

CALGARY: ENGINEERED STRENGTH

ENGINEERING SECTOR PROFILE





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Calgary Economic Development has compiled this profile to give interested businesses and individuals an overview of Calgary's engineering services and to highlight the recent performance, future opportunities and the institutional support that contributes to the thriving development of engineering services occupations and industry.

There are a myriad of factors that distinguish Calgary as one of the premier cities in North America for those engaged in the engineering services profession. Recognized internationally as a centre of dynamic, entrepreneurial, and resource-based industrial activity, Calgary's overall economic performance is incredibly strong, and the companies that utilize engineering services are stable and rapidly expanding. In addition to providing conventional services in support of the construction industry and the public sector, Calgary's engineering services are particularly immersed in responding to the opportunities arising from the exponential growth of the energy sector. In oil sands projects alone, energy sector investments of over \$60 billion are scheduled to occur over the next 10 years.

Calgary's post-secondary educational institutions are augmenting the flow of new engineering graduates to the labour pool and providing innovative research to enhance the technical capabilities of the engineering profession. Calgary has earned the reputation as a highly desirable place to live and work and has successfully leveraged that advantage into achieving the most prolific increase in concentration of engineering expertise of any city in Canada.

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CALGARY ECONOMIC DEVELOPMENT



Calgary Economic Development (CED) is Calgary's lead economic development agency, committed to marketing the Calgary Region's competitive advantages, pro-business climate and superior lifestyle across Canada and around the world.

Our organization works closely with business, partner agencies, educational institutions, the community and all levels of government. We focus on leveraging Calgary's abundant energy and innovative spirit to sustain economic growth.

Calgary is Western Canada's business centre and has more head offices per capita than any other Canadian city. Its key economic drivers are Transportation and Logistics, Information and Communication Technology, Energy, Manufacturing, Financial and Business Services, Film and Creative Industries. CED concentrates its activities on developing these sectors; an experienced economic development professional is dedicated to each sector. Using a hands-on approach, we are furthering the success and growth of existing businesses, helping small and medium businesses grow their markets globally and promoting the Calgary Region as the ideal location for business investment.

Our operating principles allow us to get the job done - by working with business and partners proactively, collaboratively and responsively.

Proud of its past and focused on tomorrow, Calgary is Canada's leading business opportunity centre. To make Calgary a part of your tomorrow, let us point you in the right direction.

www.calgaryeconomicdevelopment.com

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CALGARY'S ENGINEERING SERVICES - THE FOUNDATIONS OF SUCCESS

AN OPPORTUNE BUSINESS CLIMATE

In the Calgary Region, engineering services are provided across a large number of diverse sectors from oil and gas, construction, and traditional engineering, to municipal infrastructure and advanced technology design. There is ample evidence that Calgary's business climate is rich in the advantages that support the substantial optimism for the future that is shared by those engaged in the engineering services profession. Calgary continues to enjoy a very strong and buoyant economy in a very fiscally healthy and stable province. The Conference Board's Metropolitan Outlook – Spring 2006, projects that Calgary will lead the nation in real GDP growth with an increase of 4% in 2006, and also forecasts that total employment growth will reach 1.7%, and that retail sales will increase by 6.9%.



These are currently 26,500 engineering and technology services employees in Calgary, a figure that has been rising steadily throughout the last decade. Calgary's engineering services job creation has surpassed both that of Alberta and Canada. From 1994 to 2004, Calgary's engineering services job growth has averaged 9.3% each year compared to Alberta at 6.6% and Canada at 6.8%. During the same time period, Calgary's engineering services labour force has grown an average of 9.2% each year, which is 37% faster than Alberta's growth per year and almost 40% faster than

Canada's growth per year in the same occupations.

The impressive magnitude of the current and future engineering projects necessitate an increasing supply of qualified professionals to support and deliver each initiative. Calgary engineers and engineering companies enjoy a reputation of being among the best in the world as a result of the specialized work being done in the city itself and around the globe. The quality of the labour force is exceptionally high in Calgary and there is an excellent pool of dynamic and innovative engineering talent from which to draw. At 83.9 jobs per 1,000 persons, Calgary has the highest concentration of engineers and technologists among the six largest cities in Canada.

One unique advantage enjoyed in Calgary by the engineering services occupations is the number and complexity of the projects undertaken by clients in Calgary, notably the oil and gas industry, that will continue to escalate in keeping with the further development of Alberta's oil sands.

Calgary's post-secondary educational institutions support the development of engineering services professionals and provide the impetus for innovative ideas with leading-edge research and development facilities.

With a strong and expanding customer base, an abundance of diverse and complex projects and a highly skilled workforce, Calgary continues to solidify its position as the engineering services centre of Canada. By every traditional measurement used, Calgary's engineering services occupations are in a preeminent position in terms of current and future opportunities for companies and individuals in North America.

GROWTH, EXPANSION AND DEVELOPMENT OPPORTUNITIES

The breadth and scope of opportunities for the expansion of Calgary's engineering services are extensive and intricate. They include: the mammoth task of optimizing productivity from the oil sands; the continued growth of non-traditional energy sources; and the research, development and commercialization of new technology and processes.

General Growth Opportunities for Engineering Services

In keeping with the outlook of sustained overall economic vitality in the Calgary Region, and with particular regard to the outstanding performance of the energy sector, the consensus of opinion among local engineering services firms is that over the next decade, Calgary will be 'the' place to be in North America. Local firms believe that organic growth will be in the range of 7-10% per year over the next 7-10 years based on a variety of factors including:

- An announced \$50-\$60 billion worth of oil sands project investments in Alberta up to 2015, with an additional \$10 billion worth of infrastructure investments likely to be made in the next 5-7 years.
- A \$5 billion annual investment required to keep energy sector assets productive.
- Substantial growth in the next five years in non-traditional energy sources such as coal bed methane, coal gasification, oil shale, clean coal, heavy oil, and oil sands.
- The expectation that within the next 20 years, Calgary will experience the third largest global investment in oil and gas developments.
- An influx of new firms and skilled workers to Alberta based on its debt free status and favourable tax regime.
- Expanded opportunities in teaching, distance learning and telehealth for rural communities thanks to the completion of the Alberta SuperNet, which allows for high speed internet connectivity to every community in Alberta.



Specific Engineering Opportunities

The favourable business climate for engineering services extends well beyond the energy sector and includes the development and application of new technology and the proliferation of specialized engineering expertise across a broad spectrum of initiatives that include:

- New and growing opportunities in the field of water management.
- The application of new technology as exemplified by the preliminary work underway at the University of Calgary's Quantum Computing Department for enhanced information assurance and security.
- Capitalizing on Calgary's geophysics expertise and combining it with military expertise to revolutionize the technology related to land mine detection and removal, satisfying the growing global demand for such expertise.
- Newly developed talents such as rapid design and improved project management techniques honed through the design of Calgary's internationally renowned transportation and logistics systems.
- Further developing and marketing of Calgary's aerospace engineering capabilities in support of the United States planned space initiatives to the Moon and to Mars.
- Implementation of a high speed rail system between Calgary and Edmonton, creating a world-class transportation capability in Alberta.
- The development of advanced capabilities pertaining to the detection, identification and alerting of biological weapons in the homeland defence sector. This technology also has particular application to the protection of Alberta's energy production interests.
- Environmental reclamation expertise, which is particularly well suited to cold weather climates.

Opportunities Related to Engineering Services Personnel

The wide range of engineering opportunities inherent in the Calgary Region provides the means for industry personnel to acquire and enhance expertise that is marketable around the world. For example:

- The oil and gas industry has produced highly skilled project managers who have adapted to the specialized industry demands and produce superior results much faster.
- Calgary has a significant concentration of oil and gas engineering experts who are accustomed to dealing with unique challenges, including harsh climates and environmental protection needs, and whose expertise has significant export potential.
- Calgary exports technological knowledge and expertise to the world, and continued research and development is attracting additional international recognition and interest as future commercialization opportunities are anticipated.

Opportunities Related to the Business Environment

Calgary's engineering services firms and their employees have identified a number of factors that commend the Calgary Region as a desirable place to conduct business. Calgary's business advantages include:

- A critical mass of large clients and high concentration of head offices, especially in the energy industries, allowing engineering services firms the opportunity to elevate their profile through direct access to the major decision makers that have engineering project requirements.
- A hot job market, tremendous career opportunities, an international reputation as a world-class city offering a clean and safe living environment, high quality education, medical and transportation infrastructure, and an eclectic assortment of recreation, entertainment and culture attractions, all combine to make the city a highly desirable location to live and work.
- Increased infrastructure and urban renewal activity, facilitated by Alberta's debt-free status, means an increased need for engineering expertise from initial conceptualization and planning through to project completion.
- Progressive and flexible succession opportunities available to senior engineers who may be contemplating retirement whereby the transfer of their accumulated practical knowledge and technical expertise can be perpetuated through the mentoring of younger engineers on a flex time or part time work basis.
- Opportunities related to peripheral support functions of the engineering profession, such as increased recruiting services to augment the skilled labour supply, and streamlining of the license and certification process for engineers trained outside of North America.

LABOUR FORCE OVERVIEW

Labour Force Indicators



In the Labour Force Survey released in April 2006, Statistics Canada reported 65,000 (+3.7%) overall employment gains across Alberta during the previous 12 month period. These gains were concentrated in construction, professional, scientific and technical services, public administration and natural resources.

In 2005, all engineering services companies in the Calgary Region reported exceptional growth rates ranging from 7% to 55% per year over the past five years. This vigorous growth and consistent expansion

is expected to continue in keeping with the prosperous economic outlook. During the past decade, over 62% of all the engineering jobs in Alberta were created in the Calgary Region, and future employment opportunities look just as promising.

A review of occupational statistics compiled by Statistics Canada shows that during the period 1994-2004, employment in Calgary engineering services occupations consistently outperformed the provincial and national industry norms. During this time period, Calgary's engineering labour force grew by more than 91% and engineering job growth exceeded 93%. Calgary has the highest concentration of engineers and technologists among all major Canadian centres.

Labour Force

| Occupation Statistics Labour Force (1,000's) | 1994 | 2004 | Total Growth (%) | Average Annual Growth (%) |
|---|-------------|-------------|-----------------------------|--------------------------------------|
| Canada | 264.7 | 439.7 | 66.1 | 6.6 |
| Alberta | 32.4 | 54.0 | 66.7 | 6.7 |
| Calgary * | 14.3 | 27.4 | 91.6 | 9.2 |

** Calgary refers to Statistics Canada's classification of the Calgary Economic Region, #830*

The engineering services labour force in Calgary is growing dramatically faster than that of either Alberta or Canada in these occupations. Calgary's engineering labour force has grown an average of 9.2% each year for the past decade representing a 37% faster growth rate per year than Alberta's growth, and almost 40% per year faster than Canada's growth rate for this occupation.

Employment

| Occupation Statistics Employment (1,000's) | 1994 | 2004 | Total Growth (%) | Average Annual Growth (%) |
|---|-------------|-------------|-----------------------------|--------------------------------------|
| Canada | 251.9 | 423.5 | 68.1 | 6.8 |
| Alberta | 31.3 | 51.9 | 65.8 | 6.6 |
| Calgary | 13.7 | 26.5 | 93.4 | 9.3 |

Calgary's employment in engineering services occupations has grown even faster than its labour force growth. Calgary's engineering job creation abilities have surpassed both that of Alberta and Canada. Calgary's engineering job growth over the past 10 years has grown on average by 9.3% each year from 1994 to 2004, significantly higher than the growth rate for Alberta at 6.6% and Canada at 6.8%.

Employment Concentrations

| Occupation Statistics Employment Concentrations (Engineering Jobs as a % of all jobs) | 1994 | 2004 | Total Change |
|--|-------------|-------------|---------------------|
| Canada | 1.9 | 2.6 | 36.8 |
| Alberta | 2.4 | 2.9 | 20.1 |
| Calgary | 3.2 | 4.1 | 28.1 |

The engineering services occupations are notably more concentrated in Calgary than they are in either Alberta or Canada, and this concentration has grown significantly over the past decade. Currently, 4.1% of all jobs in Calgary are in the engineering services field, representing an increase of 28.1% since 1994. Currently, there are 26,500 engineering services jobs in Calgary, out of a total of 643,000 jobs.

Unemployment

| Occupation Statistics | | | |
|------------------------------|-------------|-------------|---------------------|
| Unemployment Rate (%) | 1994 | 2004 | Total Change |
| Canada | 4.8 | 3.7 | -22.9 |
| Alberta | 3.4 | 3.9 | +14.7 |
| Calgary | 4.2 | 3.3 | -21.4 |

As of the end of 2004, unemployment rates in engineering services occupations were very low in Calgary and the unemployment rate has declined by over 21% in the past decade.

Canadian Comparison

| Summary Concentration of Employment, By Education (select Canadian Cities, 2001) | | | | | |
|--|--------------------------------|--------------------------|--------------------------------|---|---|
| City | Engineers per 1000 Jobs | Total Occupations | Engineering Occupations | Engineering & Technologist Occupations | Engineers & Technologist per 1000 Jobs |
| Vancouver | 995,315 | 35,290 | 35.5 | 71,780 | 72.1 |
| Edmonton | 503,355 | 12,245 | 24.3 | 40,250 | 80.0 |
| Calgary | 540,375 | 23,530 | 43.5 | 45,360 | 83.9 |
| Toronto | 2,413,100 | 103,350 | 42.8 | 178,170 | 73.8 |
| Ottawa | 561,875 | 25,670 | 45.7 | 39,545 | 70.4 |
| Montreal | 1,678,715 | 52,420 | 31.2 | 116,100 | 69.2 |

At 83.9 jobs per 1,000 people, Calgary has the highest concentration of engineers and technologists among the six largest cities in Canada.

For further details on 'Occupational Classifications', 'Labour Force by Occupation' and 'Employment by Occupation', see Appendices 1, 3 and 4 respectively. These appendix tables provide detailed data on the major occupational classifications used for analysis in this sector profile, as well as the national, provincial and Calgary Region trends for labour force and employment from 1994 to 2004.

