Key Research Findings

This analysis was based on the pre-determined criteria listed below:

Section	Description	Measures
Student Demand	Includes an assessment of OCAS (2007 - 2011) enrolment data at other colleges in terms of mean growth rate with a specific focus on Fleming's direct competitors where appropriate (Georgian, Sheridan, Seneca and Durham) Trends in certificate, diploma, degree, apprenticeship and continuing education (where available). **Click Below to Access Full Source Document:** Fall Enrollment Trend	• Strong = Fleming enrolment growth is outpacing system and is equal to or greater than 3% • Moderate = Fleming enrolment growth is equivalent to system demand and is between 1.0 to 2.9% • Weak = Fleming enrolment growth is less than the system demand and is less than 1%
Labour Market	Includes projected employment rate growth based on a consolidation of various Ontario, Canadian, and US sources including HRSDC, Sector Council Reports US Bureau of Labour Statistics, and the MTCU Employment Profile.	• Strong = Between 5-6 positive labour market indicators • Moderate = Between 3-5 positive labour market indicators • Weak = Between 1-2 or no positive labour market indicators
Competitive Analysis	Includes the number of actual colleges offering the program as well as the ratio of applications to acceptances at Fleming compared to other colleges and specific comment about Fleming's direct competitors where appropriate (Georgian, Sheridan, Seneca and Durham) **Click Below to Access Full Source Document:** Fall Conversion Report	• Strong = Fleming conversion ratio is greater than 2 below the system • Moderate = Fleming conversion ratio is 1 above, below or equal to the system • Weak = Fleming conversion ratio is greater than 2 above than the system
Financial Analysis	Includes a review of Contribution to Overhead (CTO) for existing programs (2010-11) **Click Below to Access Full Source Document:** Costing Analysis	• Strong = CTO is greater than 35% • Moderate = CTO is between 30 - 34% • Weak = CTO is between 20 – 30% **No Contribution = 19% or less**

Key Research Findings

Key Performance Indicators	Includes KPI trends from the Key Performance Indicator Summary 5 Year Historical Overview KPI Data from Reporting Years 2008-2012. **Click Below to Access Full Source Document:** Key Performance Indicators	• Strong = Above system average in 6-7 indicators • Moderate = Above system average in 3-5 indicators • Weak = Above system average in 0-2 indicators.
Resource Analysis	Requires school level assessment regarding space, technology, capital equipment and human resources. Recommendations from recent Program Review Reports included here	

Key Research Findings

Instrumentation and Control Technician (51011)

Student Demand[1]	• WEAK

The following information consists of OCAS yearly student fall registration data as well as a mean growth rate and average student registration for each program under these categories:

Diploma

- Seven colleges offer this program, none of which include any of Fleming's main competitors
- Fleming has a **-71%** mean growth rate, much lower than the system rate of **21.8%**
- Overall, Northern has the highest mean growth rate **(134%)** and Fleming has the lowest rate
- Lambton has the highest average registration with **59 students** and Cambrian the lowest with **3 students**

Advanced Diploma

- St. Lawrence is the only school to offer this program, which has experienced a mean growth rate of **208%** and an average registration of **15 students**

Diploma

Program: 51011 - INSTRUMENTATION ENGINEERING TECHNICIAN

	2007	2008	% Change (07-08)	2008	2009	% Change (08-09)	2009	2010	% Change (09-10)	2010	2011	% Change (10-11)	% Mean Growth Rate (07-11)	5 Year Average Reg. Students
CAMBRIAN					2		2	2	0	2	5	150	75	3
CONFEDERATION	10	21	110	21	26	24	26	10	-62	10	22	120	48	18
→ FLEMING								21		21	6	-71	-71	14
LAMBTON	58	56	-3	56	62	11	62	56	-10	56	63	13	3	59
MOHAWK	16	19	19	19									19	18
NORTHERN	19	2	-89	2	14	600	14	15	7	15	18	20	134	14
ST. LAWRENCE	8	4	-50	4				10		10	4	-60	-55	6
Total	***111***	***102***	***-8***	***102***	***104***	***2***	***104***	***114***	***10***	***114***	***118***	***4***		

[1] Registration data obtained from the Program Counts by Applicant Type Report (RPT0050P) in the OCAS Reporting and Analytics Cube December 7, 2011. Some programs/colleges may not be included because they were missing MCU codes in the OCAS dataset Prepared by Fleming Data Research (07-2012)

Key Research Findings

Advanced Diploma

Program: 61011 - INSTRUMENTATION ENGINEERING TECHNOLOGY														
	2007	2008	% Change (07-08)	2008	2009	% Change (08-09)	2009	2010	% Change (09-10)	2010	2011	% Change (10-11)	% Mean Growth Rate (07-11)	5 Year Average Reg. Students
ST. LAWRENCE	19	18	-5	18	2	-89	2	21	950	21	16	-24	208	15
Total	***19***	***18***	***-5***	***18***	***2***	***-89***	***2***	***21***	***950***	***21***	***16***	***-24***		

Labour Market	• **WEAK**

Employment Ontario[2]

Industrial Instrument Technicians and Mechanics (NOC –2243)

