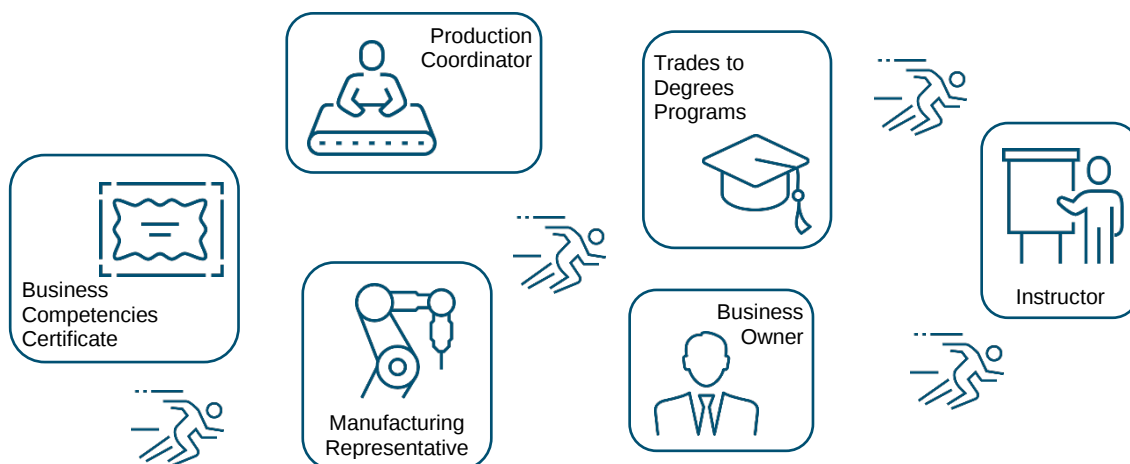
Grades for the theory component of technical training are calculated and based on a cumulative weighted average. To complete a period of technical training successfully, an apprentice must achieve a minimum cumulative weighted average of 65% across all sections in the technical training component of their apprenticeship education program with no grades below 50% in any one section.

Lab and shop components are calculated as a cumulative weighted average requiring a minimum of 65% with a minimum grade of 65% in each section.

Thriving

Successful completion of the Electrician Apprenticeship Education Program is an accomplishment that should be celebrated and can continue to be a successful provider and career choice for a lifetime.

It can also become a useful lever that opens doors leading to future career choice enhancers and/or create alternate professions pathways. This may include some of the following:



Defined Learning

Core competence (Major category)

The section introduction paragraph outlines the intent of the skill set listed below and how it connects to other skill sets such as competency groups and competency levels in the case of a multi-period group (i.e. Electrical I, Electrical II).

The major category is the grouping of work-related tasks that combine to form an identifiable portion of the trade.

Competence statement

This statement is a core competence as identified by industry. It is followed by the **weighting**, which provides and supports a guideline for instructional focus and assessment structure.



NOTE: Competence Statements will be identified by this symbol.

Weighting %

Each competence is assigned a weighting (in percent) by industry to reflect the amount of available time that is dedicated to it, on average, in the learning environment. This percentage is then converted to hours based on the total hours available for the entire training period. All percentages will total 100%.

Example: Core Competence

Foundational Skill, Job Responsibilities and Procedures	27%
Tools, Equipment, and Instruments	9%
Drawing and Specifications	10%
Rigging: Hoisting, Lifting and Load-Moving	28%
Cutting and Fabrication	26%
TOTAL	100%

Supporting competence

A supporting competence is a skill that supports the learning of the competence statement. This competence is a teachable skill that can be assessed to measure the abilities and progress of the learner (see Taxonomy).

It also has an assigned weighting (in percent) that will total 100%, however is derived based on the assigned core competence percentage.

Example: Supporting Competence (Drawing and Specifications) - 10%

Interpret drawings	22% (of 10%)
Interpret specifications.	22% (of 10%)
Layout projects using drawings and/or specifications	56% (of 10%)
TOTAL	100% of 10%

Taxonomy

Taxonomies are a cognitive framework of learning behaviors organized hierarchically in categories: knowledge, comprehension, application, analysis, evaluation, and synthesis. Taxonomy is used as a tool to identify and create learning objectives that define and measure the learning experience for all stakeholders involved.

For the purposes of Alberta's apprenticeship education programs, **supporting competences** are classified into three of these categories; Taxonomy I – **Know it**, Taxonomy II – **Do it** and Taxonomy III – **Solve it**.

These categories identify the type of skill set that will be applied to be successful.

Some supporting competences have multiple taxonomies that will require the training to address different skill sets.



NOTE: A Taxonomy verb list is also attached in the appendix to demonstrate the level and/or complexity of a given taxonomy.

- Taxonomy I competences focus on recollection of facts, definitions, and principles.
- Taxonomy II competences are a procedural application of knowledge (i.e. reference to a step-by-step process).
- Taxonomy III competences deal with critical thinking and problem solving (i.e. diagnosis and analysis).

