

THINK ENGINEERING GEOSCIENCE



ENGINEERS
GEOSCIENTISTS
New Brunswick

CHANCES ARE, IF IT'S **AWESOME,**
A PROFESSIONAL ENGINEER OR GEOSCIENTIST HAD A HAND IN IT.

**READ ON TO LEARN MORE
ABOUT BECOMING A
PROFESSIONAL ENGINEER OR
PROFESSIONAL GEOSCIENTIST
IN NEW BRUNSWICK.**

IN A WORLD THAT IS ALWAYS CHANGING, IT'S HARD TO KNOW WHAT THE FUTURE HOLDS.

STUDYING SCIENCE, TECHNOLOGY, ENGINEERING, AND MATH (STEM) OPENS UP EXCITING CAREER OPPORTUNITIES.

Are you a student interested in learning more about studying STEM?

Love mixing creativity with science? Then you should seriously consider pursuing STEM studies! There are countless opportunities across Canada and the world for professionals in these fields. In fact, the work of Professional Engineers and Geoscientists can be both challenging and rewarding. You'll have the chance to design solutions that help communities and the environment, solving the world's most complex problems.

Are you a parent interested in supporting your child's STEM studies?

In our ever-changing world, helping your child plan for their future is important. If you have a child who is interested in STEM studies, there are many ways you can support them to explore this path. Start by finding related information and experiences to help inform your child's decision and encourage them to pursue a broad range of activities and interests. With your help, your child can find a career that will touch lives every day!

COURSES* YOU NEED FOR ENTRY INTO NEW BRUNSWICK UNIVERSITY ENGINEERING AND GEOSCIENCE PROGRAMS:

UNIVERSITY OF NEW BRUNSWICK

- English 122
- Pre-Calculus A120
- Pre-Calculus B120
- Chemistry 122
- Physics 122

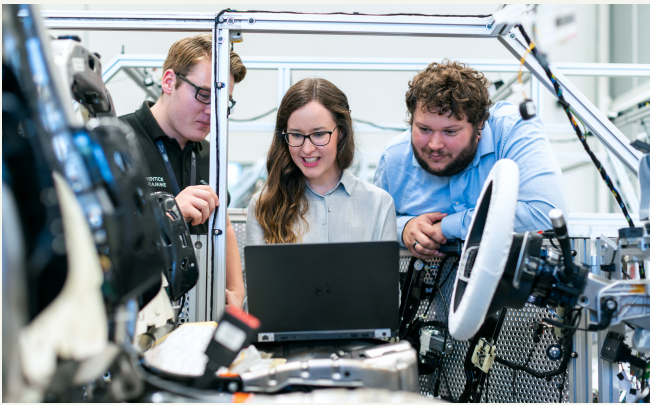
UNIVERSITÉ DE MONCTON

- Français 10411
- Mathématiques 30411C
- **2 Grade 12 Science Courses**
BIOLOGY, CHEMISTRY, OR PHYSICS
- 1 Grade 12 Course LEVEL 1

**This may not be a complete list. Check with the University to ensure you have the required courses.*

NEW BRUNSWICK'S PROFESSIONAL ENGINEERS AND PROFESSIONAL GEOSCIENTISTS TOUCH OUR LIVES EVERY DAY.

How do professional engineers touch our lives?



From the smart phone in your pocket to the bridge you drive over every day, it was a professional engineer who used math, science, and technology and added in a dash of creativity to solve a problem to make your life better.

How do professional geoscientists touch our lives?



They don't just look at rocks (although they do that too). For example, they source and supply important minerals for electric cars which contributes to a green economy, make sure natural resources are developed sustainably, and help protect the environment for now and for the future.

TEAMWORK MAKES THE DREAM WORK



Professional engineers and geoscientists rarely do their work alone. They work in teams with other professionals whose skills and knowledge complement those of the engineer or geoscientist. For example, an engineer might design a bridge, but they work closely with other tradespersons, like land surveyors, technicians, and laborers, to get that bridge built. A geoscientist who finds minerals for car batteries may rely on lab technicians, First Nations communities, foresters, biologists, pilots, accountants, engineers, and others.

