

REVIEW REPORT

on the

ELECTRICAL TRADE ENTRY and ELECTRICAL APPRENTICESHIP PROGRAMS

JUNE 2002

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EXECUTIVE SUMMARY

The Electrical Trade Entry and Apprenticeship Programs at UCC are, in the opinion of their Review Committee, running extremely well. The instruction is, on the evidence presented by current and former students, first rate; Entry Level graduates have achieved 100% employment in the last two years; the success rate of UCC-trained apprentices writing the Inter-Provincial Exam at the end of their apprenticeship is the best in the province; and exceptional working relations have been fostered between the programs and employers in the local electrical industry.

While many of the recommendations of the previous review, conducted in 1992, have been implemented, one that still remains to be addressed is to increase the emphasis on written, oral and résumé writing skills in the Entry Level curriculum.

Other concerns are the perennial and chronic shortage of supply monies, and UCC's intentions for replacing the Matching Equipment Fund Program for equipment purchase. There is some apprehensiveness, too, on the institution's lack of progress in finalizing a Student Code of Conduct to deal with disruptive student behaviour.

Although it is highly satisfied with the local operation of the programs, the Electrical Programs Review Committee readily admits to its inability to make meaningful recommendations on operational aspects governed at provincial level. It feels constrained from commenting, for example, on apprenticeship program length, which is a provincial matter, or on the need for the Industrial Training and Apprenticeship Commission (ITAC) and the Provincial Articulation Committee to develop a web-based curriculum like Nova Scotia's. These issues will not be addressed until May 2003, when the future of ITAC will have been decided. Until then, it can recommend only that the UCC Electrical faculty implement what changes they can where they have some degree of autonomy-- for example, in the Entry Level Program.

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ELECTRICAL TRADE ENTRY and APPRENTICESHIP PROGRAM REVIEW
COMMITTEE MEMBERS

CHAIR

Kevin Scollon, Coordinator,
Horticulture Program, UCC

ASSISTANT CHAIR

Gordon Tordoff, Instructor
Partsperson Program, UCC

RESOURCE PERSON

Peter Basson, Instructor
Electrical Trade Entry Program, UCC

RESOURCE PERSON

Peter Poeschek, Chair,
Construction Trades, UCC

DEAN

Ralph Finch, Dean,
Trades and Technology, UCC

REVIEW COORDINATORS

Alastair Watt
Director, Institutional Research and Planning, UCC

Nikki Pawlitschek, Research Analyst
Institutional Research and Planning, UCC

Michaline Novak, Research Analyst
Institutional Research and Planning, UCC

CHRONOLOGY OF THE ELECTRICAL TRADE ENTRY AND APPRENTICESHIP PROGRAMS REVIEW

The Electrical Trade Entry and Apprenticeship Programs Review was launched on January 30, 2002. A planning meeting with Electrical Trade Entry faculty member, Peter Basson; Construction Trades chair, Peter Poeschek; and Institutional Research and Planning members was held to discuss program review procedures and questionnaire design. Guidelines and examples of required documents for the program review were provided. Questionnaires were refined and finalized by February 12, 2002.

Stakeholders in the Electrical Trade Entry/Apprenticeship Programs were surveyed on the following dates:

Former Students (1997-01):	February 14, 2002
Advisory Committee Members:	February 18, 2002
ELTE Faculty:	February 18, 2002
Employers:	February 18, 2002
Current Students (Trade Entry)	February 26, 2002
Current Students (Apprentice)	February 25-28, 2002
Apprenticeship Faculty:	February 28, 2002

Reminders were mailed to non-responding former students, employers and Advisory Committee members on March 8, 2002. All faculty had responded by March 18. The Office of Institutional Research attempted to contact non-responding students, Advisory Committee members and employers by phone between March 21 and 28. A final attempt to stimulate response rates was made by telephone between April 12 and 15.

Former student data from 1997-2001 were summarized from Student Outcomes Reporting System (SORS) data, as provided by the Centre for Education Information, Standards and Services (CEISS).

The cut-off date for all responses was April 30. Information binders were sent to members of the Electrical Trade Entry and Apprenticeship Programs Review Committee on May 10, and that committee met to analyze the data and form its recommendations on May 30, 2002.

PROGRAM BACKGROUND

Electrical Trade Entry Program has evolved through the years, starting as an Electrical Pre-Apprenticeship Program in 1976.

In 1982 the format was changed to TRAC, a continuous entry program, competency-based, open entry/exit, self-paced. The TRAC Program was dropped due to lack of enrolment in 1998. In the fall of 1988, Electrical Trade Entry was adopted, with a block intake of sixteen for a six-month period. In 1993, the course was extended to nine months in order to cover basic AC theory (as requested in 1992 Program Review).

The course has an intake of 20 students for 2001/2002 with a Lab Faculty and in 2003 the first intake of CTC students.

The ELTE course covers the same materials as the First Year Apprenticeship, plus basic AC theory. In 1997, the first construction trades house was added as a work project for ELTE students. The houses have been purchased for the last several years by the YMCA as their "Dream House."

ELECTRICAL TRADE ENTRY PROGRAM CAPACITY, DEMAND & COMPLETION RATES

(Source: UCC Colleague)

Note: Figures for Applications are taken from Colleague with an application date between November 1st and August 31st of the applicable years and Graduation figures are taken from Colleague with a cast date between May 1st and June 30th. Enrolment figures were provided by Electrical Trade Entry faculty.

