



RED RIVER COLLEGE
OF APPLIED ARTS, SCIENCE AND TECHNOLOGY

Electrical Program
Curriculum Validation – Program Renewal

Final Report
September 2005

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Perry Samagalski	Advanced Education & Training, Apprenticeship Branch
Brian Neil	Advanced Education & Training, Apprenticeship Branch
Dennis Henry	Wescan Electrical Mechanical
Ken Oertel	Chief Electrical Inspector, City of Winnipeg
Dave Foreman	Manitoba Electrical League
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Electrical Program Curriculum Validation – Program Renewal

Final Report

Introduction:

The Curriculum Validation – Program Renewal for the Electrical program was carried out between February/05 and May/05. The purpose of the Curriculum Validation – Program Renewal process was to assess the current status of the program and to develop a 5 – year plan for program renewal.

The Curriculum Validation – Program Renewal process utilizes a structured format that identifies the current status of industry expectations, a description and vision for a desired future state, and a plan for creating it. The process normally requires the completion of a series of seven activities that result in the deliverables outlined below.

Curriculum Validation - Program Renewal Deliverables:

The process involved 7 interrelated deliverables:

1. Environmental Scan and Analysis of the key findings of similar programs across Canada.
2. Industry Occupational Analysis (DACUM)
3. Graduate Skills and Abilities Chart
4. Graduate Profile
5. Program Renewal Plan
6. A 5-year Program Renewal Plan timeline
7. Final Report

Outcomes from the Deliverables:

1. Environmental Scan and Key Findings (Appendix A)

The Environmental Scan provides the faculty and Chair with information about similar programs that are offered in colleges and universities locally and nationally. The Curriculum Validation Facilitator gathered information on similar programs and trends influencing their development and direction. The information was gathered from web sites, email and telephone contacts and included:

- Name of institution, location, contact person
- Size of program
- Credential offered
- Program features
- Curriculum Model
- Curriculum Content

- Student Assessment
- Current and Coming Challenges
- Curriculum Renewal
- Partnerships
- Additional Information (Other and comments)

Ten programs similar to Red River College's Electrical program were scanned. These programs are delivered at the following colleges.

1. Assiniboine Community College, Brandon, MB
2. Camosun College, Victoria, BC
3. College of the North Atlantic, Bonavista, NL
4. Fanshawe College, ON
5. Holland College, Prince Edward Island
6. New Brunswick Community College, NB
7. Selkirk College, Nelson, BC
8. SIAST, Moose Jaw, SK
9. University College of the Cariboo, Kamloops, BC
10. Winnipeg Technical College, Winnipeg, MB

Key findings from the Environmental Scan

Enrolment:

Entrance requirements range from Grade 10 equivalency to a High School Diploma. There is an emphasis on English and Math skills for all the scanned programs.

The number of annual intakes per program varies - from continuous intake at 3 colleges to twice-per-year at 4 colleges and once-per-year at 3 colleges.

Annual enrolment numbers vary from a low of 16 for two programs to a high of 70 students per year in one of the continuous intake programs.

Red River College's Electrical program has two intakes of 24 students for an annual enrolment quota of 48 students.

Delivery:

Programs vary in length from 24 weeks through to 1 year. Red River College's Electrical program is 38 weeks in length.

Technology:

Two colleges are using some "cutting-edge" technology to deliver their program:

- The College of the North Atlantic is using virtual reality software to teach students some aspects of the practical areas (e.g. testing a circuit).
- New Brunswick Community College is using CATTRAX-E simulation software to teach a portion of the curriculum.

Course Content / Curriculum:

Course listings indicate that the curriculum is similar for all scanned colleges. Seven colleges specifically state that their curriculum is designed to meet some of the requirements for in-school training in the Apprenticeship programs offered in their respective provinces.

Red River College's Electrical program graduates may challenge the Apprenticeship and Training Level 1 and 2 in-school training toward the Electrical Construction Apprenticeship.

Experiential Component:

Colleges across Canada vary in their approaches:

- None of the three British Columbia colleges scanned include an experiential component.
- The experiential components at other colleges range from a 60-hour "job-shadowing work term at the College of the North Atlantic because students are "not allowed to practice without a license" in Newfoundland and Labrador to a five-week practicum offered at Assiniboine Community College.
- The University College of the Cariboo arranges volunteer work experience on an annual Habitat for Humanity project for students.
- Red River College offers Electrical program students a two-week work experience with local contractors.

Unique Program Features:

The Winnipeg Technical College, Camosun College and the College of the North Atlantic have a continuous entry and exit enrolment system. Two of these colleges offer incentives to students to complete the program as quickly as possible:

- The Winnipeg Technical College offers an early completion reward, in the form of a partial tuition refund, to students who successfully complete the program in less than 10 months. The refund is generally calculated based on the number of months left remaining in the 10 - month timeframe. Early completion allows the college to backfill vacant seats on a continuous intake basis.
- Camosun College refunds full weeks of tuition to students who successfully complete the program earlier than the prescribed 25 weeks. In addition, Camosun allows time extensions to students who may require longer than the prescribed 25 weeks to complete the program. However, additional tuition fees are charged for time extensions.

Challenges:

The main challenge expressed by many colleges is that of attracting students who are motivated to excel and who go on to pursue careers in the electrical trades.

In addition, there is significant concern expressed regarding the “level” of math skills with which students are entering the programs – it is felt that students are graduating from high school with a credit in Math but are lacking the basic math skills required to function in the Electrical programs. As a result, many colleges including Red River College are now offering a trade-specific Math course as part of their curriculum.

Camosun College expresses a concern with their difficulty in recruiting qualified instructors when journeypersons can earn considerably more out in industry. Also, retirements of existing instructors are compounding this concern.

2. Industry Occupational Analysis (DACUM) Chart (Appendix B)

The Industry Occupational Analysis using the DACUM process is a familiar component of the curriculum development process at Red River College and provides the program with a description of skills required for an entry-level position in the electrical construction industry. Included in the process is the identification of emerging and retiring industry trends.

The DACUM occupational analysis took place over two full days (January 27 and February 3, 2005). A total of 8 people from government and industry participated in this workshop. Participants were employed in the Apprenticeship Branch of Manitoba Advanced Education and Training, a professional association, electrical

contractors and a trade union. Seven of the eight participants were also members of the Advisory Committee. The purpose of the Advisory Committee is to provide guidance and advice on all matters related to the program. As many of these members are several years away from entry-level jobs, it was difficult to focus on entry-level skills. This experience demonstrated that it is crucial to recruit entry-level workers and/or recent graduates to participate in the DACUM occupational analysis to ensure the validity of the outcome.

Participants were asked to identify the major competencies required by entry-level electrical workers. At the end of the two days, the resulting DACUM occupational analysis chart (See Appendix B) identified 10 general areas of competencies broken - down into 103 skills and abilities.

Also, as part of the Electrical occupational analysis the following emerging and retiring trends were identified:

Emerging Industry Trends:

- voice data / video (communications)
- “watering down trade” - separating trade into specific tasks
- increased safety issues
- changes in technology
- increased misunderstanding of complexity of the trade
- increased regulations and legislation because of litigation
- importance of building automation systems

Retiring industry trends:

- old ways of selling
- inappropriate work practices
- pride in and quality of workmanship
- decreased regulation enforcement
- changing units of measure

3. Graduate Skills and Abilities Chart (Appendix C)

The faculty Graduate Skills and Abilities workshops were conducted to identify a composite graduate profile for all graduates of the Electrical program. This workshop was held on March 16 and 23, 2005.

The outcome of these workshops was a single, composite chart that outlines the graduate skills and abilities. The chart is an integration of:

- 1) Competencies identified in the Industry Occupational Analysis (DACUM) Chart,

- 2) College Wide Learning Outcomes (CWLOs), and
- 3) Resulting revisions to the chart based on faculty's assessment of what would constitute realistic learning expectations of students in the program.

This Skills and Abilities chart serves as the focus for curriculum renewal and the basis for the development of Graduate Profile.

4. Graduate Profile (Appendix D)

From the Graduate Skills and Abilities Chart, the Graduate Profile was developed by the Curriculum Validation Facilitator and the Curriculum Consultant in consultation with the department Chair. This draft Graduate Profile was then vetted by the entire faculty before finalizing. The Graduate Profile is an outline for the development of curriculum and serves as a baseline to measure student learning.

5. Program Renewal Plan (Appendix E)

The program renewal plan is the result of translating the preceding four deliverables into a coherent plan for the renewal of the program.

