# **Construction Electrician and Industrial Electrician**

Transition Plan Version 3

### **Table of Contents**

Abbreviations
Introduction: Harmonization
Harmonization: What's Changing in BC?5
Change to the Apprenticeship Pathway6
Transition Planning7
BC Program Development8
Public Training Providers (13)
Private Training Providers (3)
Apprentice Numbers in Current Programs9
The Gaps
Transition Plan
Details of Transition Plan
Pathways for Current Apprentices (Summary)15
Cross Program Credit
Standardized Level Exams17
Appendix A: Details of Gaps
Appendix B: Overall Communication Plan
Appendix C: Transition Map27

### **Abbreviations**

CCDA	Canadian Council of Directors of Apprenticeship
CE	Construction Electrician
CL	Current level (2012/2013 Program Outlines)
FDN	Foundation program
IE	Industrial Electrician
HL	Harmonized level (2017 Program Outlines)
NOA	Red Seal National Occupational Analysis
RSOS	Red Seal Occupational Standard; replaces NOA
SLE	Standardized Level Exam
ТР	Training provider
тт	Technical training
тw	Trade worker
WBT	Work-based training

### Introduction: Harmonization

The Canadian Council of Directors of Apprenticeship (CCDA) is responsible for the Red Seal Program, which develops common interprovincial standards and examinations. The CCDA is undertaking the Harmonization Initiative in 30 Red Seal trades by 2020. British Columbia is an active participant in this initiative.

The goal is to substantively align apprenticeship systems across Canada by making apprenticeship training requirements more consistent in the Red Seal trades.

#### Harmonization Priorities

- 1. Use of Red Seal trade name
- Consistent <u>total training hours</u> (inschool and on-the-job)
- 3. Same number of training levels
- Consistent <u>sequencing</u> of training content, including use of most recent Red Seal Occupational Standard (RSOS).

### Harmonization: What's Changing in BC?

E	What will it be?
RADE NAME	Construction Electrician
UMBER OF RAINING LEVELS	4
OTAL HOURS chnical + work-based training	7200 hours
RAINING SEQUENCE der of subjects taught	Changes to sequence*

Changing in BC?	What will it be?
NO	Industrial Electrician
NO	4
NO	7200 hours
YES	Changes to sequence*
	in BC? NO NO NO

\* Changes to sequencing resulted in **3 levels of common training** for CE and IE.

### **Change to the Apprenticeship Pathway**

The re-sequencing of the Construction Electrician and Industrial Electrician programs through the Harmonization Initiative has resulted in the ability to deliver levels 1-3 as 'Electrician Common Core' levels which will serve both CE and IE apprenticeship programs. Currently in BC, Industrial Electrician apprentices attend level 1 and 2 Construction Electrician training.



### **Transition Planning**

The re-sequencing of the Construction Electrician and Industrial Electrician programs through the Harmonization Initiative has resulted in significant changes to the sequencing of technical training.

We consulted with the Deans of the 13 public post-secondary institutions that deliver the Construction Electrician and/or Industrial Electrician program, and also considered the input of our internal partners. We evaluated a number of scenarios, and the transition plan outlined in this document was identified as the best option. We have also ensured that there are options for all current apprentices to complete their apprenticeship.

## **Transition Planning Process**



### **BC Program Development**



### **Public Training Providers (13)**

- BC Institute of Technology Camosun College College of New Caledonia College of the Rockies Kwantlen Polytechnic University North Island College Northern Lights College
- Northwest Community College Okanagan College Selkirk College Thompson Rivers University University of the Fraser Valley Vancouver Island University

### **Private Training Providers (3)**

Electrical Joint Training Committee Sprott Shaw College Vancouver Career College

Note: Not all institutions teach every level.