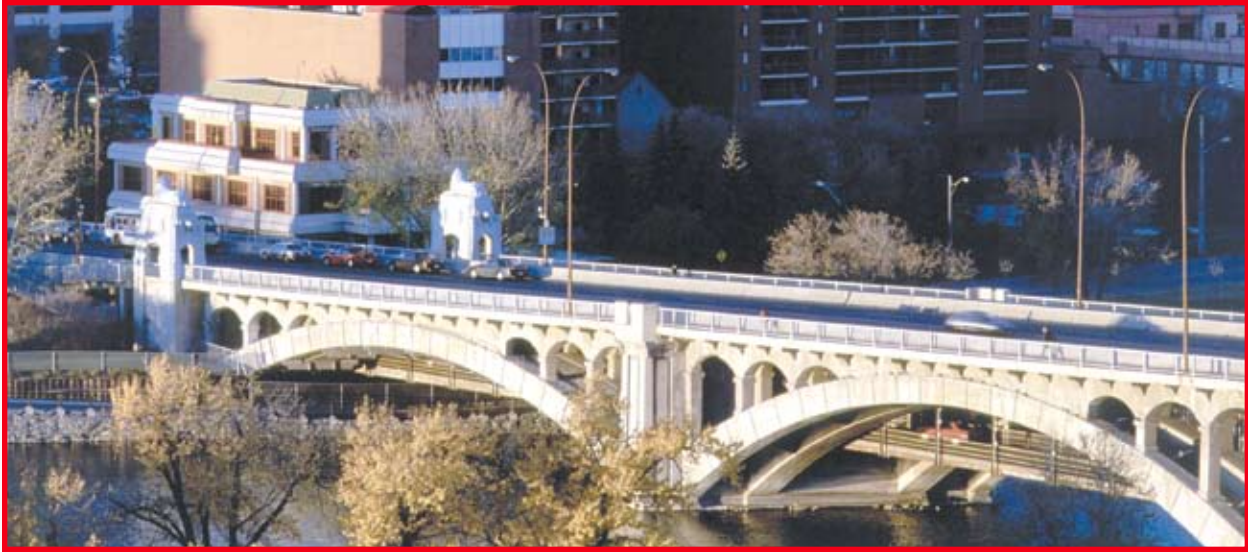


Engineering Professions in Calgary

Calgary has a diverse range of engineering expertise and skill sets. Almost 65% of the engineering services sector jobs are professional in nature. Of the 26,500 employees in Calgary's engineering services sector, the largest group is represented by the 9,700 civil, mechanical, electrical and chemical engineers. In addition, Calgary's concentration of technologists and energy sector engineers is also very strong. A complete breakdown of employment in the engineering services sector is shown in Table 6.

Table 6: Calgary Region Employment

| Calgary Economic Region Employment, Engineering and Technology Occupations, 2004 By National Occupation Classifications (NOC) | | | |
|--|---|------------------|--------------------------------|
| NOC | Title | Employees | Proportion of Total |
| C03 | Civil, Mechanical, Electrical and Chemical Engineers, includes: | 9,700 | 36.6 % |
| 031 | Civil Engineers | | |
| 032 | Mechanical Engineers | | |
| 033 | Electrical Engineers | | |
| 034 | Chemical Engineers | | |
| C04 | Other Engineers, includes: | 7,500 | 28.3 % |
| 041 | Industrial & Manufacturing Engineers | | |
| 042 | Metallurgical & Materials Engineers | | |
| 043 | Mining Engineers | | |
| 044 | Geological Engineers | | |
| 045 | Petroleum Engineers | | |
| 046 | Aerospace Engineers | | |
| 047 | Computer Engineers | | |
| 048 | Other Professional Engineers, N.E.C. | | |
| 078 | Software Engineers | | |
| C13 | Technical Occupations in Civil, Mechanical and Industrial Engineering, includes: | 2,100 | 7.9 % |
| 131 | Civil Engineering Technologist | | |
| 132 | Mechanical Engineering Technologist | | |
| 133 | Industrial Engineering Technologist | | |
| C14 | Technical Occupations in Electronic and Electrical Engineering, includes: | 7,200 | 27.2 % |
| 141 | Electronic & Electrical Engineering Technologist | | |
| 142 | Electronic Service Technician (Household and Business Equipment) | | |
| 143 | Industrial Instrument Technicians | | |
| 144 | Aircraft Instrument, Electrical and Avionics Technicians | | |
| TOTAL EMPLOYMENT | | 26,500 | 100.0 % |



Location Quotients

Location quotients are a standard economic analysis tool that measures the relative concentration of employment between two jurisdictions, and the extent to which one jurisdiction exports goods or services to other jurisdictions.

The Calgary to Alberta engineering services location quotient is 1.4, and the Calgary to Canada engineering services location quotient is 1.6, indicating that engineering services in Calgary are more concentrated than either that of Alberta or Canada. Accordingly, Calgary engineers and the companies they work for are net exporters of their services to other parts of Alberta and Canada.

Occupational Outlook

The Occupational Outlook Forecast from Alberta Human Resources and Employment for selected engineering occupations for the period 2005-2010, is depicted in Table 7.

Highlights of the forecast include half of the occupation projections having a growth rate greater than 2.5%, with the remaining half having a consistent growth rate of between 1.5% to 2.5%. The estimated total numeric growth for all occupations listed is in the range of 1,050-1,680 jobs per year. Occupations regarded as having above average growth potential include civil engineers, petroleum engineers, electrical & electronics engineering technologists, and industrial instrument technicians & mechanics, while the electronic service technicians occupation is projected to produce a demand for the highest total number of opportunities averaging between 200 to 310 jobs per year.

Alberta Occupational Outlook, Selected Engineering Occupations, 2005 – 2010

| Alberta Modified COPS Outlook (2005 – 2010) | | | | |
|--|--|-----------------------|---------------------------|---|
| Select Occupational Employment Projections, Dec. 30, 2005 | | | | |
| NOC Code | Occupation Title | % Growth Range | Growth Description | Numerical Growth Per year (jobs) |
| 2131 | Civil Engineers | > 2.5% | Above Average | 130 to 200 |
| 2132 | Mechanical Engineers | > 2.5% | Above Average | 90 to 140 |
| 2133 | Electrical & Electronics Engineers | > 2.5% | Above Average | 90 to 140 |
| 2134 | Chemical Engineers | > 2.5% | Above Average | 40 to 70 |
| 2141 | Industrial & Manufacturing Engineers | 1.5% - 2.5% | Average | 10 to 30 |
| 2142 | Metallurgical & Materials Engineers | 1.5% - 2.5% | Average | Fewer than 10 |
| 2143 | Mining Engineers | 1.5% - 2.5% | Average | Fewer than 10 |
| 2144 | Geological Engineers | 1.5% - 2.5% | Average | Fewer than 10 |
| 2145 | Petroleum Engineers | > 2.5% | Above Average | 130 to 200 |
| 2146 | Aerospace Engineers | 1.5% - 2.5% | Average | Fewer than 10 |
| 2147 | Computer Engineers (except software) | 1.5% - 2.5% | Average | 20 to 40 |
| 2148 | Other Professional Engineers n.e.c. | 1.5% - 2.5% | Average | 10 to 30 |
| 2232 | Mechanical Engineering Technologists & Technicians | > 2.5% | Above Average | 30 to 60 |
| 2233 | Industrial Engineering & Manufacturing Technologists | 1.5% - 2.5% | Average | 20 to 40 |
| 2241 | Electrical & Electronics Engineering Technologists | > 2.5% | Above Average | 150 to 230 |
| 2242 | Electronic Service Technicians | 1.5% - 2.5% | Average | 200 to 310 |
| 2243 | Industrial Instrument Technicians & Mechanics | > 2.5% | Above Average | 100 to 140 |
| 2244 | Aircraft Instrument, Electrical & Avionics Mechanics | > 2.5% | Above Average | 10 to 30 |

Source: Alberta Occupational Outlook (2005 – 2010), Alberta Human Resources and Employment, December 30, 2005.

EDUCATIONAL SUPPORT FOR ENGINEERING SERVICES

The engineering services sector in Calgary is well served by world-class, responsive institutions and programs assisting in the development of new professionals and technologists and the furthering of engineering research. Many of these programs and services have grown along with Calgary's engineering services community and have responded to local demand. These institutions continue to produce high quality graduates that are welcomed by Calgary's engineering services sector.

- The University of Calgary continues to distinguish itself as offering one of the nations most prestigious engineering programs. Schulich School of Engineering graduates from the University of Calgary are regarded as high calibre with the right 'can do' attitude.
- Smaller engineering services companies with recruitment visibility concerns have connected with the University of Calgary's Engineering Internship Program with excellent results. Interns have become the best recruitment medium as almost 70% of placed interns have ended up working long-term for the company they interned with.
- The Southern Alberta Institute of Technology (SAIT) Polytechnic technician programs also contribute to the pool of talented graduates.
- Bow Valley College, the YWCA and other institutions that offer ESL (English as Second Language) programs are especially helpful to new immigrants looking to join the engineering services sector. These programs provide a practical experience component that is particularly useful in assistance with gaining on the job training and Canadian based experience.

There are also a number of significant industry advances that have been developed in Calgary, often with institutional support. They include steam assisted gravity drainage, fire flooding, clean coal power generation, sulphur removal, global positioning technology, cold weather building, wind power, and so on. All of these have substantial export development potential and most of them have resulted from collaborative approaches between the private and the educational sectors.



University of Calgary – Schulich School of Engineering

The Engineering Faculty at the University of Calgary produces graduates in a variety of engineering disciplines. Specific details about the various programs offered by the University of Calgary to support the engineering services occupations can be found in Appendix 2.

In 2005, the Faculty of Engineering received a \$25 million donation from philanthropist Seymour Schulich, which will be matched by the province of Alberta, to create new scholarships (ranging from \$6,000 - \$20,000), research chairs, and increased funding for student field trips and societies. This donation was the largest in the University of Calgary's 40 year history. This donation also resulted in Calgary being the first "named" engineering school in Canada – the Schulich School of Engineering. This financial commitment demonstrates the prestigious reputation that has been achieved by the University of Calgary and its Engineering Faculty.

Currently, the University of Calgary's Schulich School of Engineering receives approximately 2,200 applications per year for 600 first year openings. This represents an excess demand for these program offerings of almost 267%.

The Schulich School of Engineering offers traditional 4-year degree programs (BSc) in the disciplines of:

- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Geomatics Engineering
- Manufacturing & Mechanical Engineering
- Oil & Gas Engineering
- Software Engineering

Internship programs, graduate and doctoral degree programs are also offered in all engineering disciplines.

University of Calgary, Faculty of Engineering

| University of Calgary, Faculty of Engineering | | | |
|--|-------------|-------------|-----------------------|
| | 1997 | 2004 | Growth (97-04) |
| Student Enrolment | 1,736 | 2,461 | 42 % |
| Engineering Degrees Granted | | | |
| Undergraduate | 230 | 414 | 80 % |
| Graduate | 74 | 175 | 136 % |
| <i>Source: University of Calgary, Fact Book 2004 – 2005.</i> | | | |

For more information please contact:

University of Calgary – Schulich School of Engineering

Room EN C204, Engineering Building
2500 University Drive NW
Calgary, AB T2N 1N4
Phone: (403) 220-5732
Facsimile: (403) 284-369

Southern Alberta Institute of Technology (SAIT) Polytechnic



The Southern Alberta Institute of Technology (SAIT) Polytechnic provides graduates in a number of technology related disciplines in support of the engineering services sector. Specific details about the various programs offered can be found in Appendix 2.

SAIT Polytechnic provides training to its students based on input received directly from industry participants through 61 program advisory committees encompassing 1,000 business and industry leaders. Programs targeted specifically to the engineering services sector include:

- Bachelor of Applied Petroleum Engineering Technology (APT)
- Chemical Technology (CHT)
- Chemical Engineering Technology (CET)
- Electrical Engineering Technology (EET)
- Environmental Technology (ET)
- Industrial Instrumentation Technology (IIT)
- Petroleum Engineering Technology (PT)
- Power Engineering Technology (PET)
- Process Operations (PO)

In 2004, SAIT Polytechnic received 1,693 applications for 540 available seats in the above nine programs. Similar demand was experienced for the 2005 academic year. This data represents excess demand of 122% for SAIT Polytechnic's program offerings in these specific areas.

A review of graduation information reveals the high value which industry in Calgary, and throughout Alberta, place on SAIT Polytechnic's graduates of their programs. Recently there were:

- 329 graduates of these programs in 2004, and 279 graduates in 2003, representing a growth of almost 18%;
- 99% of the 2004 graduates were employed within three months of graduation;
- Of the employed graduates in 2004, 86% were employed in training related fields;
- 57% of the employed graduates in 2004 worked in Calgary, while a further 34% of the 2004 graduating class worked elsewhere in Alberta, for an impressive combined total of 91% of the 2004 graduates working in Alberta.

For more information please contact:

SAIT Polytechnic – Department of Energy

1301 16th Ave NW

Calgary, AB T2M 0L4

Phone: (403) 284-8452

Facsimile: (403) 284-8262

Calgary Catholic Immigration Society

The Calgary Catholic Immigration Society (CCIS) is a non-profit volunteer organization which provides settlement and integration services to all immigrants and refugees in Southern Alberta. One of the many service offerings provided by CCIS is Business Employment and Training.

One of the training programs offered by CCIS is the Engineering & Technology Upgrading Program. This is a "skill-for-work" training program that facilitates the integration of foreign educated professionals into the local engineering industry. This program promotes employability and career development in the participants' related fields.

Each program has capacity for 15 students and is fully funded by Alberta Human Resources and Employment. There are two programs per year. Specific details about the Engineering & Technology Upgrading Program can be found in Appendix 2.

As with other programs serving this sector, the demand exceeds availability, as there are currently over 200 qualified applicants for the available 15 seats. Qualified applicants must:

- Possess a post secondary degree in the fields of engineering, geology or geophysics.
- Be new Canadians – less than 10 years in Canada.
- Have three years or less relevant Canadian experience.
- Possess Canadian Language Benchmark (CLB) Level 6-8 and are no longer eligible for Language Instruction for New Canadians (LINC).
- Have received employment insurance benefits in the past three years.

Since 1994, CCIS has conducted 15 programs with 100% graduation rates of 15 engineers per program resulting in 225 new Canadian engineers, with final certification being eligibility for membership in APEGGA and ultimately, employment.

For more information please contact:

Calgary Catholic Immigration Society
Business Education Training Services
3rd Floor, 120 – 17 Avenue SW
Calgary, AB T2S 2T2
Phone: (403) 262-2006
Fax: (403) 261-0955

OTHER EDUCATIONAL SUPPORT

In addition to the educational institutions previously mentioned, the following institutions compliment the post-secondary educational offerings in the Calgary Region.

