

Preparing to Become a
Canadian Professional Geoscientist
While Studying at Acadia as a
Geology or Environmental
Geoscience Major

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Introduction

- Acadia Geology students often wonder what they will be doing after they graduate
- If you intend to work in the Geology or Environmental Geoscience fields, you should know that *regulations have been put in place that require you become a 'Professional Geoscientist' to undertake certain geoscience tasks and to regulate what type of work you can do*
- The field of practice you are restricted to by these regulations is *based on the courses you have taken in university and any geoscience experience you have gained since university*
- Consequently, ensuring that you take the *'right courses'* to provide you with the opportunity and flexibility to do the work you wish to do is absolutely necessary
- You need to think about this as early as possible in your academic career, to ensure you don't miss the necessary courses

Professional Geoscientists in Nova Scotia

- You must be a *Professional Geoscientist (P.Ge.)* to “*practice geoscience*” in:
 - *Nova Scotia*
 - *all other provinces and territories in Canada*
 - *most of the United States (~35 states)*
 - *other countries (UK, Australia, New Zealand, South Africa, Namibia, Ireland)*
- Must be a *P.Ge.* to become a *qualified person*, allowing you to write and sign reports about mining or petroleum exploration, resource, or extraction activities that is released to any stock market, financial institution, or the public

Professional Geoscientists in Nova Scotia

- You must be a *P.Geo.* to become a ‘*qualified person*’ and a ‘*site professional*’, designations that allow you to undertake a variety of tasks in the geo-environmental field, including:
 - *working as a ‘qualified person’, performing environmental monitoring & remediation activities*
 - *working as a ‘site professional’, planning, designing and supervising environmental monitoring and remediation activities*
- The terms ‘*qualified person*’ and ‘*site professional*’ are defined in a variety of legislative acts involving petroleum and mineral exploration, and the environment

Professional Geoscientists in Nova Scotia

- So who needs to be a *P.Geo.*?
 - *Geologists* - have degree at Acadia
 - *Geophysicists* - do not have degree at Acadia
 - *Environmental Geoscientists* - have degree at Acadia
- These are the three streams recognized nationally by the *Canadian Geoscience Standards Board (CGSB)*; a government-appointed board to establish national geoscience standards)
- *Geochemistry is not a recognized stream, except in British Columbia, and thus geochemists usually register as Geologists*

Definition of Geoscience / Geoscientist

- *What is 'the Practice of Geoscience'?*

- The practice of '*professional geoscience*' means “the performing of any activity that requires application of the principles of the geological sciences, and that concerns the safeguarding of public welfare, life, health, property, or economic interests, including, but not limited to:”

Definition of Geoscience / Geoscientist

- *Geological Exploration*

- *“investigations, interpretations, evaluations, consultations or management aimed at discovery or development of metallic or non-metallic minerals, rocks, nuclear or fossil fuels, precious stones and water resources; and”*

Definition of Geoscience / Geoscientist

- ***Public Well-Being & Environment***
 - “*investigations, interpretations, evaluations, consultations, or management relating to geoscientific properties, conditions or processes that may affect the well-being of the general public, including those pertaining to preservation of the natural environment.*”
- This definition is wide-ranging, is quoted *verbatim* from the ***Canadian Geoscience Standards Board***, and has been adopted in the regulations of Professional Geoscientist Acts in all provinces and territories of Canada

Professional Geoscientist Act

- To be a *Professional Geoscientist* in Nova Scotia, you must join the *Association of Professional Geoscientists of Nova Scotia (APGNS)*
- The *APGNS* admits *P.Geo.*'s using the guidelines established by the *Canadian Geoscience Standards Board* for professional registration
- Other provinces have similar professional geoscience associations, sometimes joined with the engineers, that have a similar purpose and operate in a similar manner (*Quebec's system is most different, for various legal and historical reasons*)

Professional Geoscientist Act

- The *Nova Scotia Professional Geoscientist Act* codifies the *APGNS*, empowering it to:
 - *admit members with suitable credentials*
 - *investigate, judge and discipline members for malpractice (this is an alternative to civil law suits, and provides better, and cheaper, justice because those with technical knowledge judge the case outside of a courtroom and without the requirement of lawyers)*
 - *keep a **public record** of disciplinary actions (unlike doctors, lawyers, etc. - which don't make their disciplinary records public)*