1997 Applications	30	Accepted	21	Enrolled	20	Graduated 1998	17
Graduation Rate 85%							

1998 Applications	20	Accepted	20	Enrolled	20	Graduated 1999	20
Graduation Rate 100%							

1999 Applications	34	Accepted	18	Enrolled	16	Graduated 2000	16
Graduation Rate 100%							

2000 Applications	50	Accepted	17	Enrolled	16	Graduated 2001	13
Graduation Rate 81%							

2001 Applications	62	Accepted	22	Enrolled	20	Graduated 2002	20
Graduation Rate 100%							

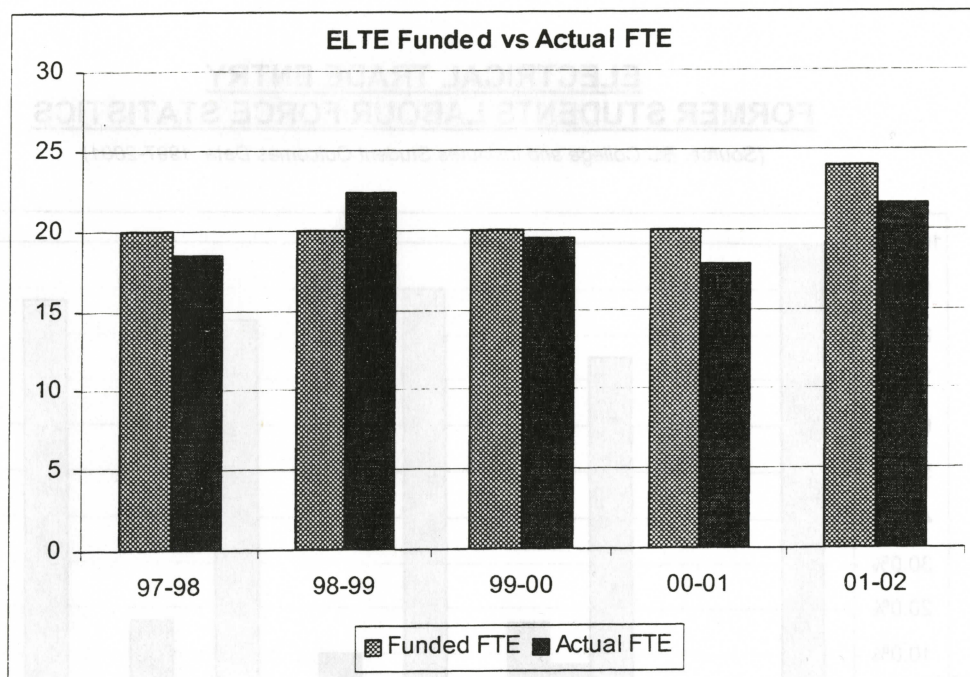
2002 Applications	109	Accepted	32	Enrolled	20	Graduated 2003	N/A
Graduation Rate N/A							

UTILIZATION - FUNDED VS ACTUAL FTE: 1997 - 2002

(Source: UCC Factbooks 1997/98 – 2001/02)

ELECTRICAL TRADE ENTRY PROGRAM

	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002
Funded FTE	20.0	20.0	20.0	20.0	24.0
Actual FTE	18.5	22.4	19.5	17.8	21.6
Utilization Rate	92.5%	112%	97.5%	89%	90%



COURSE COMPLETION RATES

(Source: Colleague)

Completion rates may be determined by subtracting “fail” (F), “did not complete” (DNC), “withdrew” (W), and “audit” (AUD) from enrolment numbers. Hence, over the period FROM 97/04/01 – 02/03/31 the following completion and attrition rates are found:

Electrical Apprenticeship

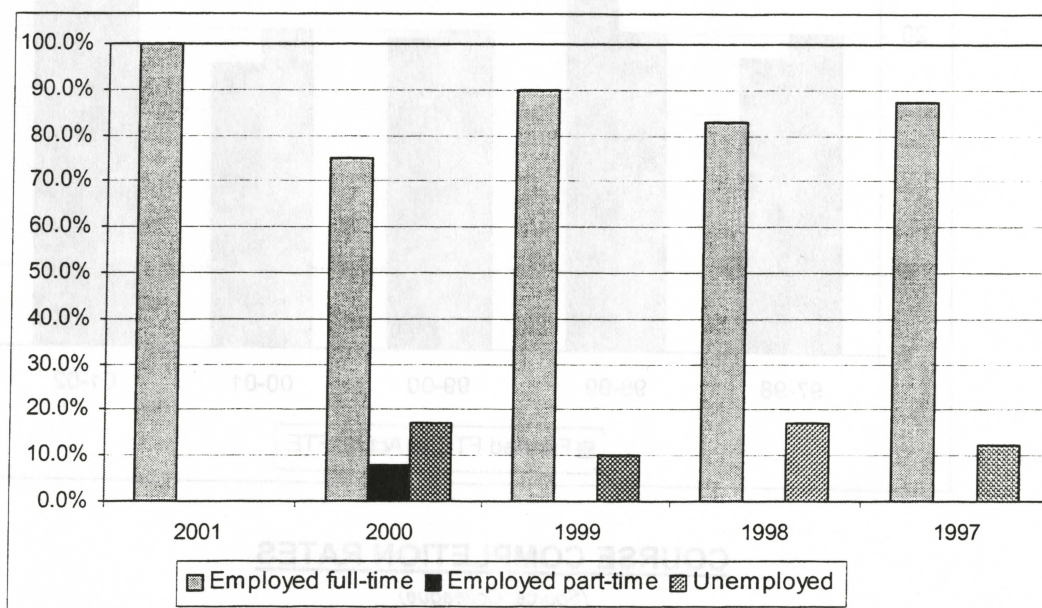
	Total Registrants	Total Passes	Total Attrition	% Completion	% Attrition
Level 1	244	230	14	94%	6%
Level 2	295	270	25	92%	8%
Level 3	292	268	24	92%	8%
Level 4	292	291	1	100%	0%
Total	1123	1059	64	94%	6%

Electrical Trade Entry

	Total Registrants	Total Passes	Total Attrition	% Completion	% Attrition
ELTE_101	91	86	5	95%	5%
ELTE_111	91	86	5	95%	5%
Total	182	172	10	95%	5%

ELECTRICAL TRADE ENTRY FORMER STUDENTS LABOUR FORCE STATISTICS

(Source: BC College and Institutes Student Outcomes Data: 1997-2001)



Completion rates may be determined by subtracting "fail" (F), "did not complete" (DNC), "withdraw" (W), and "audit" (AUD) from enrollment numbers. Hence, over the period FROM 9704/01 - 02/03/01 the following completion and attrition rates are found:

Level	Total Registrants	Total Passes	Total Attrition	% Completion	% Attrition
Level 1	244	230	14	94%	6%
Level 2	288	270	18	94%	6%
Level 3	202	208	6	103%	3%
Level 4	282	281	1	100%	0%
Total	1016	1089	64	94%	6%

TABULAR SUMMARY OF QUESTIONNAIRE RESPONSES **ELECTRICAL TRADE ENTRY PROGRAM REVIEW**

Recipient	# Sent	# Completed & Returned	% Returned
Faculty:			
ELTE	3	3	100%
Apprenticeship	5	5	100%
Employers:	15	9	60%
Advisory Committee Members:	9	7	78%
Former Students (ELTE)	70	16	28% (*net)
Current Students:			
ELTE	20	17	85%
ELE_APP:	64	61	95%
Level 1	16	15	94%
Level 2	16	15	94%
Level 3	16	16	100%
Level 4	16	15	94%
SORS - ELTE	92	57	62%
(BC College and Institutes Student Outcomes Data: 1997-2001)			
TOTAL	278	175	66%

(Note: The number of returned envelopes is subtracted from the number sent to attain the % returned.)