A half-day workshop was held with faculty and the Chair to identify a program vision and goals for program renewal. Utilizing the results of this vision and goals workshop, the Curriculum Consultant in collaboration with the Curriculum Validation Facilitator and the Chair created a final vision statement along with seven goals that will guide the program renewal process over the next five years.

The Electrical program's vision is to be recognized as a leader in the provision of training that prepares graduates for a variety of entry-level positions in the electrical construction and related industries. The following seven goals were identified to realize this vision:

1. Student Recruitment
 - Increase the number of women who enrol in the program.
2. Student Success
 - Continue to implement strategies that contribute to student success.
3. Partnerships
 - Strengthen existing partnerships with industry, government and other groups to ensure that the program graduates continue to meet current and future industry requirements.
4. Curriculum
 - Deliver a comprehensive and up-to-date certificate program that will meet the training needs of persons preparing for a variety of entry-level positions that require an electrical background.

5. Learning Environment
 - Maintain the best possible environments to facilitate teaching and learning.
6. Industry Experience
 - The anticipated amendments to the Electricians' Licence Act could restrict/eliminate the current work experience opportunity available to students enrolled in the program. As a result, the program will augment the existing work experience component with other in-industry experiences for students.
7. Resources
 - Ensure that the facilities, staffing and other resources that are available to the program are sufficient to achieve its vision.

6. 5-Year Program Renewal Timeline (Appendix F)

The Program Renewal Plan will serve as the basis for the improvement of the Electrical program. The Department Chair, faculty, and Advisory Committee are committed to renewing the program over the next 5-year period.

The following tasks were identified for completion by the end of June 2010.

1. Increase the number of women that enrol in the program.
 - Produce a *Women in Trades* brochure in collaboration with the Marketing and Public Relations for distribution to middle-years and high school counsellors. (Sept./05 – June/06)
 - Re-instate the *Girls Exploring Trades and Technology* (G.E.T.T.) summer camps for middle-years female students. (Ongoing)
2. Continue to implement strategies that contribute to student success. (Ongoing)
 - Expand the scope of the existing orientation sessions to include more information on college policies. (Sept./05 – June/06)
 - Continue delivering pre-enrolment information sessions for prospective students. (Ongoing)
 - Continue assessing the academic preparedness of all in-coming students and, if not at the appropriate level, direct them to upgrade their skills prior to the commencement of the program. (Ongoing)
 - Maintain an up-to-date inventory of available academic upgrading opportunities to which students can be directed. (Ongoing)
3. Strengthen existing partnerships with industry, government and other groups to ensure that the program graduates continue to meet current and future industry requirements.

- Renew the program Advisory Committee so that it is better able to provide on-going support to the program renewal process. (Sept./05 – June/06)
 - Continue to work with the Apprenticeship Branch to ensure that the electrical program maintains its accreditation status. (Ongoing)
4. Deliver a comprehensive and up-to-date certificate program that will meet the training needs of persons preparing for a variety of entry-level positions that require an electrical background.
- Establish a faculty curriculum committee to guide the ongoing curriculum renewal process. (Sept./05 – June/06)
 - Update all course outlines to adhere to the standardized course outline using the Course Outline Web. (Sept./05 – Dec./06)
 - Continue to work with the Apprenticeship Branch to ensure that the curriculum meets the standards outlined in the Apprenticeship Branch's Common Core Curriculum. (Ongoing)
5. Maintain the best possible environments to facilitate teaching and learning.
- Re-assess classroom and lab capacities and recommend adjustments to the enrolment quota if required. (Sept./05)
6. The anticipated amendments to the Electricians' Licence Act could restrict /eliminate the current work experience opportunity available to students enrolled in the program. As a result, it may require that the existing work experience component be augmented with other in-industry experiences for students.
- Explore the feasibility of offering students the opportunity to volunteer for Habitat for Humanity to do electrical work in their house building projects. (Jan./06 – June/06)
 - Increase the opportunities for students to experience "real-world" work situations through industry tours/field trips. (Ongoing)
7. Ensure that the facilities, staffing and other resources that are available to the program are sufficient to achieve its vision.
- Recruit an Electrical lab supervisor who is a certified journeyman in the Electrical trade. (July/05 – Sept./06)
 - Increase student access to the computer lab. (Oct./05)
 - Increase the variety of equipment in the Electrical lab. (Ongoing)
 - Provide faculty with sufficient professional development opportunities and resources to ensure that they maintain high teaching standards and remain current with the latest technology and the requirements of industry. (Ongoing)

Conclusions:

The Curriculum Validation – Program Renewal process has provided a benchmark against which the renewal of the Electrical program can be tracked and measured. The program renewal goals that were identified will ensure that the program is recognized as a leader in the provision of training that prepares graduates for a variety of employment opportunities in electrical construction and related industries. The program renewal plan will serve to guide the Chair with the assignment of resources to accomplish the renewal goals within a 5-year timeframe.

Appendix A - Environmental Scan and Key Findings

Environmental Scan

College Name Address Website Contact Person Telephone/Fax Numbers email address	Red River College Aaron Koodoo Chair, Construction Trades A1-45A, 2055 Notre Dame Ave. Winnipeg MB R3H 0J9 (204) 632-2350	Camosun College Ken Holland 4461 Interurban Road Victoria, BC V9E 2C1 (250) 370-3772	Holland College Ken Sheen Program Manager 40 Parkway Drive PO Box 235 Slemon Park, PE C0B 2A0 902-888-6416
Program Size Number of Faculty Number of Students	<ul style="list-style-type: none"> • Faculty: 4 • Students: 48 per year in two intakes of 24. 	<ul style="list-style-type: none"> • Faculty: 2 • Students: 70 per year in a continuous intake. 	
Credential Issued Certificate Diploma Degree Applied Degree Other	<ul style="list-style-type: none"> • Certificate program 	<ul style="list-style-type: none"> • Certificate program 	<ul style="list-style-type: none"> • 2 yr. Diploma program for Industrial Electrical Technician (IET) • 1 yr. Certificate program for Electrical Construction Wiring (ECW)
Program features Length Division of Academic Year Entrance requirements Selection Process Graduation Process Tuition	<ul style="list-style-type: none"> • Length: 38 weeks • September and January entry dates. • Entrance requirements: Manitoba Senior 4 or individuals applying as a special admission applicant must have successfully completed a minimum of one Science 20S/20G credit and one credit of Applied Math 30S, Pre-Calculus Math 30S, or Consumer Math 40S. English 30S is recommended. • Tuition: \$2,421.00. Books and Supplies: \$835.00. 	<ul style="list-style-type: none"> • Length: 25 weeks • Continuous intake • Entrance requirements: Grade 12 with Math 11 and Eng 12. • Tuition is \$1874.25 	<ul style="list-style-type: none"> • Length: IET Diploma – 2 years and ECW Certificate – 1 year. • Intake in Sept. only. • Entrance requirements: Grade 12 or equivalent. Preference will be given to applicants with academic English, math, and physics. • Tuition for IET students is \$3450 for the first year and \$3250 for the second. Total for other program cost is \$950 for the first year and \$250 for the second. • Tuition for ECW students is \$3420 with \$950 additional costs for books, uniform/shoes and equip/tools.

<p>New Brunswick Community College Gerald Ingersoll Chief Learning Officer/VP Academic 506-467-1366</p>	<p>SIAST Palliser Campus Moose Jaw SK (866) 467-4278</p>	<p>Assiniboine Community College Instructor - Terry Emery 1430 Victoria Avenue East Brandon, Manitoba R7A 2A9 Toll-Free: 800-862-6307 Ext. 7224</p>
<ul style="list-style-type: none"> •Faculty: 4 at 2 locations •Students: 36 per year 		
<ul style="list-style-type: none"> •Certificate program 	<ul style="list-style-type: none"> • Certificate program 	<ul style="list-style-type: none"> • Certificate program
<ul style="list-style-type: none"> •Length: 40 weeks •Intake Sept. only. •Entrance requirements: High school diploma/Adult high school diploma or GED •Tuition fees are \$2500.00 	<ul style="list-style-type: none"> •Length: 24 weeks •Start date(s): August and January •Entrance requirements: Grade 11 with Math 20 •Special admission: Application requires testing for Math and English using ACCUPLACER as the placement assessment tool. •Tuition: \$2005 Books and Supplies: \$563 	<ul style="list-style-type: none"> • Length: 10 months • Start date: September • Entrance requirements: Complete Manitoba Senior 4 (Grade 12) including: Pre-Calculus, Applied or Consumer Mathematics 40S or equivalent OR Equivalent standing in an adult education program. • Special Admissions: Applicants who do not meet these admission requirements may apply for special admissions consideration. Academic upgrading may be required prior to admission. Applicants who have extensive industry-related experience, or who have taken high school vocational programs, may be eligible for credits in this program.