It's by working as part of a team that they are able to solve real-world problems and make our world a better place.

WHAT IS ENGINEERING?

Engineering is the application of scientific principles to solve real-world problems and make the world a better place. Engineers use math and technology to ensure a safe water supply, design renewable energy solutions and energy-efficient buildings and vehicles, and create sustainable food sources and medical treatments, to name a few. Engineers are focused on finding solutions or creating new, innovative answers to problems society faces.

WHAT IS AN ENGINEER?

An engineer is an individual who has the education, skills, knowledge, and experience to do the job. An engineer is sometimes referred to as a licensed engineer, a registered engineer, or a professional engineer. They must be licensed to practice, and to do so, they must register with their provincial association.

Engineers are focused on finding solutions or creating new, innovative answers to problems communities face. If you have an interest in teamwork, problem solving, and making the world a better place, engineering might be the perfect career for you.

WHAT DOES AN ENGINEER DO?

Engineers design products, processes, and systems that protect the environment and/or enhance the quality of life, health, safety, and well-being of the public. They apply their training and education to create plans, solutions, and machines to solve a particular problem or to make something work better.

The role of an engineer can differ by discipline, but in general, engineers design, test, or build materials, equipment, or systems. For instance, civil engineers could design and construct bridges or roads and mechanical engineers could be responsible for developing, testing, and manufacturing mechanical devices or equipment.

WHERE DO ENGINEERS WORK?

A professional engineer (P.Eng.) can work anywhere in the world. One of the many benefits of becoming an engineer is that you can choose to work in your hometown, or anywhere your heart desires.

For example, engineers work for utilities such as water, electric and gas companies and government bodies as well as in medicine, manufacturing, and energy fields. Some engineers even work on projects and solutions for space exploration!

Real Stories

What's it really like using math, science, and technology to bring solutions to New Brunswick?

Here are a few stories about working in the field of engineering.

Bonjour! My name is Marilou Savoie and I am a Professional Engineer.



***Marilou Savoie, P.Eng.
President, Acadian Construction***

I graduated from Université de Moncton's Civil Engineering program in 2004. In high school, I loved physics and mathematics, which led me to the field of engineering.

My engineering knowledge has helped me a great deal solving problems in my career as a construction management engineer for commercial constructions. I enjoy the opportunity to be involved in a project's development from start to finish, to learn more about the how the project will eventually operate, and then to be able to see these new developments throughout the Atlantic Provinces.

***Tyler Patles, P.Eng.
Director of Technical Services
North Shore Mi'kmaq
District Council***



Kwe', my name is Tyler Patles, and I'm a Mi'kmaq Professional Engineer from Eel Ground First Nation.

I graduated from the University of New Brunswick in 2009 with a Bachelor of Science in Civil Engineering. I'm now the Director of Technical Services for the North Shore Micmac District Council (NSMDC), which is composed of seven of the fifteen First Nations communities in New Brunswick. The NSMDC provides technical support and advisory services to Atlantic Canada First Nations communities.

My role is heavily weighted in the areas of First Nations economic development and allows me to advocate for safe and reliable housing and drinking water for First Nations. There is no better feeling than seeing a family turning on the tap for the first time in their new home and having safe and clean water to drink.

THE WORK OF PROFESSIONAL ENGINEERS
TOUCHES OUR LIVES EVERY DAY.

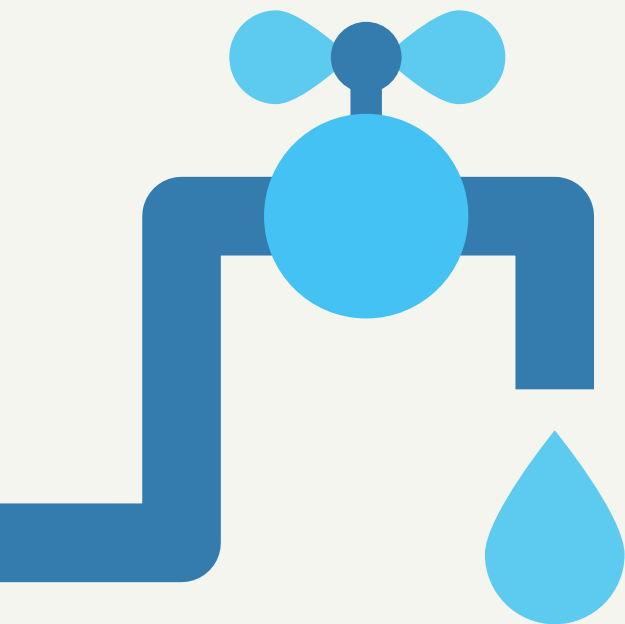


WHAT TYPE OF **ENGINEERING** IS RIGHT FOR YOU?