- Employment Ontario Rating (2009-2013):
  - **Average**
- Education and Training
  - "Completion of secondary school is usually required. Completion of the Industrial Instrument Mechanic apprenticeship program or completion of a two-year college program in industrial instrumentation technology and several years of work experience are usually required for trade certification. Red Seal trade certification allows for inter-provincial mobility. Certification can also be obtained from the Ontario Association of Engineering Technicians and Technologists (OACETT) upon meeting educational requirements, supervised work experience, and writing a professional practice examination."
- Demand
  - "Opportunities for employment in this occupation are expected to be average over the period from 2009 to 2013. As more firms introduce automated production equipment, industrial instrument technicians and mechanics are needed to ensure these machines are well maintained. Manufacturing and communications and utilities industries are the main sources of jobs for this occupation. Industrial instrument technicians and mechanics are not as vulnerable to labour market fluctuations as compared to other manufacturing and plant workers. In an economic downturn, mechanics are still required to maintain expensive machinery and do major overhaul work."

  - "People working in this occupation should expect to need intermittent retraining and professional development to keep up with rapid technological change, such as the use of computer-based control systems."

[2]"2243 Industrial Instrument Technicians and Mechanics." *Employment Ontario*.N.p., n.d. Web. 4 Sept. 2012. <http://www.tcu.gov.on.ca/eng/labourmarket/ojf/pdf/2243_e.pdf>.

Key Research Findings

HRSDC[3]

Electrical and Electronics Engineering Technologists and Technicians (NOC –2243)

	Level	Share
Expansion Demand:	16,476	35%
Retirements:	24,882	53%
Other Replacement Demand:	2,992	6%
Emigration:	2,482	5%
Projected Job Openings:	46,832	100%
	Level	**Share**
School Leavers:	34,401	72%
Immigration:	8,896	19%
Other	4,175	9%
Projected Job Seekers:	47,472	100%

- "Based on projections and considering that labour supply and demand in this occupation were balanced over the 2008-2010 period, it is expected that the number of job seekers in this occupation will remain sufficient to fill the job openings over the 2011-2020 period. The majority of job openings will arise from retirements, but expansion demand will also create a significant number of job openings. The increase in job openings will be average, which is a clear improvement over the job losses experienced over the 2001-2010 period. In fact, industries related to communications and information technologies (including electronics) will pick up again in the coming years. The return to growth in this sector comes after troubled years that followed after the tech bubble burst. With regard to labour supply, the majority of job seekers will come from the school system. The nature of the occupation is also such that many immigrants will find employment in it over the projection period."

US Bureau of Labour[4]

Automation Technician

- "Many people think of automation as laborsaving technology. But it sure keeps Jim Duffell busy."

- "Jim is an automation technician. For the past 9 years, he has spent his workdays monitoring production equipment for a food manufacturing company in San Antonio, Texas. The company's products—mixes for biscuits, enchiladas, and gravy—are manufactured using fairly typical automation processes."

- "Defined simply, automation is a technique for making a device run or a process occur with minimal direct human intervention. But the functions and technologies involved in automated manufacturing are complex. Nearly all functions, from orders coming in to products going out, are subject to automation. The technologies include mechanical, electrical, and computer, among others."

[3] "Technical Occupations In Electronics And Electrical Engineering (224)." *Canadian Occupational Projection System (COPS)*.N.p., n.d. Web. 4 Sept. 2012. <http://www23.hrsdc.gc.ca/occupationsummarydetail.jsp?&tid=41>.

[4] "Automation Technician." *United States Department of Labour (Occupational Outlook Quarterly)*. Ed. John Mullins. N.p., 2010. Web. 4 Sept. 2012. <http://www.bls.gov/opub/ooq/2010/spring/yawhat.pdf>.

Key Research Findings

- “And it is the job of automation technicians like Jim to monitor, troubleshoot, and repair these complex systems.”I go from one piece of equipment to another," says Jim. "I’m on my feet most of the day.'”

- “In the company where Jim works, ingredients for the mixes are blended, stored, and packaged by machines that are controlled by computerized devices. These devices, known as programmable logic controllers, regulate the weight and quantity of ingredients, transmission of mixes to storage areas, and packaging and shipment of final products. Additionally, customer order information is automated to reduce excess inventory.”

- “When production runs smoothly, Jim concentrates on preventative maintenance and upkeep. He uses a variety of instruments to ensure that all equipment is operating within a given tolerance, or range. For example, he may use standardized weights to make certain that the appropriate amount of each ingredient in the biscuit mix is being dispensed.”

- “If part of the process isn’t working correctly it can be an alarming experience—literally. When a piece of equipment begins functioning outside its assigned tolerance, an alarm sounds. A first alarm makes Jim aware of a problem but allows production to continue while Jim goes through a logical sequence to isolate, and fix, the problem. He must complete this process before a second alarm sounds, which indicates a more severe problem and shuts down production. Many manufacturing companies operate 24 hours a day. Shutdowns are costly, so automation technicians must be able to identify and solve problems quickly.”

- “Automation technicians may have a variety of job titles, depending on their specific duties and the industry in which they work. Jim’s title is "lead production support technician." Other common titles include "control technician" and "instrumentation technician." But whatever they are called, automation technicians need certain skills to perform their jobs.”