Construction Electrician	Status	FDN	0TT	1TT	2TT	ЗТТ	Total
CE (current model)	Active	10	1,534	2,229	1,835	1,356	6,964
	Inactive	119	1,581	866	474	154	3,194
	Total	129	3,115	3,095	2,309	1,510	10,158
Industrial Electrician	Status	FDN	ОТТ	1TT	2TT	3ТТ	Total
IE (current model)	Active		53	35	62	42	192
	Inactive		24	12	25	2	63
	Total		77	47	87	44	255
Combined	Status	FDN	0TT	1TT	2TT	3TT	Total
	Active	10	1,587	2,264	1,897	1,398	7,156
	Inactive	119	1,605	878	499	156	3,257
	Total	129 + approx. 1,000/yr	3,192	3,142	2,396	1,554	10,413

### **Apprentice Numbers in Current Programs**

#### Notes on the numbers and estimates:

Note 1: This data is from February 1, 2017.

**Note 2**: Students who have completed Level 4TT are not considered in transition planning.

**Note 3:** Numbers for FDN are those that pre-registered with ITA. There are also approximately 1,000 FDN seats/year.

### The Gaps



Gap A (CL1→HL2)

Gap B (CL2→HL3)

Gap C (CE CL3→CE HL4)

Gap D (IE CL3→IE HL4)



Gap A (CL1→HL2) applies to a student who has completed Current Level 1 or Foundation and is moving into Harmonized Level 2. \*No change to gap A resulting from content changes effective Jan 1, 2021.

Gap B (CL2→HL3) applies to a student who has completed Current Level 1 & 2 and is moving into Harmonized Common Core Level 3. \**Numbers have been updated to reflect content* changes effective Jan 1, 2021.

Gap C (CE CL3→CE HL4) applies to a student who has completed Current Level 1, 2 & CE Level 3 and is moving into Harmonized CE Level 4. \**Numbers have been updated to reflect* content changes effective Jan 1, 2021.

Gap D (IE CL3→IE HL4) applies to a student who has completed Current Level 1, 2 & IE Level 3 and is moving into Harmonized IE Level 4. \**Numbers have been updated to reflect content* changes effective Jan 1, 2021.

\*\*See Appendix A: Details of Gaps for a list of the missing competencies\*\*

### **Transition Plan**

	Harmonized Level Implementation Timelines			
	Electrician Commor	n Core Level 1	December 1, 201	8
	Electrician Common Core Level 2 December 1, 201		8	
	Electrician Common Core Level 3 December 1		December 1, 201	9
	CE Leve	el 4	December 1, 202	20
	IE Leve	4	December 1, 202	20
Year 0 2017- 2018	CL1	CL2	CE CL3 IE CL3	CE CL4 IE CL4
Year 1 2018- 2019	HL1	HL2 Gap A TP Support 2 days	CE CL3 IE CL3	CE CL4 IE CL4
Year 2 2019-	HL1	HL2	CE CL3 IE CL3	CE CL4
2019-		Gap A TP Support 2 days	HL3	IE CL4
Year 3			CE CL3 IE CL3	CE HL4 IE HL4
2020- 2021	HL1	HL2	HL3	Gap C TP Support 4 days Gap D TP Support 3 days
Year 4			HL3	CE HL4 IE HL4
2021- 2022	HL1	HL2	Gap B TP Support 4 days	Gap C TP Support 4 days Gap D TP Support 3 days
Year 5			HL3	CE HL4 IE HL4
2022- 2023	HL1	HL2	Gap B TP Support 4 days	Gap C TP Support 4 days Gap D TP Support 3 days

### **Details of Transition Plan**

Apprentices with no technical training (i.e. 0TT) and those who have completed Current FDN or CL1 will be transitioned to the Harmonized Program. Doing this will capture 75% of current apprentices into the Harmonized program.

#### Gap A

TP can request 2 days of funding from ITA Training Investment to provide gap training for FDN/CL1 students, who are transitioning to Harmonized Level 2. We will not require a document assessment for this gap. Delivery model is up to the TP.