Professional Geoscientist Act

- the *Professional Geoscientist Act* allows
 - Nova Scotia *P.Geo.*s to be able to *‘practice geoscience’* automatically in Nova Scotia and in other provinces, states or countries:
 - via ‘incidental practice’ (*for up to several weeks/months without payment of fees*)
 - via automatically becoming a member of another professional geologist association in another province, state or country (i.e. *by paying fees*); this allows one to work for longer periods of time in those jurisdictions (**Note that:** *the amount of time required to trigger fee payment differs by province; also, the feasibility of one licence fee for all provinces and territories is being discussed*)

P.Geol. Admission Requirements

- to join the *Association of Professional Geologists of Nova Scotia (APGNS)*, you are ***required to satisfy 4 requirements***
 - **knowledge requirements** (*equivalent to 4 year honours geology university curriculum*)
 - **experience requirement** (*4 years as a member-in-training - MIT - or equivalent*)
 - **4 references** (*3 must be practising geoscientists/engineers*)
 - **professional practice / ethics exam** (*knowledge of relevant laws, ethical issues; a curriculum and text is provided by the APGNS*)

Knowledge Requirements

common to all streams

(Geologist, Geophysicist, Environmental Geoscientist)

- **3 Compulsory Foundation Science**
 - Mathematics
 - Physics
 - Chemistry
- **6 Additional Foundation Science** - *no more than two from each subject*
 - Mathematics
 - Physics
 - Chemistry
 - Biology
 - Statistics
 - Computer Programming

EU = 'educational unit', basically a one-term course at Acadia

Note: *courses have lab (or equivalent) and must be 1st year university or higher AND acceptable for credit toward a degree in science, applied science or engineering*

Knowledge Requirements

common to all streams

(Geologist, Geophysicist, Environmental Geoscientist)

- **4 Compulsory Foundation Geoscience**
 - Field Techniques
 - Mineralogy and Petrology
 - Sedimentation and Stratigraphy
 - Structural Geology

***Note:** the material in these educational units may be equivalently studied as material in several courses; these courses must be acceptable for credit toward a degree in geoscience*

Knowledge Requirements

common to all streams

(Geologist, Geophysicist, Environmental Geoscientist)

- **5 Additional Foundation Geoscience**

GEOLOGY

Geochemistry

Geophysics

Igneous Petrology

Metamorphic Petrology

Sedimentary Petrology

Sedimentology

Glacial Geology or

Geomorphology

Remote Sensing

ENV GEOSCIENCE

Geochemistry

Geophysics

Hydrology/Hydrogeology

Engineering Geology

Geomorphology or

Soil Science

Glacial Geology

Remote Sensing

GEOPHYSICS

Digital Signal Processing

Global Geophysics

Seismology & Seismic Methods

Exploration Geophysics

Potential Fields & Radiometrics

Elec./Electromagnetic Methods

Note: *Geology and Environmental Science require 1 or 2 EU's from each sub-group;
Geophysics requires 1 EU from 5 of the 6 sub-groups.*

Knowledge Requirements

common to all streams

(Geologist, Geophysicist, Environmental Geoscientist)

- **9 Other Geoscience/Science**

An extensive list is available at:

<http://www.ccpge.ca/pgeoreg/en/Documents/4214%20CCPG%20Requirements%20Booklet%20Web.pdf>

basically, any geoscience or environmental science course offered at Acadia, and many other science courses that can be thought of as relating to geoscience, will qualify (e.g., CHEM 2853 - Environmental Analytical Chemistry; CHEM 2103/APSC 2113 - Thermodynamics; BIOL 2033 - Ecology; APSC 3413 - Environmental Engineering)

Note: *these courses must be at 2nd year level or higher **and** acceptable as a science credit toward a degree in science, applied science or engineering **and must be relevant to geoscience**; as a result GEOL 1033 (Oceanography) and GEOL 1073 (Natural Disasters) do not qualify, except for transfer students using them in lieu of GEOL 1013 with the GEOL 1070 laboratory*

Knowledge Requirements

common to all streams

(Geologist, Geophysicist, Environmental Geoscientist)

Geoscience Courses = 18

(note that the APGNS does not stipulate you need to take introductory geology courses; i.e., GEOL 1013 & GEOL 1023; at most universities, you need to take them as pre-requisites for the 18 advanced Geoscience courses)