You don't need to choose your specialty right away.

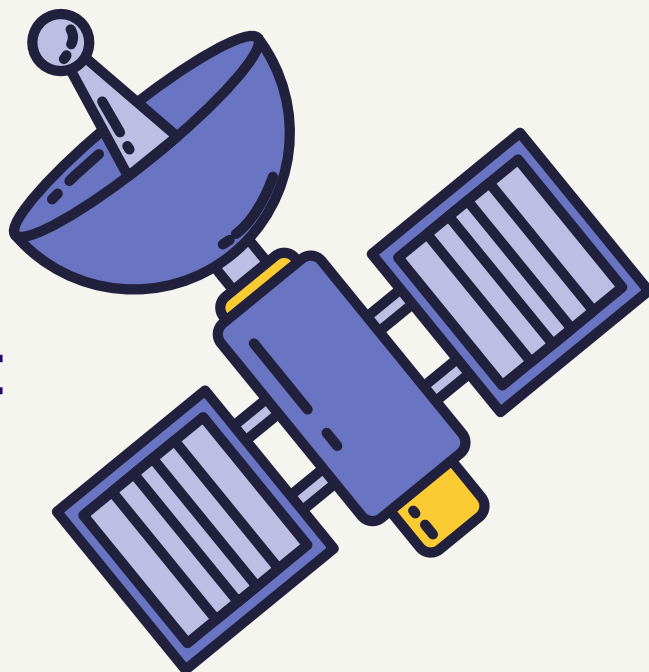
Do you want to fight illness, manage pollution, invent products, create videos games or solve problems? A degree in engineering can provide you with endless career possibilities. With this diverse range of careers comes an equally diverse range of work environments.

In most cases, you have until the second year of university to consider your options. Investigate the jobs available to engineering graduates before deciding. The next few pages only list a few of the options available.



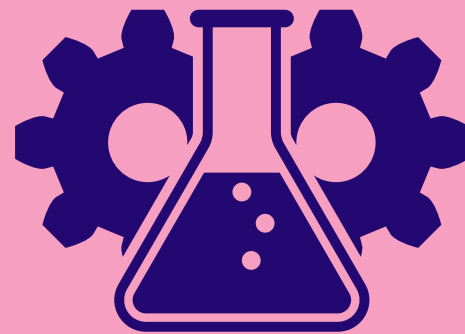
Make a difference by developing systems to provide clean water to millions of people.

Work on exciting projects that are OUT OF THIS WORLD!



CHEMICAL ENGINEERING

Have you ever thought about the science behind drinking water, gasoline, make-up or fireworks?



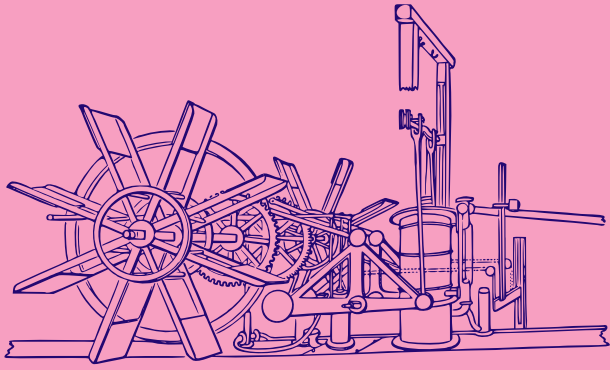
Chemical engineers transform materials and substances into products that we use every day.

Chemical engineers research, design, and develop chemical processes and equipment. Some may specialize in a particular industry, such as pulp and paper manufacturing, medical research, gas or mineral refining, energy processing, plastics, or metal extraction. Others may specialize in particular processes, such as chemical reactions like discoloration or evaporation or even pollution control.