Mount Royal College

Mount Royal College was founded in 1910 to help students achieve their full potential. Today, about 13,000 students from Canada and around the globe work toward this goal every year. Mount Royal College offers more than 60 degree, diploma, university transfer and certificate programs in areas such as arts, business, communications, health and community studies and science and technology. International exchange agreements with leading educational institutions in the United States, Mexico and Asia provide global learning opportunities. Mount Royal College graduated approximately 2,000 students in 2003/2004.

Mount Royal College

4825 Richard Road SW
Calgary, AB T3E 6K6
Phone: (403) 440-6611
www.mtroyal.ca

Bow Valley College

Bow Valley College is a workforce preparation and development institution which serves more than 11,000 learners (about 4,400 fulltime) across Canada each year.

Bow Valley College

332 – 6 Avenue SE
Calgary, AB T2G 4S6
Phone: (403) 410-1400
Toll free in Alberta: 1-866-4-BVC-NOW (1-866-428-2669)
E-mail: info@bowvalleycollege.ca
www.bowvalleycollege.ca

DeVry Institute of Technology

DeVry Institute of Technology offers bachelor's degree and diploma programs that combine the best of today's business skills with current technical applications. DeVry Calgary is the largest DeVry institution in Canada and graduates more than 500 students a year.

**DeVry Institute of Technology Calgary**

2700 – 3 Avenue SE
Calgary, AB T2A 7W4
Phone: (403) 235-3450
Toll free: (800) 363-5558
www.devry.edu/calgary/index.jsp

RESEARCH AND DEVELOPMENT SUPPORT

There are a number of federal and provincial research and development focused grants and awards available to Calgary-based companies to assist in the funding of applied or basic research. Eligible companies can apply for any of the following programs, all of which offset costs that would otherwise be incurred when conducting research and development activities.

SCIENTIFIC RESEARCH AND EXPERIMENTAL DEVELOPMENT (SR&ED) TAX INCENTIVE PROGRAM



The SR&ED program is offered by the federal government and is administered by the Canada Revenue Agency. The program is designed to encourage Canadian businesses to conduct research and development in Canada that will lead to new, improved, or technologically advanced products or processes. The SR&ED program is the largest single source of federal government support for industrial research and development.

Through the SR&ED tax incentives, Canadian controlled private corporations can earn an investment tax credit (ITC) of 35% up to the first \$2 million of qualified expenditures for SR&ED carried out in Canada, and 20% on any excess amount. Other Canadian corporations, proprietorships, partnerships and trusts can earn an ITC of 20% of qualified expenditures for SR&ED carried out in Canada.

To qualify for the SR&ED program, the research and development work must advance the understanding of scientific relations or technologies, address scientific or technological uncertainty, and incorporate a systematic investigation by qualified personnel. Examples of work that qualify include:

- Experimental development to achieve technological advancement to create new materials, devices, products, or to improve existing ones.
- Applied or basic research to advance scientific knowledge with a specific practical application in view.
- Support work in engineering, design, operations research, mathematical analysis, computer programming, data collection, test or psychological research, but only if the work is commensurate with, and directly supports, the eligible experimental development or applied or basic research.

SR&ED – Calgary Division

130, 220 – 4th Avenue SW
Calgary, AB T2G 0L1
Tel: (403) 691-5890
Fax: (403) 691-6625
www.cra-arc.gc.ca/sred

INDUSTRIAL RESEARCH ASSISTANCE PROGRAM (IRAP)

The IRAP, delivered by the National Research Council (NRC), provides a range of technical and business advisory services, along with potential financial support, to growth oriented Canadian small and medium sized enterprises (SMEs – under 500 employees).

Canadian SMEs interested in growing by using technology to commercialize services, products and processes in Canadian and international markets, can apply to NRC-IRAP for monetary contributions and mentoring support. Investments are made on a cost-shared basis for research and pre-competitive development technical projects, based on assessment of a project and firm by a team of industrial technology advisors. Depending on the specifics of the proposed project, NRC-IRAP is able to invest up to 50% of eligible project costs to a maximum of \$500,000.

Two youth initiatives are also part of the program. Through “The Internship Program with Innovative Small and Medium Enterprises” and “The Collaborative Research Program,” NRC-IRAP provides financial support through the hiring of post-secondary graduates. NRC-IRAP covers part of the graduate’s salary, up to \$12,000, while overhead, benefits and project costs are the company’s responsibility. Both internship programs last between six and 12 months.

National Research Council – Industrial Research Assistance Program

250 Karl Clark Road
Edmonton, AB T6N 1E4
Tel: (780) 495-6509
Fax: (780) 495-6510
www.irap-pari.nrc-cnrc.gc.ca

NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL OF CANADA (NSERC)

NSERC supports the development of highly qualified Canadians in the natural sciences and engineering through a number of scholarship and fellowship programs. Companies can propose a research project or nominate recent doctoral graduates to undertake research and NSERC will provide financial assistance through salary provisions.



Financial support by NSERC is offered through the following programs:

- Industrial Research and Development Fellowships (IRDF) – \$30,000 per year for 2 years, plus a minimum company contribution of \$10,000 per year.
- Industrial Postgraduate Scholarships (IPS) - \$15,000 per year for 2 years, plus a minimum company contribution of \$6,000 per year.
- Industrial Undergraduate Student Research Awards (USRA) - \$4,500 per year, plus an additional contribution by the company of at least 25% of the value of the award.

Natural Sciences and Engineering Research Council of Canada

350 Albert Street
Ottawa, ON K1A 1H5
Tel: (613) 995-4273
www.nserc.gc.ca



ALBERTA INGENUITY FUND

The primary objective of the Alberta Ingenuity Fund is to increase the research expertise in Alberta companies. Eligible companies are for-profit, provincially or federally incorporated and operating in Alberta or wholly Alberta owned. The company must be engaged in research and development activities, the majority of which revolve around technology derived from science and engineering disciplines.

Another part of the Fund is the Alberta Ingenuity Industrial Associate award. Granted to upwards of 40 recipients each year, the Fund consists of an annual stipend of \$48,000 and a research allowance of \$7,000 per year for up to two years, for a total support of \$110,000. Eligible candidates are Master's or PhD program graduates who are no more than five years out of school, or individuals expected to complete their degree requirements within three months of submitting the application.

Alberta Ingenuity Fund

2410 Manulife Plaza
10180 – 101st Street
Edmonton, AB T5J 3S4
Tel: (780) 423-5735
Fax: (780) 420-0018
www.albertaingenuity.ca

INDUSTRY ASSOCIATIONS

THE ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOLOGISTS AND GEOPHYSICISTS OF ALBERTA (APEGGA)

Since 1920, APEGGA has been a self-governing association fulfilling the mandate given to it by the Engineering, Geological and Geophysical Professions (EGGP) Act. As the regulator of the practices of engineering, geology and geophysics in Alberta, APEGGA's functions are to:

- Register engineers, geologists, and geophysicists for practice in Alberta;
- Grant Permits to Practice to companies;
- Set practice standards;
- Determine disciplinary action, when necessary, for its more than 41,000 members province wide.

The individual professional designations PEng, PGeol, PGeoph and RPT, or a company's Permit to Practice, assures that legal, academic and experience requirements to practice have been met. They also signify adherence to the high standards and ethics of the professions. Only those individuals licensed with APEGGA may practice or use titles relating to these three professions in Alberta. Currently, APEGGA completes registration for approximately 3,000 new professionals each year. Approximately one third of these individuals are graduates of Alberta's educational institutions.

An ongoing relationship with affiliated associations in other provinces, Alberta universities, industry and government, helps to ensure the value of science and technology and the impact of engineering, geology and geophysics on the lives of Albertans is understood and considered. A national voice on broader issues affecting the professions is coordinated through the Canadian Council of Professional Engineers (CCPE) and the Canadian Council of Professional Geoscientists (CCPG).

For more information please contact:

APEGGA Calgary Office

2200 Scotia Centre
700 2nd Street SW
Calgary, AB T2P 2W1
Tel: (403) 262-7714
Fax: (403) 269-2787

SOCIETY OF PETROLEUM ENGINEERS (SPE)

The Society of Petroleum Engineers (SPE) is an international industry association, headquartered in Richardson, Texas, which is focused on the dissemination of technical knowledge among petroleum engineers worldwide. The SPE discharges this mandate through the provision of local technical courses and symposia.

Of the Society's 60,000 members, approximately 3,000 are located in Canada, with over 90% of these members located in Calgary. In fact, the Calgary section is the second largest section globally, with the largest being located in the Gulf Coast region of the U.S.

The Calgary section of the SPE offers approximately 10 technical courses per year. It also provides a Distinguished Speakers series through the hosting of 10 luncheons per year and a number of other social and fundraising activities through out the year. Funds raised provide engineering and technology scholarships of approximately \$30,000 per year.

Local operations of SPE activities are undertaken exclusively by volunteer members.

For more information please contact:

SPE - Canadian Section Office

800, 540 - 5 Avenue SW

Calgary, AB T2P 0M2

Phone: (403) 264-4311

Facsimile: (403) 263-3796

CALGARY ADVANTAGES



STELLAR ECONOMIC PERFORMANCE

Calgary is Canada's fastest growing region, with an estimated 4.0 per cent growth in real GDP in 2006. It also has had the highest growth in employment of any major Canadian city: 34.4 per cent from 1996-2005.

Also, Calgary has had the highest total population growth in Canada over the past ten years (1996-2005) at a rate of 25.8%. Calgary was migrant workforce magnet between 1996-2005, with interprovincial migration of 9,000 migrants annually. Due to this strong growth, the Calgary Region's population has topped one million.

INFRASTRUCTURE

Calgary has highly integrated air, rail, road and transit infrastructures to meet the needs of the region's business and commuter needs.

The Calgary International Airport's passenger facilities are considered to be the best in the world. In 2004, J.D. Power and Associates ranked Calgary's airport number one in passenger satisfaction for airports with less than 10 million passengers per year in its Global Airport Satisfaction Index Study. Spacious, modern and friendly, Calgary's airport has non-stop flights to 49 cities around the world and is Canada's fourth busiest airport. It serves more than 9.1 million passengers a year (5.8 million domestic passengers, 1.6 million trans-border passengers and 600,000 international passengers).

Operated and maintained by the Calgary Airport Authority, the Springbank Airport is a Canada Customs-designated airport of entry located 10 kilometres west of Calgary just off the TransCanada Highway in the Municipal District of Rocky View No. 44. It occupies about 420 hectares (1,040 acres) and is the gateway to the Canadian Rockies and conveniently close to the towns of Cochrane and Bragg Creek.

Calgary also provides ready access to Asia, Europe, and the United States; many American cities are less than a four-hour flight from Calgary.

Driving and Direct Flight Times from Calgary

| Canada | Drive | Flight |
|----------------------|--------------|---------------|
| Edmonton | 3 h | 45 m |
| Montreal | 38 h | 4 h |
| Ottawa | 36 h | 3 h 50 m |
| Regina | 8 h | 1 h 11 m |
| Thunder Bay | 21 h | 2 h 50 m |
| Toronto | 35 h | 4 h 10 m |
| Vancouver | 11 h | 1 h 15 m |
| Winnipeg | 14 h | 2 h 10 m |
| United States | | |
| Chicago | 26 h | 3 h 30 m |
| Dallas | 32 h | 3 h 40 m |
| Denver | 14.5 h | 2 h 23 m |
| Los Angeles | 7 h | 3 h |
| New York City | 40 h | 5 h 53 m |
| Salt Lake City | 15 h | 1 h 46 m |
| San Francisco | 22 h | 2 h 44 m |
| Seattle | 12 h | 1 h 10 m |

Source: Statistics Canada, U.S. Census Bureau, The Calgary Advantage, Proximity One, GGA Management Consultants

FAVOURABLE TAX REGIME

Low Taxes

Calgary benefits from a low tax regime: the province of Alberta has no municipal or provincial sales tax and has one of the lowest provincial corporate tax rates in Canada (10%). Furthermore, the Canadian corporate tax rate is declining to 21% (as outlined in the 2004 federal budget), lower than most U.S. jurisdictions, and there is no provincial general capital tax. Calgary businesses also benefit from the fact that Alberta has no inventory tax, no machinery and equipment tax and no payroll tax.

Alberta is the only Canadian province to have a flat income tax rate (10%). All other Canadian provinces work on a sliding income scale. In addition, the provincial government is debt-free and Calgary's low tax regime is expected to continue throughout the foreseeable future. Alberta's beneficial tax regime creates an environment in which businesses can operate more profitably, and individuals can retain more of their personal income.



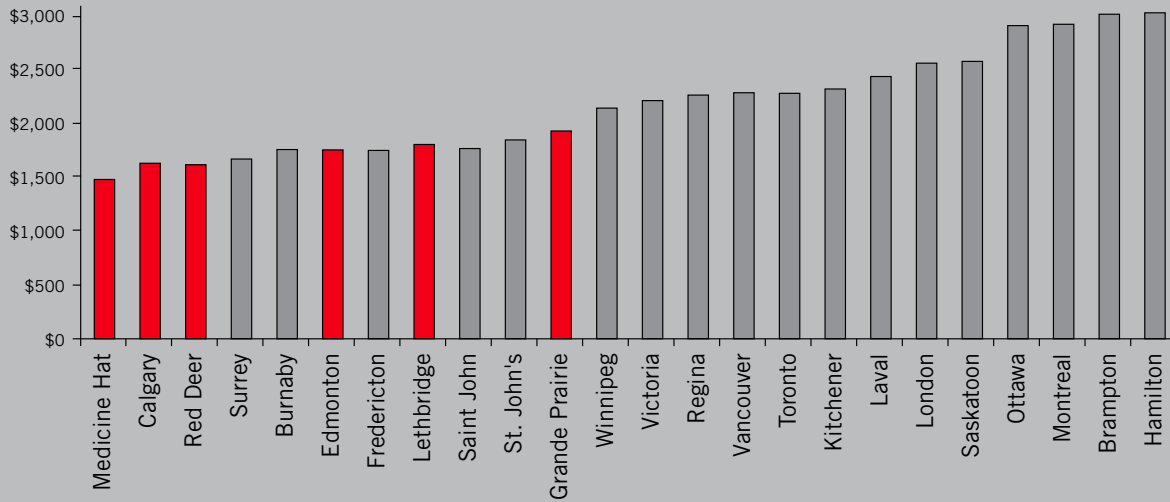
Corporate Tax

Effective April 2006, the provincial government dropped the general corporate income tax rate to 10% from 11.5%. Alberta's small business rate is 3%.

Since 2001, the provincial government has cut the small business rate in half and doubled the small business income threshold to \$400,000 and the general corporate tax rate decreased by 25%. The government has pledged to further reduce the general rate to 8%.