Returned Envelopes:
 Former Students = 12

Total Non Respondents = 68
(excluding SORS)

SUMMARY OF QUESTIONNAIRE RESPONSES

FORMER STUDENTS:

ELTE

It should be noted that former students had an 87% employment rate in the electrical field. Generic skills were all perceived to be receiving sufficient emphasis in the program, with the exception of writing and résumé skills. Some trade-specific skills taught in the program, such as scaffold erection, soldering and basic gas welding were reported as being little used by former students in the industry. Respondents reported a high regard for the instruction they received, and seven of them applauded the practical orientation of the program. Eight comments suggested that the program was too long and could be reduced by two or three months. Conversely, some respondents felt that more time needs to be spent in the lab. Two respondents felt that there was a need for greater math skills as a prerequisite to the lab and one requested more discipline for problem students.

*** Because the net response rate was only 28% (or 16 out of 70 former students), the results of this survey were used with caution.**

CURRENT STUDENTS:

ELTE

As with the former students, most of the comments from the 16 current students were of a positive nature, with seven accolades for the instructor, seven endorsements of the practical nature of the program, and three mentions of how much the students enjoyed working on the YMCA Dream Home. Negative comments focused on lack of equipment and consumables, and the need to update old equipment (8 mentions). The possibility of a shorter program and the disruptive effect of problem students were again mentioned. In the ratings section, the absence of instruction in résumé writing and writing skills was reported, and the low usage of scaffold erection skills and drilling machines.

APPRENTICESHIP: Levels 1-4

A total of 61 apprentices were surveyed in class by level in the last week of February 2002. The results of these surveys are summarized here.

Thirty-two of the 61 respondents (52%) specifically identified the quality of instruction as a major strength of the program. Seventeen of 61 (28%) felt 10 weeks were not enough time to cover the material at each level. Eight out of 61 (13%) rated the use of audio-visual devices in the classroom as inappropriate. Three respondents requested more supplies and better current equipment, especially in the labs. Two comments were made on the errors in the learning modules. A suggestion was made that night school or web delivery be made available to prepare students prior to attending apprenticeship classes. And writing skills and résumé construction were once again not perceived as receiving much emphasis at any level in the apprenticeship program.

FACULTY:

ELTE

The three Entry Level faculty reported the student success rates in the program and the job market as very high, with 100% employment of graduates in the last two years. They identified a need for 50% more shop space to accommodate the four Career Technical Centre students who have been added to the program this year (2001-02), and a corresponding need to increase supply money. They agreed that the Dream Home project is a very positive aspect of program, and pointed to the substantial waiting lists in the last few years as an indicator of the health of the program. They identified computer and résumé writing skills as competencies that need to be added to the curriculum.

APPRENTICESHIP

The five apprenticeship instructors reported that the program is working well, with good input from Advisory Board, industry, inspection, government, and former students. While the curriculum is solid, there were concerns that the 10-week time-frame for delivery is too tight, and apprehension about what might have to be sacrificed if the program length was reduced to eight weeks. The suggestion of introducing intersessional packages for home-study, either on the web or by conventional correspondence, may address any shortening of the program. As a revenue-generating proposal, faculty thought that offering endorsements for specialized fields after apprenticeship training may be a possibility. They identified the need for more emphasis on computer and résumé writing skills in the apprenticeship curriculum.

EMPLOYERS

ELTE

While Entry level students generally graduate with a good general knowledge of electricity, they are perceived by employers as having limited work experience and little knowledge of the "real world", even though they sometimes, paradoxically, exhibit a brash overconfidence. This could be remedied by bringing more employers and employed former students into the classroom to let the students know what will be expected of them when they join the labour market.

The employer survey responses stressed the need for instructors to keep their students abreast of the technology changes happening in the industry. They requested that students receive more instruction on how to find information in the code-book, and they identified more computer, writing, and verbal skills as needs in the program. Eight out of nine respondents (89%) predicted that more apprentices with better technical and communication skills will be required in the next five years because of an ageing workforce.

ADVISORY COMMITTEE MEMBERS

The majority of the Advisory Committee members agree that the program is working well. There is concern, however, regarding the shortage of skilled people to be caused very shortly by retirement demographics. In the generic skills section of the survey, they identified writing and résumé writing skills as not receiving sufficient emphasis in the Electrical programs.

STRENGTHS OF THE ELECTRICAL TRADE ENTRY AND APPRENTICESHIP PROGRAMS

1. Instructors

Throughout the various surveys done as part of this review the instructors were recognized for their dedication, knowledge, and ability to motivate the students. Without exception, instructors at every level of instruction from ELTE to Level 4 Apprentice were praised for their knowledge and desire to have the students succeed. When compared to other institutions offering similar training, UCC excels in terms of instruction.

2. Hands-on Learning

All groups highlighted the strong hands-on component of both the ELTE and the Apprenticeship Programs. Practical experiences gained at the YMCA Dream Home and on the Habitat for Humanity project were mentioned repeatedly, as well as work on Motor Control Centres.

3. Industry Rapport

Instructor rapport with industry has created a relationship that has had many benefits to UCC and the students. Donations from industry have allowed student access to up to date training on equipment UCC might otherwise not have been able to purchase. Instructor rapport with all sectors of the electrical industry allows students access to job placement opportunities and educates the industry as to the availability and knowledge of graduates.

4. Student Confidence Entering Workforce

Training received while at UCC prepares the students well for entry in the workforce. Students feel confident with skills, both theoretical and practical, after completion of both ELTE and Apprenticeship Programs. The strong practical and technical skills acquired in the ELTE Program are transferable to the Level 1 Electrical Apprenticeship, with students receiving credit for first year electrical theory and up to six months credit of time towards the four-year apprentice. This foundation prepares apprenticeship students well for the rigors of the four-year program.