- “Critical thinking and problem-solving skills are a must, as is the ability to work well under pressure. Automation technicians are sometimes asked to prepare reports for managers or other nontechnical audiences, so they should be able to write well. And because their job may involve training junior staff, automation technicians need good interpersonal and communication skills. "Nine times out of ten, the work I’m doing is more complicated than the trainees have been prepared for," says Jim. "It’s my job to explain the information in a way that’s clear enough for those new to this work to understand.”

- “Above-average proficiency in computers is also critical for these technicians, because much of their job involves minor programming. And nearly all automation technology involves measurement, so aptitude in mathematics is important.”

- “Many automation technicians have a background in either mechanics or electronics. Jim, for example, started out as a maintenance electrician for another food manufacturer. There, he learned programmable logic controller electronics—and when that company downsized, Jim’s knowledge gave him an edge in applying for his current position.”

Key Research Findings

- “Like Jim, many automation technicians build their skills through years of on-the-job training. But that training is usually supplemented with additional preparation, such as completing certification programs that are conducted by producers of automation equipment. Jim has completed four such courses related to equipment he oversees at work.”

- “Jim advises prospective technicians today to get a postsecondary degree.”It’s possible to get a job if you have a lot of experience," he says, "but these days, most companies are looking for people with an associate degree." That advice is echoed by industry sources, who stress the importance of education. Some institutions offer training specifically in automation technology, and many others offer coursework that can be tailored to duplicate such programs. Two-year programs are available at some community colleges. Vocational-technical schools, unions, and industry trade associations also offer training.”

- “Formal training should cover four basic areas: mechanics, electronics, computer science, and process control. These disciplines—known together as mechatronics—are the core of automation technology.”

- “The U.S. Bureau of Labor Statistics (BLS) does not collect employment or wage data on automation technicians. Industry sources suggest, however, that the annual wage is about $50,000, an amount similar to the May 2008 wage for closely related engineering technician occupations for which BLS does collect data. The annual median wage for U.S. workers across all occupations in May 2008 was $32,390.”

- “Jim’s job can be demanding; he’s often required to put in overtime and to be on call. But he finds his work gratifying. "Every day, there’s a different challenge," he says, "and every day I learn something."

Key Research Findings

Sector Council Report

Industrial instrument technicians and mechanics (for the province of Ontario)[5]

"For Labour Market Rankings: 1=Excess supply... 5=Excess demand"

Data Type	Units	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Employment (construction, industrial maintenance)	# of Workers	30	42	-	-	-	-	-	-	-	21	22	22	22	23	23
Employment (construction, maintenance total)	# of Workers	31	43	-	-	-	-	-	-	-	22	23	23	23	24	24
Employment (construction, new)	# of Workers	69	67	-	-	-	-	-	-	-	87	95	103	113	109	95
Employment (Non-Residential)	# of Workers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Employment (Residential)	# of Workers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Employment (Total)	# of Workers	100	109	-	-	-	-	-	-	-	110	118	126	136	132	119
Excess Supply (Total)	# of Workers	12	15	-	-	-	-	-	-	-	6	7	8	8	14	19
Excess Supply Rate (Total)	%	10.7	12.0	-	-	-	-	-	-	-	5.0	5.9	5.9	5.6	9.5	13.6
Labour Force (Total)	# of Workers	112	124	-	-	-	-	-	-	-	115	125	134	145	146	138
Labour Force - Average Age	# of Workers	46	45	-	-	-	-	-	-	-	41	41	41	40	40	41
Labour Force Change: Construction	# of Workers	2	12	-	-	-	-	-	-	-	11	10	9	10	2	-8
Labour Force Change: Mortality (Deaths)	# of Workers	-	0	-	-	-	-	-	-	-	0	0	0	0	0	0
Labour Force Change: Net In-Mobility	# of Workers	-	14	-	-	-	-	-	-	-	13	11	10	11	3	-8
Labour Force Change: New Entrants	# of Workers	-	3	-	-	-	-	-	-	-	2	2	3	3	3	3
Labour Force Change: Retirements (construction)	# of Workers	-	4	-	-	-	-	-	-	-	3	3	3	3	3	3
Labour Market Rankings	Rankings (?)	-	-	-	-	-	-	-	-	-	5	4	4	4	3	1
Peak Employment (Total)	# of Workers	109	120	-	-	-	-	-	-	-	120	129	138	149	145	130
Peak Excess Supply (Total)	# of Workers	10	13	-	-	-	-	-	-	-	3	4	5	5	11	16
Peak Excess Supply Rate (Total)	%	8	10	-	-	-	-	-	-	-	2	3	3	3	7	11
Peak Labour Force (Total)	# of Workers	119	132	-	-	-	-	-	-	-	123	133	143	154	155	146

[5] *Construction Sector Council -Construction Forecasts*.N.p., n.d. Web. 31 Aug. 2012. <http://www.constructionforecasts.ca/>.

Key Research Findings

Employment Profile[6]

In 2010-2011, **11.9%** of graduates were employed in a full time position which related to this program of study provincially

Instrumentation

Total Graduates:	132	Total Graduates in Survey:	97	Response Rate:	73.5%

594 graduates were reported after the survey window had closed. While program information for these graduates has been included wherever possible, these graduates are not included in survey results, such as response rates.

