

Computer & Software Engineers

A guide for newcomers to British Columbia



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1. Working as a Computer or Software Engineer [NOC 2147 & 2173]

Job Description

Computer engineers [NOC 2147] design and create computers and related hardware components. You may also design and develop information and communication system networks.

As a *computer engineer* you perform the following duties:

- Analyze users' requirements for new products
- Design computer and telecommunications hardware such as circuit boards and monitors
- Design and develop information system network architecture
- Develop and conduct tests to make sure the new designs and components function as expected
- Oversee the manufacturing process
- Establish and maintain relationships with suppliers and clients
- May lead and co-ordinate teams of engineers, technologists, technicians

Software engineers [NOC 2173] design, develop and test software products for various uses.

As a *software engineer* you perform the following duties:

- Analyze users' requirements
- Design and test software products or computer systems

- Co-ordinate the development, installation, and operation of computer-based systems
- Troubleshoot, upgrade and develop maintenance procedures for operating systems and applications
- May lead and co-ordinate teams of information systems professionals

Sources:

- WorkBC Career Profile <http://www.workbc.ca/Careers/> [search 2147 OR 2173]
- Career Cruising (Profiles for Computer Hardware Engineer & Computer Software Engineer)
Available from the VPL Online Articles, Encyclopedias & More page
http://www.vpl.ca/electronic_databases/alpha/c

Industry Overview

Computer engineers: Job prospects are expected to be good. There are currently not enough new computer engineering graduates with the right mix of experience and skills to meet employment demand.

In British Columbia your job may not have a complete focus on hardware, but also work with processes, electrical engineering, and software implementation.

Employment trends depend on the industries that purchase hardware products. As such, your job opportunities may be affected by fluctuations in the economy or in specific sectors.

Computer engineering is a constantly changing field. It is important to update your skills throughout your career.

Software engineers: Job prospects are expected to be good. Growth in the industry due to rapidly changing technologies, along with fewer graduates from software engineering programs, is causing a shortage of skilled professionals.

Prior work experience is valued by employers. If you have co-op or internship experience, knowledge of the most current technology and the ability to work in a multi-disciplinary environment you will be in demand. Excellent communication skills also help your job prospects.

To meet the need for highly specialized skills, employers sometimes use the Temporary Foreign Worker Program or 'fast track' channels in the immigration system to meet their needs.

The health care industry will increasingly need software engineers to design, and maintain safe and secure eHealth information systems.

Job Outlook in BC

Computer Engineers



Chart from WorkBC (NOC 2147)

Software engineers



Chart from WorkBC (NOC 2173)

WorkBC provides job openings in BC regions from 2015-2025:

Region	Expected # of Job Openings	Average Annual Employment Growth	Expected Increase in Employment
Vancouver Island			
▪ Computer Engineers	130	1.8%	60
▪ Software Engineers	330	2.5%	165
Lower Mainland / Southwest			
▪ Computer Engineers	1,220	2.5%	680
▪ Software Engineers	3,910	2.7%	2,270
Thompson-Okanagan			
▪ Computer Engineers	N/A	N/A	N/A
▪ Software Engineers	50	1.0%	15

You can learn more about working as a computer engineer or a computer software engineer in BC from:

- **WorkBC, Career Profiles** at <http://workbc.ca/Careers> [search NOC 2147 and 2173]
- **Career Cruising**
 Available from the VPL Online Articles, Encyclopedias & More page
http://www.vpl.ca/electronic_databases/alpha/c
- **Labour Market Outlook, 2015–2019**
<http://www.digcompass.ca/labour-market-outlook-2015-2019/>

Types of Employers

Computer engineers are employed throughout public and private sectors, such as:

- computer and telecommunication hardware manufacturers
- engineering, manufacturing and telecommunications firms
- information technology consulting firms
- government
- education and research institutions
- health care

Software engineers are employed by a variety of organizations including:

- information technology consulting firms that provide software-related information technology services
- information technology research and development firms
- software product manufacturers
- you may telecommute from a home office

You may also be self-employed.

Salary

In BC, the median annual salary for *computer engineers* is \$85,572. The median annual salary for *software engineers* is \$82,214. Earnings vary according to your level of education, experience and the type of company you work for.

If you are employed in a full-time job you may also receive benefits such as health and dental insurance, paid vacation and sick leave. Some companies also provide you with the use of a company car and annual profit-sharing or performance-based bonuses.