Course Content Overview

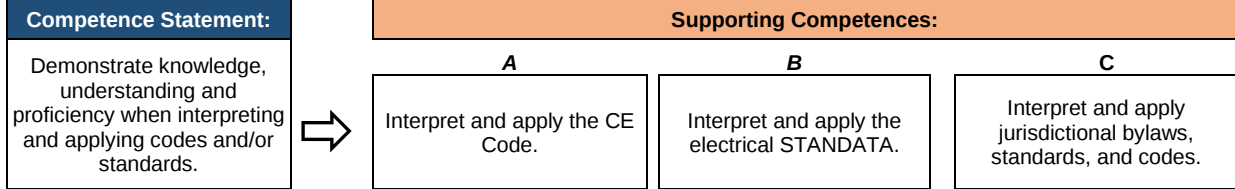


The term **“In Context”** indicates that the supporting competence will become integrated learning and/or utilized as a component of the competence statement. It will **not** have an assigned weighting and will **not** be assessed as an examination item.

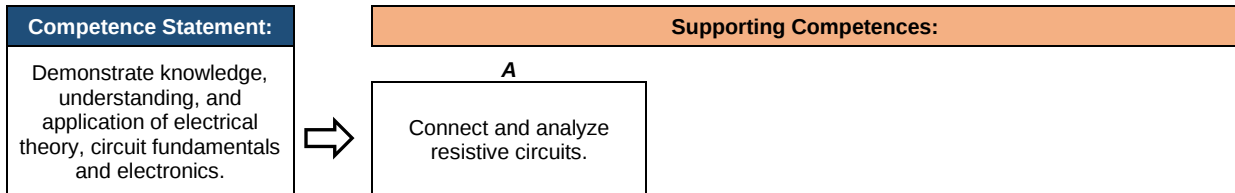
PERIOD ONE COURSE CONTENT

CORE COMPETENCE ONE: <i>Foundational Skills, Job Responsibilities, and Procedures</i>			
Competence Statement:	Supporting Competences:		
Apply foundational skills essential to convey and receive critical training and workplace information.	⇒	A Select, use, and maintain personal protective equipment.	B Demonstrate safety awareness and safe work practices.
			C Demonstrate knowledge and understanding of working at heights.
	⇒	D Demonstrate knowledge and understanding of material handling.	E Use drawings, diagrams, schematics, and specifications.
			F Organizes tasks and work area
	⇒	G Apply quality workmanship practices	H Demonstrate critical thinking skills. <i>In Context</i>
			I Demonstrate numeracy skills. <i>In Context</i>
	⇒	J Demonstrate literacy skills. <i>In Context</i>	K Demonstrate digital literacy skills. <i>In Context</i>
			L Demonstrate communication skills. <i>In Context</i>
CORE COMPETENCE TWO: <i>Tools, Equipment, and Instruments</i>			
Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding and proficiency regarding the use and maintenance of tools, equipment, and instruments.	⇒	A Select, use, and maintain hand tools. <i>In Context</i>	B Select, use, and maintain power tools. <i>In Context</i>
			C Select, use, and maintain speciality tools. <i>In Context</i>
	⇒	D Select, use, and maintain measurement instruments.	E Select, use, and maintain testing equipment. <i>In Context</i>
			F Select, use, and maintain diagnostic equipment. <i>In Context</i>

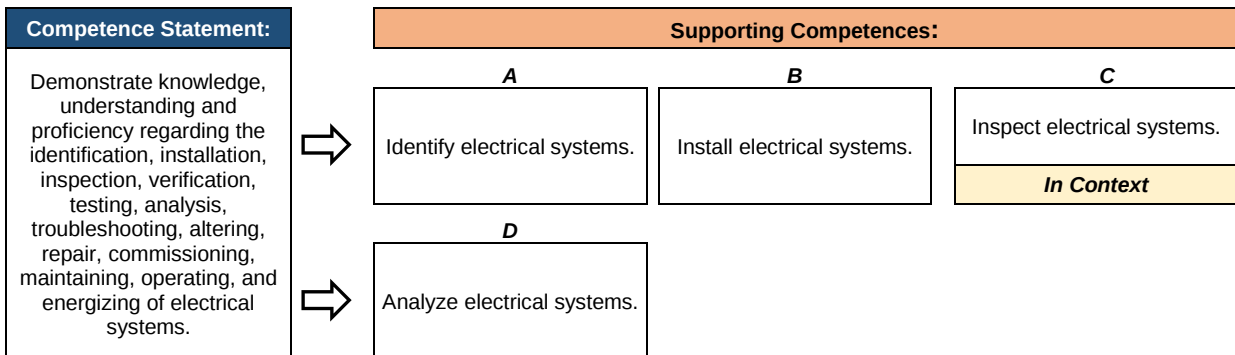
CORE COMPETENCE THREE: Codes and Standards