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Curriculum Model and/or features Learning Outcomes vs. Instructional Objectives vs. Competency-Based Experiential Component Unique delivery features (such as use of laptops, distribute learning practices, instructional technology)	<ul style="list-style-type: none"> • Learning Outcomes developed at the program level. • Approximately two-thirds of the program hours are spent on theoretical courses designed to develop knowledge of industry related rules, regulations, and specifications. The balance of the time is spent on practical projects in the College's workshop which has been set up to simulate the industry work environment. • Two-week in-industry component provides students with practical on-the-job experience. 	<ul style="list-style-type: none"> • Self-paced progression • Learning Outcomes Based with a Program Learning Outcomes model identified. • Program is organized into 36 modules listed under the major categories of Common Core, Occupational Core and Electrical Specialty. • Provincial Apprenticeship training modules are used, employability skills modules, and hands-on learning. • No practicum component • Employability skills are captured at the Program Learning Outcomes level 	<ul style="list-style-type: none"> • ECW profile (curriculum) is based on the latest edition of the National Occupational Analysis for Construction Electrician.
Curriculum Content Course titles Course hours Syllabus and/or course outlines available	<ul style="list-style-type: none"> • Fundamentals of Electricity - 128 hrs. • Electrical Laboratory - 40 hrs. • Residential Code - 160 hrs. • Residential Wiring - 160 hrs. • In-Industry - 80 hrs. 	Level 1: Common Core <ul style="list-style-type: none"> • Describe effective learning techniques • Describe safe work practices • Solve mathematical problems • Apply trade science concepts 	Industrial Electrical Technician (IET) <ul style="list-style-type: none"> • Safety and Workshop Processes • Technical Math • Computer Literacy • Physics • Direct Current Fundamentals

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		<ul style="list-style-type: none"> • PLAR is available for Practicum courses. • Tuition Fees: \$1,517.08 Misc. fees: \$743.20 (does not include books).
<ul style="list-style-type: none"> • Based on the NB Apprenticeship and professional certification system. • Learning Outcomes Model • Students write 'block 1' of apprenticeship at end of program 	<ul style="list-style-type: none"> • As part of the Industry Communications course students practice fundamental employability skills related to oral and written communications. They also practice teamwork employability skills related to working effectively with others, and they learn personal employability skills and the effect of attitudes and behaviours on a successful job search. 	<ul style="list-style-type: none"> • The program provides training in a number of areas within the construction electrician trade. Each area contains practical and theoretical elements.
<ul style="list-style-type: none"> • Alternating Current Circuits • Blueprint Reading • Canadian Electrical Code Interpretation • Communication • DC Theory • Direct Current Circuits 	<ul style="list-style-type: none"> • DC Theory • Cells and Batteries • Basic Circuits • Conductors and Branch Circuits • Extra Low Voltage Wiring • Industry Communications 	<ul style="list-style-type: none"> • AC Machines • AC Theory Devices & Circuits • Blueprint Reading • Commercial Electrical Code • Commercial Wiring • Communications

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Curriculum Content Course titles Course hours Syllabus and/or course outlines available	<ul style="list-style-type: none"> • Alternating Current Fundamentals & 3 Phase Systems – 146 hrs. • Electrical Laboratory A.C. - 44 hrs. • Commercial Code - 118 hrs. • Commercial Wiring - 126 hrs. • Electric Motor Repair Theory - 40 hrs. • Solid State - 20 hrs. • Programmable Logic Controllers - 60 hrs. • Electrical P/E Math - 106 hrs. • WHMIS Workshop – 4 hrs. • General Safety Training - 4 hrs. • Communications – 20 hrs. • Elective: Accreditation for Level 1 - 0 hrs. 	<ul style="list-style-type: none"> • Process technical information • Use basic measuring, layout and hand tools • Use power tools • Lift loads • Erect ladders and scaffolds • Use oxyacetylene unit • Assemble basic electrical circuits • Use common fastenings and fittings • Describe industrial organization Level 2: Electrical - Occupational Core • Describe safe work practices for electrical trade • Describe the electrical trade • Interpret electrical schematics and diagrams • Apply the principles of electromagnetism • Apply electrical energy and power concepts • Use basic electrical measuring instruments 	<ul style="list-style-type: none"> • Alternating Current Fundamentals • Voltage and Power Analysis • Transformers/Three Phase Theory • Building Codes • Blueprint Reading • Wiring Methods • Lighting and Control • Over-Current Protection • Electrical Rotating Equipment and Control I • Electrical Rotating Equipment and Control II • Written and Oral Communications • Computer Aided Design and Drafting (CAD) • Electronic Devices • Digital Techniques • HVAC control • Variable Speed Drives • Programmable Logic Controllers • Hydraulic Circuits and Control • Pneumatic Control Systems • Premise Cabling – Copper • Premise Cabling - Fibre Optic • Alarm Systems • Servo and Process Control Fundamentals • Welding

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<ul style="list-style-type: none"> • Electric Heating • General First Aid and CPR • Mathematics • Occupational Health and Safety • Programmable Logic Controllers • Raceways and Cables • Residential Wiring • Safety Measures in Construction • Single-Phase Motors and Controllers • Single-Phase Service Entrance • Tools and Fasteners • Transformers • WHMIS • Work Practicum 	<ul style="list-style-type: none"> • Basic Computer Operation • Electrician Trade Mathematics • Residential Services • Residential Wiring Plans • Propane Safety • Electrical Machine Shop • Power Actuated Tools • Wiring Methods 	<ul style="list-style-type: none"> • DC Theory Devices & Circuits • Practicum 1 (two weeks) • Practicum 2 (three weeks) • Residential & Premise Wiring • Residential Electrical Code • Solid State Theory and Diodes • Three-phase Theory

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		<ul style="list-style-type: none"> • Analyze series, parallel and combination circuits • Select conductors for specific • Use electrical hand tools • Install selected circuit devices • Connect AC single phase motors and controls <p>Level 3: Electrical Specialty</p> <ul style="list-style-type: none"> • Apply safe and acceptable work habits • Apply the Canadian Electrical Code • Use specialized hand tools • Use specialized power tools • Identify cables, fixtures and fittings • Install cables, fixtures and fittings • Describe DC principles of electricity • Analyze three wire circuits • Connect and operate single phase transformers • Connect and operate AC motor controls • Connect and operate lighting circuits • Industrial power electronics 	<p>Electrical Construction Wiring (ECW)</p> <ul style="list-style-type: none"> • Safety and Workshop Processes • Trade Math • Computer Literacy • Direct Current Fundamentals • Alternating Current Fundamentals • Voltage and Power Analysis • Transformers • Three Phase Theory • Building Codes • Blueprint Reading • Wiring Methods I • Wiring Methods II • Lighting and Control • Electrical Rotating Equipment and Control • Written and Oral Communications • HVAC Control (Residential) • Premise Cabling – Copper • Alarm Systems • Welding

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Student Assessment Content theory assessment Skills assessment Assessment practices for any experiential components (practicum, clinical, work experience, coop education)	<ul style="list-style-type: none"> • The Canadian Adult Achievement Test is administered to all enrollees to assess academic readiness for the program. If academic skills are not at the appropriate level, student will be directed to upgrade skills prior to the commencement of the program. 	<ul style="list-style-type: none"> • PLAR is practiced 	
Current & Coming Challenges Content including employability skills, inclusiveness, global orientation Delivery of the program Assessment practices Instructional technology	<ul style="list-style-type: none"> • The program will be required to meet the standards outlined in the Manitoba Apprenticeship Branch's Common Core Curriculum. 	<ul style="list-style-type: none"> • Budgets are always decreasing, but industry wants more coming from the program. • Recruitment of qualified instructors is difficult when they can earn more out in - industry. Retirements of instructors are compounding this issue. 	

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<ul style="list-style-type: none"> • PLAR is practiced 		<ul style="list-style-type: none"> • To graduate with a Construction Electrician certificate, students must successfully complete 63 academic credits and 5 practical credits. • Practical credits can be attained as follows: <ul style="list-style-type: none"> - Practicum - Work Experience (available through Prior Learning Assessment and Recognition only) - Student-Initiated Project
<ul style="list-style-type: none"> • As there is a very high application rate (over 300 for 18 seats), there is a need to get the other 282 interested in other programs at NBCC. • The level of Math that students arrive with is varied. As a result, program has included an electrical specific Math course as part of the program. 		