Net Property Tax for a Single-Family Home, 2005

(selected Canadian cities)



Notes:

1. Includes municipal, regional and school taxes, net of any applicable homeowner grants.
2. Taxes are based on the value of a typical single family home, defined as a 25 to 30 year old detached bungalow with three bedrooms, a main floor area of 1,200 square feet, finished full basement, double car garage and a 6,000 square foot lot. Information for Vancouver, Surrey and Burnaby is based on an average value home that may differ slightly from the above definition.

Source: Alberta Government, 2006 budget.

Major Provincial Tax Rates, 2006

| | AB | BC | SK | MB | ON | QC | NB | NS | PE | NL |
|--------------------------------|--------|-------------------|--------------------|--------------------|-----------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Personal income tax | | | | | | | | | | |
| Statutory rate range | | | | | | | | | | |
| – lowest rate (%) | 10.00 | 6.05 | 11.00 | 10.90 | 6.05 | 16.00 ^a | 9.68 | 8.79 | 9.80 | 10.57 |
| – highest rate (%) | 10.00 | 14.70 | 15.00 | 17.40 | 11.16 | 24.00 ^a | 17.84 | 17.50 | 16.70 | 18.02 |
| Surtax (%) | – | – | – | – | 20.0/36.0 | – | – | 10.0 | 10.0 | 9.0 |
| Credit amounts | | | | | | | | | | |
| Basic amount (\$) | 14,899 | 8,858 | 8,589 | 7,734 | 8,377 | 6,520 | 8,061 | 7,231 | 7,412 | 7,410 |
| Spousal amount (\$) | 14,899 | 7,585 | 8,589 | 6,482 | 7,113 | 6,520 | 6,845 | 6,140 | 6,294 | 6,055 |
| Corporate income tax | | | | | | | | | | |
| General rate (%) | 10.0 | 12.0 | 17.0 | 14.5 | 14.0 | 9.9 | 13.0 | 16.0 | 16.0 | 14.0 |
| M&P rate (%) | 10.0 | 12.0 | 10-17 ^b | 14.5 | 12.0 | 9.9 | 13.0 | 16.0 | 16.0 | 5.0 |
| Small business | | | | | | | | | | |
| – rate (%) | 3.0 | 4.5 | 5.0 | 4.5 | 5.5 | 8.5 | 2.0 | 5.0 | 6.5 | 5.0 |
| – threshold (\$000) | 400 | 400 | 300 | 400 | 400 | 400 | 450 | 350 | 300 | 300 |
| Capital tax | | | | | | | | | | |
| General (max. %) | – | – | 0.60 | 0.50 | 0.30 | 0.525 | 0.25 | 0.275 | – | – |
| Financial institutions (max %) | | | | | | | | | | |
| | – | 3.00 | 3.25 | 3.00 | 0.90 | 1.30 ^c | 3.00 | 4.00 | 5.00 | 4.00 |
| Retail sales tax (%) | – | 7.0 | 7.0 | 7.0 | 8.0 | 7.5 ^d | 8.0 | 8.0 | 10.0 ^d | 8.0 |
| Gasoline tax (¢/litre) | 9.0 | 14.5 ^e | 15.0 | 11.50 | 14.7 | 15.2 ^{ef} | 14.5 ^f | 15.5 ^f | 20.7 | 16.5 ^f |
| Tobacco tax (\$/carton) | 32.00 | 35.80 | 35.00 ^f | 35.00 ^f | 24.70 | 20.60 | 23.50 ^f | 31.04 ^f | 34.90 ^g | 34.00 ^f |
| Payroll tax (max %) | – | – | – | 2.15 | 1.95 | 4.26 ^g | – | – | – | 2.00 |

Rates for other provinces as of March 21, 2006.

a Quebec residents receive an abatement of 16.5% of basic federal tax in lieu of federal cash transfers to Quebec for several social programs.

b The general rate is reduced by up to seven points based on the share of a corporation's national manufacturing and processing income allocated to Saskatchewan.

c The Quebec Financial Institutions Capital Tax includes a base rate of 1.20% and a compensatory tax of 0.25%.

d These provinces apply their retail sales tax on the retail price of the good inclusive of the GST.

e An additional 6¢/litre is imposed in the greater Vancouver area, 2.5¢/litre in Victoria and 1.5¢/litre in Montreal.

f These provinces apply their retail sales taxes on the retail price of the good inclusive of the particular excise tax.

g Quebec levies an additional 2% compensatory tax on the wages paid by financial institutions that is not included in this rate.

Source: Alberta Government, 2005 Budget

Provincial Income Tax Rates, 2006

| (%) | AB | BC | SK | MB | ON | QC | NB | NS | PE | NL | Canada |
|-------------------|------|------|-------|------|------|-----|------|------|------|------|--------|
| General | 10.0 | 12.0 | 17.0 | 14.5 | 14.0 | 9.9 | 13.0 | 16.0 | 16.0 | 14.0 | 22.12 |
| Mfg. & processing | 10.0 | 12.0 | 10-17 | 14.5 | 12.0 | 9.9 | 13.0 | 16.0 | 16.0 | 5.0 | 22.12 |
| Small business | 3.0 | 4.5 | 5.0 | 4.5 | 5.5 | 8.5 | 2.0 | 5.0 | 6.5 | 6.5 | 13.12 |

Source: Alberta Economic Development

State Effective Corporate Income Tax Rates

| (%) | Oregon | California | N Dakota | Montana | Idaho | Colorado | Utah | New Mexico | Louisiana | Federal |
|-------------------|--------|------------|----------|---------|-------|----------|------|------------|-----------|---------|
| General | 6.6 | 8.84 | 7.0 | 6.75 | 7.6 | 4.63 | 5.0 | 7.6 | 8.0 | 35.00 |
| Mfg. & processing | 6.6 | 8.84 | 7.0 | 6.75 | 7.6 | 4.63 | 5.0 | 7.6 | 8.0 | 33.95 |
| Small business | 6.6 | 8.84 | 6.83 | 6.75 | 7.6 | 4.63 | 5.0 | 4.8 | 6.85 | 32.00 |

Source: Alberta Economic Development
Rates effective January 2005.

Top Marginal Personal Income Tax Rates, 2006

| (%) | AB | BC | SK | MB | ON | QC | NB | NS | PE | NL |
|--------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Federal | 29.00 | 29.00 | 29.00 | 29.00 | 29.00 | 29.00 | 29.00 | 29.00 | 29.00 | 29.00 |
| Provincial | 10.00 | 14.70 | 15.00 | 17.40 | 17.41 | 24.00 | 17.84 | 19.25 | 18.37 | 19.64 |
| Federal abatement ¹ | – | – | – | – | – | (4.79) | – | – | – | – |
| Total | 39.00 | 43.70 | 44.00 | 46.40 | 46.41 | 48.21 | 46.84 | 48.25 | 47.37 | 48.64 |

Rates for other provinces known as of March 21, 2005.

1 Quebec residents receive an abatement of 16.5% of basic federal tax in lieu of federal cash transfers to Quebec for several social programs. This reduces the top federal rate of 29% by 16.5%, or 4.79% of taxable income.

Source: Alberta Government, 2006 Budget

EXCEPTIONAL QUALITY OF LIFE



HEALTH

Calgarians value the quality of their public health-care system and are committed to continuously improving its services and program. For example, a new Alberta Children's Hospital is being developed on the University of Calgary's West Campus by the Calgary Health Region. This world-class pediatric health-care facility will be completed in 2006. It will feature state-of-the-art technology and family-centered care, research and education – to the benefit of all Calgarians.

The vast majority of the Calgary area's health services are delivered by 2,000 physicians (family practitioners and specialists) and the Calgary Health Region. Funded by the Province of Alberta, the Calgary Health Region employs 22,000 people and each year delivers more than \$1.5 billion of health-care services at more than 100 locations, including four hospitals in Calgary (the Foothills Medical Centre, Rockyview General Hospital, Peter Lougheed Centre and Alberta Children's Hospital) and more than a dozen hospitals and health-care centres in the surrounding communities of Canmore, Banff, Claresholm, Didsbury, High River, Black Diamond, Strathmore and Vulcan. In all, the Region serves more than 1.1 million people in southern Alberta, southeastern British Columbia and southwestern Saskatchewan.

An integral part of Calgary's health-care system is the University of Calgary, where the faculties of Medicine, Nursing, and Kinesiology educate new generations of health-care practitioners and conduct world-renowned research.

Calgary was ranked as the Healthiest City in the World in which to live in a survey by Mercer Human Resource Consulting in 2004; the survey examined 144 major cities and determined Calgary is one of the safest cities in Canada to live in.

EDUCATION

In addition to the post-secondary institutions highlighted previously, Calgary's education system includes; the Calgary Board of Education, which has 215 public schools with more than 9,000 teaching staff and nearly 100,000 students. Also, the city has 96 Catholic schools with more than 4,000 staff and nearly 44,000 students. A comprehensive curriculum of academic arts and sciences programs is offered by Calgary's primary and secondary schools, with a commitment to excellence and child-centered development. Calgary is also served by a growing number of private, charter and alternative schools.

Alberta and Calgary students ranked at the top in reading, mathematics and science in an international study undertaken by the Organization for Economic Cooperation & Development in 2003.



LIFESTYLE

A modern metropolis with a Western heritage. An exceptionally productive workforce that loves to play in the Rocky Mountains. A four-season city with abundant sunshine and warm chinook winds.

If ever a city offered the best of all worlds, surely it is Calgary.

By international standards, Calgary is young (founded just 130 years ago), but it is confident and successful. For most of the past century the city has hosted "The Greatest Outdoor Show on Earth," the annual Calgary Exhibition and Stampede. In 1988, the city welcomed the world to the "best-ever" Olympic Winter Games, demonstrating not only its friendly spirit, but its "can-do" attitude. These events reflect Calgarians' love of the Old West and winter sports, particularly skiing and ice hockey. Calgarians were dubbed the greatest sports fans in the world in 2004 when the underdog Calgary Flames made it to the NHL's Stanley Cup Finals.

Calgarians love to work and play. They are Canada's most productive workers – and arguably they have Canada's greatest backyard: the majestic Rocky Mountains which include Banff National Park and Kananaskis Country.

Within city limits are the Bow River, one of the finest trout rivers in the world, more than two dozen golf courses and three dozen parks connected by 580 kilometres of cycling and pedestrian pathways and 260 kilometres of on-street bike routes. Calgary's natural environment is one of the city's greatest assets. Citizens and government alike are deeply committed to protecting and preserving the river valleys and environmentally sensitive areas as well as the integrity of its communities.

First-class facilities such as the Pengrowth Olympic Saddledome, Spruce Meadows and Canada Olympic Park provide additional recreational opportunities and act as training and performance venues for some of the world's best athletes. As well, recreational facilities abound, such as community ice hockey arenas, swimming pools, soccer pitches and more.

Calgary's moderate climate accommodates year-round outdoor activities. The city receives 2,395 hours of sunshine a year. The average daily high in summer (June, July and August) is 22.3° C; the average daily high in winter (December, January and February) is –2.3° C, although daytime temperatures of 10° C are common during chinooks, periodic warm western winds.

Arts and culture thrive in the city. The EPCOR CENTRE for the Performing Arts is home to several professional theatre companies and the Calgary Philharmonic Orchestra, and hosts hundreds of touring performers every year. Arts and artifacts take centre stage at the city's two museums: the Glenbow Museum and the Nickle Arts Museum. With programs in drawing, painting, sculpture, photography, glass, ceramics and other arts, the Alberta College of Art and Design helps educate and expand Calgary's artistic community.

In the performing arts, One Yellow Rabbit's High Performance Rodeo is Canada's leading festival of new and experimental theatre, combining theatre, dance, poetry, music, radio drama, video art and spoken word. The Esther Honens International Piano Competition, the International Organ Festival, Theatre Calgary, the Alberta Ballet, Alberta Theatre Projects, and Calgary's Folk Festival are other world-class cultural organizations and events in Calgary cultural community.

For more than half a century, Calgary has been Canada's energy capital, and as such the city is home to more than 87% of Canada's oil and natural gas producers. To compete in the world arena, Calgary boasts international leaders in energy discovery, recovery, technology and associated services and support.

ADDITIONAL INFORMATION



For additional information on Calgary's engineering services sector, or to learn more about the many services offered by Calgary Economic Development, please contact:

Calgary Economic Development

731 - 1st Street SE

Calgary, Alberta

T2G 2G9

Phone: (403) 221-7831

or toll-free: 1-888-222-5855

Fax: (403) 221-7828

Email: info@calgaryeconomicdevelopment.com

Website: www.calgaryeconomicdevelopment.com

APPENDICES

APPENDIX 1: CALGARY REGION - OCCUPATIONAL CLASSIFICATIONS

This profile reflects information focused on the following Standard Occupational Classifications, as described by Statistics Canada:

- C031: CIVIL ENGINEERS
- C032: MECHANICAL ENGINEERS
- C033: ELECTRICAL & ELECTRONICS ENGINEERS
- C034: CHEMICAL ENGINEERS
- C041: INDUSTRIAL & MANUFACTURING ENGINEERS
- C042: METALLURGICAL & MATERIALS ENGINEERS
- C043: MINING ENGINEERS
- C044: GEOLOGICAL ENGINEERS
- C045: PETROLEUM ENGINEERS
- C046: AEROSPACE ENGINEERS
- C047: COMPUTER ENGINEERS
- C048: OTHER PROFESSIONAL ENGINEERS, Not Elsewhere Classified
- C131: CIVIL ENGINEERING TECHNOLOGIST, CONSTRUCTION ESTIMATOR
- C132: MECHANICAL ENGINEERING TECHNOLOGISTS/TECHNICIANS
- C133: INDUSTRIAL ENGINEERING & MANUFACTURING TECHNOLOGISTS
- C134: CONSTRUCTION ESTIMATORS
- C141: ELECTRICAL & ELECTRONIC ENGINEERING TECHNOLOGISTS
- C142: ELECTRONIC SERVICE TECHNICIAN (Household & Business Equipment)
- C143: INDUSTRIAL INSTRUMENT TECHNICIANS & MECHANICS
- C144: AIRCRAFT INSTRUMENT, ELECTRICAL & AVIONIC MECHANICS

APPENDIX 2: DETAILED ENGINEERING EDUCATIONAL PROGRAM INFORMATION

UNIVERSITY OF CALGARY

The University of Calgary is a comprehensive research university that provides a dynamic setting for scholars in 16 faculties, 53 departments and more than 30 research institutes and centres. The university has more than 4,700 faculty and staff and nearly 29,000 full-time equivalent students, including 900 international students from 87 countries. In 2004, the University of Calgary granted 6,415 degrees.