CORE COMPETENCE FOUR: Electrical Theory and Circuit Fundamentals



CORE COMPETENCE FIVE: Electrical Systems



PERIOD TWO COURSE CONTENT

CORE COMPETENCE ONE: *Foundational Skills, Job Responsibilities, and Procedures*

Competence Statement:		Supporting Competences:		
Apply foundational skills essential to convey and receive critical training and workplace information.	⇒	A Select, use, and maintain personal protective equipment. <i>In Context</i>	B Demonstrate safety awareness and safe work practices. <i>In Context</i>	C Demonstrate knowledge and understanding of working at heights. <i>In Context</i>
		D Demonstrate knowledge and understanding of material handling. <i>In Context</i>	E Use drawings, diagrams, schematics, and specifications.	F Organizes tasks and work area <i>In Context</i>
	⇒	G Apply quality workmanship practices <i>In Context</i>	H Demonstrate critical thinking skills. <i>In Context</i>	I Demonstrate numeracy skills. <i>In Context</i>
		J Demonstrate literacy skills. <i>In Context</i>	K Demonstrate digital literacy skills. <i>In Context</i>	L Demonstrate communication skills. <i>In Context</i>

CORE COMPETENCE TWO: *Tools, Equipment, and Instruments*

Competence Statement:		Supporting Competences:		
Demonstrate knowledge, understanding and proficiency regarding the use and maintenance of tools, equipment, and instruments.	⇒	A	B	C
		Select, use, and maintain hand tools.	Select, use, and maintain power tools.	Select, use, and maintain speciality tools.
	<i>In Context</i>	<i>In Context</i>	<i>In Context</i>	
	⇒	D	E	F
Select, use, and maintain measurement instruments.		Select, use, and maintain testing equipment.	Select, use, and maintain diagnostic equipment.	
<i>In Context</i>	<i>In Context</i>	<i>In Context</i>		

CORE COMPETENCE THREE: *Codes and Standards*

Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding and proficiency when interpreting and applying codes and/or standards.	A Interpret and apply the CE Code.	B Interpret and apply the electrical STANDATA. <i>In Context</i>	C Interpret and apply jurisdictional bylaws, standards, and codes. <i>In Context</i>

CORE COMPETENCE FOUR: *Electrical Theory and Circuit Fundamentals*

Competence Statement:	Supporting Competences:	
Demonstrate knowledge, understanding, and application of electrical theory, circuit fundamentals and electronics.	A	B
	Connect and analyze direct current (DC) circuits. <i>In Context</i>	Connect and analyze single-phase alternating current (AC) circuits.

CORE COMPETENCE FIVE: *Electrical Systems*

Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding and proficiency regarding the identification, installation, inspection, verification, testing, analysis, troubleshooting, altering, repair, commissioning, maintaining, operating, and energizing of electrical systems.	A	B	C
	Identify electrical systems.	Install electrical systems.	Inspect electrical systems. <i>In Context</i>
	D	E	F
	Verify electrical systems. <i>In Context</i>	Test electrical systems. <i>In Context</i>	Analyze electrical systems.
	G		
	Troubleshoot electrical systems		

PERIOD THREE COURSE CONTENT

CORE COMPETENCE ONE: *Foundational Skills, Job Responsibilities, and Procedures*

Competence Statement:		Supporting Competences:		
Apply foundational skills essential to convey and receive critical training and workplace information.	⇒	A Select, use, and maintain personal protective equipment. <i>In Context</i>	B Demonstrate safety awareness and safe work practices. <i>In Context</i>	C Demonstrate knowledge and understanding of working at heights. <i>In Context</i>
		D Demonstrate knowledge and understanding of material handling. <i>In Context</i>	E Use drawings, diagrams, schematics, and specifications. <i>In Context</i>	F Organizes tasks and work area <i>In Context</i>
	⇒	G Apply quality workmanship practices <i>In Context</i>	H Demonstrate critical thinking skills. <i>In Context</i>	I Demonstrate numeracy skills. <i>In Context</i>
		J Demonstrate literacy skills. <i>In Context</i>	K Demonstrate digital literacy skills. <i>In Context</i>	L Demonstrate communication skills. <i>In Context</i>

CORE COMPETENCE TWO: *Tools, Equipment, and Instruments*

Competence Statement:		Supporting Competences:		
Demonstrate knowledge, understanding and proficiency regarding the use and maintenance of tools, equipment, and instruments.	⇒	A	B	C
		Select, use, and maintain hand tools.	Select, use, and maintain power tools.	Select, use, and maintain speciality tools.
	<i>In Context</i>	<i>In Context</i>	<i>In Context</i>	
	⇒	D	E	F
Select, use, and maintain measurement instruments.		Select, use, and maintain testing equipment.	Select, use, and maintain diagnostic equipment.	
		<i>In Context</i>	<i>In Context</i>	

