



STUDENT GUIDE
GEOLOGICAL ENGINEERING
University of British Columbia

2023-2024



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Director's Welcome

To our incoming 2nd year students, welcome to UBC Geological Engineering!

Introduced in 1921, our program was the first of its kind worldwide, whether Geological Engineering or its closely related offshoots of Geotechnical Engineering, Engineering Geology or Applied Geology. Our program is also widely recognized as one of the top Geological Engineering programs in the world, and around it, Vancouver has grown to be a key international center for the geotechnical, mining, and energy resource sectors. The strong support we receive from industry and our alumni allow us to expose our 175+ students to the remarkable projects carried out by local companies and the career opportunities that await you when you graduate.

You are also automatically a member of GeoRox – the student club of the UBC Geological Engineering program. GeoRox is one of the most active student clubs on campus and plays a pivotal role in enriching the student experience by organizing mentoring and professional outreach events, such as the annual Alumni Dinner and Distinguished Geological Engineering Lecture, as well as design competitions and field trips where students can escape the classroom and be exposed to the working environment. I strongly encourage you to get involved.

The purpose of this guide is to give you information about the structure and course requirements in the Geological Engineering program. You should use this guide to help you plan your degree program. Our program is structured to include a set of core course requirements that all students must fulfill to graduate. In addition, there are a number of electives that allow you to tailor the program to your individual interests.

To our returning 3rd and 4th year students, welcome back! You will find here a number of updates that supersede previous year's student guides. Please pay close attention to these. Remember, the official program is the one posted online in the UBC Calendar, which can be accessed through the link below:

[Geological Engineering entry in the UBC Calendar](#)

For additional information, you can also consult the Geological Engineering website: <http://www.geoeng.ubc.ca/>.

New Program Changes!!

In response to changes by the Canadian Engineering Accreditation Board (CEAB), regarding recommended reductions to the overall credit load in engineering programs, we will be reducing the number of unconstrained technical electives in Geological Engineering. These changes will be phased in by your year standing.

- 1) For students with 4th year standing: the number of technical electives is now reduced from 12 to 9 credits. Accordingly, the overall credit total for 4th year is now 36 instead of 39 credits.

- 2) For students with 3rd year standing: the “Earth Sciences technical elective” now requires you to choose one of EOSC 320, EOSC 321, EOSC 322, EOSC 331, or EOSC 332. This change is to increase the geology training that Geological Engineering students receive.
- 3) For students with 3rd year standing: the number of technical electives is now reduced from 6 to 3 credits. Accordingly, the overall credit total for 3rd year is now 39 instead of 42 credits.

These changes should be reflected in your Degree Navigator. If there are any questions, please contact the program Director. Remember that you are responsible for ensuring you meet all degree requirements to be eligible to graduate.

Administrative Structure of the Program

Geological Engineering is an interdisciplinary program in the Faculty of Applied Science and housed in the Department of Earth, Ocean and Atmospheric Sciences. Oversight is provided by the Geological Engineering Board of Study. The undergraduate program leads to a BAsC or "Engineering" degree. This degree can be obtained with or without participation in the Co-op program. All graduates from the program will receive the designation “BAsC in Geological Engineering” on their degree, and are eligible for registering as a P.Eng. after meeting the professional experience, law and ethics requirements set out by the governing body in the jurisdiction you wish to register (e.g., Engineers and Geoscientists British Columbia).

Getting Help

Degree Navigator

There are several sources of help and advising for the program. [Degree Navigator](#) is an easy to use tool that will allow you to track your program, the course requirements you have fulfilled, and those still required for graduation. Details on how to use Degree Navigator can be found at: <http://students.engineering.ubc.ca/how-use-degree-navigator>.

Tip: When using [Degree Navigator](#), choose the view “Audit – UBC Report” to visualize your degree. The version year should be set to the one that applies to you by default. Remember, Degree Navigator is a tool and not the official record of whether you have fulfilled your degree requirements. It is generally correct but might not be programmed for every option. For example, Degree Navigator will recognize most of the popular courses taken as technical electives, but there are other courses that are also acceptable that will appear as invalid. If this happens to you, or if you have any questions regarding your degree requirements, please contact the Director of Geological Engineering (see Advising).

