# Geological Engineering

## Get to know GEOLOGICAL ENGINEERING

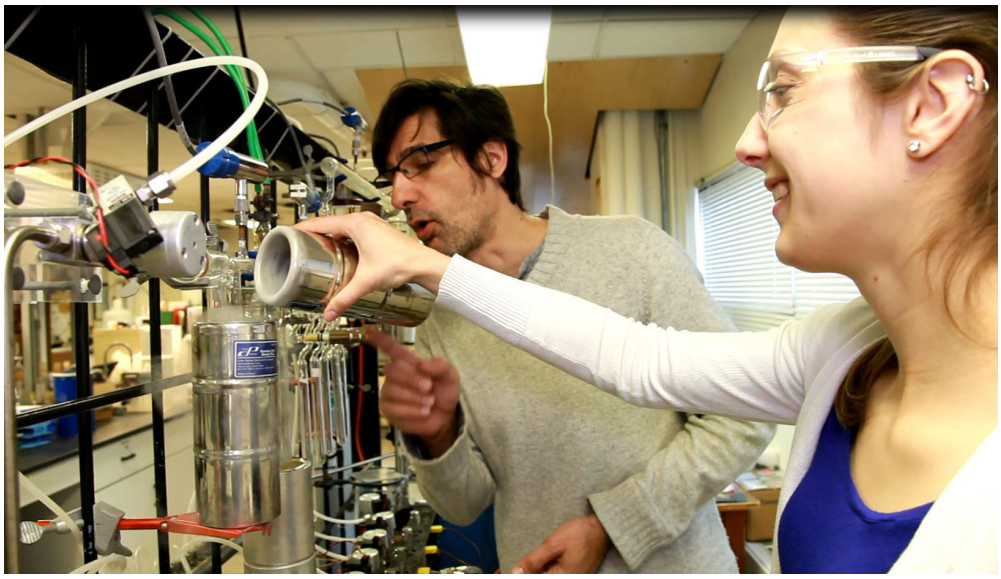
This program applies principles and techniques of the earth sciences to solve engineering challenges such as: building infrastructure (tunnels, caverns, foundations, dams) on, with, or through the materials beneath our feet; locating, evaluating, and sustainably extracting essential mineral and energy resources; preventing and remediating soil, rock & water contamination; managing natural hazards; and engineering tools and methods to probe into the earth. You will study physics, chemistry, mechanics, and applied mathematics as well as natural processes that shape the earth such as earthquakes, volcanoes, tectonics, mountain building, erosion, and sedimentation. You will also acquire valuable field skills and training in state-of-the-art geological investigation and geo-engineering analysis and design.

## Degree OPTIONS

**Bachelor of Applied Science in Engineering**

**Bachelor of Applied Science in Engineering with Professional Internship**

***Specializations in Geotechnical, Geoenvironmental, Resource Engineering, and Applied Geophysics***



*"Geological Engineering is the practical application of principles, concepts and techniques of the geological sciences to provide sustainable engineered solutions to human needs.The Earth is our classroom, our work bench, as well as our responsibility."*

## Queen's ADMISSIONS

Students apply to Queen's Engineering (QE) through the OUAC (Ontario University Application Centre) website. Secondary School prerequisites include these five 4U courses, English 4U, Calculus and Vectors 4U, Advanced Functions 4U, Chemistry 4U, and Physics 4U. Applicants outside of Ontario may have additional requirements.

## A Common START

Queen's is unique in offering a common first year along with an open discipline choice. When you do choose your program, you don't have to worry about caps or quotas.

Provided you pass all of your first year courses, you are guaranteed a place in your engineering program of choice. Queen's also offers Section 900, a special extended program for students struggling with first year courses. Take things at a slower pace and recover in time for second year.

## Course HIGHLIGHTS

Geological Engineering students have the opportunity to take a wide range of technical courses to help prepare them for the many possible career destinations available. Such courses include:

- Engineering Geology
- Geological Engineering Field School
- History of Life and Earth Dynamics
- Resource Geoscience and Engineering
- Geotechnical (Rock & Soil) Engineering
- Hydrogeology and Groundwater
- Pure and Applied Geophysics
- Exploration and Environmental Geochemistry