5. Instructor / Student Ratio

Career Technical Centre funding now covers the costs of four students per year, and has allowed the class size to rise from 16 to 20 and the hiring of a laboratory faculty member. The resulting decrease in student/instructor ratio from 16:1 to 10:1 has facilitated much greater student/instructor contact in the electrical lab.

6. Employment Opportunities

Students graduating from the ELTE Program are in high demand within the industry and are actively recruited. The employment rate for the graduating classes of 2000 and 2001 was 100%. (See page 4). This bodes well for both the program and the future success of the students and is a testament to the strength of the program and the relationship that exists between industry and UCC.

AREAS OF THE ELECTRICAL TRADE ENTRY and APPRENTICESHIP PROGRAMS THAT CAN BE IMPROVED (with recommendations)

1. Communication Skills

Consistently throughout the review, former students, current students, employers, advisory committee members and even faculty gave low ratings to the emphasis placed in the programs on oral communication skills, writing skills, and résumé writing skills. Given the fact that the electrical industry has an actively moving workforce, with students often working for many different employers during their careers, the need for good communication skills is essential.

RECOMMENDATION 1 (a):

That instructors in the Electrical Department implement more oral and written communication instruction within the program curriculum. Writing skills might be addressed through practice, for example, in invoice preparation and in creating progress reports and memoranda. Résumé writing skills might be highlighted with the addition of a short course, perhaps offered by Electrical faculty at UCC, or perhaps by agreement with the English Department or the Counseling Department.

ACTION: Electrical Faculty

2. Program Length

Several comments from students and faculty revolved around program length and the amount of course content for both the ELTE and Apprenticeship Programs. The apprentices felt that their programs should have more time allotted than the current 10 weeks per session, and are apprehensive about the rumoured reduction to eight weeks. The case of Entry Level is different. Application figures for the last two years show a huge demand for places (109 applications for Fall 2002); it is unlikely that the BCIT Entry Level Program in Kelowna is going to siphon off this demand—in fact there may be an increase in demand from the Okanagan; and several former and current students surveyed indicate that the program could be shortened to six months. Given these circumstances, and the fact that the Entry Level curriculum is not provincial but local, the Review Committee sees an opportunity to tap into this demand by establishing two six-month programs, and to explore the possibilities of raising tuition fees accordingly.

RECOMMENDATION 2 (a):

That, to respond to the demand for entry-level training, the Electrical Faculty, the Dean, Trades and Technology, and the Program Administrator explore the possibilities of moving the Electrical Trade Entry Program to a bi-annual, six-month format, and of operating one or more of these lines on a revenue-generating basis under the aegis of Continuing Education.

ACTION: Electrical faculty; Dean, Trades and Technology; Program Administrator

RECOMMENDATION 2 (b):

That the Electrical faculty and the Dean, Trades and Technology, urge the Provincial Articulation Committee and the ITAC Transitional Committee to transfer the apprenticeship curriculum to web-based delivery, or at least to adjust portions of it to web-based or correspondence-based packages suitable for intersessional home study. Such delivery would allow students to complete prescribed studies prior to entrance into various levels of the Electrical Apprenticeship program and should help them to access the program at or above the prerequisite level to successfully complete their education.

ACTION: Electrical faculty; Dean, Trades and Technology

3. Discipline

Both former and current students raised concerns about student discipline. These concerns included fellow students disregarding rules, skipping class on a regular basis, and exhibiting generally immature behaviour. The continuing lack of an institutional Student Code of Conduct hampers the ability of faculty to

deal with these situations; the only recourse that faculty have in the case of a disruptive student is the imposition of a performance contract, which has no legal standing.

RECOMMENDATION 3 (a):

That until such time as UCC finalizes its Student Code of Conduct, the Dean of Trades and Technology and the Vice-President Academic endorse the current performance contract so that the instructors in both programs have the ability to deal with discipline issues that may arise.

ACTION: Dean, Trades and Technology; Vice-President, Academic

4. Stricter Screening Process for Apprenticeship

Students and faculty raised concerns about the lack of a standard entrance exam for apprenticeship students entering into the program. Currently, it appears that some apprenticeship offices set entrance exams while others do not. Students who arrive without the necessary skills needed are set up for failure immediately because of the rigors of the program. Math skills were identified in the surveys as being those most deficient among incoming students.

Recommendation 4 (a):

Currently, ITAC is in a state of realignment, but when its next configuration is determined, UCC should have a strong representative on the Provincial Articulation Committee (or its successor). This representative should strongly promote the need for consistent standards for entry into the Apprenticeship Program.

ACTION: Electrical faculty

Recommendation 4 (b):

UCC may also institute its own entrance exam for apprentices in the hope that those who do not have the skills to pass this exam may deselect themselves from the Apprenticeship Program until such time as they gain them. This exam may be administered via Internet or Web CT delivery, and might be an application of "LASERCAT", the recently developed Math screening program. Electrical faculty are encouraged to consult with the Assessment Centre to determine the most appropriate testing program.

ACTION: Electrical faculty

5. Supplies Budget

Because the current base supplies budget does not allow for purchase of adequate consumable lab materials, Electrical students and faculty are forced to use and reuse materials to the point where they are of no use. The situation is exacerbated by Non-Guaranteed Intakes (NGI's), which cause year by year fluctuations in the numbers of training days, and thus the number of sections, that each Trades and Technology department must deliver. For example, in 2001-02, Electrical's \$16,000 supply budget covered 666 instructional days, whereas for 2002-03 that same \$16,000 must cover 773 instructional days, resulting in a 16% decrease in supply money. In contrast, other departments that are offering fewer instructional days and thus fewer sections than last year are experiencing a welcome but unnecessary percentage increase in their supply budgets. What is clear is that departments need adequate and consistent supply monies to run each section they offer, regardless of whether it is base or NGI, so as to avoid the annual supplies budget roller-coaster effect, and that a formula should be devised to ensure consistency.

RECOMMENDATION 5 (a):

That the UCC Budget Planning and Priorities Committee reconsider its freeze on supplies as the cost of electrical supplies, and indeed that of all materials purchased across the institution, has risen, without a corresponding increase in supply funds.

ACTION: UCC Budget Planning and Priorities Committee

RECOMMENDATION 5 (b):

That the fees currently collected for lab supplies from the Electrical students be earmarked for the Electrical programs and be re-directed into their supplies budget.