Course Registration: Standard Time Tables (STT)

Most students will register through a Standard Time Table (STT) that allows automatic registration in several core courses organized so that the times for lectures and labs are free of scheduling conflicts. This will only be possible if you haven't completed any of the courses listed in the STT. If you have completed one or more courses in the STT, for example during the previous school year, you will receive an error message. In this case, you will have to register for your courses individually (see instructions in the next section).

Please note that not all required courses are included in the STT. You should make sure to register separately for all courses listed for your year in the [UBC Calendar](#) if they are not included in the STT. For example, *MATH 253 and STAT 251 are core to the 2nd year program but are not included in the STT.* You must register for these separately. This might also apply to labs separate from the courses that are included in the STT. For example, CIVL 316 is included in the 3rd year STT but the lab for this course is not. Students must register for a lab section separately.

Also note that when registering using a STT, the online registration system assumes you have all prerequisites for the courses listed in the STT. It will not check for this. It is your responsibility (and in your best interest!) to drop any courses you are registered in that you do not have the prerequisites for; or separately, have received permission from the course instructor to waive the prerequisites. **Only the instructor for the course can grant a student request to waive a prerequisite.**

Course Registration: Individual Courses/Non-STT

For students who need to register for non-STT courses, for example technical electives, or because they are not eligible for a STT, **course registration must be carried out through the host department offering the course.** The following are the procedures for the courses most common to the Geological Engineering program:

EOSC courses:	Please contact our Senior Program Assistant, the kind and most helpful Ian Ayeras (iayeras@eoas.ubc.ca).
CIVL courses:	Please complete the Civil Engineering online course request form: https://civil.ubc.ca/course-registration-form/ Note that Civil generally does not process requests for Technical Electives until one or two weeks before the start of each term. Further information can be found on their FAQ .
MINE courses:	Please contact the Mining main office: https://mining.ubc.ca/contact/
Complementary Studies courses:	These are a special category of courses that are common to all engineering programs to meet specific requirements of the Canadian Engineering Accreditation Board (CEAB). They include the "Humanities and Social Sciences" electives and "Impact of Engineering on Society, Sustainability and Environmental Stewardship" elective.

First-Year courses:	The 1 st year program falls under the jurisdiction of Engineering Academic Services. For any 1 st year courses that still need to be completed or are not appearing correctly in Degree Navigator, please contact Engineering Academic Services .
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Advising

For questions regarding the program, advising, or approval of courses and technical electives, please contact the **Director of Geological Engineering, Prof. Erik Eberhardt** (eeberhar@mail.ubc.ca). You can also drop by his office at: EOS-South 251.

For questions related to transfer credits, yet-to-be-completed 1st year requirements or program requirements listed as “complementary studies” electives, contact [Engineering Academic Services](#) in the lobby of the Kaiser Building.

For questions related to Co-Op, Go Global, Coordinated International Exchange, etc., contact the respective offices for these.

For the student perspective on courses and other student experiences, talk to **senior GeoRox students** in the program. They are a great resource!

Prerequisites

The waiving of prerequisites must be obtained from the course instructor. Note that some instructors are willing to waive prerequisites for students outside their department if the student has an equivalent course from their program of study. However, this is at the discretion of the instructor.

Program Requirements

Program Curriculum

The tables below outline the program curriculum for Geological Engineering based on the [2023/24 UBC Calendar](#)). If there are any discrepancies, please note that the online UBC Calendar is the official record of the courses required for completing the program (see note below on *Program Changes and Year Standing*). **Remember: It is your responsibility to check that your program can be completed according to your preferred timeline for graduation.** It is also your responsibility to check that your courses fit together into a workable timetable and that you have the required prerequisites. If you have any questions, please contact the Geological Engineering Director to arrange a meeting.

Helpful tip: Make sure to check out [Degree Navigator](#). Degree Navigator is an interactive advising tool designed to help you make informed decisions regarding your academic program. It will show the courses you have taken and the courses related to your degree requirements you still need to take.

2nd Year			Credits
T1	APSC 201	Technical Communication	3
	CIVL 215	Fluid Mechanics I	4
	CIVL 230	Solid Mechanics	4
	EOSC 210	Earth Science for Engineers	3
	EOSC 220	Introductory Mineralogy	3
	MATH 253	Multivariable Calculus	3
T2	CIVL 210	Soil Mechanics I	4
	EOSC 213	Computational Methods in Geological Engineering	3
	EOSC 221	Introductory Petrology	3
	EOSC 223 ¹	Field Techniques	3
	EOSC 240	Site Investigation	3
	STAT 251	Elementary Statistics	3
Total Credits			39

¹ Includes one-week field school at the end of Term 2.