College Name Address Website Contact Person Telephone/Fax Numbers email address	Red River College Aaron Koodoo Chair, Construction Trades A1-45A, 2055 Notre Dame Ave. Winnipeg MB R3H 0J9 (204) 632-2350	Camosun College Ken Holland 4461 Interurban Road Victoria, BC V9E 2C1 (250) 370-3772	Holland College Ken Sheen Program Manager 40 Parkway Drive PO Box 235 Slemon Park, PE C0B 2A0 902-888-6416
Curriculum Renewal Process frequency	<ul style="list-style-type: none"> • On-going review of curriculum by an Advisory Committee to keep the program up-to-date with industry. Members include industry, employers, instructors and current students. • Accreditation Review by Apprenticeship Branch occurs every 3 years. • Curriculum renewal is undertaken on an as-needed basis and a possible formal Program Renewal occurring approximately every 5 years. 	<ul style="list-style-type: none"> • Province-wide annually via Apprenticeship Branch. 	
Partnerships Post-Secondary High School Business and Industry Government Union International	<ul style="list-style-type: none"> • Graduates of this program may challenge the Apprenticeship Branch Level 1 and 2 entrance tests and, if successful, may be granted one or two levels of in-school training toward the Electrical Construction Apprenticeship. 	<ul style="list-style-type: none"> • Graduates are eligible for Level 1 Apprenticeship provided they obtain employment with a journeyperson • Currently negotiating with some of the high schools to introduce up to 4 of the courses within the program during high school years. Students would finish off Level 1 In-school training upon graduation from Grade 12 and it is anticipated they would spend 4 weeks plus at the college. 	

New Brunswick Community College Gerald Ingersoll Chief Learning Officer/VP Academic 506-467-1366	SIAST Palliser Campus Moose Jaw SK (866) 467-4278	Assiniboine Community College Instructor - Terry Emery 1430 Victoria Avenue East Brandon, Manitoba R7A 2A9 Toll-Free: 800-862-6307 Ext. 7224
<ul style="list-style-type: none"> • Every 3 to 4 years, unless there are changes at the national level prior to that timeframe. 		<ul style="list-style-type: none"> • In accordance with college policy, the Construction Electrician program works with an Advisory Committee to keep the program up-to-date with industry. Members include industry, employers, instructors and current students.
<ul style="list-style-type: none"> • Apprenticeship Branch 	<ul style="list-style-type: none"> • The Saskatchewan Apprenticeship and Trade Certification Branch grant the first of four levels of training to graduates who enter the Electrician Apprenticeship Program. 	<ul style="list-style-type: none"> • Graduates who find employment and enter into apprenticeship agreements with their employers can apply course credits towards the technical training requirements for apprenticeship training as a Construction and/or Industrial Electrician.

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		<ul style="list-style-type: none"> • Electrical program offered at the local penitentiary. 	
Other	<ul style="list-style-type: none"> • In addition to developing the required knowledge and skills for entry level employment in the electrical construction industry the program is designed to prepare graduates for employment with public utilities, motor repair facilities, and manufacturers and distributors of electrical equipment. 	<ul style="list-style-type: none"> • Continuous entry and exit system, with 25 weeks of programming prescribed. Students who complete the program in less than 25 weeks will have full weeks of tuition refunded. Extra time for legitimate reasons is granted with extra tuition charged. • Unions will hire only graduates from the program 	
Comments			

New Brunswick Community College Gerald Ingersoll Chief Learning Officer/VP Academic 506-467-1366	SIAST Palliser Campus Moose Jaw SK (866) 467-4278	Assiniboine Community College Instructor - Terry Emery 1430 Victoria Avenue East Brandon, Manitoba R7A 2A9 Toll-Free: 800-862-6307 Ext. 7224
<ul style="list-style-type: none"> • Use simulation software (CATTRAX-E) to teach some of the curriculum. Also use test tracking software to allow a self-paced component. 		<ul style="list-style-type: none"> • Graduates of this program find employment opportunities with electrical contractors, construction companies, maintenance departments of industrial companies, public utilities and wholesale supply houses. Many graduates choose at some time in their careers to start their own business.
<ul style="list-style-type: none"> • Currently have an MOU with the Construction Association of New Brunswick and the unions regarding the number of students trained annually. There has been a bit more of an upswing in the need for trained trades people in recent years. 		

College Name Address Website Contact Person Telephone/Fax Numbers email address	University College of the Cariboo Peter Poeschek (Chair) Box 3010 Kamloops, BC V2C 5N3 (250) 828-5113 peoschek@cariboo.bc.ca	Selkirk College Al Walker, Program Coordinator Nelson, BC V1N 3J1 (250) 354-3240 OR 352-6601 Ext 240	College of the North Atlantic Box 670 Bonavista, NL AOC 1B0 Tel:(709) 468-2610/ Fax:(709) 468-2004
Program Size Number of Faculty Number of Students	<ul style="list-style-type: none"> •Faculty: 1 F/T and 1 Educational Assistant •Students: 16 per intake 		<ul style="list-style-type: none"> •Faculty: 2 (including "related" instructor) • Students: Capacity 16
Credential Issued Certificate Diploma Degree Applied Degree Other	<ul style="list-style-type: none"> •Certificate program 	<ul style="list-style-type: none"> • Certificate program 	<ul style="list-style-type: none"> •Certificate program
Program features Length Division of Academic Year Entrance requirements Selection Process Graduation Process Tuition	<ul style="list-style-type: none"> •Length: 6-months •February and August Intake. •Entrance requirements: Grade 12 diploma or equivalent placement on the ACCUPLACER Entry Assessment Test for English and Math at a 060 level. •Tuition Fees are \$2350.00 Texts and supplies cost \$500 and \$16.50/month covers lab/studio fee. 	<ul style="list-style-type: none"> •Length: 9-months • Intake in Sept. and Jan. • Entrance requirements: High School graduation or equivalent, Principles of Math 11 or equivalent with a "C" grade or better, all applicants must complete pre-admission computerized placement testing in math and reading once they have submitted their application • Tuition: \$2720.00 plus books and other fees. Total \$3602.00 	<ul style="list-style-type: none"> •Length: 10-months •Continuous Intake •Entrance requirements: High school graduation or Grade XI Certificate or Adult Basic Education graduation certificate.

Fanshawe College Room D2001 1460 Oxford Street East P.O. Box 7005 London, Ontario N5Y 5R6 Tel: (519) 452-4414	Winnipeg Technical College Doug McKay 130 Henlow Bay Winnipeg, MB R3Y 1G4 204-989-6550 www.wtc.mb.ca
	<ul style="list-style-type: none"> • Faculty: 1 • Students: 19
<ul style="list-style-type: none"> • Certificate program 	<ul style="list-style-type: none"> • Certificate program
<ul style="list-style-type: none"> • Length: 1 year • Entrance requirements: OSSD with courses from the College (C), University (U), University/College (U/C), or Open (O) stream or Academic and Career Entrance Certificate (ACE) or BTSD-Level 4 certificate or Pre-Technology Ontario College Certificate or Ontario High School Equivalency Certificate (GED) or Mature Applicant with appropriate preparation. • Tuition for level 1 & 2 is \$2460.32 plus books & supplies \$1335.00. 	<ul style="list-style-type: none"> • Length: 10 months • Continuous Intake any month from September to July based on seat availability. • Full-time students take 10 months to complete this program. Half-time secondary students may complete the program in two school years. The actual time required to complete the program will depend on individual rates of progress. • Entrance Requirements: Senior 2 Consumer or Applied Math and Senior 2 English Language Arts. Applicants not meeting entrance requirements must write the Skills Assessment and achieve an equivalent level in mathematics and reading comprehension. • Tuition: \$3200 with \$320/month cost for any course-extension.