CORE COMPETENCE THREE: *Codes and Standards*

Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding and proficiency when interpreting and applying codes and/or standards.	A Interpret and apply the CE Code.	B Interpret and apply the electrical STANDATA. In Context	C Interpret and apply jurisdictional bylaws, standards, and codes. In Context

CORE COMPETENCE FOUR: *Electrical Theory and Circuit Fundamentals*

Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding, and application of electrical theory, circuit fundamentals and electronics.	A	B	C
	Connect and analyze direct current (DC) circuits.	Connect and analyze single-phase alternating current (AC) circuits.	Connect and analyze three-phase alternating current (AC) circuits.
	<i>In Context</i>	<i>In Context</i>	

CORE COMPETENCE FIVE: *Electrical Systems*

Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding and proficiency regarding the identification, installation, inspection, verification, testing, analysis, troubleshooting, altering, repair, commissioning, maintaining, operating, and energizing of electrical systems.	A	B	C
	Identify electrical systems.	Install electrical systems.	Inspect electrical systems.
		<i>In Context</i>	<i>In Context</i>
	D	E	F
	Verify electrical systems.	Test electrical systems.	Analyze electrical systems.
	<i>In Context</i>	<i>In Context</i>	
	G		
	Troubleshoot electrical systems.		

PERIOD FOUR COURSE CONTENT

CORE COMPETENCE ONE: *Foundational Skills, Job Responsibilities, and Procedures*

Competence Statement:		Supporting Competences:		
Apply foundational skills essential to convey and receive critical training and workplace information.	⇒	A Select, use, and maintain personal protective equipment. In Context	B Demonstrate safety awareness and safe work practices. In Context	C Demonstrate knowledge and understanding of working at heights. In Context
	⇒	D Demonstrate knowledge and understanding of material handling. In Context	E Use drawings, diagrams, schematics, and specifications In Context	F Organizes tasks and work area In Context
	⇒	G Apply quality workmanship practices In Context	H Demonstrate critical thinking skills. In Context	I Demonstrate numeracy skills. In Context
	⇒	J Demonstrate literacy skills. In Context	K Demonstrate digital literacy skills. In Context	L Demonstrate communication skills. In Context
	⇒	M Demonstrate mentorship skills In Context		

CORE COMPETENCE TWO: *Tools, Equipment, and Instruments*

Competence Statement:		Supporting Competences:		
Demonstrate knowledge, understanding and proficiency regarding the use and maintenance of tools, equipment, and instruments.	⇒	A	B	C
		Select, use, and maintain hand tools.	Select, use, and maintain power tools.	Select, use, and maintain speciality tools.
	<i>In Context</i>	<i>In Context</i>	<i>In Context</i>	
	⇒	D	E	F
		Select, use, and maintain measurement instruments.	Select, use, and maintain testing equipment.	Select, use, and maintain diagnostic equipment.
	<i>In Context</i>	<i>In Context</i>	<i>In Context</i>	

CORE COMPETENCE THREE: *Codes and Standards*

Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding and proficiency when interpreting and applying codes and/or standards.	A Interpret and apply the CE Code.	B Interpret and apply the electrical STANDATA. In Context	C Interpret and apply jurisdictional bylaws, standards, and codes. In Context

CORE COMPETENCE FOUR: <i>Electrical Theory and Circuit Fundamentals</i>			
Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding, and application of electrical theory, circuit fundamentals and electronics.	A	B	C
	Connect and analyze resistive circuits.	Connect and analyze single-phase alternating current (AC) circuits.	Connect and analyze three-phase alternating current (AC) circuits.
	<i>In Context</i>	<i>In Context</i>	<i>In Context</i>
	D		
	Connect and analyze electronics		

CORE COMPETENCE FIVE: <i>Electrical Systems</i>			
Competence Statement:	Supporting Competences:		
Demonstrate knowledge, understanding and proficiency regarding the identification, installation, inspection, verification, testing, analysis, troubleshooting, altering, repair, commissioning, maintaining, operating, and energizing of electrical systems.	A	B	C
	Identify electrical systems.	Install electrical systems.	Inspect electrical systems.
		<i>In Context</i>	<i>In Context</i>
	D	E	F
	Verify electrical systems.	Test electrical systems.	Analyze electrical systems.
		<i>In Context</i>	
	G	H	I
	Troubleshoot electrical systems.	Alter electrical systems.	Repair electrical systems.
		<i>In Context</i>	<i>In Context</i>
	J	K	L
	Commission electrical systems.	Maintain electrical systems.	Operate electrical systems.
	<i>In Context</i>	<i>In Context</i>	<i>In Context</i>
	M		
	Energize electrical systems.		
	<i>In Context</i>		

Period One Course Content

(8 weeks – 240 hours)

Period One Core Competences	Weighting
Foundational Skills, Job Responsibilities and Procedures	11%
Tools, Equipment, and Instruments	2%
Codes and Standards	19%
Electrical Theory, Circuit Fundamentals, and Electronics	31%
Electrical Systems	37%

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures Weighting – 11%



An Electrician utilizes a host of foundational skills and abilities that will enable them to understand and perform their job responsibilities and apply procedures for everyday activities. These skills are acquired, practiced, and honed through a combination of personal and professional learning environments and are essential tools in the learner's working portfolio.