3rd Year			Credits
T1	CIVL 311	Soil Mechanics II	4
	EOSC 323	Structural Geology I	3
	EOSC 329	Quantitative Groundwater Hydrology	3
	EOSC 330	Principles of Geomorphology	3
	EOSC 350	Environmental, Geotechnical, and Exploration Geophysics I	3
T2	CIVL 316	Hydrology and Open Channel Flow	4
	MINE 303	Rock Mechanics Fundamentals	4
	<i>Field School Requirement² (choose one of):</i>		
	EOSC 328	Field Geology	3
	EOSC 428	Quantitative Groundwater Hydrology	3
T1 or T2	<i>Complementary Studies: Impact of Engineering on Society³</i>		3
	<i>Complementary Studies: Humanities³</i>		3
	<i>Technical Electives⁴</i>		3
	<i>Geology Elective (choose one of):</i>		
	EOSC 320	Sedimentology	3
	EOSC 321	Igneous Petrology	
	EOSC 322	Metamorphic Petrology	
EOSC 331	Introduction to Mineral Deposits		
EOSC 332	Tectonic Evolution of North America		
Total Credits			39

² Taught at the end of Term 2 after final exams. See details below under Field Schools.

³ See [Engineering Academic Services](#) details and list of eligible courses.

⁴ See suggestions below under section on Specialization (Technical Elective Selection).

4 th Year			Credits	
T1	CIVL 402	Professionalism and Law in Civil Engineering	3	
	CIVL 410	Foundation Engineering I	3	
	EOSC 433	Geological Engineering Practice I - Rock Engineering	3	
	EOSC 445	Engineering Design Project	6 ⁵	
T2	CIVL 411	Foundation Engineering II	3	
	EOSC 429	Groundwater Contamination	3	
	EOSC 434	Geological Engineering Practice II - Soil Engineering	3	
T1 or T2	<i>Technical Electives</i> ⁶		9	
	<i>Complementary Studies: Engineering Economics (choose one of):</i>			
	CHBE 459	Chemical and Biological Engineering Economics		
	CIVL 403	Engineering Economic Analysis		
	MECH 431	Engineering Economics		3
	MINE 396	Engineering Economics		
MTRL 455	Economic Aspects of Materials Engineering			
Total Credits			36	

⁵ Must be taken continuously across Term 1 and 2 in the same academic year.

⁶ See suggestions below under section on Specialization (Technical Elective Selection).

Engineering Design Project

Students should wait until they have 4th year standing before taking EOSC 445 *Engineering Design Project*. This two-term course is our capstone design experience and will involve team work, design, analysis, and technical communication. EOSC 445 builds upon three other design-focused courses: EOSC 433 *Geological Engineering Practice I - Rock Engineering*; EOSC 434 *Geological Engineering Practice II - Soil Engineering*; and EOSC 429 *Groundwater Contamination*.

Because EOSC 445 is a 6 credit course that spans both Term 1 and 2, it MUST be taken consecutively in the same academic year; students should not plan a co-op work term or international exchange in their final year when they would be taking this course.

Field Schools

There are two field-school course requirements in the program: EOSC 223 *Field Techniques*, and one of either EOSC 328 *Field Geology* or EOSC 428 *Field Techniques in Groundwater Hydrology*. These field schools run after final exams in April. Please note that these courses may or may not require special fees separate from tuition that are charged to partially cover field costs. Information regarding any charges is usually provided in advance, but if you are working with a tight budget, you can check with our Senior Program Assistant, Ian Ayeras (iayeras@eoas.ubc.ca).

Note that if you need to take your 3rd year field school at the end of your 4th year right before graduating (many of our students do this), procedures are in place to make sure your grades will be submitted in time for approval to graduate at the Spring convocation ceremony.

Complementary Studies

Complementary Studies are a special set of unconstrained electives that are required for all Applied Science students. A set of minimum requirements are identified related to “Professional Development”, “Communications”, “Impact of Technology on Society”, “Engineering Economics” and “Humanities and Social Sciences”. Students are referred to the Engineering Academic Services [website](#) for a listing of eligible courses to meet these requirements.