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Curriculum Model and/or features Learning Outcomes vs. Instructional Objectives vs. Competency-Based Experiential Component Unique delivery features (such as use of laptops, distribute learning practices, instructional technology)	<ul style="list-style-type: none"> •Provincial modules •No guaranteed practicum. 	<ul style="list-style-type: none"> •Curriculum is designed to prepare learners for entry level positions as apprentice electricians 	<ul style="list-style-type: none"> •Learning Outcomes are used but called Objectives. •Use of Virtual Reality to train students in some of the practical areas (e.g. testing a circuit). •Also have a 'state-of-the-art' lab.
Curriculum Content Course titles Course hours Syllabus and/or course outlines available	<ul style="list-style-type: none"> •Care and use of hand tools •Electrical meters •Installation and maintenance of electrical equipment •Electrical theory and calculations •Canadian Electrical Code. •Students engage in extensive practical exercises to develop their job readiness skills, such as motor control, cable tray, conduit and residential wiring. 	<ul style="list-style-type: none"> •Trade Math •Electrical Shop 1 Electrical Installations and Wiring Methods •Electrical Shop II Electrical Installations and Wiring Methods •Communication and Learning Skills •Electrical Fundamentals •DC Circuit Analysis •Electromagnetism and Applications •Meters and Test Equipment – Part I •Prints and Drawings 	Entry Level <ul style="list-style-type: none"> •WHMIS 6 hrs. •First Aid 16 hrs. •Rigging 30 hrs. •Hand Tools 15 hrs. •Power Tools 30 hrs •Fasteners 15 hrs. •DC Theory 30 hrs. •Series and Parallel Circuits 45 hrs •Codes 30 hrs. •Voltage Drop & Power Loss 30 hrs. •Single Phase Theory 60 hrs. •Three Phase Theory 30 hrs.

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	<ul style="list-style-type: none"> • Learning Outcomes Based • Half-time secondary students may be enrolled with full -time students. • Training may be interrupted and resumed with no loss of credits at any time.
<ul style="list-style-type: none"> • Digital Electronics I • Electrical Theory I • Prints & Installation • Industrial Communication • Digital Electronics II • Electrical Theory II • Network Cabling • Fluid Power & Controls • Installation Practices • Safety & Electrical Code 	<ul style="list-style-type: none"> • AC Machines • Three-Phase Power • Residential Wiring • Canadian Electrical Code • AC Motor Controls • Intermediate Motor Controls • Construction Electrical • Applied Electrical Applications (Four week work practicum) • DC Circuits • AC Circuits

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		<ul style="list-style-type: none"> • AC Motor Controls and Industrial Wiring – Part I • Canadian Electrical Code and Wiring – Part 1 • Industrial Power Electronics – Part I 	<ul style="list-style-type: none"> • Blueprint (Generic) 30 hrs. • Blueprint 2 30 hrs. • Conduit, Tubing and Fittings 30 hrs. • Conductors and Cables 45 hrs. • Fundamental Wiring 45 hrs. • Protective Devices 30 hrs. • Transformers 30 hrs. • Single Phase Service Entrance 30 hrs. • Three Phase Service Entrance 30 hrs. • Distribution Equipment 30 hrs. • Fire Alarms 30 hrs. • Electric Heating Systems & Controls 30 hrs. • Safety Practices 30 hrs. • Raceway, Wireways and Busways 30 hrs. • Single Phase Motors 30 hrs. • Troubleshooting Techniques 6 hrs. • Intercom Systems 15 hrs. • Security Systems 15 hrs. • Workplace Communications 45 hrs. • Customer Service 30 hrs.

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			<ul style="list-style-type: none"> • Quality Assurance/Quality Control 30 hrs. • Introduction to Computers 30 hrs. • Work Place Skills 30 hrs. • Job Search Techniques 15 hrs. • Entrepreneurial Awareness 15 hrs • Workplace Exposure 60 hrs.
Student Assessment Content theory assessment Skills assessment Assessment practices for any experiential components (practicum, clinical, work experience, coop education)			<ul style="list-style-type: none"> • Theory is assessed via written tests and exams; practical is assessed via demonstration of skill.

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<ul style="list-style-type: none"> • Advanced Standing: Credit for any course in the program will be given to students who can demonstrate that they have the required skills to meet the objectives of the course. 	<ul style="list-style-type: none"> • Theory is assessed via tests and skills are assessed via demonstration. Skills are also assessed during work practicum.

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Current & Coming Challenges Content including employability skills, inclusiveness, global orientation Delivery of the program Assessment practices Instructional technology	<ul style="list-style-type: none"> •Skills in reading and Math are not necessarily the same among high school applicants and a Grade 12 diploma is no guarantee that an applicant actually has the required skills. 		<ul style="list-style-type: none"> •A Grade XII certificate does not necessarily mean a student has appropriate Math and English skills so the entrance requirements seem low. •A graduate must gain employment with a journey person before he/she can register as an Apprentice and work in the field. This creates a significant challenge for graduates to gain advanced level training.
Curriculum Renewal Process frequency	<ul style="list-style-type: none"> •Province-wide annually via Apprenticeship Branch. 		<ul style="list-style-type: none"> •Program is accredited by the Apprenticeship Board. New programs are accredited for 3 years. Previously accredited programs are accredited for 5 years.
Partnerships Post-Secondary High School Business and Industry Government Union International	<ul style="list-style-type: none"> •Graduates are eligible for Level 1 Apprenticeship provided they obtain employment with a journey person. 		<ul style="list-style-type: none"> •The department is looking to work more closely with the high schools to ensure that applicants with a high school diploma have the required Math and English skills for the program.

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	<ul style="list-style-type: none"> •The program is an accredited training program with Manitoba Education and Training - Apprenticeship Branch. Students who complete program with a minimum 70% in both theory and practical, and gain employment and register as an apprentice within 2 years of graduating from the program will receive credit for Apprenticeship Level 1 in-school training.

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Other	<ul style="list-style-type: none"> •Current students get some volunteer experience working on Habitat for Humanity projects under the supervision of a journey person. 	<ul style="list-style-type: none"> •Employers may desire a higher level of Math as part of hiring requirement. 	<ul style="list-style-type: none"> •The 60 hour Workplace Exposure component of the program is job shadowing. Job shadowing is used instead of a practicum because legislation prohibits anyone but registered apprentices from working in the field.
Comments	<ul style="list-style-type: none"> •Also have F/T evening program with May and October intakes •Will be changing name of institution to Thompson Rivers University. 		<ul style="list-style-type: none"> •The introduction of virtual reality has become necessary since the introduction of legislation that prohibits anyone other than registered apprentices from working legally in the electrical trade.

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<ul style="list-style-type: none"> • Upon completion of the program students will be able to seek employment as Fire Alarm Technicians or apprentices in Electrical Construction and Maintenance, Industrial Electrician, Network Cabling or other related mechanical trades. 	<ul style="list-style-type: none"> • Applicants who do not meet the entrance requirements for enrollment may still be considered based on a documented plan approved by the College that identifies the required skills and knowledge that will support student learning to meet these entrance requirements. The plan will include any additional costs that may be incurred by students. • Students complete the program on a self-paced basis. An early completion reward is refunded to student if successfully completed prior to 10 month timeframe.
	<ul style="list-style-type: none"> • Graduates of this program usually find employment as apprentice electricians with electrical contractors or in maintenance depts. of large buildings & major companies. Graduates have also obtained employment with electrical wholesale companies, electrical manufacturers, power distribution & cable companies, & security & fire alarm companies.

Appendix B – Industry Occupational Analysis (DACUM) Chart

DEMONSTRATE TEAMWORK SKILLS F	Demonstrate initiative F1	Demonstrate enthusiasm F2	Adjust work plan according to changes in situation F3	Demonstrate a respect for the work of others F4	Respond and adjust to feedback F5	Discuss and apply learning acquired by others F6	Coordinate work with other trades F7	
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	
DEMONSTRATE COMMUNICATION SKILLS G	Recall and follow instructions G1	Demonstrate active listening skills G2	Ask questions for clarification G3	Write legibly G4	Scan / Review for meaningful content G5	Demonstrate correct grammar G6	Use language appropriate to audience G7	Interpret non-verbal communication G8
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
	Use trade terminology G9	Describe employment standards G10	Interpret trade-related resources G11	Complete industry-related forms G12	Interpret invoices and purchase orders G13			
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4			
USE MATH SKILLS H	Apply basic math skills H1	Practice mental math H2	Use a calculator H3	Interpret and use ratios H4	Apply formulas H5	Apply algebraic and trigonometric functions H6	Apply binary math H7	Identify costs H8
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
DEMONSTRATE PROFESSIONALISM I	Identify and follow reporting structure I1	Practice punctual behaviour I2	Demonstrate ethical behaviour I3	Practice manners I4	Demonstrate an interest in trade I5	Practice organizational skills I6	Present a positive image I7	Identify and work within limitations I8
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
	Apply independent work habits I9	Demonstrate pride in quality of work I10	Demonstrate problem solving skills I11	Maintain professional standing I12	Demonstrate a commitment to lifelong learning I13			
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4			
USE TECHNOLOGY J	Use office technology J1	Use communication technology J2	Demonstrate keyboarding skills J3	Manage computer files J4	Use industry software J5	Transfer skills of familiar applications to new software J6	Use programmable logic controls J7	
	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	

Appendix C – Graduate Skills and Abilities Chart

ELECTRICAL DACUM Graduate Skills and Abilities Chart

Facilitated by Bob Richard, Gene Semchych and Ann Pedersen
Date: January 27th, February 3rd and March 23, 2005

DACUM Skill Rating Scale:

- 1 Can perform some parts of this skill satisfactorily but requires assistance and/or supervision to perform the entire skill.
- 2 Can perform this skill satisfactorily but requires periodic assistance and/or supervision.
- 3 Can perform this skill competently without assistance or supervision.
- 4 Can perform this skill competently without assistance, with more than acceptable quality, and with initiative/adaptability to unique situations.