Programs in Instrumentation

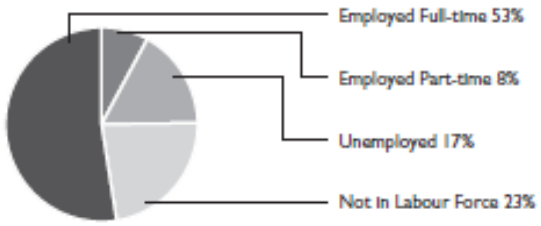
Programs	Duration	Total Grads	Total in Survey	Total in Labour Force	Colleges
Automation Engineering Technology	3 Years	13	7	6	Cambrian
Automation Technician	2 Years	1	1	1	Sir Sandford Fleming
Instrumentation Engineering Technician	2 Years	59	42	23	Cambrian, Confederation, Lambton, Mohawk, Northern, Sault, St. Lawrence
Instrumentation Engineering Technology	3 Years	59	47	45	Fanshawe, Lambton, St. Lawrence

Summary of Survey Data

	Program Cluster	All Programs
Survey Population	97	50,622
Labour Force Participation	77%	74%
Employment Rate[a]	**79%**	**83%**
Employed Part-time[a]	11%	18%
Employed Full-time[a]	68%	65%
Average Annual Earnings – Total	**$42,192**	**$33,199**
Average Annual Earnings – Female	–	$31,897
Average Annual Earnings – Male	$42,278	$34,607
Graduate Satisfaction	67%	79%
Employer Satisfaction	93%	93%

a. As a percentage of graduates in the labour force.

Graduate Outcomes for Program Cluster (as a percentage of all respondents)



[6] "Employment Profile." *Ontario*. N.p., 2011. Web. 19 July 2012. <http://www.tcu.gov.on.ca/pepg/audiences/colleges/serials/eprofile09-10/profile10.pdf>.

Key Research Findings

Instrumentation

Top Five Industries of Employment

	#	%
Utilities	8	13.6%
Primary Metal Manufacturing	6	10.2%
Professional, Scientific and Technical Services	5	8.5%
Specialty Trade Contractors	5	8.5%
Administrative and Support Services	4	6.8%

Top Five Occupational Categories

	#	%
Retail Salespersons and Sales Clerks	10	16.9%
Construction Estimators	6	10.2%
Electrical and Electronics Engineers	5	8.5%
Power Systems and Power Station Operators	5	8.5%
Various* (each at this level of participation)	3	5.1%

* Electrical and Electronics Engineering Technologists and Technicians; Industrial Electricians; Mechanical Engineering Technologists and Technicians

Summary of Graduate Outcomes by Program

	Full-time Employed, Program Related		Full-time Employed, Program Unrelated		Part-time Employed, Program Related		Part-time Employed, Program Unrelated		Unemployed		Not in Labour Force	
	#	%	#	%	#	%	#	%	#	%	#	%
Automation Engineering Technology	4	57.1	1	14.3	–	–	–	–	1	14.3	1	14.3
Instrumentation Engineering Technician	5	11.9	9	21.4	–	–	3	7.1	6	14.3	19	45.2
Instrumentation Engineering Technology	24	51.1	8	17.0	1	2.1	3	6.4	9	19.1	2	4.3
All Programs in Cluster*	**33**	**34.4**	**18**	**18.8**	**1**	**1.0**	**6**	**6.3**	**16**	**16.7**	**22**	**22.9**

* Does not include 1 program with fewer than 5 graduates in the labour force.

Earnings of Full-time Employed Participants

Program	Average – Females	Average – Males	Median – Females	Median – Males	Average for Program	Median for Program
Automation Engineering Technology	–	–	–	–	–	–
Instrumentation Engineering Technician	–	$34,950	–	$36,500	$34,758	$36,500
Instrumentation Engineering Technology	–	$46,098	–	$41,250	$46,314	$41,899
All Programs in Cluster*	**–**	**$42,278**	**–**	**$40,000**	**$42,192**	**$40,000**

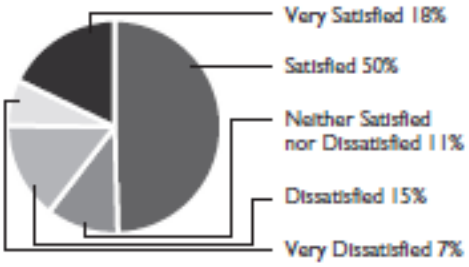
* Does not include 1 program with fewer than 5 graduates in the labour force.

Key Research Findings

Instrumentation

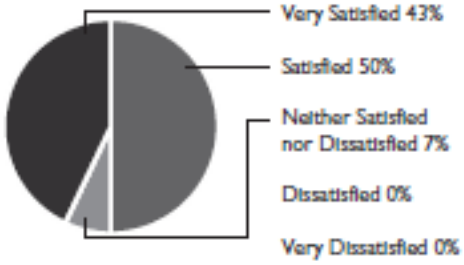
Program Cluster Satisfaction

Graduate Satisfaction with the usefulness of his/her college education in achieving his/her goals after graduation:*



* 95 graduates participated in this question.

Employer Satisfaction with employee overall college preparation for the type of work he/she was doing:*



* 14 employers participated in this survey.