These supporting competences are observed, studied, and performed in all periods of the apprenticeship education program.



Apply foundational skills essential to convey and receive critical training and workplace information.

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Supporting Competence	Taxonomy	Weighting
1A. Select, use, and maintain personal protective equipment.	I, II	7%
1B. Demonstrate safety awareness and safe work practices.	I	22%
1C. Demonstrate knowledge and understanding of working at heights.	I, II	2%
1D. Demonstrate knowledge and understanding of material handling.	I, II	5%

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Supporting Competence	Taxonomy	Weighting
1E. Use drawings, diagrams, schematics, and specifications.	I, II, III	50%
1F. Organizes tasks and work area	I	7%
1G. Apply quality workmanship practices	I	7%
1H. Demonstrate critical thinking skills.		In Context
1I. Demonstrate numeracy skills.		In Context
1J. Demonstrate literacy skills.		In Context
1K. Demonstrate digital literacy skills.		In Context
1L. Demonstrate communication skills.		In Context

Core Competence 2: Tools, Equipment, and Instruments

Weighting – 2%



An Electrician employs a variety of tools, equipment, and instruments throughout their working day. These items extend an individual's ability to perform activities and functions. Tools, equipment, and instruments come in many forms and configurations and require training and knowledge to utilize them in a safe, effective, and intended manner.

This section will focus on knowledge and procedures associated with tools, equipment, and instruments. Components of this section will be integrated and incorporated throughout all periods of the apprenticeship education program.

CS

Demonstrate knowledge, understanding and proficiency regarding the use and maintenance of tools, equipment, and instruments.

Core Competence 2: Tools, Equipment, and Instruments

Supporting Competence	Taxonomy	Weighting
2A. Select, use, and maintain hand tools.		In Context
2B. Select, use, and maintain power tools.		In Context
2C. Select, use, and maintain speciality tools.		In Context

Core Competence 2: Tools, Equipment, and Instruments

Supporting Competence	Taxonomy	Weighting
2D. Select, use, and maintain measurement instruments.	I, II	100%
2E. Select, use, and maintain testing equipment.		In Context
2F. Select, use, and maintain diagnostic equipment.		In Context

Core Competence 3: Codes and Standards

Weighting – 19%



Electricians use and apply codes and standards every day in their work environment. Electrical codes and standards are crucial guidelines that govern the design, installation, and maintenance of electrical systems to ensure safety, efficiency, and compliance with regulations. These codes and standards are established to safeguard the well-being of both the public and electrical professionals, maintaining a high standard of electrical work across the province.

This section will focus on an introduction to electrical codes and standards with an emphasis on single dwellings.



Demonstrate knowledge, understanding and proficiency when interpreting and applying codes and/or standards.

Core Competence 3: Codes and Standards

Supporting Competence	Taxonomy	Weighting
3A. Interpret and apply the CE Code.	I, II, III	100%
3B. Interpret and apply the electrical STANDATA.		In Context
3C. Interpret and apply jurisdictional bylaws, standards, and codes.		In Context

Core Competence 4: Electrical Theory, Circuit Fundamentals and Electronics

Weighting – 31%



Electrical theory, circuit fundamentals, and electronics form the foundational knowledge base for electricians, providing the understanding and skills necessary to design, install, and maintain electrical systems. These concepts are essential for electricians to navigate the complexities of electrical work, troubleshoot issues, and ensure the safety and functionality of electrical installations.

This section will focus on the introduction of electrical theory concepts with an emphasis on resistive circuits.



Demonstrate knowledge, understanding, and application of electrical theory, circuit fundamentals and electronics.

Core Competence 4: Electrical Theory, Circuit Fundamentals and Electronics

Supporting Competence

Taxonomy

Weighting

4A. Connect and analyze resistive circuits.

I, II, III

100%

Core Competence 5: Electrical Systems

Weighting – 37%



Electrical systems serve as the intricate network of components and wiring that enables the generation, distribution, and utilization of electricity within various structures. For electricians, a comprehensive understanding of electrical systems is paramount, as it forms the basis for their work in designing, installing, and maintaining safe and efficient electrical installations.

This section will focus on the EMF sources, alarms and detection systems, control circuit components and related equipment.



Demonstrate knowledge, understanding and proficiency regarding the preparation, installation, inspection, verification, testing, analysis, troubleshooting, altering, repairing, commissioning, maintaining, operating, and energizing of electrical systems.