#### Dual Streaming of CE or IE CL3 and HL3

**Note**: Gap B has been reduced as a result of content changes effective Jan 1, 2021. See Appendix A: Details of Gaps.

Dual streaming provides a pathway for students in both the current and harmonized programs to continue in their program without transitioning from  $CL2 \rightarrow HL3$ . It will prevent apprentices from transitioning where there is a large gap in training (Gap B).

Apprentices with Harmonized Level 2 (HL2) must take HL3. Students who have completed the previous level in the HL program must take the next level in the HL program. Allowing apprentices to register into the CL program will result in substantial gaps in their training.

Delivery method and schedule are up to the training provider. Some options are:

- Deliver CE or IE CL3 and HL3 during the same semester.
- Deliver CE or IE CL3 in one semester and HL3 in a subsequent semester.
- Coordinate with another training provider in the same region to offer CE or IE CL3 at one school and HL3 at the other school.

ITA is committed to working with training providers to provide pathways for apprentices to complete their training.

If you have questions that relate to the delivery of dual streaming, please contact Program Standards at programstandards@itabc.ca.

If you have any questions that relate to the funding of programs, please contact the Training Investment Department at <u>investment@itabc.ca</u>.

#### Gap B (CE/IE CL2→HL3)

TP can request 4 days of funding from ITA Training Investment in order to provide gap training for CE or IE CL2 students who are transitioning to Harmonized Level 3. ITA will not require a document assessment for this gap. Delivery model is up to the TP.

#### Gap C (CE CL3→HL4)

TP can request 4 days of funding from ITA Training Investment in order to provide gap training for CE CL3 students who are transitioning to CE Harmonized Level 4. ITA will not require a document assessment for this gap. Delivery model is up to the TP.

#### Gap D (IE CL3→HL4)

TP can request 3 days of funding from ITA Training Investment in order to provide gap training for IE CL3 students who are transitioning to IE Harmonized Level 4. ITA will not require a document assessment for this gap. Delivery model is up to the TP.



### Pathways for Current Apprentices (Summary)

### **Cross Program Credit**

The Harmonized CE and IE programs contain Cross Program Credit for holders of the other Electrician Certificate of Qualification. Holders of a CofQ in one Electrician program will receive credit for levels 1, 2 and 3 and 4,500 WBT hours in the other Harmonized Electrician apprenticeship program. Individuals who receive this credit **must wait until Harmonized Level 4 is implemented** to attend the final year of training.

CE CofQ holder	<ul> <li>OPTION A – IE Harmonized apprenticeship program (After Dec 1, 2018)</li> <li>Register in Harmonized IE Program</li> <li>Automatically receive cross credit for HL1, HL2, HL3 and 4,500 WBT</li> <li>Take IE HL4 after Dec 1, 2020 (TWs who receive the Harmonized cross program credit may not take IE Current Level 4)</li> <li>OPTION B – Current IE apprenticeship program (Before Dec 1, 2018)</li> </ul>
registering in IE Apprenticeship Program	<ul> <li>In the current IE program standards, no cross program credit is granted for holders of a CE CofQ.</li> <li>However, if a TW has already taken current Level 1 and current Level 2 in the CE apprenticeship program, that credit will transfer into the IE apprenticeship program.</li> <li>Register in Current IE program</li> <li>Credit will transfer for CL1 and CL2</li> <li>Complete IE CL3 by end of Nov 2021</li> <li>Complete IE CL4 by end of Nov 2020</li> <li>0 WBT hours are granted</li> </ul>
IE CofQ holder registering in CE Apprenticeship Program	<ul> <li>OPTION A – CE Harmonized apprenticeship program (After Dec 1, 2018)</li> <li>Register in Harmonized CE Program</li> <li>Automatically receive cross credit for HL1, HL2, HL3 and 4,500 WBT</li> <li>Take CE HL4 after Dec 1, 2020 (TWs who receive the Harmonized cross program credit may not take CE CL4)</li> <li>OPTION B – Current CE apprenticeship program (Before Dec 1, 2018)</li> <li>Register in Current CE program</li> <li>Automatically receive cross credit for CL1 and CL2</li> <li>Complete CE CL3 by end of Nov 2021</li> <li>OWBT hours are granted</li> </ul>

### **Standardized Level Exams**

Standardized Level Exams are being developed for the harmonized program.