Program Cluster Historical Data

	00-01 Grads	01-02 Grads	02-03 Grads	03-04 Grads	04-05 Grads	05-06 Grads	06-07 Grads	07-08 Grads	08-09 Grads	09-10 Grads
Percentage Employed	86.8%	90.0%	95.5%	88.3%	88.3%	72.9%	89.7%	89.7%	80.0%	78.7%
Percentage Employed Full-time	85.7%	88.8%	87.9%	85.0%	83.5%	71.8%	85.9%	84.6%	78.0%	68.0%
Percentage Employed Full-time Related Jobs	71.4%	66.3%	60.6%	55.0%	59.2%	56.5%	67.9%	62.8%	52.0%	44.0%
Average Annual Salary Full-time Related Jobs	$38,914	$42,119	$45,079	$41,364	$40,839	$44,101	$42,910	$49,701	$52,747	$49,661

Key Research Findings

Working in Canada[7]

Industrial Instrument Technicians and Mechanics (NOC 2243)

- **Employment Rating:**
  - **N/A**
- **Wage Range by Region:**

Location	Wage ($/hr)		
	Low	Median	High
Ontario	21.15	27.00	46.00
Hamilton--Niagara Peninsula Region	21.15	27.00	46.00
Kingston - Pembroke Region	N/A	N/A	N/A
Kitchener--Waterloo--Barrie Region	21.15	27.00	46.00
London Region	N/A	N/A	N/A
Muskoka-Kawarthas Region	N/A	N/A	N/A
Northeast Region	N/A	N/A	N/A
Northwest Region	21.15	27.00	46.00
Ottawa Region	21.15	27.00	46.00
Stratford--Bruce Peninsula Region	N/A	N/A	N/A
Toronto Region	21.15	27.00	46.00
Windsor-Sarnia Region	12.01	32.94	50.62

Competitive Analysis[8]	• **WEAK**

The following information consists of OCAS yearly fall application and registration data as well as a conversion ratio for each program under this category:

Diploma

- Fleming's ratio **(7:1)**was much lower than the system's **(3:1)** in 2011
- Overall, Cambrian and Northern had the highest ratio in 2011 **(2:1)** and Fleming had the lowest

Advanced Diploma

- St. Lawrence had a relatively good conversion ratio in 2011 **(3:1)**

[7]"Electrical and Electronic Engineering Technicians." *Working In Canada*.N.p., n.d. Web. 4 Sept. 2012. <http://www.workingincanada.gc.ca/report-eng.do?area=8792&lang=eng&noc=2241&action=final&ln=p®ionKeyword=Peterborough%2C+Ontario%5C&s=1&source=0&titleKeyword=electrical+engineering+technician#wages>.

[8] Application data obtained from OCAS College Count Cube October 19, 2011Registration data obtained from the Program Counts by Applicant Type Report (RPT0050P) in the OCAS Reporting and Analytics Cube December 7, 2011.Some programs/colleges may not be included because they were missing MCU codes in the OCAS dataset Prepared by Fleming Data Research (07-2012)

Key Research Findings

Diploma

Program: 51011 - INSTRUMENTATION ENGINEERING TECHNICIAN														
	App. 2007	Reg. 2007	Conversion Ratio	App. 2008	Reg. 2008	Conversion Ratio	App. 2009	Reg. 2009	Conversion Ratio	App. 2010	Reg. 2010	Conversion Ratio	App. 2011	Reg. 2011	Conversion Ratio
CAMBRIAN	0			0			19	2	10:1	18	2	9:1	12	5	2:1
CONFEDERATION	51	10	5:1	57	21	3:1	78	26	3:1	42	10	4:1	62	22	3:1
→ FLEMING	0			0			0			46	21	2:1	41	6	7:1
LAMBTON	211	58	4:1	230	56	4:1	205	62	3:1	179	56	3:1	168	63	3:1
MOHAWK	86	16	5:1	77	19	4:1	69			0			0		
NORTHERN	52	19	3:1	63	2	32:1	57	14	4:1	57	15	4:1	39	18	2:1
ST. LAWRENCE	42	8	5:1	37	4	9:1	16			46	10	5:1	22	4	6:1
Total	***442***	***111***	***4:1***	***464***	***102***	***5:1***	***444***	***104***	***4:1***	***388***	***114***	***3:1***	***344***	***118***	***3:1***

Advanced Diploma

Program: 61011 - INSTRUMENTATION ENGINEERING TECHNOLOGY														
	App. 2007	Reg. 2007	Conversion Ratio	App. 2008	Reg. 2008	Conversion Ratio	App. 2009	Reg. 2009	Conversion Ratio	App. 2010	Reg. 2010	Conversion Ratio	App. 2011	Reg. 2011	Conversion Ratio
ST. LAWRENCE	63	19	3:1	48	18	3:1	22	2	11:1	54	21	3:1	47	16	3:1
Total	***63***	***19***	***3:1***	***48***	***18***	***3:1***	***22***	***2***	***11:1***	***54***	***21***	***3:1***	***47***	***16***	***3:1***

Financial Analysis

• **STRONG**

Source: Program Costing Analysis 2010/2011

- Contribution to Overhead: 37.9%
- Program Weight: 1.30
- Funding Unit: 2.30

Key Performance Indicators

• **WEAK**

Source: Key Performance Indicator Summary 5 Year Historical Overview KPI Data from Reporting Years 2008-2012

KPI1-Graduation Rate	-
KPI2-Working	-
KPI3-Working Related	-
KPI4-Grad. Satisfaction	-
KPI8-Student Satisfaction-Learning	-40% below system
KPI9-Student Satisfaction- Teachers	-42% below system
KPI11-Grad. Satisfaction-Program	-

Key Research Findings

Resource Analysis

Equipment

Staffing

Space

Key Research Findings

Appendix

The following is the original environmental scan conducted by the Library Researchers to form the basis of the previous summary of Key Research Findings Report.