Core Competence 5: Electrical Systems

Supporting Competence	Taxonomy	Weighting
5A. Identify electrical systems.	I	24%
5B. Install electrical systems.	I, II, III	21%
5C. Verify electrical systems.		In Context
5D. Analyze electrical systems.	I, II, III	55%

Period Two Course Content

(8 weeks – 240 hours)

Period Two Core Competences	Weighting
Foundational Skills, Job Responsibilities, and Procedures	3%
Tools, Equipment, and Instruments	In Context
Codes and Standards	16%
Electrical Theory, Circuit Fundamentals, and Electronics	45%
Electrical Systems	36%

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures Weighting – 3%



An Electrician utilizes a host of foundational skills and abilities that will enable them to understand and perform their job responsibilities and apply procedures for everyday activities. These skills are acquired, practiced, and honed through a combination of personal and professional learning environments and are essential tools in the learner's working portfolio.

These supporting competences are observed, studied, and performed in all periods of the apprenticeship education program.



Apply foundational skills essential to convey and receive critical training and workplace information.

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Supporting Competence	Taxonomy	Weighting
1A. Select, use, and maintain personal protective equipment		In Context
1B. Demonstrate safety awareness and safe work practices.		In Context
1C. Demonstrate knowledge and understanding of working at heights.		In Context
1D. Demonstrate knowledge and understanding of material handling.		In Context
1E. Use drawings, diagrams, schematics, and specifications.	I, II	100%
1F. Organizes tasks and work area		In Context
1G. Apply quality workmanship practices		In Context
1H. Demonstrate critical thinking skills.		In Context
1I. Demonstrate numeracy skills.		In Context
1J. Demonstrate literacy skills.		In Context
1K. Demonstrate digital literacy skills.		In Context
1L. Demonstrate communication skills.		In Context

Core Competence 2: Tools, Equipment, and Instruments**Weighting – In Context**

Demonstrate knowledge, understanding and proficiency regarding the use and maintenance of tools, equipment, and instruments.

Core Competence 3: Codes and Standards

Weighting – 16%



Electrical codes and standards are crucial guidelines that govern the design, installation, and maintenance of electrical systems to ensure safety, efficiency, and compliance with regulations. These codes and standards are established to safeguard the well-being of both the public and electrical professionals, maintaining a high standard of electrical work across the province.

This section will focus on circuit classifications, electric vehicle charging, electric heating, and cooling with an emphasis on apartment and similar building requirements.



Demonstrate knowledge, understanding and proficiency when interpreting and applying codes and/or standards.

Core Competence 3: Codes and Standards

Supporting Competence	Taxonomy	Weighting
3A. Interpret and apply the CE Code.	I, II, III	100%
3B. Interpret and apply the electrical STANDATA.		In Context
3C. Interpret and apply jurisdictional bylaws, standards, and codes.		In Context

Core Competence 4: Electrical Theory, Circuit Fundamentals and Electronics

Weighting – 45%



Electrical theory, circuit fundamentals, and electronics form the foundational knowledge base for electricians, providing the understanding and skills necessary to design, install, and maintain electrical systems. These concepts are essential for electricians to navigate the complexities of electrical work, troubleshoot issues, and ensure the safety and functionality of electrical installations.

This section will focus on single-phase alternating current (AC) circuits that contain capacitors, resistors, and inductors.



Demonstrate knowledge, understanding, and application of electrical theory, circuit fundamentals and electronics.

Core Competence 4: Tools, Electrical Theory, Circuit Fundamentals and Electronics

Supporting Competence	Taxonomy	Weighting
4A. Connect and analyze resistive circuits.		In Context
4B. Connect and analyze single-phase alternating current (AC) circuits.	I, II, III	100%

Core Competence 5: Electrical Systems

Weighting – 36%



Electrical systems serve as the intricate network of components and wiring that enables the generation, distribution, and utilization of electricity within various structures. For electricians, a comprehensive understanding of electrical systems is paramount, as it forms the basis for their work in designing, installing, and maintaining safe and efficient electrical installations.

This section will focus on heating and cooling systems in addition to magnetic motor controls and switching circuits.



Demonstrate knowledge, understanding and proficiency regarding the preparation, installation, inspection, verification, testing, analysis, troubleshooting, altering, repairing, commissioning, maintaining, operating, and energizing of electrical systems.

Core Competence 5: Electrical Systems

Supporting Competence	Taxonomy	Weighting
5A. Identify electrical systems.	I	18%
5B. Install electrical systems.	I, II	11%
5C. Inspect electrical systems.		In Context
5D. Verify electrical systems.		In Context
5E. Test electrical systems.		In Context
5F. Analyze electrical systems.	I, II, III	33%
5G. Troubleshoot electrical systems.	I, II, III	38%

Period Three Course Content

(10 weeks – 300 hours)

Period Three Core Competences	Weighting
Foundational Skills, Job Responsibilities and Procedures	In Context
Tools, Equipment, and Instruments	3%
Codes and Standards	13%
Electrical Theory, Circuit Fundamentals and Electronics	27%
Electrical Systems	57%

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Weighting – In Context



Apply foundational skills essential to convey and receive critical training and workplace information.