ACTION: Vice President, Administration and Finance

RECOMMENDATION 5 (c):

That in order to address the annual problems of under-funding, over-funding, budget over-run and contingency funding (bail-out), the Dean, Trades and Technology, allocate vocational program supplies budgets according to a formula which calculates program supplies budgets on the basis of the number of sections (or number of instructional training days) offered each fiscal year and on the level of instruction.

ACTION: Dean, Trades and Technology

Due to the loss of the provincial Matching Funds Program, the Electrical Department acknowledges that the scope of fundraising for capital purchases is greatly reduced and that revenue generation will be difficult. However, offering endorsements through Continuing Education might be a source of revenue for the Electrical Programs.

RECOMMENDATION 5 (d):

That the Electrical faculty consider and develop revenue-generating options such as post-apprenticeship endorsements in areas such as instrumentation, variable frequency drives, programmable logic controllers, and fire alarms, which would allow journeymen to upgrade in the electrical trade and add to their range of skills.

ACTION: Electrical Faculty

6. Student Job Readiness

Several comments concerning job preparedness were raised as part of the review. Electrical Trade Entry students felt somewhat unprepared for the rigors of the working environment. They felt unaware of the demands of the profession they were entering and wished more first-hand information.

RECOMMENDATION 6 (a):

That Electrical Trade Entry faculty should include, as part of the curriculum, field trips to actual workplaces. As well, instructors should bring in employers and former students as guest speakers to highlight industry expectations for graduating students.

ACTION: Electrical Trade Entry Faculty

APPENDIX A

METHODOLOGY

The data were collected in the following ways:

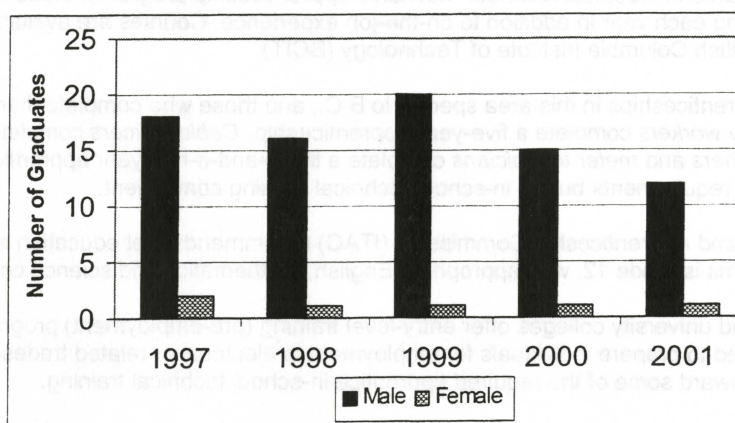
- 1) Consultation took place with Peter Poeschek, Chair, Construction Trades, and Peter Basson, Electrical Trade Entry Instructor, on the design of the surveys.
- 2) Surveys were administered to Electrical Trade Entry and Apprenticeship faculty, and current students, and to ELTE Program Advisory Committee members, employers, and former students. All data were processed using SPSS to achieve frequency rates and mean responses. Subjective comments for each group were recorded separately and anonymously. Former student data from 1997-2001 graduates of the ELTE program were summarized from Student Outcomes Reporting System (SORS) data, as provided by the Centre for Education Information, Standards and Services (CEISS).
- 3) "Descriptive Data" on the Electrical Trade Entry Program's objectives, course outlines, etc., were solicited from Peter Poeschek, Chair, Construction Trades, and Peter Basson, ELTE instructor.
- 4) Data on enrolment figures, graduation rates, gender and grade distributions were provided by the Office of Institutional Research and Planning.
- 5) The following people associated with the program participated in the review process or were interviewed:

- Doug Jontz, Instructor, Electrical

APPENDIX B

GENDER RATIO OF ELECTRICAL TRADE ENTRY PROGRAM GRADUATES

(Source: UCC Convocation Guides 1997-2001)



APPENDIX C

EMPLOYMENT PROSPECTS¹

Electricians (Construction and Maintenance)

Nature of the Work

Electricians install and repair electrical wiring and related equipment in buildings. Because electricity is used for a variety of purposes including climate control, security and communications, electricians need to be proficient in many applications of electricity. They are employed by electrical contractors, maintenance departments of large institutions, such as hospitals or industrial plants, or they may be self-employed. Electrician apprentices are included in this group.

Main Duties

These electricians work on new construction sites and on renovations to existing buildings. They ensure that all electrical connections are safe and meet the electrical code.

Electricians interpret architectural drawings and electrical code specifications at construction sites. They pull wire through conduits and through holes in walls and floors. They install, replace and repair lighting fixtures and other electrical equipment such as switches, relays and circuit breaker panels. They splice, join and connect wire to fixtures and components to form circuits, according to the plans. As well, they test circuits to ensure the compatibility and safety of systems. In many cases they are called on to troubleshoot faults in electrical and electronic systems as well as to connect sound and visual communication equipment, signalling devices and heating and cooling systems. At some sites, they conduct preventive maintenance programs.

Example Titles

- apprentice electrician
- construction electrician
- electrician
- apprentice community antenna television technician

Education and Training

To work as an *electrician* in B.C. it is compulsory to be certified in the trade or to be registered in a four-year apprenticeship program that will lead to qualification. Electricians must complete the apprenticeship program and pass an interprovincial standards examination to receive a Certificate of Qualification with an interprovincial Red Seal endorsement and a Certificate of Apprenticeship.

¹ (Source: BC WORK Futures, NOC 7241)

While it is not necessary to be certified as an *electrical rewind mechanic*, a four-year apprenticeship program is available for this trade. Electrical rewind mechanics may also receive a Certificate of Apprenticeship and a Certificate of Qualification with an interprovincial Red Seal endorsement upon completion of the program.

As part of the electrician and electrical rewinder mechanic apprenticeship programs, students are required to complete in-school technical training each year in addition to on-the-job experience. Courses are available at B.C. colleges, university colleges and at the British Columbia Institute of Technology (BCIT).

There are several apprenticeships in this area specific to B.C., and those who complete them work for B.C. Hydro. *Telecontrol technology workers* complete a five-year apprenticeship. *Cable splicers* complete a four-year apprenticeship. *Operator/area dispatchers* and *meter technicians* complete a three-and-a-half-year apprenticeship. These apprenticeships have work experience requirements but no in-school technical training component.