Technical Electives

Technical electives provide you the means to tailor your program to your interests. The next section speaks to specializations in Geological Engineering and provides suggested courses. A full list of pre-approved technical elective courses is provided at the end of this document in Appendix 1. Note that this pre-approval only applies to the courses qualifying as an acceptable technical elective; **course registration is at the discretion of the host department offering the course and is subject to the course not being full or that you meet any prerequisites.**

Note 1: Technical electives MUST be 300 or 400 level courses. 100 and 200 level courses are not eligible as technical electives.

Note 2: The course level of the technical electives DO NOT have to match your standing or year relative to the program requirements listed in the UBC Calendar. For example, the technical electives requirement listed under the 3rd year program do not need to be restricted to 300 level courses, and those listed under the 4th year program do not need to be restricted to 400 level courses. In both cases, you may take any approved 300/400 level technical to meet either the 3rd or 4th year technical electives requirements.

Note 3: The list in Appendix 1 is not comprehensive and there may be new courses or other courses you are interested in that are equally acceptable. Please seek the formal approval of the Geological Engineering Director by email before you enroll in a technical elective course if it is not listed here.

Note 4: 300 or 400 level EOSC courses that are listed as counting towards a constrained elective, if not selected for the constrained elective, may be taken as a technical elective. For example, you can take both EOSC 328 and EOSC 428, counting one towards the field school requirement and the other as a technical elective. Similarly, you can take two or more of EOSC 320, 321, 322, 331 and 332, and count one towards your geology elective and the other(s) towards your technical electives.

Specialization (Technical Elective Selection)

Geological Engineering has four areas of specialization you can choose from to focus your technical electives, or you can mix and match a little from each: i) Geotechnical, ii) Environmental, iii) Natural Hazards, and iv) Critical Minerals (Natural Resources). Note that you are not required to specialize! You are free to choose your technical electives, with the restriction that they must either be 300 or 400 level courses and relevant to Geological Engineering in a very broad sense. Courses that explicitly state in their calendar description that they are not eligible for credit in the Faculty of Applied Science, are not eligible.

The lists that follow are only suggestions for those who wish to expand upon the coverage of these specializations already built into your required courses. A full listing of pre-approved technical electives are included in Appendix 1.

Geotechnical Interest

Broadly speaking, this is the application of engineering and geological understanding to the needs of civil, mining, and energy projects (site investigations, engineering design, project planning, construction, environmental protection, etc.). Technical electives you will want to consider include those that provide additional soil and rock mechanics (e.g., MINE 403), geological field mapping skills (e.g., EOSC 328 instead of EOSC 428), and specifics regarding geotechnical practice in different industrial settings (e.g., dam construction via CIVL 413, mine waste management via MINE 380, etc.). You will gain skills relevant to the design of foundations, tunnels, hydroelectric dams, open pit and underground mines, natural hazard mitigation works, environmental protection works, highway/railway/pipeline routes, slope stabilization, forestry, and many other important projects. You will be able to find employment in consulting companies, construction, mining and energy production firms, as well as government. These jobs seek to balance the needs of society while working to ensure public safety and minimizing impacts on the environment.

Relevant electives:

CIVL 413	Design of Earth Dams and Containment Structures
CIVL 417	Coastal Engineering
EOSC 320	Sedimentology
EOSC 328	Field Geology
EOSC 332	Tectonic Evolution of North America
FRST 385	Watershed Hydrology
GEOS 308	Quaternary and Applied Geomorphology
GEOS 309	Geographical Sciences Field Course
GEOS 370	Advanced Geographic Information Science
GEOS 373	Introductory Remote Sensing
GEOS 406	Watershed Geomorphology
IGEN 450	Pipeline Engineering
MINE 380	Mine Waste Management
MINE 403	Rock Mechanics Design

Environmental Interest

An essential component of engineering design is recognizing and mitigating/minimizing the impacts that engineering projects can have on the natural environment. The technical electives you will want to consider for this specialization are similar to those for the Geotechnical interest; the two are closely related and are equally important for careers in Geological Engineering. However, to specialize more you may want to consider additional courses related hydrogeochemistry and groundwater remediation (e.g., EOSC 430, 431), hydrogeological field investigations (e.g., EOSC 428 instead of EOSC 328), water resource engineering (e.g., CIVL 415, 416), and the design of landfills, tailings dams and environmental cleanup (e.g., CIVL 406, 408, MINE 380, 455). Your employment prospects will also be similar to those of your Geotechnical focused colleagues, including consulting and mining/energy companies who have specialized environmental groups.