## Acquire Skills. Gain Experience. Go Global.

**That is a degree from Queen's.**

queensu.ca/geol

2025-2026

# Geological Engineering MAJOR MAP

*BACHELOR OF APPLIED SCIENCE | BACHELOR OF APPLIED SCIENCE WITH PROFESSIONAL INTERNSHIP*

Queen's UNIVERSITY

| | 1ST YEAR | 2ND YEAR | 3RD YEAR | 4TH OR FINAL YEAR |
|---|---|---|---|---|
| **GET THE COURSES YOU NEED** | Queen's Engineering first year is common – courses include: Physics, Chemistry, Calculus, Algebra, Graphics, Computing, and Earth Systems Engineering.<br><br>Also APSC100, the entry level course in our Engineering Design and Practice Sequence (EDPS), focusing on problem solving, experimentation principles, and finishing off with a team-based engineering project.<br><br>Discipline selection will take place in February! | Courses include: Solid Mechanics, Field Methods, Mineralogy, Surficial Processes, Statistics, Earth Systems Engineering, History of Life, Economics, Petrology and Earth Materials, Geophysical Characterization of the Earth, and Differential Equations.<br><br>You will also take the second EDPS course – APSC200 with a focus on Geological Engineering Design.<br><br>Following 2nd year in the spring, you will take a Geological Engineering Field School course. | Courses include: Rock Structures, Soil Mechanics, Applied Hydrogeology, Applied Quantitative Analysis, Resource Engineering, Applied Geophysics, Site Investigation & Geological Engineering Design, Terrain Evaluation, Rock Mechanics, and Geochemical Characterization of the Earth.<br><br>In addition to 3 Complementary Studies courses, you will also take 4 Technical Electives in 3rd and 4th year to specialize or diversify in Geological Engineering. You would typically take 1 elective in 3rd year. | Courses include: 4th year Design Project and a Geological Engineering Field School (prior to the Fall term).<br><br>You will have lots of room in this year to create your own specialized or diversified program through technical electives, developing additional expertise in geotechnical and rock engineering for mining, tunneling, or construction; mineral or energy exploration and resource development, geoenvironmental engineering, and engineering geophysics. |
| **GET RELEVANT EXPERIENCE** | Join teams or clubs on campus such as the Environmental Sustainability Team (QUEST) and the Queen's Project on International Development.<br><br>Apply to first year positions such as First Year Project Coordinators (FYPCOs).<br><br>See the AMS Clubs Directory or the Queen's Get Involved page for more ideas. | Look into summer jobs related to Geological Engineering by talking to the department or Career Services about work through SWEP or NSERC.<br><br>Take more responsibility within different clubs or extracurriculars. Consider entrepreneurial opportunities at programs like the Queen's Innovation Connector Summer Initiative. | Stay during the summer as an assistant to a faculty member or apply for external research opportunities. Apply for NSERC USRA positions in the department of physics.<br><br>Consider applying to do a 12-16 month QUIP internship between your third and fourth year. | Investigate requirements for full-time jobs or other opportunities related to careers of interest. Engage in your 4th year design project - a real world example of the work that Geological Engineers do!<br><br>Assess what experience you're lacking and fill in gaps with volunteering, clubs, or internship. |
| **GET ENGAGED WITH THE COMMUNITY** | Get involved with the Engineering Society (ENGSOC).<br><br>Volunteer on- or off-campus with different community organizations, such as the ENGSOC Committee on Inclusivity. | Get involved with the Miller Club, the departmental student council. Start or continue volunteering with organizations such as the Queen's Engineering and Commodities Association.<br><br>Attend conferences like the Commerce and Engineering Environmental Conference (CEEC), and the Oil and Gas Speakers Series. | Get connected with GARNET- Geo Alumni Resource Network. If interested, attend PDAC- Prospectors and Developers Association of Canada, Oil and Gas Speakers Series, and the Annual Advances in Earth Sciences Research Conference. Investigate the Professional Geoscientists of Ontario for the requirements to be qualified as a professional Geoscientist. | Consider joining professional associations like the Canadian Geotechnical Society, the International Association of Hydrogeologists, The Tunneling Association of Canada, and the National Ground Water Association.<br>Join groups on LinkedIn reflecting specific careers or topics of interest in Geological Engineering. |
| **GET ENGAGED GLOBALLY** | Speak to a QUIC advisor or get involved in their programs, events, and training opportunities.<br><br>Prepare for work or studies in a multi-cultural environment by taking QUIC's Intercultural Awareness Training Certificate and research possible immigration regulations. | Is an exchange in your future? Start thinking about where you would like to study abroad. | Build your intercultural competence by getting involved with other cultures or by practicing or improving your language skills. | International students interested in staying in Canada can speak with an International Student Advisor. |
| **GET CAREER READY** | Grappling with program decisions? Go to the Orientation Evenings held by different Engineering departments and attend the various Career Fairs during the year.<br><br>Get some help deciding by visiting Career Services. | Explore different careers of interest in the Career Services Career Advising and Resource Area. For more information check out Career Cruising. | Start focusing on areas of interest. Research education requirements for careers of interest. If needed, prepare to take any required tests (like the LSAT or GMAT) and get help thinking about grad school from Career Services. You may wish to do an independent studies project (GEOE 340). | Apply to jobs or future education, or make plans for other adventures. Get help from Career Services with job searching, resumes, interviews, grad school applications, or other decisions.<br><br>Find impactful work that aligns with your values using the Queen's Career Guide to the UN Sustainable Development Goals. |