Chemical engineers will develop processes to separate components of liquids and gases or to generate electrical currents using controlled chemical processes. They will conduct research into the development or improvement of chemical engineering reactions, and materials in order to develop new or improved manufacturing processes. They will evaluate chemical technology and equipment to determine production specifications.

Chemical engineers will also conduct quality control programs and develop safety procedures for those working with potentially dangerous chemicals to ensure they are following safe standards for raw materials, products, and waste products.





CIVIL ENGINEERING

Did you know that civil engineers design, plan and build cruise ships, skate parks and roller coasters?

Civil engineers build our physical world—from roads to buildings, to bridges and tunnels, to airports and subway systems, to water and sewage systems. They participate in large construction projects, and may specialize in building and structural inspection, surveying, mapping, and planning.

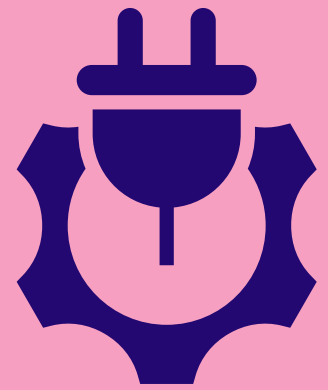
Civil engineers will work with clients and other members of a project team to determine project requirements. They will consider construction costs, government regulations, potential environmental hazards, and other risk factors in planning the design and construction of a project. They will then design and develop construction procedures ensuring that these plans meet the guidelines and specifications of building codes and other regulations.

They will test, evaluate, and recommend appropriate building and construction materials, and will establish and monitor construction work schedules. Civil engineers will also conduct traffic studies, environmental impact studies, and other investigations.



ELECTRICAL ENGINEERING

From robots to rockets, electrical engineers have developed and tested the electrical systems for many out of this world inventions!

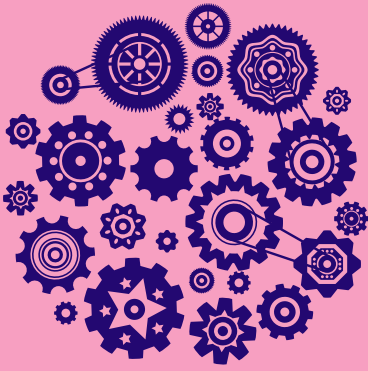


Electrical engineers create much of the technology we use every day. From satellite communications to televisions, computers, wireless networks, and radio electrical and electronics, engineers are involved.

They design, plan, research, evaluate, and test electrical and electronic equipment and systems. For example, electrical engineers may work on electric motors, radar and navigation systems, communications systems, power generation equipment, or the electrical systems of automobiles and aircraft. Electronics engineers may work on broadcast and communications systems, from mobile phones and tablets to GPS navigation systems.

Electrical engineers design electrical and electronic circuits, components, systems, and equipment and supervise and inspect the installation, testing, and operation of these systems and components. They will also develop maintenance and operating standards for electrical and electronic systems and equipment.





MECHANICAL ENGINEERING

If you're fascinated with moving parts or interested in designing motorcycles or railways, mechanical engineering may be right for you.

Mechanical engineers focus on how things work and see the world as parts in motion—they research, design, and develop a variety of products ranging from engines, turbines, and generators; to refrigeration and air-conditioning systems; to medical devices; to elevators and escalators.

Mechanical engineers research the possibility, design, operation, and performance of machine components and systems. They plan and manage projects; prepare materials, cost, and design specifications for machinery and systems. They supervise and inspect the installation and modification of mechanical systems at construction sites or in industrial facilities, and they develop maintenance standards, schedules, and programs to provide guidance to industrial maintenance crews. Mechanical engineers investigate mechanical failures or unexpected maintenance problems and determine solutions.



WHAT IS GEOSCIENCE?

Geoscience is the study of the structure and history of our planet and its natural systems. It is a branch of science that has important impacts on many aspects of our lives: where we live; the materials used to make our homes, electronic devices, cities, and transportation; the crops we grow; how we communicate; and the water, energy, and natural resources we use.