INSTRUMENTATION & CONTROL ENGINEERING TECHNICIAN
Profession Research August 2012

Overview of the Profession

NOC: 2243 Industrial Instrument Technicians and Mechanics

Main duties

Industrial instrument technicians and mechanics perform some or all of the following duties:

- Consult manufacturer's manuals, circuit diagrams and blueprints to determine tests and maintenance procedures for instruments used for measuring and controlling flow, level, pressure, temperature, chemical composition and other variables in manufacturing and processing
- Inspect and test operation of instruments and systems to diagnose faults using pneumatic, electrical and electronic testing devices and precision measuring instruments
- Repair and adjust system components, such as sensors, transmitters and programmable logic controllers, or remove and replace defective parts
- Calibrate components and instruments according to manufacturers' specifications
- Perform scheduled preventive maintenance work and complete test and maintenance reports
- Install control and measurement instruments on existing and new plant equipment and processes
- Consult with and advise process operators.

http://www30.hrsdc.gc.ca/NOC/English/NOC/2006/ProfileQuickSearch.aspx?val=2&val1=2243&val65=*

Common Job Titles

The following list represents the list of common job titles that belong to the grouping: **Industrial Instrument Technicians and Mechanics** (NOC 2243)

- apprentice industrial instrument mechanic
- apprentice instrument mechanic
- control technician, nuclear generating station and heavy water plant
- heavy water plant control technician
- industrial instrument mechanic
- industrial instrument panel repairer
- industrial instrument technician
- industrial process control equipment repairer
- instrumentation and electrical technician, industrial
- instrumentation technician, industrial

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- instrument maintenance mechanic
- instrument mechanic - utilities
- instrument technician, industrial
- mechanic, industrial instrument
- nuclear generating station and heavy water plant control technician
- nucleonic controller repairer
- precision instrument mechanic
- process control equipment mechanic
- process control equipment repairer
- repairer, industrial process control equipment
- repairer, nucleonic controllers
- service technician, industrial instruments
- service technician, process control equipment
- technician, industrial instruments

http://www23.hrsdc.gc.ca/occupationsummarydetail.jsp?&tid=41

Labour Market

Industrial Instrument Technicians and Mechanics (NOC 2243)
Muskoka-Kawarthas Region, Ontario
Labour Market Information Dashboard

Jobs	Median Wage	Outlook	Certification
0 Job View Job Opportunities section	N/A View Wages section	N/A View Outlook section	Regulated

Description
Industrial instrument technicians and mechanics repair, maintain, calibrate, adjust, and install industrial measuring and controlling instrumentation. They are employed by pulp and paper processing companies, nuclear and hydro power generating companies, mining, petrochemical and natural gas companies, industrial instrument and other manufacturing companies, and by industrial instrument servicing establishments.
Included Job Titles
apprentice industrial instrument mechanic, industrial instrument mechanic, instrument technician, industrial, instrumentation technician, industrial, process control equipment mechanic.
+ View more
Job Duties
Industrial instrument technicians and mechanics perform some or all of the following duties:

- Consult manufacturer's manuals, circuit diagrams and blueprints to determine tests and maintenance procedures for instruments used for measuring and controlling flow, level, pressure, temperature, chemical composition and other variables in manufacturing and processing

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- Inspect and test operation of instruments and systems to diagnose faults using pneumatic, electrical and electronic testing devices and precision measuring instruments
- Repair and adjust system components, such as sensors, transmitters and programmable logic controllers, or remove and replace defective parts
- Calibrate components and instruments according to manufacturers' specifications
- Perform scheduled preventive maintenance work and complete test and maintenance reports
- Install control and measurement instruments on existing and new plant equipment and processes
- Consult with and advise process operators.

Related Occupations

- Aircraft Instrument, Electrical and Avionics Mechanics, Technicians and Inspectors
- Electrical and Electronics Engineering Technologists and Technicians
- Construction Millwrights and Industrial Mechanics (Except Textile)

Included Cities in this region

Peterborough, Bracebridge, Brighton, Cobourg, Gravenhurst, Huntsville, Lindsay, Port Hope, Trent Hills, Bobcaygeon, Bridgenorth, Chemong Heights, Chemong Park, Fenelon Falls, Fife's Bay, Lakefield, Omemee, Stewart Heights

http://www.workingincanada.gc.ca/print_report-eng.do?noc=2243&area=8792

Technical Occupations In Electronics And Electrical Engineering (224)

Skill Level:
Occupations Usually Requiring College or Apprenticeship Training
Occupations in this Group:
Electrical and Electronics Engineering Technologists and Technicians (2241),Electronic Service Technicians (Household and Business Equipment) (2242),Industrial Instrument Technicians and Mechanics (2243),Aircraft Instrument, Electrical and Avionics Mechanics, Technicians and Inspectors (2244)
Employment (non-student) in 2010:
109,759
Median Age of workers in 2010:
39.9 years old
Average Retirement Age in 2010:
59 years old
Over the 2008-2010 period, employment in this occupation grew slightly but the unemployment rate also increased and did so more quickly than the average for all occupations. The average hourly wage for this occupation also increased a little more quickly than for all occupations. According to key labour market indicators, the number of job seekers was sufficient to fill the job openings in this occupation. Over the 2011-2020 period, an occupation will be in excess demand (a shortage of workers) if the projected number of job openings is significantly greater than the projected number of job seekers. An occupation will be in excess supply (a surplus of workers) if the projected number of job openings is smaller than the projected number of job seekers. For **Technical Occupations In Electronics And Electrical Engineering**, over the 2011-2020 period, job openings (arising from expansion demand and replacement demand) are expected to total **46,832** and **47,472** job seekers (arising from school leavers, immigration and mobility) are expected to be available to fill the job openings.