Exam	Exam Development	Exam Launch (tentative)
HL1	2017	Summer 2019
HL2	2017	Summer 2019
HL3	2018	TBD

An **OPSN** will be sent to announce the implementation of the SLEs as they are launched.

### **Appendix A: Details of Gaps**

#### GAP A: CL1→HL2

#### Gap (Missing Content)

This table lists the content that a student will be **missing** if they have completed Current Level 1 (CL1) and then take Harmonized Level 2 (HL2).

	Competency	Objectives/LT	Self- directed Learning Hours**	Instructional Hours*
A1	Use Electrical Circuit Concepts	Describe the generation of an alternating voltage Describe the features of alternating current Describe the difference between DC ohmic and effective AC resistance	2.5	7
G2	Use communication and mentoring techniques	Describe the shared responsibility for workplace learning	0	3
J1	Install Low Voltage Distribution Equipment	HL1 single phase, 3 wire services (HL3 three phase, three phase services)	0	0
L1	Install Grounding and Bonding Systems	HL1 single phase, 3 wire services, system ground and bonding conductor (HL3 three phase, three phase services, system ground and bonding conductor)	0	0
R1	Install Luminaires	Describe basic LED lighting Describe incandescent lighting	3	1.5
R3	Install Lighting Controls	Describe control of LED and incandescent lamps	1.5	1.5
R4	Install Lighting Standards	Describe types and installation of lighting standards	3	0
AA1	Install Voice/Data/Video (VDV) Systems	Types of structured cabling systems CAT5 and coaxial, termination	3	0
			13	13

\*Instructional Hours are hours of content that an apprentice would need dedicated instruction to cover.

**\*\*Self-Directed Hours** are hours of content that an apprentice would be able to cover through self-study, on the job or in the context of other tasks/levels.

#### **Overlap (Repeated Content)**

This table lists the content that a student will be **repeating** if they have completed Current Level 1 (CL1) and then take Harmonized Level 2 (HL2).

	Competency	Overlap Hours
V1	Install Motor Starters and Controls	10
V2	Maintain Motor Starters and Controls	23
	Total Overlap Hours	33

#### GAP B: CL2→HL3

#### Gap (Missing Content)

This table lists the content that a student will be **missing** if they have completed Current Level 2 (CL2) and then take Harmonized Level 3 (HL3).

	Competency	Objectives	Self- directed Learning Hours**	Instructional Hours*
G2	Use communication and mentoring techniques	Describe the shared responsibility for workplace learning	0	3
11	Install Overcurrent Protection Devices	Theory of protection	0	0
12	Install Ground Fault, Arc Fault and Surge Protection Devices	Fault mitigation devices	5	3
N1	Install Renewable Energy Generating and Storage Systems	Describe types	0	3
<del>M3</del>	Install DC (Direct Current) Generating Systems	Describe the characteristics and operating principles of DC generators	<del>15</del>	<del>30</del>
<del>M4</del>	Maintain DC Generating Systems	Describe the maintenance of DC generators		
¥3	Install DC Motors	Describe the operating principles of DC motors Connect DC motors		
¥4	Maintain DC Motors	Describe maintenance and troubleshooting for DC motors		
₩1	Install Motor Starters and Controls	DC motor controllers	3	6
<del>\/2</del>	Maintain Motor Starters and Controls	Control of DC machines		
Q1	Install Conductors and Cables	Identify conductors and cables Determine conductor and cable requirements	3	0
Q2	Install Raceways, Boxes and Fittings	Determine requirements for raceways, boxes and fittings	3	0
R4	Install Lighting Standards	Describe types and installation of lighting standards	3	0
S1	Install HVAC Systems and Controls	Environmental heating controls	12	12
S2	Maintain HVAC Systems and Controls	Environmental heating controls		
U1	Install Cathodic Protection Systems	Describe cathodic protection systems	6	