Indicates skill rating.

DACUM Committee Skill deleted.

Skill or Competency added by Faculty or DACUM wording changed.

Grey shaded Box = General Areas of Competency (GAC)

Unshaded Box = Specific skill within GAC

Capitalized text in CWLOs = General Area of Competency (GAC)

Normal text in CWLOs = Specific skills within GAC

Industry DACUM	Faculty Expectations	College-Wide Learning Outcomes (CWLOs)								
DEMONSTRATE SAFE WORK PRACTICES A	DEMONSTRATE SAFE WORK PRACTICES A									
Review / interpret safety regulations A1 <table border="1" style="width: 100%; text-align: center;"><tr><td style="background-color: yellow;">1</td><td>2</td><td>3</td><td>4</td></tr></table>	1	2	3	4	Review / interpret Manitoba Safety/Electrical regulations A1 <table border="1" style="width: 100%; text-align: center;"><tr><td style="background-color: yellow;">1</td><td>2</td><td>3</td><td>4</td></tr></table>	1	2	3	4	I1 - be aware of personal and group health and safety practices and procedures, and act in accordance with these (All) K3 - work to agreed quality standards and specifications <input type="checkbox"/>
1	2	3	4							
1	2	3	4							
Apply Workplace, Safety and Health standards A2 <table border="1" style="width: 100%; text-align: center;"><tr><td style="background-color: yellow;">1</td><td>2</td><td>3</td><td>4</td></tr></table>	1	2	3	4	Apply Workplace, Safety and Health standards A2 <table border="1" style="width: 100%; text-align: center;"><tr><td style="background-color: yellow;">1</td><td>2</td><td>3</td><td>4</td></tr></table>	1	2	3	4	E4 - take care of your personal health
1	2	3	4							
1	2	3	4							
Apply WHMIS A3 <table border="1" style="width: 100%; text-align: center;"><tr><td>1</td><td style="background-color: yellow;">2</td><td>3</td><td>4</td></tr></table>	1	2	3	4	Apply WHMIS A3 <table border="1" style="width: 100%; text-align: center;"><tr><td style="background-color: yellow;">1</td><td>2</td><td>3</td><td>4</td></tr></table>	1	2	3	4	E4 - take care of your personal health
1	2	3	4							
1	2	3	4							
Dress appropriately A4 <table border="1" style="width: 100%; text-align: center;"><tr><td>1</td><td>2</td><td style="background-color: yellow;">3</td><td>4</td></tr></table>	1	2	3	4	Dress appropriately A4 <table border="1" style="width: 100%; text-align: center;"><tr><td style="background-color: yellow;">1</td><td>2</td><td>3</td><td>4</td></tr></table>	1	2	3	4	E4 - take care of your personal health
1	2	3	4							
1	2	3	4							
Use and maintain personal protective equipment A5 <table border="1" style="width: 100%; text-align: center;"><tr><td style="background-color: yellow;">1</td><td>2</td><td>3</td><td>4</td></tr></table>	1	2	3	4	Use and store personal protective equipment A5 <table border="1" style="width: 100%; text-align: center;"><tr><td style="background-color: yellow;">1</td><td>2</td><td>3</td><td>4</td></tr></table>	1	2	3	4	E4 - take care of your personal health
1	2	3	4							
1	2	3	4							

Identify safety hazards A6 1 2 3 4	Identify safety hazards A6 1 2 3 4	F3 - assess, weigh and manage risk D1 - assess situations and identify problems
Report safety hazards A7 1 2 3 4	Report safety hazards A7 1 2 3 4	
Observe safe work practices of others A8 1 2 3 4	Observe safe work practices of others A8 1 2 3 4	E4 - take care of your personal health F3 - assess, weigh and manage risk H4 - identify and access learning sources and opportunities
Test circuits A9 1 2 3 4	Maintain a safe work environment A9 1 2 3 4	F3 - assess, weigh and manage risk
Clean work environment A10 1 2 3 4	Clean work environment A10 1 2 3 4	

APPLY THEORIES OF TRADE BA	D6 - readily use science, technology and mathematics as ways to think, gain and share knowledge, solve problems and make decisions A5 - use relevant scientific, technological and mathematical knowledge and skills to explain or clarify ideas
Apply D.C. theory BA1 1 2 3 4	B2 - access, analyze and apply knowledge and skills from various disciplines (e.g. the arts, languages, science, technology, mathematics, social sciences, and the humanities)
Apply A.C. theory BA2 1 2 3 4	B2 - access, analyze and apply knowledge and skills from various disciplines (e.g. the arts, languages, science, technology, mathematics, social sciences, and the humanities)
Apply 3 phase transformers BA3 1 2 3 4	B2 - access, analyze and apply knowledge and skills from various disciplines (e.g. the arts, languages, science, technology, mathematics, social sciences, and the humanities)
Apply electronics BA4 1 2 3 4	B2 - access, analyze and apply knowledge and skills from various disciplines (e.g. the arts, languages, science, technology, mathematics, social sciences, and the humanities)

PLAN INSTALLATION B	PLAN INSTALLATION B	K1 - plan, design or carry out a project or task from start to finish with well-defined objectives and outcomes (All)
Apply theories of trade B1 1 2 3 4	Apply theories of trade B1(Now Heading BA) 1 2 3 4	
Interpret trade-related codes B2 1 2 3 4	Interpret trade-related codes B1 1 2 3 4	A1 - read and understand information presented in a variety of forms (e.g. words, graphs, charts, diagrams) B1 - locate, gather and organize information using appropriate technology and information systems
Interpret blueprints B3 1 2 3 4	Interpret blueprints B2 1 2 3 4	B1 - locate, gather and organize information using appropriate technology and information systems C1 - decide what needs to be measured or calculated
Interpret schematics B4 1 2 3 4	Interpret schematics B3 1 2 3 4	C1 - decide what needs to be measured or calculated
Manage and minimize material waste B5 1 2 3 4	Manage and minimize material waste B5 1 2 3 4	
Select materials B6 1 2 3 4	Select materials B6 1 2 3 4	
	Perform take-off B4 1 2 3 4	B1 - locate, gather and organize information using appropriate technology and information systems C1 - decide what needs to be measured or calculated C3 - make estimates and verify calculations
	Describe electrical systems B5 1 2 3 4	

USE TOOLS C	USE TOOLS C	K4 - select and use appropriate tools and technology for a task or project (All)
Use basic hand tools C1	Use basic hand tools (e.g. screwdrivers, side cutters, hammers) C1	
1 2 3 4	1 2 3 4	
Use power tools C2	Use power tools C2	
1 2 3 4	1 2 3 4	
Use digital and analog multi-meters C3	Use digital and analog multi-meters and clip-on ammeters C3	
1 2 3 4	1 2 3 4	
Use knockout cutters C4	Use knockout cutters C4	
1 2 3 4	1 2 3 4	
Use benders (hand and hydraulic) C5	Use benders (hand and hydraulic) C5	
1 2 3 4	1 2 3 4	
Use cutting tools C6	Use cutting tools C6	
1 2 3 4	1 2 3 4	
Use cable cutters C7	Use cable cutters C7	
1 2 3 4	1 2 3 4	
Describe powder actuated tools C8	Describe powder actuated tools C8	
1 2 3 4	1 2 3 4	
Use compression tools C9	Use compression tools C9	
1 2 3 4	1 2 3 4	