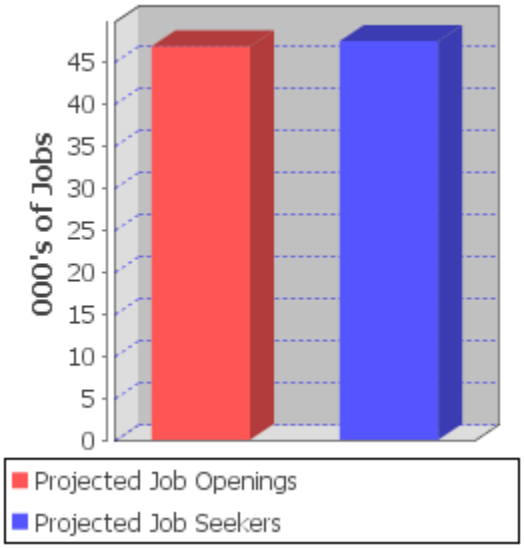
Key Research Findings

Based on projections and considering that labour supply and demand in this occupation were balanced over the 2008-2010 period, it is expected that the number of job seekers in this occupation will remain sufficient to fill the job openings over the 2011-2020 period. The majority of job openings will arise from retirements, but expansion demand will also create a significant number of job openings. The increase in job openings will be average, which is a clear improvement over the job losses experienced over the 2001-2010 period. In fact, industries related to communications and information technologies (including electronics) will pick up again in the coming years. The return to growth in this sector comes after troubled years that followed after the tech bubble burst. With regard to labour supply, the majority of job seekers will come from the school system. The nature of the occupation is also such that many immigrants will find employment in it over the projection period.

Projection of Cumulative Job Openings and Job Seekers over the Period of 2011-2020

	Level	Share
Expansion Demand:	16,476	35%
Retirements:	24,882	53%
Other Replacement Demand:	2,992	6%
Emigration:	2,482	5%
Projected Job Openings:	46,832	100%

	Level	Share
School Leavers:	34,401	72%
Immigration:	8,896	19%
Other	4,175	9%
Projected Job Seekers:	47,472	100%



http://www23.hrsdc.gc.ca/occupationsummarydetail.jsp?&tid=41

U.S. Bureau of Labor

Key Research Findings

Spring 2010 Vol. 54, Number 1

Automation technician
John Mullins
Economist
Download the PDF (323K)
You're a *what* from past issues

Many people think of automation as laborsaving technology. But it sure keeps Jim Duffell busy.

Jim is an automation technician. For the past 9 years, he has spent his workdays monitoring production equipment for a food manufacturing company in San Antonio, Texas. The company's products—mixes for biscuits, enchiladas, and gravy—are manufactured using fairly typical automation processes.

Defined simply, automation is a technique for making a device run or a process occur with minimal direct human intervention. But the functions and technologies involved in automated manufacturing are complex. Nearly all functions, from orders coming in to products going out, are subject to automation. The technologies include mechanical, electrical, and computer, among others.

And it is the job of automation technicians like Jim to monitor, troubleshoot, and repair these complex systems. "I go from one piece of equipment to another," says Jim. "I'm on my feet most of the day."

In the company where Jim works, ingredients for the mixes are blended, stored, and packaged by machines that are controlled by computerized devices. These devices, known as programmable logic controllers, regulate the weight and quantity of ingredients, transmission of mixes to storage areas, and packaging and shipment of final products. Additionally, customer order information is

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automated to reduce excess inventory.

When production runs smoothly, Jim concentrates on preventative maintenance and upkeep. He uses a variety of instruments to ensure that all equipment is operating within a given tolerance, or range. For example, he may use standardized weights to make certain that the appropriate amount of each ingredient in the biscuit mix is being dispensed.

If part of the process isn't working correctly it can be an alarming experience—literally. When a piece of equipment begins functioning outside its assigned tolerance, an alarm sounds. A first alarm makes Jim aware of a problem but allows production to continue while Jim goes through a logical sequence to isolate, and fix, the problem. He must complete this process before a second alarm sounds, which indicates a more severe problem and shuts down production. Many manufacturing companies operate 24 hours a day. Shutdowns are costly, so automation technicians must be able to identify and solve problems quickly.

Automation technicians may have a variety of job titles, depending on their specific duties and the industry in which they work. Jim's title is "lead production support technician." Other common titles include "control technician" and "instrumentation technician." But whatever they are called, automation technicians need certain skills to perform their jobs.