PROGRAMS IN SUPPORT OF ENGINEERS

The Schulich School of Engineering administers four-year programs leading to a BSc degree in Chemical, Civil, Computer, Electrical, Geomatics, Mechanical & Manufacturing, Oil & Gas, and Software Engineering. Graduate work leading to the MSc, MEng, and PhD degrees is also offered by all of the undergraduate engineering programs.

Engineering Program Details

CHEMICAL & PETROLEUM ENGINEERING

Chemical engineering is the most broadly based of engineering disciplines and involves the design and operation of a variety of plants and processes. For example, chemical engineers design and oversee the processes involved in producing clothing fibres and dyes, leather, pharmaceuticals, refined petroleum products, plastics, and even the semiconductor chips in computers.

The Department of Chemical Engineering program is aimed at acquainting students with subjects common to all engineering disciplines and to the processing steps used to convert materials to more usable forms. There is also a strong emphasis on computer skills, and many courses involve the application of computer modeling software commonly used in industry. Teams of students will use their detailed knowledge to design a complete industrial process for a specific product such as polyethylene. These projects are usually industry oriented and prepare students for real-life industrial experience. Students are also offered elective courses such as biochemical or environment studies as well as a minor in Petroleum Engineering.

Chemical engineers have professional employment opportunities in a wide variety of industries ranging from oil and gas to food processing. Furthermore, chemical engineering can serve as a springboard into biomedicine, environmental management, nuclear engineering, and metallurgy.

CIVIL ENGINEERING

Wherever there is construction in the world, there is the need for civil engineers. They build, operate and maintain housing, factories, offices, roads, bridges, water works, water supply systems, sewage systems, mines, and the list goes on. Life without these projects would be very different. Current estimates by Canadian

municipalities show a need for some \$25 billion worth of infrastructure repair and this is only highway and municipal services networks.

Civil engineers form the highest proportion of the Canadian engineering work force. A career may be in any areas such as design, construction, operation and maintenance of civil engineering projects. Involvement in these aspects can be through application, regulation, research or teaching. Civil engineers can be found working for contractors, municipalities, governments or universities be it an office, on site or in a laboratory. Civil engineering encompasses several disciplines including environmental engineering, materials engineering, structural engineering, transportation engineering and water resource engineering, as listed below.

Environmental engineering involves:

- Hydrocarbon Contaminated Soil/Sludge Treatment
- Pyrolysis of Contaminated Soil
- Composting of Municipal Solid Waste & Hydrocarbon Contaminated Soil
- Biological Removal of Nutrients
- Hydraulic Conductivity of Clay Liners
- Transport Phenomenon of Pollutants
- Numerical Modelling of Geomaterials as Filters
- Fluid Flow in Soils
- Greenhouse Gas Emission Assessment & Control
- Former Industrial Sites; Decommissioning, Contamination Assessment and Remediation

Materials engineering is primarily concerned with the development of new or improved materials for constructing structures such as buildings, bridges, roads, sewers, dams, airports, etc. Materials engineers are also involved in design of materials and methods to repair existing structures that may be damaged due to structural overload or environmental causes, among others.

Materials engineering involves:

- Durability of Concrete
- Fibre Reinforced & High Strength Concrete
- Use of Waste Materials in Concrete Production
- Time Dependent Deformation of Engineering Materials
- Snow Properties and Avalanche Initiation
- Properties of Bituminous Materials
- Asphalt
- Asphalt Modification

Structural engineers plan and design buildings, bridges, dams, towers, storage facilities and much more. Structural engineering involves:

- Analysis of Plates
- Computer Analysis of Structures
- Hollow & Post - Tensioned Masonry
- Design, Serviceability & Analysis of Reinforced & Pre-Stressed Concrete Structures
- Load-Bearing Structures in the Human Body
- Shear Strength of Flat Plates
- Risk Analysis
- Ice Structure Interaction

Transportation engineering involves:

- Planning and Designing of Highways and Roads
- Mountain Highway Engineering
- Road Surfacing
- Road Safety
- Railway Planning
- Airport Terminal Planning & Air Transport Systems
- Bicycle & Pedestrian Facilities Planning
- Intelligent Transport Systems (ITS)
- Microscopic Traffic Simulations
- Highway Geometric Design Research
- Transportation Engineering Research

Water resources engineers are concerned with the problems associated with the use and control of water.

Water resources engineering involves:

- Water and Wastewater Treatment Plant Design
- Water Distribution, Wastewater and Storm Water Sewer Systems
- Irrigation Engineering
- River Engineering, Hydraulics, Hydrodynamics, Sediment Transport, Contaminant Transport, River Morphology, Ice-Covered Rivers
- Hydraulic Structures (reservoirs, floodways, dams, dykes, spillways & sluice gates, channels, water intakes, etc.)
- Groundwater and Seepage, Well Design, Seepage Control, Underground Contaminant Transport
- Surface Runoff Analysis
- Hydrology, Winter Hydrology, Climate Change
- Extreme Events: Floods, Torrents, Mudflows, Debris Flow
- Geographic Information Systems & Remote Sensing

COMPUTER ENGINEERING

Computer engineers concentrate on the efficient assembly of the elements of computer hardware and their function in an assembled configuration. They develop computer components and computer system specifications, design and build product and circuit prototypes, and test and assemble hardware for specific functions.

Today's information revolution is driving an increasing demand for computer engineers to work on products ranging from cameras to fly-by-wire passenger aircraft. The computer and related manufacturing industries, both large and small, need engineers to develop advanced computer architectures and to build and assemble the components of memory and advanced circuits in increasingly miniaturized and more efficient applications.

The Computer Engineering Program focuses on math, science, engineering principles, and computing in the first year. In following years, the concentration increases on math, circuits, computing, and computer communications. They also participate in team design projects under the direct supervision of a faculty member. Students can select electives such as system engineering, graphics and more.

Computer engineers will find an array of career opportunities available to them in the rapidly developing field of computer technology, whether they choose to work in research, telecommunications, health care, manufacturing, consulting, or the public sector.

ELECTRICAL ENGINEERING

Electrical engineering encompasses almost all aspects of daily life in this hi-tech era. Electrical engineering concepts are used extensively in telecommunication, space technology, information processing, and medical imaging. Electrical engineers have designed life-support systems used in hospitals, personal communication devices, video and audio systems, micro sensors that sense car collisions and release airbags, solar panels used in space, and much more.

Electrical engineering students are introduced to the basic concepts of electric machines, electronic devices, circuits and networks, radio communication, computers and control systems. Students also learn about microelectronics, digital system design, control, power systems, and advanced topics such as digital communication, microwaves, and fibre optics. The department offers a wide range of electives so that students may choose courses that match their interests. There are also courses for students to work on advanced-level projects under the guidance of a professor.

The University of Calgary's Electrical Engineering Program has expanded to meet industry needs. The new Information Communication Technology (ICT) building provides additional educational space and the most up-to-date educational equipment, providing graduates with an education that promises outstanding career opportunities.

GEOMATICS ENGINEERING

Geomatics engineering is a modern discipline which integrates acquisition, modeling, analysis, and management of spatially referenced data, i.e. data identified according to their locations. Based on the scientific framework of geodesy, it uses terrestrial, marine, airborne, and satellite-based sensors to acquire spatial and other data. It includes the process of transforming spatially referenced data from different sources into common information systems with well-defined accuracy characteristics.

A geomatics engineer uses knowledge coming from several disciplines, such as:

- Geodesy
- Positioning and Navigation
- Digital Imaging and Mapping
- Geographical Information Systems
- Land Tenure Systems

Modeling spatial geometry, making observations and estimating spatial positions and their uncertainty is a key component of the geomatics engineering education. Since the world of geomatics is constantly evolving, it is also essential to keep up with the rapid growth of the knowledge, methods and tools of this interdisciplinary field.

MECHANICAL & MANUFACTURING ENGINEERING

Mechanical engineering has a direct impact on our everyday lives – all of our home appliances and all means of transportation have seen some input from mechanical engineers. The research activities of manufacturing engineers include the design, modeling and analysis of manufacturing systems and the development of the next generation of integrated manufacturing systems. The Department of Mechanical Engineering was founded in 1968. In 1995, the undergraduate program of Manufacturing Engineering was established. A Petroleum Engineering minor was added to the Mechanical Engineering program in 1997. To reflect the change of these programs, the department was renamed as the Department of Mechanical and Manufacturing Engineering in 1998. A Mechatronics Engineering minor was added to the Mechanical Engineering and Manufacturing Engineering programs in 2002.

The department has six major research areas:

- Applied Mechanics
- Nano-MEMS, Automation, Control, and Robotics
- Bioengineering
- Thermo-Fluids, Energy Systems & Environment
- Manufacturing Engineering
- Design and Materials

Many mechanical engineering graduates work in the oil and gas industry as drilling engineers, reservoir engineers, facilities designers, sales and marketing representatives, and pipeline engineers. Others have chosen careers in computing, aerospace, electronics, environmental and biomedical engineering, manufacturing and a variety of other industries. Manufacturing engineers graduate with career capabilities ranging from product development to business management such as product design and development, process design and control, manufacturing system and facility design and analysis, production planning and control, operations management, systems engineering and integration, and so on.

OIL & GAS ENGINEERING

Oil and gas engineering involves the production of oil and gas in an economical and environmentally safe manner. Oil and gas engineers evaluate reservoirs, using reservoir description and modeling techniques, oversee drilling operations, design integrated strategies for primary and improved recovery schemes, and design hydrocarbon production and treatment facilities.

The Oil and Gas Engineering Program builds on the basic science and technology subjects common to all engineering disciplines. Engineers in this field gain a sound understanding of geological principles and learn to integrate them with the principles of energy and mass conservation and thermodynamics.

Oil and gas engineers are concerned with the movement of multiple phases through porous media and with the separation and processing of these phases once they are brought to the surface. The Oil and Gas Engineering Program shares a number of courses with the Chemical Engineering Program. Courses in reservoir, petroleum production, drilling, well logging and formation evaluation, well testing, oil field safety and environmental impacts, improved recovery techniques, and oil and gas treating processes, provide the basic technologies associated with oil and gas engineering.

Computers play a major role in oil and gas engineering, as engineers must integrate geological data with production data in order to understand the past performance and to predict the future performance of a given reservoir.

Calgary is Canada's energy capital and graduates of the University of Calgary's Oil and Gas Engineering Program are trained with industry relevant knowledge to meet employment needs.

SOFTWARE ENGINEERING

The increasing dependence of modern civilization on computing devices and systems requires software engineers to put the “intelligence” and reliability into these systems. Sophisticated software, languages, protocols, and systems are necessary to ensure the reliable operation of devices used in everything from computer games to banking systems.

Software engineers use their specialized knowledge to develop, install, validate, and maintain computer programs and software systems. Typically, software engineers will use their computer language and programming skills to analyze and design programs to increase system performance, reliability, and software reuse.

The Software Engineering Program at the University of Calgary starts with a first year curriculum comprising fundamentals of math, science, and engineering principles. As they proceed in their degree, students begin to concentrate on applied math, circuits, programming, and computer architecture. And in the final year, the students can customize their program by selecting from a wide range of technical electives such as graphics, computer and digital systems, computer communication, networks, information and business systems.

A degree in software engineering opens the door to career possibilities in all industries that use advanced information systems, including entertainment, telecommunications, manufacturing, and business.

BIOMEDICAL ENGINEERING SPECIALIZATION - BMEN

The Biomedical Engineering specialization is a new undergraduate program offered by the Schulich School of Engineering which educates and trains high-quality undergraduate students for a research or industry-related career in biomedical engineering. The BMEN is a specialization, comparable to a major, which can be completed in parallel with any regular BSc degree in Engineering. This means that students will be trained in a traditional engineering discipline, while obtaining knowledge in biological and medical science. A highlight of the program is a capstone “Biomedical Engineering Research Thesis”.

In the first year, students will complete the same courses as all other first-year engineering students. At the end of their first year, students apply to the BMEN when they apply to one of nine other programs. Students will be admitted first to a program, and then to the BMEN. Enrollment is limited to 32 students each year, and is based primarily on academic achievement.

Biomedical engineers work in industries such as healthcare, pharmaceuticals, sports medicine, medical imaging, medical instrumentation, and are involved in design, manufacture and testing of medical products, as well as in government, academic and research institutions.

Engineering Minors

Most programs in the Engineering Faculty offer minor degrees. The Department of Chemical and Petroleum Engineering offers a minor in Petroleum Engineering, the Department of Civil Engineering offers minors in Environmental, Structural, and Transportation Engineering, the Department of Mechanical and Manufacturing Engineering offers a Mechanical Engineering degree with minors in Mechatronics or in Petroleum Engineering (offered in conjunction with the Department of Chemical and Petroleum Engineering), and a Manufacturing Engineering degree with a minor in Mechatronics. The Faculty of Engineering, in conjunction with the Haskeyne School of Business, offers a Minor in Entrepreneurship and Enterprise Development.

Engineering Internship Program – INTE

The Faculty of Engineering also provides the option of an Internship Program. The Engineering Internship Program is a five-year program which includes, in addition to the regular four-year academic program, an internship year (a minimum of twelve and a maximum of sixteen consecutive months) of supervised work experience in industry.

Since its inception in 1993, the University of Calgary's Engineering Internship Program has been of particular benefit to students and local industry alike. This program was developed in direct response to industry's expressed desire to have new graduates with more "practical knowledge", and consequently, this program integrates university study with degree related work experience.

Internship students work consecutively for 12 to 16 months between their third and fourth academic years. The students gain skills, practical job experience (which counts towards their APEGGA professional designation requirements), a network of business contacts, and additional knowledge concerning career opportunities. Businesses gain trained, capable and energetic employees that are capable of fitting into the longer term needs of the company. This is a strictly voluntary internship program, but the success rates are impressive. In the 2004 academic year, of 414 undergraduate degrees granted, almost 73% had been placed as interns through this program. Currently, of the 2,461 students enrolled in the school, almost 29% are currently active in the Engineering Internship Program.

Joint Degrees in Engineering

The Schulich School of Engineering offers joint degree programs with 13 other faculties at the University of Calgary. Students starting a joint degree at the beginning of their academic career can complete both degrees within five years. A joint degree provides a broader education befitting those aiming for a career that includes leadership, not only of corporations, but roles in formulating and providing leadership in public policy. An extra degree minor provides a learning experience in entrepreneurship and enterprise development for those planning to start up a business or join corporations.