Core Competence 2: Tools, Equipment, and Instruments

Weighting – 3%



An Electrician employs a variety of tools, equipment, and instruments throughout their working day. These items extend an individual's ability to perform activities and functions. Tools, equipment, and instruments come in many forms and configurations and require training and knowledge to utilize them in a safe, effective, and intended manner.

This section will focus on knowledge and procedures associated with tools, equipment, and instruments. Components of this section will be integrated and incorporated throughout all periods of the apprenticeship education program.



Demonstrate knowledge, understanding and proficiency regarding the use and maintenance of tools, equipment, and instruments.

Core Competence 2: Tools, Equipment, and Instruments

Supporting Competence	Taxonomy	Weighting
2A. Select, use, and maintain hand tools.		In Context
2B. Select, use, and maintain power tools.		In Context
2C. Select, use, and maintain speciality tools.		In Context
2D. Select, use, and maintain measurement instruments.	I, II, III	100%
2E. Select, use, and maintain testing equipment.		In Context
2F. Select, use, and maintain diagnostic equipment.		In Context

Core Competence 3: Codes and Standards

Weighting – 13%



Electricians use and apply codes and standards every day in their work environment. Electrical codes and standards are crucial guidelines that govern the design, installation, and maintenance of electrical systems to ensure safety, efficiency, and compliance with regulations. These codes and standards are established to safeguard the well-being of both the public and electrical professionals, maintaining a high standard of electrical work across the province.

This section will focus on motors, transformers, substations, and capacitor banks.



Demonstrate knowledge, understanding and proficiency when interpreting and applying codes and/or standards.

Core Competence 3: Codes and Standards

Supporting Competence	Taxonomy	Weighting
3A. Interpret and apply the CE Code.	I, II, III	100%
3B. Interpret and apply the electrical STANDATA.		In Context
3C. Interpret and apply jurisdictional bylaws, standards, and codes.		In Context

Core Competence 4: Electrical Theory, Circuit Fundamentals and Electronics

Weighting – 27%



Electrical theory, circuit fundamentals, and electronics form the foundational knowledge base for electricians, providing the understanding and skills necessary to design, install, and maintain electrical systems. These concepts are essential for electricians to navigate the complexities of electrical work, troubleshoot issues, and ensure the safety and functionality of electrical installations.

This section will focus on three-phase alternating current (AC) systems and connections.



Demonstrate knowledge, understanding, and application of electrical theory, circuit fundamentals and electronics.

Core Competence 4: Electrical Theory, Circuit Fundamentals and Electronics

Supporting Competence	Taxonomy	Weighting
4A. Connect and analyze resistive circuits.		In Context
4B. Connect and analyze single-phase alternating current (AC) circuits.		In Context
4C. Connect and analyze three-phase alternating current (AC) circuits.	I, II, III	100%

Core Competence 5: Electrical Systems

Weighting – 57%



Electrical systems serve as the intricate network of components and wiring that enables the generation, distribution, and utilization of electricity within various structures. For electricians, a comprehensive understanding of electrical systems is paramount, as it forms the basis for their work in designing, installing, and maintaining safe and efficient electrical installations.

This section will focus on machines, motors, and transformers.



Demonstrate knowledge, understanding and proficiency regarding the preparation, installation, inspection, verification, testing, analysis, troubleshooting, altering, repair, commissioning, maintaining, operating, and energizing of electrical systems.

Core Competence 5: Electrical Systems

Supporting Competence	Taxonomy	Weighting
5A. Identify electrical systems.	I	11%
5B. Install electrical systems.		In Context
5C. Inspect electrical systems.		In Context
5D. Verify electrical systems.		In Context
5E. Test electrical systems.		In Context
5F. Analyze electrical systems.	I, II, III	64%
5G. Troubleshoot electrical systems.	I, II, III	25%

Period Four Course Content

(10 weeks – 300 hours)

Period Four Core Competences	Weighting
Foundational Skills, Job Responsibilities and Procedures	9%
Tools, Equipment, and Instruments	In Context
Codes and Standards	31%
Electrical Theory and Circuit Fundamentals	22%
Electrical Systems	38%

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Weighting – 9%



An Electrician utilizes a host of foundational skills and abilities that will enable them to understand and perform their job responsibilities and apply procedures for everyday activities. These skills are acquired, practiced, and honed through a combination of personal and professional learning environments and are essential tools in the learner's working portfolio.

These supporting competences are observed, studied, and performed in all periods of the apprenticeship education program.



Apply foundational skills essential to convey and receive critical training and workplace information.