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In its 2016 Report on Members' Compensation and Benefits, Engineers & Geoscientists British Columbia (formerly APEGBC) provided these salary figures:

Industry	Mean	Lower Quartile	Median	Upper Quartile
High Technology	\$96,729	\$74,000	\$90,000	\$120,000
High Tech Manufacturing	\$103,315	N/A	\$90,000	N/A
Product Development	\$102,274	\$78,773	\$95,150	\$122,500
Research & Development	\$85,076	\$64,500	\$84,086	\$97,115
Software Development	\$94,786	N/A	\$87,395	N/A
Systems Integration	\$93,438	N/A	\$95,500	N/A

Job Bank Canada provides hourly wages in BC Regions:

Computer Engineers (NOC 2147)

Location	Wage (\$/hr)		
	Low	Median	High
British Columbia	25.48	40.50	50.61
Lower Mainland - Southwest Region	25.48	40.50	51.92
Vancouver Island and Coast Region	25.48	40.50	50.61

Software engineers (NOC 2173)

Location	Wage (\$/hr)		
	Low	Median	High
British Columbia	19.23	37.13	51.28
Lower Mainland - Southwest Region	16.83	37.96	51.28
Thompson--Okanagan Region	19.23	37.13	51.28
Vancouver Island and Coast Region	19.23	37.13	51.28

Sources:

- WorkBC Career Profile
- Career Cruising
- Job Bank Canada, Wages Report http://www.jobbank.gc.ca/wage-outlook_search-eng.do?reportOption=wage
- Engineers & Geoscientists British Columbia Report on Compensation and Benefits <https://www.egbc.ca/Careers/Compensation-Survey>

Working Hours

You usually work an average of 5 days, Monday to Friday, totaling 40 hours per week. However, longer hours and overtime are often required to meet deadlines.

2. Skills, Education and Experience

Skills

- Curious
- Aptitude for math and science
- Logical and detail-oriented
- Work well as part of a team
- Problem-solving skills
- Analytical skills
- Communication skills

Education and Experience

Computer engineers require:

- Bachelor's degree in computer engineering or related field

You may also require:

- Registration with Engineers & Geoscientists British Columbia (formerly APEGBC)
- Past participation in an undergraduate co-op program
- Master's or doctoral degree in a related discipline
- Network certification
- Information Systems Professional (ISP) certification through the Institute for Certification of Computing Professionals

Software engineers require:

- Bachelor's degree in software engineering, computer science or related field

You may also require

- Past participation in an undergraduate co-op program
- Master's or doctoral degree in a related discipline
- Experience as a computer programmer
- Information Systems Professional (ISP) certification through the Institute for Certification of Computing Professionals

Source: WorkBC

Qualifications

There are no mandatory requirements for licensing or professional certification in order to work in entry level computer and software engineering positions.

However, you must be licensed by the ***Engineers & Geoscientists British Columbia*** if you use the title "Engineer." This allows you to approve engineering drawings and reports and to practise as a professional engineer (P.Eng.).

You are eligible for registration with Engineers & Geoscientists British Columbia once you graduate from an accredited educational program, and after four years of supervised work experience in engineering. You must also pass a professional practice examination and complete the law and ethics seminar.

Internationally trained engineers:

You may qualify as a "Provisional Member" with the Engineers & Geoscientists British Columbia. This designation provides member status to internationally trained engineering graduates if you have completed the academic, experience, professionalism, and residency requirements for registration as Professional Engineers.

For more information:

- **Engineers & Geoscientists British Columbia - Become a Member**
<https://www.egbc.ca/Become-a-Member>
- **Engineers & Geoscientists British Columbia Online Resource for Internationally Trained Engineers and Geoscientists :**
 - Self assessment tool: <http://engtechnbc.ca/>
 - Job Mentoring Programs:
<https://www.egbc.ca/Member-Programs/Mentoring-Program>
- **Information & Communications Technology Council (ICTC)**
 - Immigration Initiatives
http://www.ictc-ctic.ca/?page_id=1779
Provides assistance to internationally educated professionals
- **A Roadmap to Engineering in Canada. Engineers Canada**
<http://newcomers.engineerscanada.ca/>
- **International agreements** between professional engineering associations
<http://www.engineerscanada.ca/mobility-international>
- **Introduction to Engineering in BC – Langara College**

These courses are designed to provide you with industry specific skills in order to find employment in an engineering environment. They also help you gain a good understanding of Canadian workplace culture.

<http://www.langara.bc.ca/continuing-studies/programs-and-courses/programs/introduction-to-engineering-in-bc/index.html>

3. Finding Jobs

You'll find job advertisements in local newspapers and electronic sources, as well as through professional associations' publications.

Local Newspapers

You can look at the *Vancouver Sun* & *The Province* at Vancouver Public Library for free. Check the job postings daily, the careers section in the *Vancouver Sun* on Wednesdays and Saturdays and, in *The Province* on Sundays.

Job White Pages

- Available in print at the Central Library or online at

<http://jobfreeway.com/memberdocs/vpl-home.htm>

NOTE: *You can only access this database from the Central Library or VPL branch libraries. Access is NOT available from home or outside the Library.*

Online Job Postings

- **Engineering Central Canada**

<http://www.engcen.ca/>

- **IT Job Universe Canada**

<http://jobs.itworldcanada.com/>

- **Indeed**

<http://ca.indeed.com/>

- **Skilled Workers.com**

http://www.skilledworkers.com/search_job/search.php

- **TechJobs.ca**

<http://www.technicaljobs.ca/en>

Professional Associations' Career Resources

- **Engineers & Geoscientists Career Listings**
<https://www.egbc.ca/Careers/Career-Listings>
- **BC Technology Industry Association (BC TIA) Careers Page**
<https://www.bctechjobs.ca/>
- **Institute of Electrical and Electronics Engineers (IEEE)**
<http://careers.ieee.org/>

Identifying the Right Position

When you browse job advertisements, you'll find different job titles.