Geoscience and geoscientists help us understand the Earth and the environments that create the world we live in, and ultimately piece the past together to help us understand the future.

WHAT IS A GEOSCIENTIST?

Geoscientists find natural resources, protect the environment, manage and protect water sources, and investigate and protect society from natural disasters. They must be licensed to practice, and to do so, they must register with their provincial association.

If you have an interest in the Earth and its environment and systems, then geoscience might be the right career for you.

WHAT DOES A GEOSCIENTIST DO?

Geoscientists are scientists, researchers, and problem solvers. They research and explore the Earth to supply the resources society needs to protect itself, the Earth and its environment.

Depending on their field of practice, a professional geoscientist could be a hydrogeologist who manages and protects water resources; a paleontologist who uncovers fossils that are millions or even billions of years old; or a geochemist, geophysicist, medical geologist, or volcanologist - there are so many types of geoscientists!

DID YOU KNOW?

One of the many benefits of working in the field of geoscience is that you can choose to work at home in New Brunswick or anywhere your heart desires. The options for travel are large with this profession!

As a geoscientist, you could work for the government, a private practice, large mining or exploration companies, with banks predicting trends, or stay in school and become a teacher helping students learn about all of these subjects.

Many geoscientists work closely with engineers to protect the development of our cities and towns by assessing water resources, soil stability, earthquake risk, groundwater contamination, and rock, sand, and gravel supplies.

Real Stories

What's it really like using math, science, and technology to bring solutions to New Brunswick?

Here are a few stories about working in the field of geoscience.

Hi! My name is Kandi Gallagher, and I am a Professional Geologist with my own consulting business based in New Brunswick.



***Kandi Gallagher, P.Geo.
Geologist***

I received my Bachelor of Science degree, with a major in Environmental Geochemistry, from the University of New Brunswick in 2007. An interesting fact about me is that I went to university as a mature student and a single mother. Prior to university, I took two years of high school upgrading in preparation for science courses at the university level. It was a struggle and took me an extra year to achieve my degree, but I persevered.

I was fortunate to be hired by a local company directly after graduation, which allowed me to gain a tremendous amount of experience.

From my earliest memories, geology has always been a passion, specifically rocks and minerals. I am grateful to have had the opportunities, support and guidance that have given me so many wonderful opportunities.

***Prof. David R Lentz PhD, P.Geo., FGC
Dept of Earth Sciences,
University of New Brunswick***



Hello, my name is Dr. David Lentz. As the UNB Economic Geology Chair, I have been involved in teaching and research very much centered on New Brunswick, but also extending to other parts of Canada and internationally as well.

My research is focused on gold, base-metals, and other critical minerals for a green economy. Many of these metals and minerals are found in the province of New Brunswick and throughout Atlantic Canada.

During my career, I've very much enjoyed the highly diverse challenges associated with mineral resources research, which significantly impacts the well-being of people in New Brunswick, the regions being studied elsewhere in Canada, and other economically challenged areas.

THE WORK OF PROFESSIONAL GEOSCIENTISTS
TOUCHES OUR LIVES EVERY DAY.



CAREERS IN GEOSCIENCE

Geoscience offers an intellectually challenging and rewarding, wide-ranging career. It offers the opportunity to work outside (“in the field”), in a lab or at a desk. In most cases the work of a typical geoscientist involves work in all three of these settings.

While geoscientists work as individual scientists, each responsible for the work they undertake and the persons they supervise, most also contribute as important members of larger teams that collaborate together to achieve the objectives of their employer, client or funding agency.

Because their work involves the analysis of different Earth systems and geoscientific situations in their natural setting, geoscientists need to gather on-site data and make field observations. Work site locations can be remote and physically challenging. Travel can be local, regional, national or out of this world depending on the nature of the geoscientist’s specialty and the reach of their employer’s interests.

The geoscientist community in Canada is large. According to the Canadian Federation of Earth Sciences there are over 20,000 geoscientists in Canada. The main employers of geoscientists in Canada are:

- Mineral exploration, mining and Earth materials companies
- Oils and gas and other energy supply companies
- Consulting firms
- Government agencies
- Universities and research establishments



Professional Geoscientists study our planet. There are many different activities geoscientists (also known as Earth Scientists) undertake and many different types of work they do. It is as varied as the nature of the science itself!