Use reamers, cutters and threaders C10 1 2 3 4	Use reamers, cutters and threaders C10 1 2 3 4	
Use cable benders C11 1 2 3 4	Describe cable benders C11 1 2 3 4	
Use torque wrenches C12 1 2 3 4	Describe torque wrenches C12 1 2 3 4	
Use testing equipment C13 1 2 3 4	Use testing equipment C13 1 2 3 4	B2 - access, analyze and apply knowledge and skills from various disciplines (e.g. the arts, languages, science, technology, mathematics, social sciences, and the humanities)
Use pyrotenyc tools C14 1 2 3 4	Use pyrotenyc tools C14 1 2 3 4	
INSTALL ELECTRICAL SYSTEMS D	INSTALL ELECTRICAL SYSTEMS D	
Reconcile delivery to invoice D1 1 2 3 4	Reconcile delivery to invoice D1 1 2 3 4	
Manage materials D2 1 2 3 4	Manage materials D2 1 2 3 4	
Apply electrical code D3 1 2 3 4	Apply trade-related codes D3 1 2 3 4	
Select tool for task D4 1 2 3 4	Select tool for task D4 1 2 3 4	
Install equipment D5 1 2 3 4	Install equipment D5 1 2 3 4	

Install raceway system D6 1 2 3 4	Install raceway system D6 1 2 3 4	
Pull wire D7 1 2 3 4	Pull wire D7 1 2 3 4	
Install cable D8 1 2 3 4	Install cable installations D7 1 2 3 4	
Install fire stopping D9 1 2 3 4	Describe fire stopping D8 1 2 3 4	
Patch holes D10 1 2 3 4	Patch holes D10 1 2 3 4	
	Install logic and control systems D9 1 2 3 4	
Terminate and splice wire and cable D11 1 2 3 4	Terminate and splice wire and cable D10 1 2 3 4	
Install fixtures and devices D12 1 2 3 4	Install fixtures and devices D11 1 2 3 4	
Commission circuits D13 1 2 3 4	Describe commissioning D12 1 2 3 4	K2 - develop a plan, seek feedback, test, revise and implement
Apply principles / processes for energizing circuits D14 1 2 3 4	Apply principles / processes for energizing circuits D13 1 2 3 4	
	Install structure cabling D14 1 2 3 4	

Re-sort and re-stock materials D15	Re-sort and re-stock materials D15	
1 2 3 4	1 2 3 4	
MAINTAIN ELECTRICAL SYSTEMS E	MAINTAIN ELECTRICAL SYSTEMS E	
Clean systems E1	Clean systems E1	
1 2 3 4	1 2 3 4	
Record data E2	Record data E2	C2 - observe and record data using appropriate methods, tools and technology
1 2 3 4	1 2 3 4	
Interpret graphs and charts E3	Interpret graphs and charts E3	
1 2 3 4	1 2 3 4	
Troubleshoot systems E4	Troubleshoot systems E4	D1 - assess situations and identify problems D7 - evaluate solutions to make recommendations or decisions
1 2 3 4	1 2 3 4	
Identify problems E5	Identify problems E5	D1 - assess situations and identify problems D5 - be creative and innovative in exploring possible solutions
1 2 3 4	1 2 3 4	
Conduct a visual inspection E6	Conduct a visual inspection E6	D1 - assess situations and identify problems
1 2 3 4	1 2 3 4	
Conduct mechanical inspection E7	Conduct mechanical inspection E7	D1 - assess situations and identify problems
1 2 3 4	1 2 3 4	
Repair fixtures and equipment E8	Repair fixtures and equipment E8	
1 2 3 4	1 2 3 4	

Remove electrical devices E9 1 2 3 4	Remove electrical devices E9 1 2 3 4	
Replace components E10 1 2 3 4	Replace components E8 1 2 3 4	D7 - evaluate solutions to make recommendations or decisions

DEMONSTRATE TEAMWORK SKILLS F	DEMONSTRATE TEAMWORK SKILLS F	J1 - understand and work within the dynamics of a group (All)
Demonstrate initiative F1 1 2 3 4	Demonstrate initiative F1 1 2 3 4	D5 - be creative and innovative in exploring possible solutions F5 - be socially responsible and contribute to your community G3 - be innovative and resourceful: identify and suggest alternative ways to achieve goals and get the job done H3 - set
Demonstrate enthusiasm F2 1 2 3 4	Demonstrate enthusiasm F2 1 2 3 4	E1 - feel good about yourself and be confident J7 - lead or support when appropriate, motivating a group for high performance
Adjust work plan according to changes in situation F3 1 2 3 4	Adjust work plan according to changes in situation F3 1 2 3 4	D1 - assess situations and identify problems D2 - seek different points of view and evaluate them based on facts D8 - implement solutions F1 - set goals and priorities balancing work and personal life G4 - be open and respond constructively to change
Demonstrate a respect for the work of others F4 1 2 3 4	Demonstrate a respect for the work of others F4 1 2 3 4	E3 - recognize your own and other people's good efforts J3 - be flexible: respect, be open to and supportive of the thoughts, opinions and contributions of others in a group J4 - recognize and respect people's diversity, individual differences and
Respond and adjust to feedback F5 1 2 3 4	Respond and adjust to feedback F5 1 2 3 4	D2 - seek different points of view and evaluate them based on facts D9 - check to see if a solution works, and act on opportunities for improvement J5 - accept and provide feedback in a constructive and considerate manner K6 - continuously

Discuss and apply learning acquired by others F6 1 2 3 4	Discuss and apply learning acquired by others F6 1 2 3 4	
	Learn from mistakes F6 1 2 3 4	D2 - seek different points of view and evaluate them based on facts D9 - check to see if a solution works, and act on opportunities for improvement G5 - learn from your mistakes and accept feedback K6 - continuously monitor the success of a proje
Coordinate work with other trades F7 1 2 3 4	Coordinate work with other trades F7 1 2 3 4	G2 - carry out multiple tasks or projects
	Assist others as necessary F8 1 2 3 4	J6 - contribute to a team by sharing information and expertise
DEMONSTRATE COMMUNICATION SKILLS G	DEMONSTRATE COMMUNICATION SKILLS G	
Recall and follow instructions G1 1 2 3 4	Follow instructions G1 1 2 3 4	J5 - accept and provide feedback in a constructive and considerate manner G4 - be open and respond constructively to change
Demonstrate active listening skills G2 1 2 3 4	Demonstrate active listening skills G2 1 2 3 4	A3 - listen and ask questions to understand and appreciate the points of view of others

Ask questions for clarification G3 1 2 3 4	Ask questions for clarification G3 1 2 3 4	A3 - listen and ask questions to understand and appreciate the points of view of others G6 - cope with uncertainty J2 - ensure that a team's purpose and objectives are clear
Write legibly G4 1 2 3 4	Write legibly G4 1 2 3 4	A2 - write and speak so others pay attention and understand
Scan / Review for meaningful content G5 1 2 3 4	Scan / Review for meaningful content G5 1 2 3 4	
	Read for meaning G5 1 2 3 4	
Demonstrate correct grammar G6 1 2 3 4	Use correct grammar G6 1 2 3 4	A2 - write and speak so others pay attention and understand
Use language appropriate to audience G7 1 2 3 4	Use language appropriate to audience G7 1 2 3 4	A2 - write and speak so others pay attention and understand J2 - ensure that a team's purpose and objectives are clear J5 - accept and provide feedback in a constructive and considerate manner
Interpret non-verbal communication G8 1 2 3 4	Interpret non-verbal communication G8 1 2 3 4	
Use trade terminology G9 1 2 3 4	Use trade terminology G9 1 2 3 4	
Describe employment standards G10 1 2 3 4	Describe employment standards G10 1 2 3 4	

Interpret trade-related resources G11 1 2 3 4	Interpret trade-related resources G11 1 2 3 4	A1 - read and understand information presented in a variety of forms (e.g. words, graphs, charts, diagrams)
Complete industry-related forms G12 1 2 3 4	Complete industry-related forms G12 1 2 3 4	
Interpret invoices and purchase orders G13 1 2 3 4	Interpret invoices and purchase orders G13 1 2 3 4	

USE MATH SKILLS H	USE MATH SKILLS H	A5 - use relevant scientific, technological and mathematical knowledge and skills to explain or clarify ideas (All)
Apply basic math skills H1 1 2 3 4	Apply basic math skills H1 1 2 3 4	
Practice mental math H2 1 2 3 4	Practice mental math H2 1 2 3 4	
Use a calculator H3 1 2 3 4	Use a calculator H3 1 2 3 4	
Interpret and use ratios H4 1 2 3 4	Interpret and use ratios and percentages H4 1 2 3 4	
Apply formulas H5 1 2 3 4	Apply formulas H5 1 2 3 4	
Apply algebraic and trigonometric functions H6 1 2 3 4	Apply algebraic and trigonometric functions H6 1 2 3 4	