Relevant electives:

CIVL 406	Water Treatment and Waste Management
CIVL 407	Environmental Laboratory Analysis
CIVL 408	Geo-Environmental Engineering
CIVL 415	Water Resource Engineering
CIVL 416	Environmental Hydraulics
CIVL 475	Environmental Stewardship in Civil Engineering
CONS 330	Conservation Science and Sustainability
CONS 440	Conservation Decision-Making and Policy
CONS 481	Conservation Planning in Practice
ENVR 410	Energy, Environment, and Society
ENVR 420	Ecohydrology of Watersheds and Water Systems
ENVR 430	Ecological Dimensions of Sustainability
EOSC 340	Global Climate Change
EOSC 428	Field Techniques in Groundwater Hydrology
EOSC 430	Aqueous Geochemistry
EOSC 431	Groundwater Remediation
GEOG 310	Environment and Sustainability
GEOG 312	Climate Change: Science and Society
GEOG 314	Analysing Environmental Problems
GEOG 318	Sustainability in a Changing Environment
GEOG 319	Environmental Impact Assessment
GEOG 410	Environment and Society
GEOG 412	Water Management: Theory, Policy, and Practice
GEOS 305	Introduction to Hydrology
GEOS 406	Watershed Geomorphology
ISCI 360	Systems Approaches to Regional Sustainability
ISCI 361	Field Course: Regional Sustainability
MINE 380	Mine Waste Management
MINE 455	Mine Water Management
MINE 486	Mining and the Environment

Geohazards Interest

Owing to global population pressures, more people live in areas vulnerable to natural hazards, increasing their impact on communities, infrastructure and engineering projects.

To assess, manage and mitigate this increasing exposure, Geological Engineers are called upon to characterize, analyse and forecast to deliver avoidance, prevention and/or protective measures. Key is the ability to quantify uncertainty in a changing climate and communicating with the public about geohazard issues. The technical electives you will want to consider are those that focus on the principles of different geohazard types (e.g., GEOG 316, GEOS 408), influencing factors (e.g., ATSC 313, EOSC 340), data analysis of magnitude, frequency and risk (e.g., CPSC 340, EOSC 410), and spatio-temporal visualization (e.g., DSCI 320, GEOS 370) and communication (e.g., APSC 402). Your employment prospects will be similar to those for the Geotechnical specialization, involving the same consulting companies but also smaller firms specialized in geohazards and government agencies.

Relevant electives:

APSC 402	Living Language: Science and Society
ATSC 313	Renewable Energy Meteorology
CIVL 417	Coastal Engineering
CPSC 330	Applied Machine Learning
CPSC 340	Machine Learning and Data Mining
CPSC 440	Advanced Machine Learning
DSCI 320	Visualization for Data Science
ENVR 410	Energy, Environment, and Society
EOSC 320	Sedimentology
EOSC 328	Field Geology
EOSC 340	Global Climate Change
EOSC 410	Geoscientific Data Analysis and Empirical Modelling
GEOG 316	Geography of Natural Hazards
GEOS 308	Quaternary and Applied Geomorphology
GEOS 309	Geographical Sciences Field Course
GEOS 370	Advanced Geographic Information Science
GEOS 373	Introductory Remote Sensing
GEOS 408	The Changing Cryosphere
IGEN 450	Pipeline Engineering

Critical Minerals Interest

This area of interest trains Geological Engineers for work in the mineral exploration or energy development industries. You will still obtain the same engineering skills to allow you to work in functions described under Geotechnical and Environmental interests, but with options to focus more on geology and mineral deposits (e.g., EOSC 331, 424), geological mapping (e.g., EOSC 328 instead of EOSC 428), mining methods (e.g., MINE 485) and indigenous rights (MINE 470). You will be able to find employment with companies involved directly in resource exploration, development and production, or with companies providing services such as mineral resource consulting.