Engineering Diplomas

The Schulich School of Engineering sponsors a diploma program providing additional special qualifications in designated departments which lead to the diploma of the Faculty of Engineering. This program is intended primarily for professional engineers engaged in practice who are not interested in submitting to the discipline of a true graduate degree including a thesis, or who are unable to meet the residence requirements of the MSc degree.

The school also sponsors a diploma program providing additional specialization in Environmental Engineering. This diploma is intended for professional engineers or holders of equivalent approved degrees and leads to the diploma of the Faculty of Engineering in Environmental Engineering.

The Schulich School of Engineering and the Haskayne School of Business jointly sponsor a diploma program providing additional special qualifications in the area of project management which leads to the diploma of the Faculty of Engineering and of the Haskayne School of Business in project management. This program is intended primarily for professionals engaged in practice who are not interested in the MSc or MEng degrees.

University of Calgary – Schulich School of Engineering

Summary of Degree Programs in Support of Engineers

| Degrees Offered | | | | | | | | |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Undergraduate | | | | | | | | |
| Chemical | Civil | Computer | Electrical | Geomatics | Manufacturing | Mechanical | Oil & Gas | Software |
| BSc | BSc | BSc | BSc | BSc | BSc | BSc | BSc | BSc |
| BSc BMEN | BSc BMEN | | BSc MEN | BSc BMEN | BSc BMEN | BSc BMEN | | |
| BSc(Eng)/ BSc* | BSc(Eng)/ BSc* | BSc(Eng)/ BSc* | BSc(Eng)/ BSc* | BSc(Eng)/ BSc* | BSc(Eng)/ BSc* | BSc(Eng)/ BSc* | BSc(Eng)/ BSc* | BSc(Eng)/ BSc* |
| BSc(Eng)/ BA* | BSc(Eng)/ BA* | BSc(Eng)/ BA* | BSc(Eng)/ BA* | BSc(Eng)/ BA* | BSc(Eng)/ BA* | BSc(Eng)/ BA* | BSc(Eng)/ BA* | BSc(Eng)/ BA* |
| BSc INTE | BSc INTE | BSc INTE | BSc INTE | BSc INTE | BSc INTE | BSc INTE | BSc INTE | BSc INTE |
| Graduate | | | | | | | | |
| MEng | MEng | | MEng | MEng | MEng | MEng | | |
| MSc | MSc | | MSc | MSc | | MSc | | |
| PhD | PhD | | PhD | PhD | PhD | PhD | | |
| <p>* Combined degree with Faculties of Humanities and Social Sciences</p> <p>Note: "BSc BMEN" denotes a BSc degree with a Biomedical Engineering specialization and the "BSc INTE" denotes a BSc degree with an Internship Program.</p> | | | | | | | | |

Southern Alberta Institute of Technology (SAIT) Polytechnic

The Southern Alberta Institute of Technology (SAIT) Polytechnic offers more than 70 applied degree, diploma and certificate programs to some 65,000 students every year. SAIT Polytechnic is internationally renowned for its quality technical education and hands-on training.

Engineering and Technologists Programs

FULL-TIME PROGRAMS

BACHELOR OF APPLIED PETROLEUM ENGINEERING TECHNOLOGY (APT)

- Two-year applied degree
- Full and part-time studies
- Includes work experience component
- Fall or winter starts
- High industry demand

Since 1995, SAIT Polytechnic has offered a program leading to the Bachelor of Applied Technology Petroleum Engineering. Although the program is primarily designed to upgrade the education of technology diploma graduates, there is enough flexibility to accommodate students from a variety of backgrounds. Both day and evening classes are run to accommodate full-time and part-time students, and an increasing number of the courses are available for distance delivery to students located outside the Calgary area. All participants in the program are required to complete coursework and obtain a total of at least 50 credits of new learning in the core courses and approved optional courses, in addition to completion of the Credit Work Experience. Each student's personal development program is designed in consultation with the advisor who is assigned by SAIT Polytechnic to ensure that the personal development program will suit the student's needs.

Accreditation:

This degree does not currently provide the requirements leading to registration as a professional engineer. The degree is designed to provide the graduate with in-depth, applicable training that will allow the graduate to function as a highly skilled member of an engineering team working in one of the areas outlined above.

CHEMICAL TECHNOLOGY (CHT)

- Two-year diploma
- Fall start
- Co-operative work option

Highly-skilled chemical technologists are in demand by Canada's continually expanding chemical industry. This program combines a laboratory orientation with a broad theoretical background to provide students with the skills needed to work alongside professional chemists in a wide range of industrial and research settings. Opportunities exist in petroleum and natural gas processing, petrochemicals, metallurgical refining, food and beverage processing, agriculture, environmental consulting and government departments of agriculture and forestry.

Accreditation:

The program is nationally accredited by the Canadian Technology Accreditation Board and by the Canadian Council of Technicians and Technologists. Graduates can also register with the Alberta Society of Engineering Technologists and the Chemical Institute of Canada.

CHEMICAL ENGINEERING TECHNOLOGY (CET)

- Two-year diploma
- Fall start
- Partial distance education option available

Chemical engineering technologists work closely with chemical engineers in designing equipment and developing commercial production facilities. They assist in evaluating and redesigning equipment processes in the energy and petroleum industries, manufacturing plants, and environmental control. Their knowledge and skills may also be applied to resolving process and production problems, designing new plants and processes, evaluating the economic and technical feasibility of modifying, replacing or installing new plant equipment, and training and supervising production unit operators.

The program prepares graduates to work in production, process development and environmental control for the expanding industries of petroleum, chemical, petrochemical, pulp and paper. Career opportunities exist in engineering design, computer-based process simulation, technical sales, field operations and environmental work.

Accreditation:

This program has national accreditation under the Canadian Technology Accreditation Board. Thus, graduates with two years of suitable experience are eligible for registration in the Alberta Society of Engineering Technologists. The program is also accredited by the Canadian Council of Technicians and Technologists. Registration agreements also exist with American and British societies.

ELECTRICAL ENGINEERING TECHNOLOGY (EET)

- Two-year diploma
- Fall start
- Evening course and part-time study options
- High industry demand

This program provides students with the skills and academic training needed for early career development as highly competent electrical engineering technologists. It offers a comprehensive study in electrical and electronic theory, technical mathematics and computers, report writing and drafting. It also provides in-depth training in electrical machines and controls, control systems industrial networking, programmable logic controllers, power systems and computer applications. The program includes the design and layout of electrical systems, code applications, metering and protective relaying. Graduates are prepared for a wide range of work in the electrical field, including jobs in design, estimating, technical sales, power generation, distribution, metering, industrial electronic control, supervisory control systems and industrial networking. Employers include consulting and design firms, the oil and gas industry, industrial plants, technical sales companies, electrical contractors, utility companies and various manufacturers and distributors.

Accreditation:

The program has met the Canadian Technology Accreditation Board and Canadian Council of Technicians and Technologists criteria.

ENVIRONMENTAL TECHNOLOGY (ET)

- Two-year diploma
- Fall start

This program provides students with a unique and focused combination of environmental technology and chemistry knowledge and skills.

An Environmental Technology graduate is trained to work in environmental protection, conservation and preservation of natural resources, and environmental education, communication and research. Graduates work in utility and mining companies, chemical manufacturers, steel makers, transportation, industry, federal/provincial government departments, municipalities, educational institutions, wastewater management and water treatment plants, research and health care centres, environmental interest groups, and other industry associations.

Accreditation:

The program will be accredited in the future.

INDUSTRIAL INSTRUMENTATION TECHNOLOGY (IIT)

- Two-year Engineering Technologist Diploma
- Fall start
- High industry demand

Automated process control and measurement systems in the production of various commodities are rapidly changing and demand highly-skilled industrial instrumentation technologists. These technologists use electronic test equipment to install, troubleshoot, calibrate, maintain and repair electrical/electronic measurement and control instruments. This program provides students with sound theoretical and practical training in the operation and maintenance of pneumatic devices, control valves, electronic instruments, digital logic devices, and computer based process controls, and control system design. Students also become well versed in personal computer applications in instrumentation, process control systems design, Fieldbus, SCADA, PLC, distributed control system design and interfacing of industrial microcomputer control systems with real processes. Modern laboratory facilities include pilot-scale versions of processes found in various industries and a fully equipped control room.

Accreditation:

The Industrial Instrumentation Technology program at the Engineering Technologist level is accredited by the Canadian Council of Technicians and Technologists (CCTT). Students are eligible for membership in the Alberta Society of Engineering Technologists (ASET) and the Instrumentation, Systems, and Automation Society (ISA).

PETROLEUM ENGINEERING TECHNOLOGY (PT)

- Two-year diploma
- Fall start
- High industry demand

This challenging program trains engineering technologists in all areas of the upstream petroleum industry, helping meet the demand for highly-skilled people in field and office positions. Using the latest computer

software, students complete courses in core areas of engineering science, drilling, geology, production and reservoir engineering technology. Graduates are prepared for careers in the upstream oil and gas areas such as exploration and development, field operations, drilling, computer applications, prospect analysis and reserves determination.

Accreditation:

The program is nationally accredited by the Canadian Technology Accreditation Board and Canadian Council of Technicians and Technologists at the technologist level.

POWER ENGINEERING TECHNOLOGY (PET)

- Two-year diploma
- Fall start
- High industry demand

This program is designed to meet industry demand for certified power engineering technologists who can control large, complex power and process systems. It offers a high-level course of study that trains students to perform production work in the operation and development of large energy projects such as oil sands, gas plants and electrical generating stations. Graduates are prepared for careers in petroleum, power, petrochemical, refining, and pulp and paper industries as well as field and design offices and mechanical or industrial sales outlets.

Accreditation:

After successfully completing this program, graduates will receive a SAIT Polytechnic diploma in Power Engineering Technology and are eligible to apply for ABSA certification exams.

PROCESS OPERATIONS (CPO)

- One-year certificate
- Fall start
- Four-week practicum

This program prepares students for careers as process operators responsible for the daily and safe running of processing equipment at industrial plants. Graduates are employed in processing industries such as

petrochemical, fertilizer, pulp and paper, natural gas processing, metallurgical, petroleum refining, and food and beverage production. Their jobs include plant, battery, process and field operators.

Accreditation:

Graduates are eligible for the Process Operations Certificate and may also write the new Alberta Boilers Branch Fourth-Class Engineers Certificate.

Distance Education Programs

- Power Engineering

Apprenticeship Programs

- Instrument Mechanic

Career Upgrading

- Electrical Design
- Petroleum Geological Applications
- Petroleum Geophysical Applications
- Oil & Gas Production Accounting
- PLC Applications
- Petroleum Engineering Applications
- Power Engineering (Fifth Class)
- Power Engineering (Fourth Class)
- Power Engineering (Third Class)
- Power Engineering (Second Class)
- Petroleum Land Administration

Calgary Catholic Immigration Society

Engineering and Technology Upgrading Program

The Calgary Catholic Immigration Society offers an Engineering & Technology Upgrading Program with the following objectives:

- To give new Canadian professionals the opportunity to upgrade and integrate their written and verbal communication skills as they relate to the execution of future industry endeavours.
- To improve computer skills, basic to high-end technical communications that will enable the participant to supply a potential employer with the skills needed to work in the Canadian environment.
- To supply three levels of training on AutoCAD, designed to cover basic AutoCAD features and commands, including 3D and multi-view drawing.

Components:

Skills Training - Four Months:

- Technical Communications
- Job Search Techniques
- Computer Training (MS Office Suite)
- SAIT Polytechnic AutoCAD Training
- English Verbal Grammar
- Communication, Presentation
- Project Management Seminars
- Industry Guest Speakers

Employment Practicum - Three Months:

- Work Experience
- Group Dynamics & Industry Speakers

Appendix 3: Labour Force by Occupation, 1994 – 2004

| Canada, LF, (' 000) | | | | | | | | | | | |
|-----------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
| All Occs | 14,562.6 | 14,673.1 | 14,834.5 | 15,058.5 | 15,296.8 | 15,575.0 | 15,842.1 | 16,110.8 | 16,580.1 | 16,954.0 | 17,183.4 |
| C03 | 93.3 | 90.0 | 90.3 | 92.7 | 101.4 | 97.5 | 96.1 | 106.4 | 117.3 | 115.3 | 121.5 |
| C04 | 55.6 | 55.1 | 45.8 | 57.9 | 63.0 | 60.4 | 62.7 | 64.6 | 56.2 | 50.1 | 60.8 |
| C13 | 30.8 | 39.7 | 36.4 | 34.4 | 42.0 | 47.1 | 41.6 | 49.7 | 47.0 | 49.5 | 63.8 |
| C14 | 85.0 | 93.1 | 104.1 | 111.1 | 119.3 | 149.0 | 152.2 | 162.7 | 188.2 | 197.3 | 193.6 |
| Total Eng | 264.7 | 277.9 | 276.9 | 296.1 | 325.7 | 354.0 | 352.6 | 383.4 | 408.7 | 412.2 | 439.7 |
| Alberta, LF, (' 000) | | | | | | | | | | | |
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
| All Occs | 1,451.3 | 1,479.8 | 1,508.6 | 1,541.8 | 1,591.5 | 1,636.5 | 1,666.4 | 1,709.5 | 1,764.7 | 1,810.0 | 1,843.4 |
| C03 | 10.5 | 9.8 | 10.5 | 13.3 | 12.5 | 14.6 | 10.8 | 14.6 | 17.2 | 15.5 | 17.8 |
| C04 | 10.1 | 7.9 | 7.5 | 8.2 | 11.1 | 11.1 | 7.8 | 10.9 | 12.5 | 7.0 | 11.1 |
| C13 | 3.7 | 4.3 | 3.5 | 3.3 | 4.6 | 5.5 | 5.7 | 4.9 | 5.5 | 6.8 | 7.0 |
| C14 | 8.1 | 8.5 | 10.8 | 12.7 | 12.6 | 12.5 | 15.0 | 16.8 | 20.7 | 21.4 | 18.1 |
| Total Eng | 32.4 | 30.5 | 32.3 | 37.5 | 40.8 | 43.7 | 39.3 | 47.2 | 55.9 | 50.7 | 54.0 |
| Calgary - 830, LF, (' 000) | | | | | | | | | | | |
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
| All Occs | 476.0 | 493.9 | 515.6 | 532.1 | 562.3 | 582.9 | 605.8 | 628.5 | 647.6 | 660.7 | 677.2 |
| C03 | 5.5 | 4.2 | 5.1 | 5.8 | 6.7 | 7.0 | 5.3 | 8.6 | 8.3 | 8.0 | 9.9 |
| C04 | 5.7 | 4.5 | 4.3 | 5.0 | 6.8 | 7.5 | 5.6 | 7.9 | 8.5 | 5.0 | 7.8 |
| C13 | 0.0 | 1.5 | 0.0 | 0.0 | 1.9 | 1.9 | 2.2 | 2.3 | 1.9 | 2.7 | 2.3 |
| C14 | 3.1 | 3.7 | 5.6 | 4.4 | 4.9 | 4.7 | 6.9 | 7.6 | 10.2 | 9.6 | 7.4 |
| Total Eng | 14.3 | 13.9 | 15.0 | 15.2 | 20.3 | 21.1 | 20.0 | 26.4 | 28.9 | 25.3 | 27.4 |

Source: Statistics Canada, Labour Force Survey, Special Program #A010507

Caution: Data with 3 and 4 digits NAICS or NOCS should be used with prudence. Data with a higher variability is reliable enough for some purposes, however it should be used with great caution. Therefore, in any subsequent use, specific reference should be made to the high sampling variability of data.