Core Competence 1: Foundational Skills, Job Responsibilities, and Procedures

Supporting Competence	Taxonomy	Weighting
1A. Select, use, and maintain personal protective equipment		In Context
1B. Demonstrate safety awareness and safe work practices.	I	38%
1C. Demonstrate knowledge and understanding of working at heights.		In Context
1D. Demonstrate knowledge and understanding of material handling.		In Context
1E. Use drawings, diagrams, schematics, and specifications	I, II, III	54%
1F. Organizes tasks and work area		In Context
1G. Apply quality workmanship practices	I	4%
1H. Demonstrate critical thinking skills.		In Context
1I. Demonstrate numeracy skills.		In Context
1J. Demonstrate literacy skills.		In Context
1K. Demonstrate digital literacy skills.		In Context
1L. Demonstrate communication skills.		In Context
1M. Demonstrate mentorship skills	I	4%

Core Competence 2: Tools, Equipment, and Instruments**Weighting – In Context**

Demonstrate knowledge, understanding and proficiency regarding the use and maintenance of tools, equipment, and instruments.

Core Competence 3: Codes and Standards

Weighting – 31%



Electricians use and apply codes and standards every day in their work environment. Electrical codes and standards are crucial guidelines that govern the design, installation, and maintenance of electrical systems to ensure safety, efficiency, and compliance with regulations. These codes and standards are established to safeguard the well-being of both the public and electrical professionals, maintaining a high standard of electrical work across the province.

This section will focus on the practical application of codes and standards in electrical installations.



Demonstrate knowledge, understanding and proficiency when interpreting and applying codes and/or standards.

Core Competence 3: Codes and Standards

Supporting Competence	Taxonomy	Weighting
3A. Interpret and apply the CE Code.	I, II, III	100%
3B. Interpret and apply the electrical STANDATA.		In Context
3C. Interpret and apply jurisdictional bylaws, standards, and codes.		In Context

Core Competence 4: Electrical Theory, Circuit Fundamentals and Electronics

Weighting – 22%



Electrical theory, circuit fundamentals, and electronics form the foundational knowledge base for electricians, providing the understanding and skills necessary to design, install, and maintain electrical systems. These concepts are essential for electricians to navigate the complexities of electrical work, troubleshoot issues, and ensure the safety and functionality of electrical installations.

This section will focus on the application of electronics.



Demonstrate knowledge, understanding, and application of electrical theory, circuit fundamentals and electronics.

Core Competence 4: Electrical Theory, Circuit Fundamentals and Electronics

Supporting Competence	Taxonomy	Weighting
4A. Connect and analyze resistive circuits.		In Context
4B. Connect and analyze single-phase alternating current (AC) circuits.		In Context
4C. Connect and analyze three-phase alternating current (AC) circuits.		In Context
4D. Connect and analyze electronics.	I, II, III	100%

Core Competence 5: Electrical Systems**Weighting – 38%**

Electrical systems serve as the intricate network of components and wiring that enables the generation, distribution, and utilization of electricity within various structures. For electricians, a comprehensive understanding of electrical systems is paramount, as it forms the basis for their work in designing, installing, and maintaining safe and efficient electrical installations.

This section will focus on building automation and PLCs, hydraulic and pneumatic control systems, and fire alarm systems.



Demonstrate knowledge, understanding and proficiency regarding the preparation, installation, inspection, verification, testing, analysis, troubleshooting, altering, repair, commissioning, maintaining, operating, and energizing of electrical systems.

Core Competence 5: Electrical Systems

Supporting Competence	Taxonomy	Weighting
5A. Identify electrical systems.	I, II	12%
5B. Install electrical systems.		In Context
5C. Inspect electrical systems.		In Context
5D. Verify electrical systems.	I, II	4%
5E. Test electrical systems.		In Context
5F. Analyze electrical systems.	I, II, III	68%

Core Competence 5: Electrical Systems

Supporting Competence	Taxonomy	Weighting
5G. Troubleshoot electrical systems.	I, II, III	16%
5H. Alter electrical systems.		In Context
5I. Repair electrical systems.		In Context
5J. Commission electrical systems.		In Context
5K. Maintain electrical systems.		In Context
5L. Operate electrical systems.		In Context
5M. Energize electrical systems.		In Context

Taxonomy Verb List

This is a list of common verbs used to demonstrate the level and/or complexity of a given taxonomy. It is only intended as a guide and is not meant to exclude additional verbs.

Taxonomy I (*Recall It*)

Verbs	
Convert	Define
Describe	Explain
Identify	List
Recognize	State

Taxonomy II (*Do It*)

Verbs	
Apply	Connect
Demonstrate	Draw
Extract	Locate
Maintain	Perform
Select	Splice
Tap	Terminate
Use	

Taxonomy III (*Solve It*)

Verbs	
Analyze	Calculate
Create	Determine
Develop	Interpret
Program	Solve
Troubleshoot	Verify



Apprenticeship
and Industry Training
tradesecrets.alberta.ca