	Competency	Objectives	Self- directed Learning Hours**	Instructional Hours*
U2	Maintain Cathodic Protection Systems	Describe the maintenance of cathodic protection systems		
T1	Install Exit and Emergency Lighting Systems	Describe exit and emergency lighting systems	9	0
Τ2	Maintain Exit and Emergency Lighting Systems	Describe procedures to test exit and emergency lighting systems Describe procedures to maintain exit and emergency lighting systems		
AA1	Install Voice/Data/Video (VDV) Systems	Types of structured cabling systems CAT5 and coaxial, termination	3	0
		Total Gap Hours	<del>62</del> New Total: 44	<del>57</del> New Total: 21

\*Instructional Hours are hours of content that an apprentice would need dedicated instruction to cover.

**\*\*Self-Directed Hours** are hours of content that an apprentice would be able to cover through self-study, on the job or in the context of other tasks/levels.

Note: Cross-out text shows competencies that are no longer part of the gap after the program changes effective Jan 1, 2021

#### **Overlap (Repeated Content)**

This table lists the content that a student will be **repeating** if they have completed Current Level 2 (CL2) and then take Harmonized Level 3 (HL3).

	Competency	Objectives	Overlap Hours
A6	Analyze Electronic Circuits	Field effect transistors (FETs)	2
V1	Install Motor Starters and Controls	A/C, plugging, anti-plugging	30
V2	Maintain Motor Starters and Controls	A/C, plugging, anti-plugging	12
		Total Overlap Hours	44

#### Gap C: CE CL3 $\rightarrow$ CE HL4

#### Gap (Missing Content)

This table lists the content that a student will be **missing** if they have completed Current CE Level 3 (CE CL3) and then take CE Harmonized Level 4 (CE HL4).

	Competency	Objectives	Self-directed Learning	Instructional Hours*
			Hours**	
<del>D7</del>	Identify Hazardous Locations	Wiring methods for hazardous locations	4	9
G2	Use communication and mentoring techniques	Describe the shared responsibility for workplace learning	3	0
P5	Install high voltage transformers	Calculate voltage, current, kVA Non-destructive testing Describe installation of high voltage transformers	3	2
R4	Install Lighting Standards	Describe types and installation of lighting standards	3	0
N1	Install Renewable Energy Generating and Storage Systems	Describe types	3	0
L3	Install Ground Fault Detection Systems	High capacity installations	2	0
Q1	Install Conductors and Cables	Identify conductors and cables Determine conductor and cable requirements	3	0
Q2	Install Raceways, Boxes and Fittings	Determine requirements for raceways, boxes and fittings	3	0
S1	Install HVAC Systems and Controls	Environmental heating controls	12	12
S2	Maintain HVAC Systems and Controls	Environmental heating controls		
T1	Install Exit and Emergency Lighting Systems	Describe exit and emergency lighting systems	9	0
Τ2	Maintain Exit and Emergency Lighting Systems	Describe procedures to test exit and emergency lighting systems Describe procedures to maintain exit and emergency lighting systems		
U1	Install Cathodic Protection Systems	Describe cathodic protection systems	6	0
U2	Maintain Cathodic Protection Systems	Describe the maintenance of cathodic protection systems		
AA1	Install Voice/Data/Video (VDV) Systems	Types of structured cabling systems CAT5 and coaxial, termination	3	0

Competency	Objectives	Self-directed Learning Hours**	Instructional Hours*
	Total approximate hours	54 New Total: 50	<del>23</del> New Total: 14

\*Instructional Hours are hours of content that an apprentice would need dedicated instruction to cover.

**\*\*Self-Directed Hours** are hours of content that an apprentice would be able to cover through self-study, on the job or in the context of other tasks/levels.

Note: Cross-out text shows competencies that are no longer part of the gap after the program changes effective Jan 1, 2021

**Note:** There is **no overlap** (repeated content) for students if they have completed Current CE Level 3 (CE CL3) and then take Harmonized CE Level 4 (CE HL4).