NOTE: 0.0 = ESTIMATES WITH LESS THAN 1,500.

C03 = Civil, Mechanical, Electrical and Chemical Engineers

C04 = Industrial & Manufacturing, Metallurgical & Materials, Mining, Geological, Petroleum, Aerospace, and other engineers, N.E.C.

C13 = Technical Occupations in Civil, Mechanical and Industrial Engineering

C14 = Technical Occupations in Electronic and Electrical Engineering

Note: Does not include C073, Software Engineers.

APPENDIX 4: EMPLOYMENT BY OCCUPATION, 1994 – 2004

| Canada, EMP, (' 000) | | | | | | | | | | | |
|---|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
| All Occs | 13,043.7 | 13,271.0 | 13,391.6 | 13,676.5 | 10,419.2 | 14,389.8 | 14,758.6 | 14,946.7 | 15,307.9 | 15,665.1 | 15,949.7 |
| C03 | 89.9 | 87.6 | 87.4 | 90.7 | 99.1 | 95.7 | 93.2 | 103.4 | 113.4 | 109.7 | 118.3 |
| C04 | 53.0 | 53.4 | 44.2 | 56.6 | 60.3 | 58.4 | 61.2 | 62.5 | 53.8 | 48.1 | 59.1 |
| C13 | 28.5 | 38.2 | 34.4 | 33.2 | 40.4 | 45.7 | 40.6 | 47.9 | 44.8 | 48.1 | 61.7 |
| C14 | 80.5 | 88.2 | 100.5 | 106.7 | 116.1 | 144.5 | 147.7 | 155.6 | 178.0 | 187.8 | 184.4 |
| Total Eng | 251.9 | 267.4 | 266.5 | 287.2 | 315.9 | 344.3 | 342.7 | 369.4 | 390.0 | 393.7 | 423.5 |
| Alberta, EMP, (' 000) | | | | | | | | | | | |
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
| All Occs | 1,324.0 | 1,363.4 | 1,403.7 | 1,450.2 | 1,507.7 | 1,542.2 | 1,583.2 | 1,630.0 | 1,671.5 | 1,717.9 | 1,757.9 |
| C03 | 10.3 | 9.6 | 10.2 | 13.1 | 12.0 | 14.5 | 10.4 | 14.4 | 17.0 | 15.1 | 17.5 |
| C04 | 9.8 | 7.8 | 7.1 | 8.1 | 10.8 | 10.1 | 7.6 | 10.7 | 12.4 | 6.8 | 10.6 |
| C13 | 3.4 | 4.1 | 3.3 | 3.3 | 4.6 | 5.3 | 5.5 | 4.9 | 5.2 | 6.7 | 6.7 |
| C14 | 7.8 | 8.2 | 10.4 | 12.5 | 12.5 | 12.0 | 14.4 | 16.5 | 20.2 | 20.7 | 17.1 |
| Total Eng | 31.3 | 29.7 | 31.0 | 37.0 | 39.9 | 41.9 | 37.9 | 46.5 | 54.8 | 49.3 | 51.9 |
| Calgary - 830, EMP, (' 000) | | | | | | | | | | | |
| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
| All Occs | 432.4 | 454.0 | 480.8 | 500.7 | 533.5 | 550.2 | 578.2 | 599.7 | 611.4 | 625.4 | 643.4 |
| C03 | 5.3 | 4.1 | 5.0 | 5.8 | 6.6 | 6.9 | 5.1 | 8.4 | 8.3 | 7.8 | 9.7 |
| C04 | 5.5 | 4.4 | 4.1 | 4.9 | 6.6 | 6.9 | 5.5 | 7.8 | 8.4 | 4.8 | 7.5 |
| C13 | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | 1.8 | 2.1 | 2.3 | 1.7 | 2.6 | 2.1 |
| C14 | 2.9 | 3.5 | 5.4 | 4.3 | 4.9 | 4.6 | 6.6 | 7.5 | 9.8 | 9.4 | 7.2 |
| Total Eng | 13.7 | 12.0 | 14.5 | 15.0 | 20.0 | 20.2 | 19.3 | 26.0 | 28.2 | 24.6 | 26.5 |
| <p>Source: Statistics Canada, Labour Force Survey, Special Program #A010507</p> <p>Caution: Data with 3 and 4 digits NAICS or NOCS should be used with prudence. Data with a higher variability is reliable enough for some purposes, however it should be used with great caution. Therefore, in any subsequent use, specific reference should be made to the high sampling variability of data.</p> <p>NOTE: 0.0 = ESTIMATES WITH LESS THAN 1,500.</p> <p>C03 = Civil, Mechanical, Electrical and Chemical Engineers</p> <p>C04 = Industrial & Manufacturing, Metallurgical & Materials, Mining, Geological, Petroleum, Aerospace, and other engineers, N.E.C.</p> <p>C13 = Technical Occupations in Civil, Mechanical and Industrial Engineering</p> <p>C14 = Technical Occupations in Electronic and Electrical Engineering</p> <p>Note: Does not include C073, Software Engineers.</p> | | | | | | | | | | | |

APPENDIX 5: WAGE AND SALARY BY OCCUPATION

NOC 2131

| | |
|--------------------------------|--|
| Occupation Title (NOC): | Civil Engineers |
| Occupation Title (OCCinfo): | Civil Engineer Environmental Engineer Geomatics/Surveying Engineer |
| Region | Calgary |
| NOC Code: | 2131 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---|---------|---------|---------|---------|----------------|
| Starting | \$11.54 | \$39.77 | \$27.72 | \$25.50 | A |
| After 3 years | \$15.00 | \$41.05 | \$36.47 | \$37.81 | A |
| Top | \$16.00 | \$76.92 | \$50.86 | \$48.16 | A |
| *All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report . | | | | | |

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 37.8 |
| Overall Average Wage (per hour), Calgary | \$40.69 |
| Overall Average Salary (annual)*, Calgary | \$80,212 |
| *Rounded to the nearest dollar | |

SKILLS SHORTAGE INFORMATION:

| | |
|--|-----|
| Civil Engineers | |
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 35% |
| NO | 45% |
| N/A | 20% |
| Estimated Vacancy Rate | |
| 2005 | 1% |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|---|-----------------|
| Professional, Scientific & Technical Svcs | \$82,655 |
| OVERALL ACROSS ALL INDUSTRIES | \$77,445 |
| Public Administration | \$71,882 |

NOC 2132

| | |
|--------------------------------|----------------------|
| Occupation Title (NOC): | Mechanical Engineers |
| Region | Calgary |
| NOC Code: | 2132 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$19.94 | \$25.52 | \$24.47 | \$25.38 | B |
| After 3 years | \$20.93 | \$38.94 | \$35.38 | \$38.16 | B |
| Top | \$21.92 | \$64.76 | \$49.96 | \$52.01 | B |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 39.2 |
| Overall Average Wage (per hour), Calgary | \$41.14 |
| Overall Average Salary (annual)*, Calgary | \$84,013 |
| <i>*Rounded to the nearest dollar</i> | |

SKILLS SHORTAGE INFORMATION:

| Mechanical Engineers | |
|--|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 40% |
| NO | 30% |
| N/A | 30% |
| Estimated Vacancy Rate | |
| 2005 | 1% |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|---|-----------------|
| Professional, Scientific & Technical Svcs | \$83,754 |
| OVERALL ACROSS ALL INDUSTRIES | \$78,620 |
| Manufacturing | \$64,595 |
| Health Care & Social Assistance | \$41,186 |

NOC 2133

| | |
|--------------------------------|--------------------------------------|
| Occupation Title (NOC): | Electrical and Electronics Engineers |
| Occupation Title (OCCinfo): | Electrical Engineer |
| Region | Calgary |
| NOC Code: | 2133 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$20.00 | \$58.97 | \$23.70 | \$21.15 | B |
| After 3 years | \$19.23 | \$41.09 | \$32.01 | \$29.59 | B |
| Top | \$28.72 | \$60.00 | \$44.27 | \$47.37 | B |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 38.9 |
| Overall Average Wage (per hour), Calgary | \$36.30 |
| Overall Average Salary (annual)*, Calgary | \$73,486 |
| <i>*Rounded to the nearest dollar</i> | |

SKILLS SHORTAGE INFORMATION:

| Electrical and Electronics Engineers | |
|--|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 10% |
| NO | 70% |
| N/A | 20% |
| Estimated Vacancy Rate | |
| 2005 | 0% |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|---|-----------------|
| Utilities | \$89,161 |
| Professional, Scientific & Technical Svcs | \$80,288 |
| OVERALL ACROSS ALL INDUSTRIES | \$75,090 |
| Public Administration | \$62,689 |
| Manufacturing | \$54,998 |

NOC 2134

| | |
|--------------------------------|--------------------|
| Occupation Title (NOC): | Chemical Engineers |
| Region | Calgary |
| NOC Code: | 2134 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|----------------|----------------|----------------|---------------|-----------------------|
| Starting | N/A | N/A | N/A | N/A | B |
| After 3 years | N/A | N/A | N/A | N/A | B |
| Top | N/A | N/A | N/A | N/A | B |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 39.9 |
| Overall Average Wage (per hour), Calgary | \$48.04 |
| Overall Average Salary (annual)*, Calgary | \$99,734 |
| <i>*Rounded to the nearest dollar</i> | |

SKILLS SHORTAGE INFORMATION:

| Chemical Engineers | |
|--|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 75% |
| NO | 0% |
| N/A | 25% |
| Estimated Vacancy Rate | |
| 2005 | 5% |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|--------------------------------------|-----------------------|
| OVERALL ACROSS ALL INDUSTRIES | \$92,029 |

NOC 2141

| | |
|--------------------------------|---|
| Occupation Title (NOC): | Industrial and Manufacturing Engineers |
| Occupation Title (OCCinfo): | Industrial Engineer Manufacturing Engineer |
| Region | Calgary |
| NOC Code: | 2141 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$12.00 | \$27.40 | \$19.32 | \$19.67 | C |
| After 3 years | \$15.30 | \$36.06 | \$25.67 | \$24.07 | C |
| Top | \$19.67 | \$52.88 | \$33.68 | \$32.37 | C |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 40.4 |
| Overall Average Wage (per hour), Calgary | \$25.01 |
| Overall Average Salary (annual)*, Calgary | \$52,014 |
| <i>*Rounded to the nearest dollar</i> | |

SKILLS SHORTAGE INFORMATION:

| Industrial and Manufacturing Engineers | |
|---|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 27% |
| NO | 53% |
| N/A | 20% |
| Estimated Vacancy Rate | |
| 2005 | 6% |

INDUSTRY INFORMATION:

The following is a list of industries within the specific occupation. You can view the wage information, which is broken down by industry in **Alberta**, by clicking on the Industry link.

| Industry | Average Salary |
|---|-----------------|
| Professional, Scientific & Technical Svcs | \$79,649 |
| OVERALL ACROSS ALL INDUSTRIES | \$68,602 |
| Manufacturing | \$66,996 |

NOC 2142

| | |
|--------------------------------|---------------------------------------|
| Occupation Title (NOC): | Metallurgical and Materials Engineers |
| Occupation Title (OCCinfo): | Materials/Metallurgical Engineer |
| Region | Calgary |
| NOC Code: | 2142 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | N/A | N/A | N/A | N/A | C |
| After 3 years | N/A | N/A | N/A | N/A | C |
| Top | \$26.41 | \$45.30 | \$29.05 | \$26.41 | C |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 41.7 |
| Overall Average Wage (per hour), Calgary | \$27.33 |
| Overall Average Salary (annual)*, Calgary | \$59,280 |
| <i>*Rounded to the nearest dollar</i> | |

SKILLS SHORTAGE INFORMATION:

| | |
|--|-----|
| Metallurgical and Materials Engineers | |
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | N/A |
| NO | N/A |
| N/A | N/A |
| Estimated Vacancy Rate | |
| 2005 | N/A |

INDUSTRY INFORMATION:

| | |
|--------------------------------------|-----------------------|
| Industry | Average Salary |
| OVERALL ACROSS ALL INDUSTRIES | \$73,330 |

NOC 2143 – Mining Engineers – No Information available

NOC 2144 – Information available for Alberta only

| | |
|-------------------------|----------------------|
| Occupation Title (NOC): | Geological Engineers |
| Region | Alberta |
| NOC Code: | 2144 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | N/A | N/A | N/A | N/A | C |
| After 3 years | N/A | N/A | N/A | N/A | C |
| Top | \$23.08 | \$58.35 | \$45.33 | \$43.27 | C |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 39.4 |
| Overall Average Wage (per hour), Alberta | \$43.95 |
| Overall Average Salary (annual)*, Alberta | \$90,582 |

**Rounded to the nearest dollar*

SKILLS SHORTAGE INFORMATION:

| Geological Engineers | |
|---|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 14% |
| NO | 14% |
| N/A | 71% |
| Estimated Vacancy Rate | |
| 2005 | 0% |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|-------------------------------|----------------|
| OVERALL ACROSS ALL INDUSTRIES | \$90,582 |

NOC 2145

| | |
|--------------------------------|---------------------|
| Occupation Title (NOC): | Petroleum Engineers |
| Region | Calgary |
| NOC Code: | 2145 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$23.08 | \$56.13 | \$32.40 | \$24.81 | C |
| After 3 years | \$28.85 | \$76.92 | \$35.71 | \$31.15 | C |
| Top | \$43.27 | \$80.77 | \$58.50 | \$51.92 | C |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 39.6 |
| Overall Average Wage (per hour), Calgary | \$42.60 |
| Overall Average Salary (annual)*, Calgary | \$87,341 |