The Industry Training and Apprenticeship Commission (ITAC) recommends that education required prior to entering these apprenticeship programs is grade 12, with appropriate English, mathematics and science courses.

Many B.C. colleges and university colleges offer entry-level training (pre-employment) programs in a number of these trades that are designed to prepare individuals for employment in electrical or related trades. These programs may also be considered as credit toward some of the required apprentice in-school technical training.

Current details regarding these apprenticeships can be obtained by contacting a local ITAC area office.

Generally, people employed in these areas should have mathematical and mechanical aptitude, an analytical approach to problem-solving, physical strength, manual dexterity, good hand-eye coordination and an ability to work at heights. Additional skills include an ability to read and interpret drawings and electrical code specifications. These workers should be knowledgeable about computerized machinery and efficient with hand tools. Since electrical wires are colour-coded good eyesight and colour vision are vital. These people should be able to work alone or as a member of a team. Those who install or maintain equipment in homes or businesses must be neat and able to deal with customers courteously. To remain competitive in this field workers should be willing to upgrade their skills continually.

Working Conditions

Electricians work in both residential and commercial construction, either as employees or as contractors. As much of their work is done on a project-to-project basis, they are subject to layoffs between projects. The availability of projects is affected by the seasonal nature of the construction industry and by economic conditions that affect construction activity.

Working conditions will vary depending upon the type and stage of the construction project. Rough wiring is done before walls are in place and is weather-dependent. Later in projects, the installation of electrical equipment is done indoors. Much electrical work is done in a standing position, often in confined spaces. Physical risks involved include falling from a height or receiving an electrical shock.

In 1995 the estimated average earnings of these workers (\$29,700) were slightly higher than the workforce average (\$27,900). However, the average earnings of women were only \$22,500. This lower earnings level indicates that a high proportion of women electricians are new entrants to the occupation. Women who worked full time, full year earned \$30,200, which is less than the amount earned by the men (\$38,000) who worked full time, full year in these occupations. Both of these amounts are below the average earnings for full-time, full-year employees in the workforce (\$39,400).

According to the Construction Labour Relations Association of B.C., unionized electricians are paid approximately \$34 per hour, as of May 1996. Although this occupation has traditionally been highly unionized, current trends are moving away from union positions. The average salary for recent college graduates entering the trade was \$2,560 per month for full-time work.

This occupational group experienced a decline in workers, from 5,960 in 1990 to approximately 5,500 workers in 1998. This occupation is still a large occupational group despite the small decline in workers. The International Brotherhood of Electrical Workers estimates that there are more workers in this group, but the union groups electricians, industrial electricians and power system electricians into the same category.

About 18% of these workers are self-employed. This rate is slightly higher than the 15% rate for the overall B.C. workforce.

Although 90% of these workers consider themselves full-time employees, only 43% work full time, full year. The proportion of full-time, part-year employment in this occupation is higher (46%) than the workforce as a whole (27%). This can be attributed to the seasonal nature of the work.

Electricians tend to have a higher unemployment rate (13%) than the overall provincial workforce because of the cyclical nature of the construction industry. However, women in this occupation have a much lower unemployment rate (8%) than

men. Even though these workers have a seasonal pattern of unemployment characteristic of the construction industry, it is not quite as pronounced as in other construction trades. Electricians may find work in the winter months when other construction workers are unemployed.

Almost three-quarters (74%) of these workers work in the construction industry. The remainder are scattered throughout many industries. About 3% work in education.

This is an occupation that occurs in both the rural and the urban areas of the province. These workers are distributed throughout the province in roughly the same proportions as the overall B.C. workforce.

Barely 2% of these workers are women. At an average age of 36, women electricians are younger than their counterparts who are men. The average age of men in this occupation (38) is the same as the workforce average. Close to one-third of these workers are in the 25 to 34 age group, and the remainder are distributed across the age groups in similar proportions to the overall B.C. workforce.

Employment Prospects

Employment in electrical trades is forecast to grow at about the average for all occupations through to 2008. This is a large occupational group with 5,500 workers in 1998. According to the Canadian Occupational Projection System (COPS), about 820 new jobs will be created over this period, and an additional 2,360 replacement jobs will become available as workers retire. This forecast reflects the historic relationship between population growth and construction activity and the generally good level of investment and housing activity.

Construction is the major industry employing workers in this occupational group. The construction industry in B.C. grew rapidly from 1986 to 1995. Between 1996 and 1999, however, construction activity declined due to weaker population growth, slower economic growth and weaker labour markets. Since then, non-residential construction activity has remained relatively stable, but residential housing construction is still below its 1994 peak. Low levels of residential construction since 1995 have created much demand for housing. The construction industry is expected to grow at the rate of 1.6% per year between 1998 and 2008, according to COPS, which is the same rate as the provincial average for all industries. Industry sources expect higher than average levels of residential construction and thus expect higher employment growth over the short term.

Construction generally is sensitive to such factors as interest rates and material costs. Population growth and an aging population also directly affect residential construction activity. Many contractors and construction tradespersons rely on such activity to generate business. Seniors staying longer in their homes, divorce and young people expecting to form their own households are among the demographic and lifestyle changes that are affecting both the quantity and mix of housing buyers can afford or want.

After a boom in the first half of the 1990s, the construction industry remained flat. The commercial construction industry is starting to recover. Current shortages of high-end office space will once again stimulate the market for commercial construction. Planning and construction of new hotels has recently started to pick up and is driven by the continued popularity of B.C. as a holiday destination for tourists.

Public sector funding for capital projects has been an important source of construction employment. Since the lifting of the 1997/1998 public institutional construction freeze, there has been a flurry of school construction. Other public construction projects over the short term will be in the transportation infrastructure of the province and will include road and bridge construction and a planned extension of the Sky Train in the Lower Mainland.

Because the construction industry employs such a large number of workers, there will be a significant number of openings for *electricians* in the long term, especially to replace an aging workforce. Industry sources indicate that there are currently enough apprentices to replace qualified workers who are retiring from the work force. However, there may be a shortage of apprentices over the longer term if employers do not train new entrants to replace older workers who are close to retirement.

Productivity gains are reducing the need for tradespeople. New methods and tools mean that fewer people are required to do the same amount of work. When construction activity does increase, there may not be a corresponding increase in the number of jobs. Because of the essential nature of electrical work, this is not as great a problem for electricians as it is for some other trades. There are also mandatory safety standards that require qualified tradespeople to ensure that connections are made properly.