#### Gap D: IE CL3→IE HL4

#### Gap (Missing Content)

This table lists the content that a student will be **missing** if they have completed Current IE Level 3 (IE CL3) and then take IE Harmonized Level 4 (HL4).

	Competency	Objectives	Self-directed Learning Hours**	Instructional Hours*
<del>D7</del>	Identify Hazardous Locations	Wiring methods for hazardous locations	2	6
G2	Use communication and mentoring techniques	Describe the shared responsibility for workplace learning	3	0
P5	Install high voltage transformers	Calculate voltage, current, kVA Meggering Describe installation of high voltage transformers	3	2
N1	Install Renewable Energy Generating and Storage Systems	Describe types	3	0
L3	Install Ground Fault Detection Systems	High capacity systems	2	0
Q1	Install Conductors and Cables	Identify conductors and cables Determine conductor and cable requirements	3	0
Q2	Install Raceways, Boxes and Fittings	Determine requirements for raceways, boxes and fittings		
T1	Install Exit and Emergency Lighting Systems	Describe exit and emergency lighting systems	9	0
Τ2	Maintain Exit and Emergency Lighting Systems	Describe procedures to test exit and emergency lighting systems Describe procedures to maintain exit and emergency lighting systems		
U1	Install Cathodic Protection Systems	Describe cathodic protection systems	3	3
U2	Maintain Cathodic Protection Systems	Describe the maintenance of cathodic protection systems		
W1	Install Drives	Size, install and configure variable speed drives	3	6
AA1	Install Voice/Data/Video (VDV) Systems	Types of structured cabling systems CAT5 and coaxial, termination	3	0
		Total approximate hours	34 New Total: 32	17 New Total: 11

\*Instructional Hours are hours of content that an apprentice would need dedicated instruction to cover. \*\*Self-Directed Hours are hours of content that an apprentice would be able to cover through self-study, on the job or in the context of other tasks/levels.

#### Note: Cross-out text shows competencies that are no longer part of the gap after the program changes effective Jan 1, 2021

#### **Overlap (Repeated Content)**

This table lists the content that a student will be **repeating** if they have completed IE Current Level 3 (IE CL3) and then take IE Harmonized Level 4 (IE HL4).

	Competency	Hours
AA1	Install Voice/Data/Video (VDV) Systems	3
AC1	Install Automated Control Systems	20
AC3	Program Automated Control Systems	25
		48

### **Appendix B: Overall Communication Plan**

Audience	Purpose	Mode
Training Providers	To announce the changes to training standards and the publication of a new Program Outline and Program Profile on the trade webpage on the ITA website	Official Program Standards Notification (OPSN) via email and posting on trade webpage
Training Providers	To plan for transitioning to the new program	Webinar(s), phone calls and/or face to face meetings
Training Providers	To announce the final transition plan	Program Update and Transition Plan via email and posting on trade webpage
Training Providers	To announce the launch of the harmonized level exams	OPSN via email and posting on trade webpage
Employers	To gather input on transition scenarios	Webinar(s), phone calls and/or face to face meetings
Employers	To inform on the upcoming changes to the program and the pathways to completion for their apprentices	Letters sent through ITA Direct Access (DA)
Employers	To inform on the upcoming changes to the program and the pathways to completion for their apprentices	Presentations at Program Advisory Committees (PAC) and other industry events
Apprentices	To inform on the upcoming changes to the program and their pathways to completion	Letters sent through ITA Direct Access (DA)
Apprentices	To inform on the upcoming changes to the program and their pathways to completion	Targeted outreach via phone and email
Apprentices	To inform on the upcoming changes to the program and their pathways to completion	Classroom visits by Apprenticeship Advisors



### **Appendix C: Transition Map**

Last Updated: February 5, 2021 (Dual streaming for Level 3 to December <u>2021</u>) (CL2 ->HL3 Training Provider <u>Support</u> Available)