**Rounded to the nearest dollar*

SKILLS SHORTAGE INFORMATION:

| Metallurgical and Materials Engineers | |
|--|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 7% |
| NO | 80% |
| N/A | 13% |
| Estimated Vacancy Rate | |
| 2005 | 0% |

INDUSTRY INFORMATION:

The following is a list of industries within the specific occupation. You can view the wage information, which is broken down by industry in **Alberta**, by clicking on the Industry link.

| Industry | Average Salary |
|---|-----------------|
| Mining and Oil & Gas Extraction | \$123,797 |
| OVERALL ACROSS ALL INDUSTRIES | \$97,464 |
| Professional, Scientific & Technical Svcs | \$79,857 |

NOC 2146 – Aerospace Engineers – No information available

NOC 2147 – Information available for Alberta only

| | |
|--------------------------------|--|
| Occupation Title (NOC): | Computer Engineers (Except Software Engineers) |
| Region | Alberta |
| NOC Code: | 2147 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$12.00 | \$40.83 | \$40.34 | \$40.83 | B |
| After 3 years | N/A | N/A | N/A | N/A | B |
| Top | N/A | N/A | N/A | N/A | B |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 36.5 |
| Overall Average Wage (per hour), Alberta | \$40.43 |
| Overall Average Salary (annual)*, Alberta | \$76,694 |
| <i>*Rounded to the nearest dollar</i> | |

SKILLS SHORTAGE INFORMATION:

| Computer Engineers (Except Software Engineers) | |
|--|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | N/A |
| NO | N/A |
| N/A | N/A |
| Estimated Vacancy Rate | |
| 2005 | N/A |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|--------------------------------------|-----------------|
| Public Administration | \$76,989 |
| OVERALL ACROSS ALL INDUSTRIES | \$76,694 |

NOC 2148

| | |
|--------------------------------|--------------------------------------|
| Occupation Title (NOC): | Other Professional Engineers, n.e.c. |
| Region | Calgary |
| NOC Code: | 2148 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$21.11 | \$39.77 | \$29.24 | \$21.11 | A |
| After 3 years | \$28.23 | \$28.23 | \$28.23 | \$28.23 | A |
| Top | \$37.40 | \$37.40 | \$37.40 | \$37.40 | A |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 37.4 |
| Overall Average Wage (per hour), Calgary | \$28.56 |
| Overall Average Salary (annual)*, Calgary | \$55,580 |

**Rounded to the nearest dollar*

SKILLS SHORTAGE INFORMATION:

| Other Professional Engineers, n.e.c. | |
|---|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | N/A |
| NO | N/A |
| N/A | N/A |
| Estimated Vacancy Rate | |
| 2005 | N/A |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|--------------------------------------|-----------------|
| OVERALL ACROSS ALL INDUSTRIES | \$59,987 |
| Public Administration | \$59,312 |

NOC 2173

| | |
|--------------------------------|--------------------|
| Occupation Title (NOC): | Software Engineers |
| Region | Calgary |
| NOC Code: | 2173 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$16.63 | \$36.06 | \$28.78 | \$31.19 | B |
| After 3 years | \$23.08 | \$43.27 | \$32.25 | \$32.97 | B |
| Top | \$28.85 | \$48.08 | \$44.39 | \$46.78 | B |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 39.2 |
| Overall Average Wage (per hour), Calgary | \$34.99 |
| Overall Average Salary (annual)*, Calgary | \$71,029 |

**Rounded to the nearest dollar*

SKILLS SHORTAGE INFORMATION:

| Software Engineers | |
|---|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 25% |
| NO | 75% |
| N/A | 0% |
| Estimated Vacancy Rate | |
| 2005 | 4% |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|---|-----------------|
| OVERALL ACROSS ALL INDUSTRIES | \$73,919 |
| Professional, Scientific & Technical Svcs | \$72,030 |
| Manufacturing | \$54,927 |

NOC 2173

| | |
|--------------------------------|--------------------|
| Occupation Title (NOC): | Software Engineers |
| Region | Calgary |
| NOC Code: | 2173 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$14.42 | \$23.84 | \$19.74 | \$21.66 | B |
| After 3 years | \$14.00 | \$40.24 | \$27.85 | \$23.24 | B |
| Top | \$15.00 | \$53.79 | \$34.73 | \$34.67 | B |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 37.0 |
| Overall Average Wage (per hour), Calgary | \$31.93 |
| Overall Average Salary (annual)*, Calgary | \$61,252 |
| <i>*Rounded to the nearest dollar</i> | |

SKILLS SHORTAGE INFORMATION:

| Civil Engineering Technologists and Technicians | |
|--|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 64% |
| NO | 36% |
| N/A | 0% |
| Estimated Vacancy Rate | |
| 2005 | 5% |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|---|-----------------|
| Public Administration | \$63,937 |
| OVERALL ACROSS ALL INDUSTRIES | \$62,094 |
| Manufacturing | \$55,252 |
| Professional, Scientific & Technical Svcs | \$54,332 |

NOC 2232

| | |
|--------------------------------|--|
| Occupation Title (NOC): | Mechanical Engineering Technologists and Technicians |
| Region | Calgary |
| NOC Code: | 2232 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$18.46 | \$26.44 | \$21.89 | \$19.23 | B |
| After 3 years | \$14.00 | \$34.28 | \$29.43 | \$30.64 | B |
| Top | N/A | N/A | N/A | N/A | B |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 38.3 |
| Overall Average Wage (per hour), Calgary | \$30.66 |
| Overall Average Salary (annual)*, Calgary | \$61,016 |
| <i>*Rounded to the nearest dollar</i> | |

SKILLS SHORTAGE INFORMATION:

| Mechanical Engineering Technologists and Technicians | |
|--|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 43% |
| NO | 43% |
| N/A | 14% |
| Estimated Vacancy Rate | |
| 2005 | 4% |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|---|-----------------|
| Mining and Oil & Gas Extraction | \$76,365 |
| Professional, Scientific & Technical Svcs | \$71,124 |
| OVERALL ACROSS ALL INDUSTRIES | \$67,024 |
| Public Administration | \$60,718 |
| Manufacturing | \$41,759 |

NOC 2233

| | |
|--------------------------------|--|
| Occupation Title (NOC): | Industrial Engineering and Manufacturing Technologists and Technicians |
| Region | Calgary |
| NOC Code: | 2233 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$10.00 | \$39.06 | \$19.86 | \$18.86 | C |
| After 3 years | \$17.95 | \$26.30 | \$23.19 | \$25.85 | C |
| Top | \$19.00 | \$31.98 | \$23.83 | \$21.63 | C |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 39.7 |
| Overall Average Wage (per hour), Calgary | \$22.58 |
| Overall Average Salary (annual)*, Calgary | \$46,251 |
| <i>*Rounded to the nearest dollar</i> | |

SKILLS SHORTAGE INFORMATION:

| Industrial Engineering and Manufacturing Technologists and Technicians | |
|--|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 6% |
| NO | 56% |
| N/A | 38% |
| Estimated Vacancy Rate | |
| 2005 | 0% |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|--------------------------------------|-----------------|
| Manufacturing | \$69,476 |
| OVERALL ACROSS ALL INDUSTRIES | \$68,153 |

NOC 2241

| | |
|--------------------------------|--|
| Occupation Title (NOC): | Electrical and Electronics Engineering Technologists and Technicians |
| Region | Calgary |
| NOC Code: | 2241 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$10.00 | \$20.00 | \$14.64 | \$14.95 | B |
| After 3 years | \$14.00 | \$35.20 | \$27.72 | \$32.02 | B |
| Top | \$18.00 | \$51.28 | \$38.51 | \$45.41 | B |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 39.2 |
| Overall Average Wage (per hour), Calgary | \$31.63 |
| Overall Average Salary (annual)*, Calgary | \$67,742 |
| <i>*Rounded to the nearest dollar</i> | |

SKILLS SHORTAGE INFORMATION:

| Electrical and Electronics Engineering Technologists and Technicians | |
|--|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 11% |
| NO | 78% |
| N/A | 11% |
| Estimated Vacancy Rate | |
| 2005 | 0% |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|---|-----------------|
| Utilities | \$79,239 |
| Professional, Scientific & Technical Svcs | \$70,170 |
| OVERALL ACROSS ALL INDUSTRIES | \$65,285 |
| Health Care & Social Assistance | \$42,253 |
| Construction | \$40,143 |
| Manufacturing | \$38,679 |

NOC 2242

| | |
|--------------------------------|---|
| Occupation Title (NOC): | Electronic Service Technicians (Household and Business Equipment) |
| Occupation Title (OCCinfo): | Computer Service Technician Electronic Technician Office Equipment Technician Security Alarm Installer |
| Region | Calgary |
| NOC Code: | 2242 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$8.00 | \$23.08 | \$13.84 | \$12.02 | B |
| After 3 years | \$9.50 | \$38.46 | \$19.73 | \$20.00 | B |
| Top | \$17.00 | \$36.06 | \$25.93 | \$27.44 | B |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 39.9 |
| Overall Average Wage (per hour), Calgary | \$18.81 |
| Overall Average Salary (annual)*, Calgary | \$38,855 |
| <i>*Rounded to the nearest dollar</i> | |

SKILLS SHORTAGE INFORMATION:

| Electronic Service Technicians (Household and Business Equipment) | |
|--|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 26% |
| NO | 59% |
| N/A | 15% |
| Estimated Vacancy Rate | |
| 2005 | 3% |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|--|-----------------------|
| Educational Services | \$51,058 |
| Public Administration | \$50,190 |
| OVERALL ACROSS ALL INDUSTRIES | \$44,213 |
| Construction | \$44,116 |
| Business, Building, and Other Support Svcs | \$40,449 |
| Wholesale Trade | \$39,708 |
| Professional, Scientific & Technical Svcs | \$39,466 |
| Other Services (Repair, Personal, Related) | \$36,409 |
| Manufacturing | \$34,440 |
| Information, Culture, Recreation (incl. Tourism) | \$32,859 |
| Retail Trade | \$31,998 |

NOC 2243

| | |
|--------------------------------|---|
| Occupation Title (NOC): | Industrial Instrument Technicians and Mechanics |
| Occupation Title | Instrument Technician |
| Region | Calgary |
| NOC Code: | 2243 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | \$10.00 | \$32.63 | \$21.38 | \$26.98 | B |
| After 3 years | \$15.00 | \$28.85 | \$22.73 | \$27.88 | B |
| Top | \$19.00 | \$34.62 | \$30.32 | \$31.00 | B |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 39.8 |
| Overall Average Wage (per hour), Calgary | \$24.28 |
| Overall Average Salary (annual)*, Calgary | \$50,568 |

**Rounded to the nearest dollar*

SKILLS SHORTAGE INFORMATION:

| Industrial Instrument Technicians and Mechanics | |
|---|-----|
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 0% |
| NO | 80% |
| N/A | 20% |
| Estimated Vacancy Rate | |
| 2005 | 0% |

INDUSTRY INFORMATION:

| Industry | Average Salary |
|--|-----------------|
| Mining and Oil & Gas Extraction | \$69,671 |
| Manufacturing | \$69,032 |
| Construction | \$65,061 |
| Other Services (Repair, Personal, Related) | \$64,760 |
| OVERALL ACROSS ALL INDUSTRIES | \$64,707 |
| Health Care & Social Assistance | \$46,759 |
| Finance, Insurance, Real Estate, Leasing | \$29,322 |

NOC 2244 – Information available for Alberta only

| | |
|--------------------------------|--|
| Occupation Title (NOC): | Aircraft Instrument, Electrical and Avionics Mechanics, Technicians and Inspectors |
| Region | Alberta |
| NOC Code: | 2244 |

HOURLY WAGE DETAIL:

(For full-time and part-time employees)

| Wages* | Minimum | Maximum | Average | Median | Sampling Error |
|---------------|---------|---------|---------|---------|----------------|
| Starting | N/A | N/A | N/A | N/A | C |
| After 3 years | \$13.66 | \$26.44 | \$17.93 | \$20.00 | C |
| Top | \$23.00 | \$48.08 | \$34.57 | \$27.64 | C |

**All wages are hourly except where otherwise indicated. Wages and salaries do not include overtime hours, tips, benefits, profit shares, bonuses (unrelated to production) and other forms of compensation. For more information, please review the Survey Methodology Report.*

OVERALL RESULTS TABLE:

| | |
|---|----------|
| Average Hours Worked (per week) | 38.2 |
| Overall Average Wage (per hour), Alberta | \$21.36 |
| Overall Average Salary (annual)*, Alberta | \$42,761 |

**Rounded to the nearest dollar*

SKILLS SHORTAGE INFORMATION:

| | |
|---|-----|
| Aircraft Instrument, Electrical and Avionics Mechanics, Technicians and Inspectors | |
| Estimated Hiring Difficulties (percent of responding organizations) | |
| YES | 25% |
| NO | 25% |
| N/A | 50% |
| Estimated Vacancy Rate | |
| 2005 | 0% |

INDUSTRY INFORMATION:

| | |
|--------------------------------------|-----------------------|
| Industry | Average Salary |
| OVERALL ACROSS ALL INDUSTRIES | \$42,761 |

Notes:

THE FOLLOWING SAMPLING ERROR CODES APPLY TO ALL OF THE HOURLY WAGE DETAIL TABLES IN THIS REPORT:

A. Represents a sample error of less than or equal to $\pm 5\%$ (19 times out of 20)

B. Represents a sample error of between $\pm 5.01\%$ and $\pm 10\%$ (19 times out of 20)

C. Represents a sample error of more than $\pm 10\%$ (19 times out of 20)

Caution must be used when referencing results with Sample Error Code "C" due to the higher sampling error.

In some instances, anomalies have occurred as a result of weighting the data, the occurrence of outliers, or the margin of error associated with the survey results. For example, the average top pay may be less than the average pay after 3 years experience. In most cases, the inconsistency is fairly small and within the margin of error for the survey. For some occupations, outliers have been suppressed and the averages have been recalculated. For some wage levels for other occupations the information has been entirely suppressed. N/A is listed in instances of insufficient response.

These wage results include employees in companies of 10 or more employees, from the public and private sector and include full and part-time employees. Average wages were weighted by the number of employees.

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Source:

<http://www.alis.gov.ab.ca/wageinfo/Content/RequestAction.asp?format=html&aspAction=GetWageHomePage&Page=Home>

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