Introductory (First Year) Geoscience Courses = 2

Total Geoscience Courses = 20

Other Science Courses = 9

(29 science courses in all)

*How do these match up with
Acadia Geology & Env. Geoscience
Major & Honours Degrees?*

Acadia Major Geology Degree

CORE

- Physical Geology (1013)
- Historical Geology (1023)
- Mineralogy (2133)
- Paleontology (2213)
- Petrology & Stratigraphy (2043)
- Geomorphology (2703)
- Field Methods (2080)
- Structural Geology (3603)
- Global & North American Geology (4103)

plus three of:

- Clastic Petrology/Sedimentology (3303)
- Carbonate Petrology/Sedimentology (3323)
- Igneous Petrology (3403)
- Metamorphic Petrology (3503)

PRE-REQUISITES

- Chemistry (1013 & 1023)
- Physics (1053 & 1063)
- Math (1013 & 1023, 2233 & 2243, or 1333 & 2313)
- 4 Other Science Courses
(from GEOL, MATH, PHYS, CHEM, BIOL, COMP, ENGR;
including four science courses making up minor)

5 ELECTIVES

- Atmosphere, Weather & Climate (2753)
- Geochemistry (3013; *every other year*)
- Geophysics (3823; *every other year*)
- Hydrogeology (3723)
- 4th Petrology (3303, 3323, 3403, or 3503)
- Mineral Deposits (4803)
- Advanced Field School (4083)
- Quaternary Geology (4713 *every other year*)
- Mineral Exploration (4813; *when the parallel grad course is taught*)
- Applied Geochemistry (4833; *when the parallel grad course is taught*)

Acadia Honours Geology Degree

CORE

- Physical Geology (1013)
- Historical Geology (1023)
- Mineralogy (2133)
- Paleontology (2213)
- Petrology & Stratigraphy (2043)
- Geomorphology (2703)
- Field Methods (2080)
- Structural Geology (3603)
- Global & North American Geology (4103)
- Honours Thesis (4996)

plus three of:

- Clastic Petrology/Sedimentology (3303)
- Carbonate Petrology/Sedimentology (3323)
- Igneous Petrology (3403)
- Metamorphic Petrology (3503)

PRE-REQUISITES

- Chemistry (1013 & 1023)
- Physics (1053 & 1063)
- Math (1013 & 1023, 2233 & 2243, or 1333 & 2313)
- 4 Other Science Courses
(from GEOL, MATH, PHYS, CHEM, BIOL, COMP, ENGR;
including four science courses making up minor)

5 ELECTIVES

- Atmosphere, Weather & Climate (2753)
- Geochemistry (3013; *every other year*)
- Geophysics (3823; *every other year*)
- Hydrogeology (3723)
- 4th Petrology (3303, 3323, 3403, or 3503)
- Mineral Deposits (4803)
- Advanced Field School (4083)
- Quaternary Geology (4713 *every other year*)
- Mineral Exploration (4813; *when the parallel grad course is taught*)
- Applied Geochemistry (4833; *when the parallel grad course is taught*)

Totals

Geology Major

- *17 Geology Courses*
- *10 Other Sciences*
- *27 Science Courses Total*

Need to:

Take three Geology courses as university (free) electives

Take either Geochemistry or Geophysics as one of your geology electives

Geology Honours

- *19 Geology Courses*
- *10 Other Sciences*
- *29 Science Courses Total*

Need to:

Take one Geology course as a university (free) elective

Take either Geochemistry or Geophysics as one of your geology electives

Note: you can reduce (by one) the # of Geology courses you have to take as free electives by ensuring that the extra (10th) science course required for your degree is relevant to geoscience, making it satisfy the Other Geoscience/Science requirement

Acadia Major Env. Geosci. Degree

CORE

- Physical Geology (1013)
 - Historical Geology (1023)
 - Mineralogy (2133)
 - Paleontology (2213)
 - Petrology & Stratigraphy (2043)
 - Geomorphology (2703)
 - Geochemistry (3103)
 - Hydrogeology (3723)
 - Geophysics (3823)
 - Field Methods (2080)
 - Structural Geology (3603)
 - Human Activity in the Environment (2643)
 - Legal Issues (3113)
 - Environmental Impact Assessment (3423)
- and either:*
- Clastic Petrology/Sedimentology (3303)
 - Carbonate Petrology/Sedimentology (3323)