Apply binary math H7 1 2 3 4	Apply binary math H7 1 2 3 4	
Identify costs H8 1 2 3 4	Identify costs H8 1 2 3 4	
	Use digital math H7 1 2 3 4	
	Use complex fractions H8 1 2 3 4	
	Use complex numbers H9 1 2 3 4	
	Use work, power and energy math H10 1 2 3 4	

DEMONSTRATE PROFESSIONALISM I	DEMONSTRATE PROFESSIONALISM I	
Identify and follow reporting structure I1 1 2 3 4	Identify and follow reporting structure I1 1 2 3 4	D3 - recognize the human, interpersonal, technical, scientific and mathematical dimensions of a problem
Practice punctual behaviour I2 1 2 3 4	Practice punctual behaviour I2 1 2 3 4	
Demonstrate ethical behaviour I3 1 2 3 4	Demonstrate ethical behaviour I3 1 2 3 4	D3 - recognize the human, interpersonal, technical, scientific and mathematical dimensions of a problem E2 - deal with people, problems and situations with honesty, integrity and personal ethics

Practice manners I4 1 2 3 4	Practice manners I4 1 2 3 4	F3 - assess, weigh and manage risk F5 - be socially responsible and contribute to your community
Demonstrate an interest in trade I5 1 2 3 4	Demonstrate an interest in trade I5 1 2 3 4	
Practice organizational skills I6 1 2 3 4	Practice organizational skills I5 1 2 3 4	D3 - recognize the human, interpersonal, technical, scientific and mathematical dimensions of a problem
Present a positive image I7 1 2 3 4	Present a positive image I6 1 2 3 4	E1 - feel good about yourself and be confident
Identify and work within limitations I8 1 2 3 4	Identify and work within limitations I7 1 2 3 4	D3 - recognize the human, interpersonal, technical, scientific and mathematical dimensions of a problem H2 - assess personal strengths and areas for development
Apply independent work habits I9 1 2 3 4	Apply independent work habits I8 1 2 3 4	G1 - work independently or as a part of a team
Demonstrate pride in quality of work I10 1 2 3 4	Demonstrate pride in quality of work I9 1 2 3 4	F4 - be accountable for your actions and the actions of your group
Demonstrate problem solving skills I11 1 2 3 4	Demonstrate problem solving skills I10 1 2 3 4	D4 - identify the root cause of a problem D7 - evaluate solutions to make recommendations or decisions J9 - manage and resolve conflict when appropriate
Maintain professional standing I12 1 2 3 4	Maintain professional standing I11 1 2 3 4	H2 - assess personal strengths and areas for development
Demonstrate a commitment to lifelong learning I13 1 2 3 4	Demonstrate a commitment to lifelong learning I12 1 2 3 4	H1 - be willing to continuously learn and grow H3 - set your own learning goals H5 - plan for and achieve your learning goals

USE TECHNOLOGY J	USE TECHNOLOGY J	A4 - share information using a range of information and communications technologies (e.g. voice, e-mail, computers)
Use office technology J1 1 2 3 4	Use office technology J1 1 2 3 4	
Use communication technology J2 1 2 3 4	Use communication technology J2 1 2 3 4	
Demonstrate keyboarding skills J3 1 2 3 4	Demonstrate keyboarding skills J3 1 2 3 4	
Manage computer files J4 1 2 3 4	Manage computer files J4 1 2 3 4	
Use industry software J5 1 2 3 4	Use industry software J5 1 2 3 4	B2 - access, analyze and apply knowledge and skills from various disciplines (e.g. the arts, languages, science, technology, mathematics, social sciences, and the humanities)
Transfer skills of familiar applications to new software J6 1 2 3 4	Transfer skills of familiar applications to new software J6 1 2 3 4	
Use programmable logic controls J7 1 2 3 4	Use programmable logic controls J7 1 2 3 4	

No matches for E5 - Show interest, initiative and effort

F2 - plan and manage time, money and other resources to achieve goals

Appendix D – Graduate Profile

Electrical Graduate Profile

The Electrical Graduate:

- Works safely, following relevant government and industry guidelines, regulations, standards, safety codes and practices
- Interprets blueprints, schematics, forms and electrical code rules to plan installations
- Selects, operates and maintains a variety of tools and equipment for the completion of trade-related tasks
- Completes tasks, within limitations of expertise, by applying theories of the electrical trade
- Installs a variety of basic electrical systems and/or system components under direct supervision of a journeyman electrician
- Maintains and troubleshoots basic electrical systems by applying fundamental electrical science principles and procedures
- Works within the pressures of the construction industry, displaying both independence and the ability to work as a member of a team
- Demonstrates effective oral, written, and non-verbal communication skills, using trade terminology as appropriate
- Interacts with others in ways that contribute to effective working relationships and achievement of goals
- Estimates, calculates, and records data in trade-related forms/documents using a variety of math skills
- Works as a professional, demonstrating a positive attitude, commitment, and discipline
- Maintains high standards of practice and professional standing through a commitment to life-long learning
- Solves problems in a broad range of situations by thinking critically and adapting to new circumstances
- Manages time to complete tasks and attain goals
- Uses computer, communication and office technologies as required

Appendix E – Program Renewal Plan

Electrical Program - Program Renewal

Vision

In the next five years, the Electrical program will be recognized as a leader in the provision of training that prepares graduates for a variety of entry-level positions in the electrical construction and related industries.

The Electrical program has developed the following goals to realize its vision:

1. Student Recruitment

Increase the number of women that enrol in the program. The program will:

- Work with schools, government and industry partners to organize and deliver annual Girls Exploring Trades and Technology (G.E.T.T.) summer camps for middle-years female students.
- Collaborate with the Marketing and Public Relations to produce a Women in Trades brochure for distribution to middle-years and high- school counselors.

2. Student Success

Continue to develop strategies that contribute to student success. The program will:

- Continue delivering pre-enrolment information sessions for prospective students.
- Expand the scope of the existing orientation sessions to include more information on college policies (e.g. PLAR, Harassment, Challenge for Credit, Transfer of Credit, Appeals and Safety).
- Administer the Canadian Adult Achievement Test to all enrollees to assess academic readiness for the program. In particular, an enrollee's mathematical skills will be assessed and, if not at the appropriate level, he/she will be directed to upgrade his/her skills prior to the commencement of the program.
- Maintain an up-to-date inventory of available academic upgrading opportunities to which enrollees can be directed.

3. Partnerships

Strengthen existing partnerships with industry, government and other groups to ensure that the program graduates continue to meet current and future industry requirements. The program will:

- Review the current Advisory Committee membership, timing of meetings, meeting agendas etc... with the goal of renewing the Advisory Committee so that it is better able to provide on-going support to the program renewal process, and
- Continue to work with the Apprenticeship Branch to ensure that program maintains accreditation for Level 1 – Construction Electrician.

4. Curriculum

Deliver a comprehensive and up-to-date certificate program that will meet the training needs of persons preparing for a variety of entry-level positions that require an electrical background. The program will:

- Establish a faculty curriculum committee to guide the ongoing curriculum renewal process,
- Implement curriculum renewal strategies identified in Curriculum Validation process,
- Ensure that the curriculum meets the standards outlined in the Apprenticeship Branch's Common Core Curriculum and continues to qualify for the Branch's Certificate of Accreditation for Level 1 – Construction Electrician in-school training in the Apprenticeship Program, and
- Update course outlines to adhere to the standardized course outline using the Course Outline Web.

5. Learning Environment

Maintain the best possible environments to facilitate teaching and learning. The program will:

- Re-assess the classroom and lab capacities and recommend adjustments to the enrolment quota if required.

6. Industry Experience

The anticipated amendments to the Electricians' Licence Act could restrict /eliminate the current work experience opportunity available to students enrolled in the program. As a result, the program will augment the existing work experience component with other in-industry experiences for students. The program will:

- Continue to cultivate close relationships with employers and increase the opportunities for students to experience "real-world" work situations through industry tours/field trips, and
- Explore the feasibility of offering students the opportunity to volunteer for Habitat for Humanity to do electrical work in their house building projects.

7. Resources

Ensure that the facilities, staffing and other resources that are available to the program are sufficient to achieve its vision. The program will:

- Increase the variety of equipment in the Electrical lab,
- Increase student access to the computer lab,
- Recruit an Electrical lab supervisor who is a certified journeyman in the Electrical trade, and
- Provide faculty with sufficient professional development opportunities and resources to ensure that they maintain high teaching standards and remain current with the latest technology and the requirements of industry.

Appendix F – 5 –Year Program Renewal Timeline in Gantt format