The nature of the electrician's job is also changing because more electronic equipment is being installed on construction projects. Electricians need to know more about electronics in order to install and maintain the equipment.

Experienced electricians can progress to such supervisory positions as foreman, superintendent, estimator or electrical inspector. With some money and management skills, electricians can start their own contracting businesses.

B.C. Employment Trends and Projected Demand

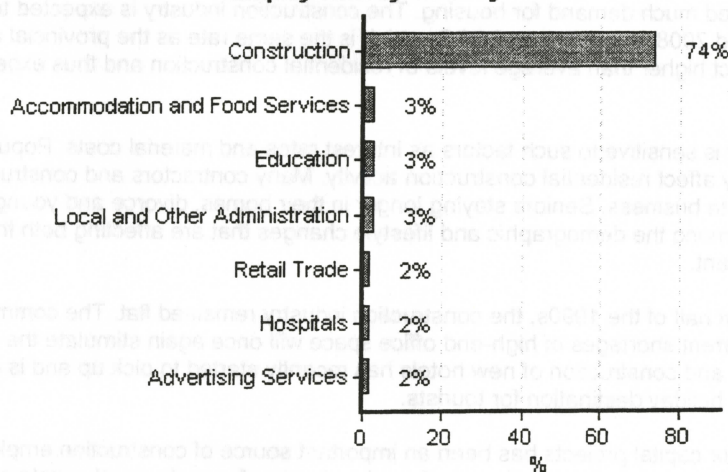
* Data Definitions

Number Employed	1990	1998	2008
	5,960	5,510	6,330
Estimated Openings	Growth (Net)	Attrition	Total
1998-2008	820	2,360	3,180
Annual Growth		This occupation	All occupations
1998-2008		1.4%	1.6%

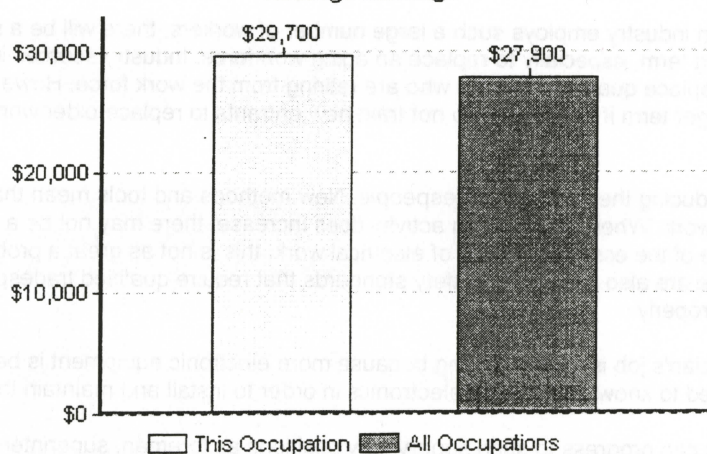
Employment by Region

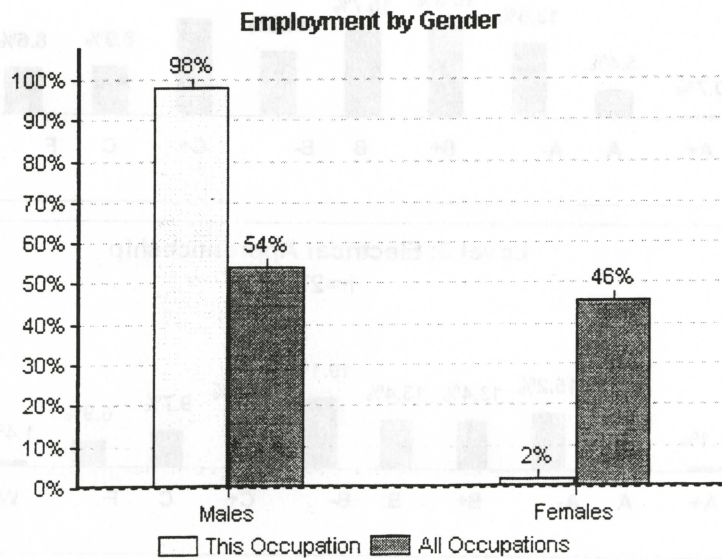
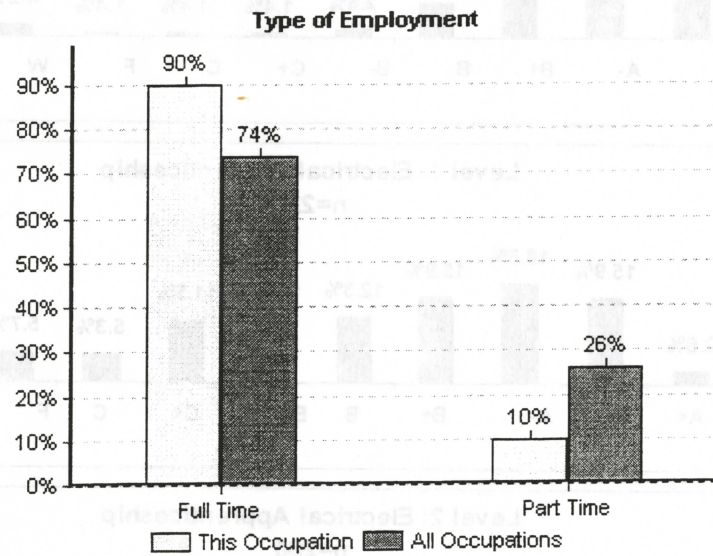
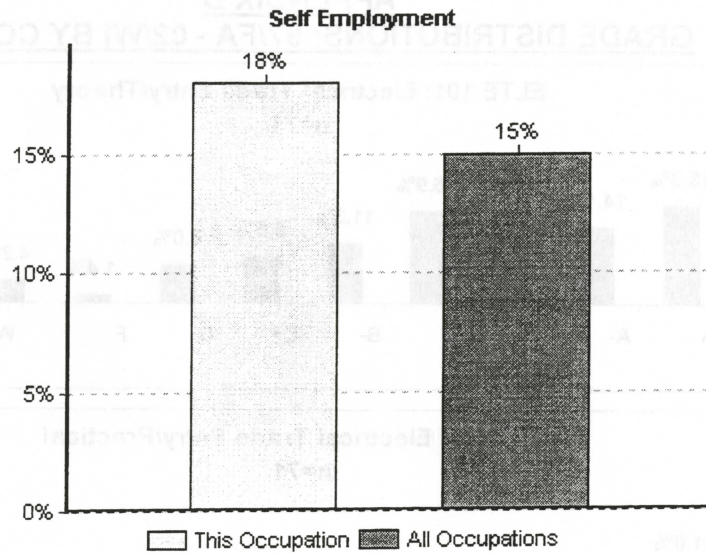
	This occupation	All occupations
Lower Mainland	59%	57%
Vancouver Island	17%	18%
Northern B.C.	9%	10%
Okanagan/Kootenay	15%	15%