PRE-REQUISITES

- Chemistry (1013 & 1023)
- Physics (1053 & 1063)
- Math (1013 & 1023, 2233 & 2243, or 1333 & 2313)
- Biology (1113, 1123)
- 2 Other Science Courses
(from GEOL, MATH, PHYS, CHEM, BIOL, COMP, ENGR;
including four science courses making up minor)

3 ELECTIVES

- Atmosphere, Weather & Climate (2753)
- Other Petrology (3303, 3323, 3403, 3503)
- Quaternary Geology (4713 *every other year*)
- Applied Geochemistry (4833; *when the parallel grad course is taught*)
- Environment & Human Health (3313)
- Contaminants in the Environment (3613)
- Mineral Deposits (4803)
- Advanced Field School (4083)
- Mineral Exploration (4813; *when the parallel grad course is taught*)

Acadia Honours Env. Geosci. Degree

CORE

- Physical Geology (1013)
- Historical Geology (1023)
- Mineralogy (2133)
- Paleontology (2213)
- Petrology & Stratigraphy (2043)
- Geomorphology (2703)
- Geochemistry (3103)
- Hydrogeology (3723)
- Geophysics (3823)
- Field Methods (2080)
- Structural Geology (3603)
- Human Activity in the Environment (2643)
- Legal Issues (3113)
- Environmental Impact Assessment (3423)
- Honours Thesis (4996)

and either:

- Clastic Petrology/Sedimentology (3303)
- Carbonate Petrology/Sedimentology (3323)

PRE-REQUISITES

- Chemistry (1013 & 1023)
- Physics (1053 & 1063)
- Math (1013 & 1023, 2233 & 2243, or 1333 & 2313)
- Biology (1113, 1123)
- 2 Other Science Courses
(from GEOL, MATH, PHYS, CHEM, BIOL, COMP, ENGR; *including four science courses making up minor*)

3 ELECTIVES

- Atmosphere, Weather & Climate (2753)
- Other Petrology (3303, 3323, 3403, 3503)
- Quaternary Geology (4713 *every other year*)
- Applied Geochemistry (4833; *when the parallel grad course is taught*)
- Environment & Human Health (3313)
- Contaminants in the Environment (3613)
- Mineral Deposits (4803)
- Advanced Field School (4083)
- Mineral Exploration (4813; *when the parallel grad course is taught*)

Totals

Env. Geosci. Major

- *19 Geology Courses
(18 credits)*
- *10 Other Sciences*
- *29 Science Courses Total*

Need to:

Take one Geology or Env. Science course as a university (free) elective

Env. Geosci. Honours

- *21 Geology Courses
(20 credits)*
- *10 Other Sciences*
- *31 Science Courses Total*

Need to:

No additional steps required

Note: you can reduce (by one) the # of Geology courses you have to take as free electives by ensuring that the extra (10th) science course required for your degree is relevant to geoscience, making it satisfy the Other Geoscience/Science requirement

P.Geol. Admission Requirements

- **During your time at Acadia:**
 - *make sure you take the right courses to satisfy the appropriate knowledge requirements*
 - *recommend you include any summer or co-op employment on your co-curricular transcript*
- **Then, after completing your degree:**
 - *get a job in geology/environmental field and*
 - *apply for status as a Member-In-Training of APGNS or equivalent in another province*
 - *be 'mentored' by a professional geoscientist*
 - *keep a log of work & responsibilities you undertake*
 - *after 48 months of geoscience experience that is cumulative and progressive in responsibility and technical achievement, you can apply for full membership to APGNS and become a **professional geoscientist.***

Questions ?

- For more information regarding the Canadian P.Geo admissions requirements, see CCPG website containing the CGSB recommendations:

<http://www.ccpge.ca/pgeoreg/index.php?lang=en&subpg=reqsforreg>

or the APGNS website containing further information:

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

- For more information about the Nova Scotia Geoscience Act, see the government website at:

http://www.gov.ns.ca/legislature/legc/bills/58th_2nd/1st_read/b117.htm

- If you have any questions regarding how your Geology or Environmental Geoscientist degree programs stack up against the P.Geo. knowledge requirements for the Geology or Environmental Geoscience streams, please contact:

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