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

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, Chemistry 4U, and Physics 4U are all required along with one of Advanced Functions 4U, Biology 4U, Data Management 4U, Computer Science 4U, Earth and Space Science 4U. A final grade of 70% must be obtained in English 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

“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.”

That is a degree from Queen’s.

queensu.ca/geol
**Geological Engineering MAJOR MAP**

**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 our Engineering Design and Practice Sequence (EDPS), focusing on problem solving, experimentation principles and finishing off with a team-based engineering project.
- Discipline selection will take place in February!

**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, tunnelling or construction; mineral or energy exploration and resource development, geoenvironmental engineering and engineering geophysics.
- During the year, attend the various Career Fairs among departments and attend the various Career Fairs, get some help deciding by visiting Career Services.
- See the AMS Clubs Directory or the Queen's Get Connected to the Community to find out about other opportunities related to careers of interest.
- Consider applying to do a 12-16 month QUIP internship between your third and fourth year.
- Do some targeted networking with alumni working in careers of interest. Research topics of interest in Geological Engineering.
- Look into summer jobs related to Geological Engineering by talking to the department or Career Services about work through SWEP or NSERC.
- Take the second EDPS course – APSC200 with a focus on Geographical Engineering Design.
- 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.
- Get involved with the Miller Club, the departmental student council. Start or continue volunteering with organizations such as the Queen's Environmental Engineering and Commodities Association.
- Get involved with the Engineering Society (ENGSOC).
- Volunteer on or off campus with different community organizations, such as the EnglishWeek Committee or the ENGSOCS Committee on Inclusivity.
- Attend conferences like the Commerce and Engineering Environmental Conference (CEEC), and the Oil and Gas Speakers Series.
- Attend the annual Prospector's and Developer's Conference in Toronto and network with the stars of the resource industry.
- Do some targeted networking with alumni working in careers of interest by joining the LinkedIn group Queen's Connects Career Network.
- Build your intercultural competence by getting involved with other cultures or by practicing or improving your language skills.
- Is an exchange in your future? Start thinking about where you would like to study abroad.
- 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.
- Explore different careers of interest by reading books in the Career Services Career Advising and Practice Sequence (EDPS) book series.
- 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 (GEDE 340).
- Consider joining professional associations like the Canadian Geotechnical Society, the International Association of Hydrogeologists, The Tunnelling Association of Canada and the National Ground Water Association. Investigate Canadian and international professional organizations. Join groups on LinkedIn reflecting specific careers or topics of interest in Geological Engineering.
- International students interested in staying in Canada can speak with an International Student Advisor.
- 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.

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

**GET RELEVANT EXPERIENCE**

- 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 Coordinators (FYPCOs).
- See the AMS Clubs Directory or the Queen’s Get Connected to the Community to find out about other opportunities related to careers of interest.
- Get some help deciding by visiting Career Services.
- Visit careers.queensu.ca/majormaps for the online version with links!
- Discipline selection will take place in February!

**GET CONNECTED WITH THE COMMUNITY**

- Get involved with the Engineering Society (ENGSOCS).
- Volunteer on or off campus with different community organizations, such as the EnglishWeek Committee or the ENGSOCS Committee on Inclusivity.
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**GET THINKING GLOBALLY**

- Speak to a QUCIC advisor or get involved in their programs, events and training opportunities.
- Prepare for work or studies in a multi-cultural environment by taking QUCIC’s Intercultural Competency Certificate, and research possible immigration regulations.
- 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.
- Explore different careers of interest by reading books in the Career Services Career Advising and Practice Sequence (EDPS) book series.
- 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 (GEDE 340).

**GET READY FOR LIFE AFTER GRADUATION**

- 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.
- Take the second EDPS course – APSC200 with a focus on Geographical Engineering Design.
- 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.
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**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, h/v 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?**

- Assay Specialist
- Architecture
- Climatology & meteorology
- Coastal and river engineering
- Environmental engineering
- Excavation design
- Geological Science
- Law
- Mining engineering
- Natural hazard mitigation
- Oceanography
- Paleontology
- Toxicology

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.

Visit careers.queensu.ca/majormaps for the online version with links!
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.

Get started thinking about the future now – where do you want to go after your degree? Having tentative goals (like careers or grad school) while working through your degree can help with short-term decisions about courses and experiences, but also help you keep motivated for success.

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, and Queen’s wants you to succeed! Check out the Student Affairs website for available resources.

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

- Biotechnology Intern
- Engineering & Applied Science Intern
- Geothermal Engineering Student
- Fuel Cell Production Intern
- Software Development Student
- Mechatronics Intern

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