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

Queen’s ADMISSIONS

Students apply to Queen’s Engineering (QE) through the OUAC (Ontario University Application Centre) website. Secondary school prerequisites include five 4U and 4M courses, one of which must be English 4U. Calculus and Vectors 4U, Advanced Functions 4U, Chemistry 4U, and Physics 4U are all required. A final competitive minimum grade of 80% must be obtained in all courses. 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

“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.”

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


That is a degree from Queen’s.

queensu.ca/geol
GET THE COURSES YOU NEED

1ST YEAR
- Queen's Engineering first year is common – courses include: Physics, Chemistry, Calculus, Algebra, Graphics, Computing and Earth Systems Engineering.
- Also APSC100, the entry level course in Engineering Design and Practice Sequence (EDPS), focusing on problem solving, experimentation principles and finishing off with a team-based engineering project.

2ND YEAR
- You will also take the second EDPS course – APSC200 with a focus on Geological Engineering Design.
- Following 2nd year in the spring, you will take a Geological Engineering Field School course.

3RD YEAR
- 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 2 of these electives in 3rd year.

4TH OR FINAL YEAR
- Courses include: 4th year Design Project and a Geological Engineering Field School (prior to the Fall term).
- 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

1ST YEAR
- Join teams or clubs on campus such as the Environmental Sustainability Team (QUEST) and the Queen's Project on International Development.
- Apply to first year positions such as First Year Project Coordinator (FYPCO).
- See the AMS Clubs Directory or the Queen's University Project Coordinators (FYPCOs).
- Get connected with the Community (ENGGOC).
- Volunteer on or off campus with different community organizations, such as the ENGSO Committee on Inclusivity.
- Get involved with the Engineering Society (ENGSO).
- Attend conferences like the Commerce and Engineering Environmental Conference (CCEC), and the Oil and Gas Speakers Series.
- Consider applying to do a 12-16 month QUIP internship between your third and fourth year.

2ND YEAR
- Look into summer jobs related to Geological Engineering by talking to the department or Career Services about work through SWEF or NSERC.
- Take more responsibility within different clubs or extracurriculars.
- Consider entrepreneurial opportunities at programs like the Queen's Innovation Connector Summer Initiative.

3RD YEAR
- 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.
- Consider applying to do a 12-16 month QUIP internship between your third and fourth year.

4TH OR FINAL YEAR
- 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.
- Join groups on LinkedIn reflecting specific careers or topics of interest in Geological Engineering.
- 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!
- Assess what experience you’re lacking and fill in gaps with volunteering, clubs, or internship.

GET CONNECTED WITH THE COMMUNITY

1ST YEAR
- Get involved with the Engineering Society (ENGSO).
- Volunteer on or off campus with different community organizations, such as the ENGSO Committee on Inclusivity.

2ND YEAR
- Get involved with the Miller Club, the department student council. Start or continue volunteering with organizations such as the Queen’s Engineering and Commodities Association.
- Attend conferences like the Commerce and Engineering Environmental Conference (CCEC), and the Oil and Gas Speakers Series.

3RD YEAR
- Get connected with GARNET- Geo Alumni Resource Network. If interested, attend PQAC-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.

4TH OR FINAL YEAR
- Consider applying to do a 12-16 month QUIP internship between your third and fourth year.

GET THINKING GLOBALLY

1ST YEAR
- Speak to a QUIC advisor or get involved in their career events and training opportunities.
- Prepare for work or studies in a multi-cultural environment by taking QUIC’s Intercultural Awareness Training Certificate and research possible immigration opportunities.

2ND YEAR
- Is an exchange in your future? Start thinking about where you would like to study abroad.

3RD YEAR
- Build your intercultural competence by getting involved with other cultures or by practicing or improving your language skills.

4TH OR FINAL YEAR
- International students interested in staying in Canada can speak with an International Student Advisor.

GET READY FOR LIFE AFTER GRADUATION

1ST YEAR
- Grappling with program decisions? Go to the Orientation Evenings held by different Engineering departments and attend the various Career Fairs during the year.
- Get some help deciding by visiting Career Services.

2ND YEAR
- Explore different careers of interest by reading books in the Career Services Career Advising and Resource Area, such as Career Opportunities in Engineering. For more information check out Career Cruising.

3RD YEAR
- 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).

4TH OR FINAL YEAR
- 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.

Employability skills

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

- 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
- 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
- Oral and written communication skills

Where could I go after graduation?

- Engineering Geology
- Geotechnical Engineer
- Groundwater Engineer
- Natural Hazard Mitigation
- Rock Engineering Specialist
- Energy Resource Exploration
- Geomatics and Remote Sensing
- Geo-environmental engineering
- 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.

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.
Geological Engineering

The future is bright for Geological Engineering students at Queen's University. With this program, you will gain a year of career-related work experience, build network connections, and receive support from Queen's staff in job search and during internship.

**PROGRAM OVERVIEW**
- Graduate with "Professional Internship" on your degree.
- Learn about current advances, practices and technologies in business and industry.
- Test drive a career, earn a competitive salary, and get real world experience.

**ELIGIBILITY**
- 2nd or 3rd Year Students
- Minimum GPA of 1.9

**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**
- Cognitive Analytics Development Intern
- Biochemistry Intern
- GIS Tech Assistant
- Mathematician Intern
- Health & Wellness Intern
- Cheminformatics Intern

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

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Queen's University
Engineering

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