Employment by Industry



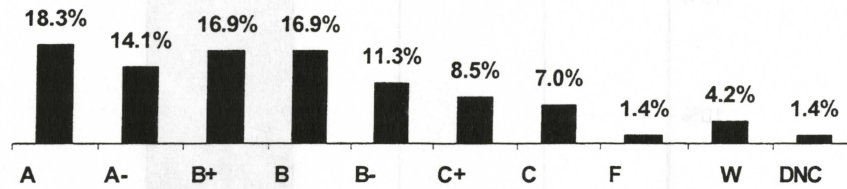
Average Earnings



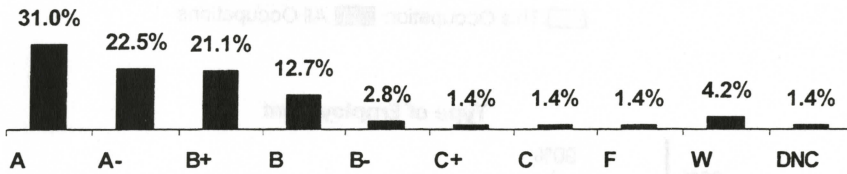


APPENDIX D
GRADE DISTRIBUTIONS: 97/FA - 02/WI BY COURSE

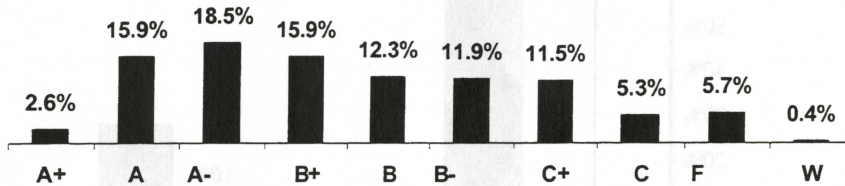
ELTE 101: Electrical Trade Entry/Theory
n=71



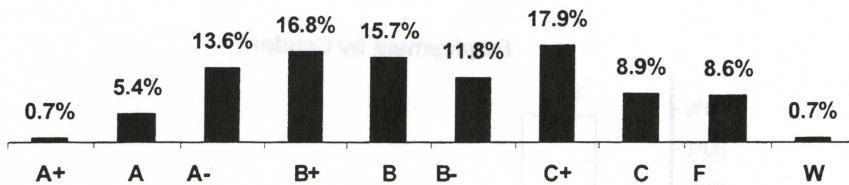
ELTE 111: Electrical Trade Entry/Practical
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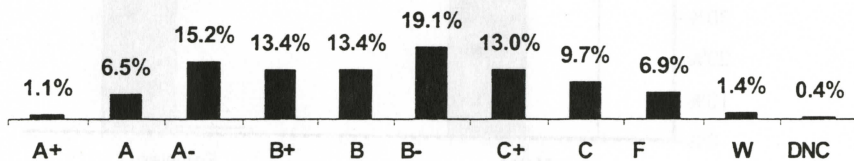
Level 1: Electrical Apprenticeship
n=227



Level 2: Electrical Apprenticeship
n=280

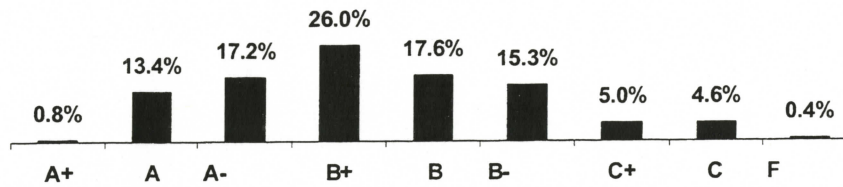


Level 3: Electrical Apprenticeship
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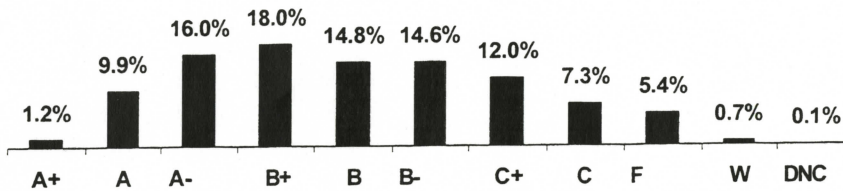


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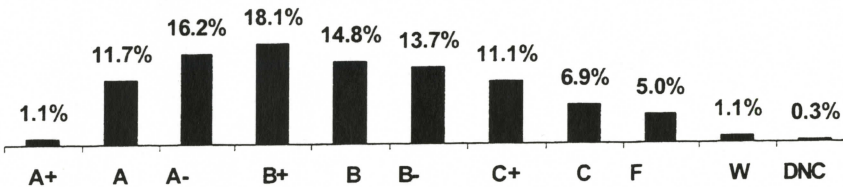
Level 4: Electrical Apprenticeship
n=262



Levels 1-4: Total Electrical Apprenticeship
n=1046



Electrical Trade Entry & Apprenticeship levels 1-4
n=1188



GRADE DISTRIBUTION: STEA - 02/01 BY COURSE

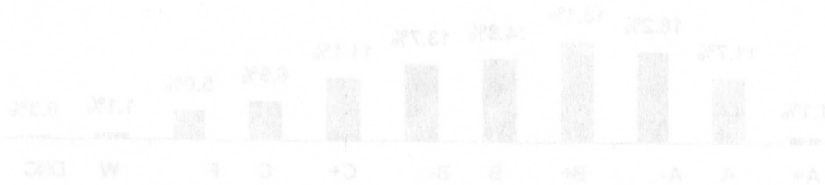
Level A: Electrical Apprenticeship
n=363



Levels 1-4: Total Electrical Apprenticeship
n=1098



Electrical Trade Entry & Apprenticeship Levels 1-4
n=1188



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