For Computer Engineers, look for these related job titles (NOC 2147):

- Computer Hardware Engineer
- Fibre-optic Network Designer
- Hardware Circuit Board Designer
- Hardware Development Engineer
- Network Test Engineer
- Systems Designer – Hardware
- Technical Architect – Hardware
- Wireless Communications Network Engineer

For Software Engineers, look for these related job titles (NOC 2173):

- Application Architect
- Computer Software Engineer
- Software Architect
- Software Design Engineer
- Software Testing Engineer
- Systems Integration Engineer – Software

- Technical Architect – Software
- Telecommunications Software Engineer

Source: *National Occupational Classification* <http://noc.esdc.gc.ca/English/noc/welcome.aspx?ver=16>

Creating a List of Potential Employers

You can use directories to produce lists of employers in Vancouver or the Lower Mainland. Contact them directly to find out if they're hiring.

- **BC Tech, Technology Guide** (special issue of Business in Vancouver)
Available at the Central Library, 380 EL3CBh
- **Canadian Company Capabilities. Information & Cultural Industries**
<http://www.ic.gc.ca/eic/site/ccc-rec.nsf/eng/00043.html>
- **Reference Canada**
http://www.vpl.ca/electronic_databases/alpha/r
Go to the "Reference Canada" database and look for "Canadian Businesses" at top of page and choose the "Custom Search" tab. Select "Business Type" and click on "Keyword/SIC/NAICS" and then enter keywords, for example, enter "computer" or "software" and click LOOKUP and then select appropriate headings. You can combine these headings with a location by clicking on "Geography", select the province, choose the cities and click the "View results" button at top left side of page.

Available from the Online Articles, Encyclopedias & More page.

NOTE: *You can access this database from a Library computer. If you are using a computer from outside the Library, you will need a Vancouver Public Library card to login to this database. After clicking on the database name, you will be asked to enter your library card number and PIN (usually last four digits of your telephone number).*

4. Applying for a Job

In Canada, employers usually expect to receive a resume or curriculum vitae and a cover letter that identifies the position you are applying for and summarizes your relevant experience.

Use the library catalogue, <http://vpl.bibliocommons.com/> to find books on writing resumes and cover letters specific to your industry.

To learn about applying for jobs in Canada, use the following guides which are available in print at the Central Library or online at <http://skilledimmigrants.vpl.ca/>.

- **Writing Resumes and Cover Letters**

Go to <http://skilledimmigrants.vpl.ca>

[Search Writing Resumes and Cover Letters]

- **Getting Canadian Work Experience**

Go to <http://skilledimmigrants.vpl.ca>

[Search Getting Canadian Work Experience]

- **Networking for Employment**

Go to <http://skilledimmigrants.vpl.ca>

[Search Networking for Employment]

- **Learn More About Working in BC and Canada**

Go to <http://skilledimmigrants.vpl.ca>

[Search Learn More About Working in BC and Canada]

5. Getting Help from Industry Sources

Industry Associations

Associations for computer & engineering professionals in BC and Canada can provide you with information and assistance. Registration and fees may be required for membership.

- **Engineers & Geoscientists British Columbia (formerly APEGBC)**
<https://www.egbc.ca/>
- **BC Technology Industry Association (BCTIA)**
<http://www.bctia.org>
- **Association of Consulting Engineers Companies of British Columbia**
<http://www.acec-bc.ca/>
- **Engineering Institute of Canada (EIC)**
<http://www.eic-ici.ca/>
- **Engineers Canada**
<http://www.engineerscanada.ca/>
- **Institute of Electrical and Electronics Engineers Canada (IEEE Canada)**
<http://vancouver.ieee.ca/> Vancouver Chapter
- **Institute for the Certification of Computing Professionals (ICCP)**
<http://iccp.org>
- **Society of Internationally Trained Engineers of British Columbia (SITE)**
<http://www.sitebc.ca/>
- **Society of Punjabi Engineers and Technologists of British Columbia**
<http://www.speatbc.org/>

Industry Journals

Search the Vancouver Public Library catalogue for journals related to your profession: www.vpl.ca

Examples at the Central Library include:

- **Computing Canada**

<http://www.itworldcanada.com/publication/computerworld>

- **Canadian Consulting Engineer**

Available at VPL Central Library, 620.5 C212 and online at:

<http://www.canadianconsultingengineer.com/>

- **Innovation: Journal of Engineers & Geoscientists British Columbia**

Available at VPL Central Library, 620.5 B86 and online at:

<https://www.egbc.ca/Resources/News-and-Publications/Innovation-Magazine/Innovation-Past-Issues>

Questions? Please ask the Information Staff in the Central Library, Vancouver Public Library or telephone 604-331-3603.

Please note that the information in this guide is also available online through the Skilled Immigrant InfoCentre website at <http://skilledimmigrants.vpl.ca/>