CONSIDER A 12-16 MONTH QUIP INTERNSHIP

## How to use this map

Use the 5 rows of the map to explore possibilities and plan for success in the five overlapping areas of career and academics. The map just offers suggestions – you don't have to do it all! To make your own custom map, use the My Major Map tool.

## Knowledge & Workplace Skills

Your time at Queen's will give you valuable skills to boost your employability, including:

- **Technical skills** – use up-to-date geological exploration tools, analysis tools, hi-tech equipment and industry leading software
- **Research skills** – conduct scientific research and analyze quantitative information, develop multiple working hypotheses
- **Management and leadership skills** - confidence and independence in new situations, group work strategies, time and resource management
- Knowledge of principles and techniques of the **earth sciences**
- Practical applications of **geological science techniques** to engineering design
- Understanding of the **variability and change of earth materials** over space and time - their history controls their future as engineering materials
- Ability to think spatially and **analyze in 4 dimensions**
- **Fieldwork skills** – design and carry out site investigations to solve problems
- **Oral and written communication skills**

## Career Possibilities

- Engineering Geology
- Geotechnical Engineer
- Groundwater Engineer
- Natural Hazard Mitigation
- Rock Engineering Specialist
- Energy Resource Exploration
- Geomatics and Remote Sensing
- Mineral Resource Exploration
- Coastal & River Engineering
- Resource Management
- Geophysical Specialist
- Environmental Policy
- Mining Engineering
- Space Exploration
- Engineering Law
- Finance

Taking time to explore career options, build experience, and network can help you have a smoother transition to the world of work after graduation.

*some careers may require additional training. Listed careers are suggestions only.

# Geological Engineering

Geological Engineers deal with the future, present and past. This program offers depth and breadth and allows you to work on the most challenging problems facing humanity now and in the future, including the clean energy revolution, climate change, sustainable resource extraction, and natural hazards. Get started thinking about the future now – and reach out for more information

## Get the help you need

Queen's provides you with a broad range of support services from your first point of contact with the university through to graduation. At Queen's, you are never alone. We have many offices dedicated to helping you learn, think and do.

Ranging from help with academics and careers, to physical, emotional, or spiritual resources – our welcoming living and learning environment offers the programs and services you need to be successful, both academically and personally. Queen's wants you to succeed! Check out the Student Affairs website for available resources.

**Bec Dew**, Undergraduate Assistant
geolugrd@queensu.ca

**Bas Vriens**, Undergraduate Chair
bas.vriens@queensu.ca

# QUIP QUEEN'S UNDERGRADUATE INTERNSHIP PROGRAM

**START DATES** in May, September, or January

**POSITIONS** are paid and full-time

**WORK TERMS** are 12-16 months long

## PROGRAM OVERVIEW

- Graduate with "Professional Internship" on your degree
- Learn about current advances, practices and technologies in business and industry
- Explore a career path, earn a salary, and build workplace skills

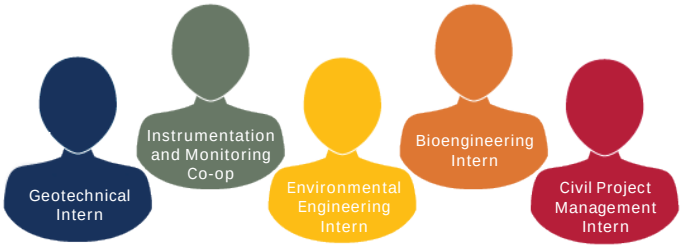
## ELIGIBILITY

- Complete 1st year before you register
- Complete 2nd or 3rd year before your internship
- Minimum GPA of 1.9
- Return to Queen's after your internship to finish your degree

## WHY QUIP?

- Gain a year of career-related work experience
- Build network connections
- Receive support from Queen's staff in job search and during internship

## SAMPLE PAST **INTERNSHIPS**




For more information, contact quip@queensu.ca or visit the Program Website.

SMITH ENGINEERING
Queen's University

Miller Hall, Bruce Wing
36 Union Street
613-533-2597
queensu.ca/geol