Critical thinking and problem-solving skills are a must, as is the ability to work well under pressure. Automation technicians are sometimes asked to prepare reports for managers or other nontechnical audiences, so they should be able to write well. And because their job may involve training junior staff, automation technicians need good interpersonal and communication skills. "Nine times out of ten, the work I'm doing is more complicated than the trainees have been prepared for," says Jim. "It's my job to explain the information in a way that's clear enough for those new to this work to understand."

Above-average proficiency in computers is also critical for these technicians, because much of their job involves minor programming. And nearly all automation technology involves measurement, so aptitude in mathematics is important.

Many automation technicians have a background in either mechanics or electronics. Jim, for example, started out as a maintenance electrician for another food manufacturer. There, he learned programmable logic controller electronics—and when that company downsized, Jim's knowledge gave him an edge in applying for his current position.

Like Jim, many automation technicians build their skills through years of on-the-job training. But that training is usually supplemented with additional preparation, such as completing certification programs that are conducted by producers of automation equipment. Jim has completed four such courses related to equipment he oversees at

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work.
Jim advises prospective technicians today to get a postsecondary degree. "It's possible to get a job if you have a lot of experience," he says, "but these days, most companies are looking for people with an associate degree." That advice is echoed by industry sources, who stress the importance of education. Some institutions offer training specifically in automation technology, and many others offer coursework that can be tailored to duplicate such programs. Two-year programs are available at some community colleges. Vocational-technical schools, unions, and industry trade associations also offer training.
Formal training should cover four basic areas: mechanics, electronics, computer science, and process control. These disciplines—known together as mechatronics—are the core of automation technology.
The U.S. Bureau of Labor Statistics (BLS) does not collect employment or wage data on automation technicians. Industry sources suggest, however, that the annual wage is about $50,000, an amount similar to the May 2008 wage for closely related engineering technician occupations for which BLS does collect data. The annual median wage for U.S. workers across all occupations in May 2008 was $32,390.
Jim's job can be demanding; he's often required to put in overtime and to be on call. But he finds his work gratifying. "Every day, there's a different challenge," he says, "and every day I learn something."

http://www.bls.gov/opub/ooq/2010/spring/yawhat.htm

Regulatory Body
This profession is regulated.

Address:	OACETT 10 Four Seasons Place, Suite 404 Etobicoke, Ontario M9B 6H7
Phone:	416-621-9621
Fax:	416-621-8694
Email:	info@oacett.org
Web Site:	www.oacett.org
Other Contact Information:	Information for internationally trained individuals is available on the Ontario Ministry of Citizenship and Immigration website. View a detailed profile of information for engineering technician and technologist.

http://www.workingincanada.gc.ca/job_titles-eng.do?area=8792&lang=eng&noc=2243&action=final&backurl=%2Freport-eng.do%3Farea%3D8792%26lang%3Deng%26noc%3D2243%26action%3Dfinal%26regionKeyword%3DPeterborough%252COntario%26source%3D2%26titleKeyword%3Dinstrumentation%2Btechnician%25

Key Research Findings

2C%2Bindustrial&regionKeyword=Peterborough%2COntario&source=2&titleKeyword=instrumentation+technician%2C+industrial

Employment Requirements

- Completion of secondary school is usually required.
- Completion of a four- or five-year apprenticeship program in industrial instrument repair
  or
  Completion of a two-year college program in industrial instrumentation technology and several years of work experience are usually required for trade certification.
- Industrial instrument mechanic trade certification is available, but voluntary, in Newfoundland and Labrador, Nova Scotia, Prince Edward Island, New Brunswick, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, Nunavut, the Northwest Territories and the Yukon.
- Interprovincial trade certification (Red Seal) is also available to qualified industrial instrument mechanics.
- In Quebec, membership in the regulatory body is required to use the title of Professional Technologist.
-

http://www30.hrsdc.gc.ca/NOC/English/NOC/2006/ProfileQuickSearch.aspx?val=2&val1=2243&val65=*

Impact of Digital Technology

All essential skills are affected by the introduction of technology in the workplace. Industrial instrument mechanics' ability to adapt to new technologies is strongly related to their skill levels across the essential skills, including reading, writing, thinking and communication skills. Technologies are transforming the ways in which workers obtain, process and communicate information, and the types of skills needed to perform in their jobs. Industrial instrument mechanics require advanced digital skills to install, program and service human–machine interfaces, supervisory control and data acquisition (SCADA) systems, distributed control systems (DCS) and programmable logic controllers. They also must be able to operate computerized tools and equipment, such as oscilloscopes, to perform their duties. Their requirements for digital skills will increase as electronic technologies continue to advance. Technology in the workplace further affects the complexity of tasks related to the essential skills required for this occupation. For example, the sophisticated electronic control systems used in industrial equipment has increased the complexity of wiring schematics and other diagrams. In addition, workers need the skills to use, install and troubleshoot increasingly complex software applications (e.g. distributed control system software). On the other hand, electronic databases and keyword search functions make it easier to find information (e.g. specifications and repair parts), while software and hardware developers continue to improve ease of use for workers through touch-screen technology, built-in self-help tutorials and user-friendly software applications. Workers can also complete documents, such as work orders, more quickly and accurately using specialized software applications that input data automatically.
http://www.hrsdc.gc.ca/eng/workplaceskills/LES/tools_resources/NOC/industrial_instrument.shtml