Geoscientists may predict the behaviour and consequences of earthquakes or search for new sources of municipal groundwater or forecast the quantity of gold to be produced over time at an underground gold mine. Some examples of the type of work they do are below.

IN THE FIELD

Surveying terrain, describing the environment, observing nature, creating maps, sampling rock, soil, water, fossils, recording real-time data, measuring water quality, and performing environmental assessments. This work may be done on ships at sea, with helicopters and small planes, on ATV's, snowmobiles, horses, and even with dog-sleds.



IN THE LAB

Using a microscope to evaluate geologic samples, analyzing rock and sand cores taken from the Earth, conducting chemical experiments, analyzing water quality, building models to run tests, identifying and preserving fossil samples, using sophisticated equipment to determine the age of ancient organisms and plants, and breaking apart the different elements of minerals in rocks.

IN THE OFFICE

Interpreting maps, analyzing laboratory results and field data, reconstructing ancient environments using fossil data, managing budgets, meeting with clients and other professionals, developing new software and technologies, researching specific topics and writing papers, preparing presentations, evaluating new ideas, understanding the scientific method and applying it to solve geological problems.



SCHOLARSHIPS AND AWARDS



The Association of Professional Engineers and Geoscientists of New Brunswick (APEGNB) is pleased to offer several scholarships for future professionals. They include:

- The Graydon Nicholas Indigenous Scholarship in Engineering
 - Available to New Brunswick residents of Indigenous ancestry who have been accepted into an engineering program at either the University of New Brunswick (Fredericton or Saint John) or Université de Moncton.
- The Jocelyne Roy-Vienneau Undergraduate Engineering Scholarship for Women
 - This scholarship honours New Brunswick's first female engineer Lieutenant Governor with a goal of working toward increasing the number of women in the engineering profession.

Other APEGNB scholarships and prizes are selected by, and awarded through, the University of New Brunswick and the Université de Moncton. Information is available on university websites or you can contact the university registrar's office directly. You may also be able to get more information on scholarships and awards from your school office.

IN THE FUTURE...

BECOMING A P.ENG. / P.GEO.

HOW DO I BECOME A PROFESSIONAL ENGINEER OR GEOSCIENTIST?

To become an engineer or geoscientist, the first step is to complete a bachelor's degree in engineering or geoscience at university. In New Brunswick, such programs are offered at the Université de Moncton and the University of New Brunswick. Entrance requirements vary slightly between universities, so make sure to contact the appropriate department for more information.

Once you complete your program, you have the option in New Brunswick to enroll as an "Member-in-Training (MIT)". To become a professional engineer (P.Eng.) or geoscientist (P.Geo.), you must apply for your license to be able to do the work with the provincial or territorial regulator. In New Brunswick's case, this would be the Association of Professional Engineers and Geoscientists of NB (also known as APEGNB).

RESOURCES

APEGNB wants to acknowledge the following organizations who have helped to inspire and produce this booklet. For further information on careers about engineering and geoscience, visit their websites.

APEGNB Touching Lives
www.apegnb.com/touchinglives

Geoscientists Canada: <https://geoscientistscanada.ca/>

Engineers Canada:
<https://engineerscanada.ca/>

Earth Sciences Canada: www.earthsciencescanada.com/

Explore Engineering:
<https://exploreengineering.ca/>

Place pour toi:
www.placepourtoi.ca/

University of New Brunswick-
Faculty of Engineering
www.unb.ca/fredericton/engineering/

University of New Brunswick-
Department of Earth Sciences
www.unb.ca/fredericton/science/depts/earth-sciences/index.html

Université de Moncton- Faculty of Engineering
www.umoncton.ca/umcm-ingenierie/

Association of Professional Engineers & Geoscientists Alberta:
www.apega.ca

**For more information on
engineering and geoscience in
New Brunswick or to coordinate
a classroom visit, contact us!**



WHERE WILL A CAREER IN ENGINEERING OR GEOSCIENCE TAKE YOU?



ENGINEERS
GEOSCIENTISTS
New Brunswick