Relevant electives:

ENVR 410	Energy, Environment, and Society
EOSC 320	Sedimentology
EOSC 321	Igneous Petrology
EOSC 322	Metamorphic Petrology

EOSC 328	Field Geology
EOSC 331	Introduction to Mineral Deposits
EOSC 332	Tectonic Evolution of North America
EOSC 421	Advanced Sedimentology
EOSC 422	Structural Geology II
EOSC 424	Advanced Mineral Deposits
MINE 395	Mineral Deposit Modeling
MINE 406	Mine Project Valuation and Risk Assessment
MINE 420	Applied Geostatistics
MINE 470	Indigenous Peoples and Mining in Canada
MINE 485	Cave Mining Systems: Design and Planning
MINE 486	Mining and the Environment

Mix and Match Interest

If your interests are broad and you would like exposure in two, three or all four areas, you can mix and match electives as you prefer.

Program Changes and Year Standing

We are always looking for ways to improve the Geological Engineering program, resulting in periodic changes to the courses needed to fulfill the degree requirements. This can sometimes be confusing in years where new requirements have been introduced. The rule is that you must complete the 2nd, 3rd or 4th year of your program as it appears in that year's UBC Calendar when you received standing for the year you are in. For example, if you received 3rd year standing for the start of the 2023/24 academic year, you must complete the 3rd year program as it appears in the 2023/24 calendar. If you received 3rd year standing in 2022/23 but are completing part of 3rd year in 2023/24 (for example due to co-op or exchange), you must complete your 3rd year program as it appeared in the 2022/23 calendar.

Your Degree Navigator should be programmed for this and is a useful tool to help you track which courses you need to complete. However, errors do sometimes occur in Degree Navigator and the official record of what courses you need to complete is the UBC Calendar. [Click here](#) to access UBC's archive of past calendars. If you have any questions regarding this, or would like permission to substitute an older program requirement with a newer option, please contact the Director of Geological Engineering (see Advising).

Schedule Conflicts

Where possible, we have tried to avoid course conflicts, particularly with core courses. However, as our program contains courses from many departments, it is impossible to ensure that all elective courses will fit into your schedule. We therefore encourage you to look at your 3rd and 4th year courses together, and plan your electives far in advance so that you acquire the proper prerequisites for the electives you are most interested in. You

may also find it easier to take a 4th year course in 3rd year so that you can fit a technical elective into your timetable in 4th year.

Hint #1: Make a list of courses you wish to take, and then check the course schedules. You will see right away where potential conflicts with lecture times and labs occur. Then, check that all your prerequisites are okay.

Applied Science Co-Op

Co-op offers an excellent opportunity to gain some valuable practical experience. Approximately 40% of Geological Engineering students take the Co-op option. In most years, the job market for Geological Engineering is relatively strong. However, all engineering disciplines can experience difficulties in finding work placements when the B.C. or Canadian economy is down. Remember, Co-op is not a job placement service. It has also been our experience that students receive better work experiences by going through Co-op than seeking their own summer jobs. This is of course your choice. However, many of the companies that hire preferentially from our program state that they can give a student a richer work experience when it involves an 8-month Co-op placement compared to a 4-month summer job.

Geological Engineering students interested in Co-op can find more information, including application requirements and procedures, through the [Applied Science Co-Op website](#).

The 3rd year of the Geological Engineering program is designed to be especially flexible to facilitate Co-op experiences. For Co-op, students have the option of taking a combination of 4- and 8-month placements to meet the minimum Co-op requirements, up to a 16-month continuous work period (divided between two different company placements). Common schedules include:

4-12-4 Schedule	WINTER Term 1 (Sept – Dec)	WINTER Term 2 (Jan – April)	SUMMER (May – Aug)
YEAR 2	study	study	work-term 1
YEAR 3	study	work-term 2	work-term 3
YEAR 4	work-term 4	study	work-term 5
YEAR 5	study	study	graduation

8-4-8 Schedule	WINTER Term 1 (Sept – Dec)	WINTER Term 2 (Jan – April)	SUMMER (May – Aug)
YEAR 2	study	study	work-term 1
YEAR 3	work-term 2	study	work-term 3
YEAR 4	study	work-term 4	work-term 5
YEAR 5	study	study	graduation

16-4 Schedule	WINTER Term 1 (Sept – Dec)	WINTER Term 2 (Jan – April)	SUMMER (May – Aug)
YEAR 2	study	study	work-term 1
YEAR 3	work-term 2	work-term 3	work-term 4
YEAR 4	study	study	work-term 5
YEAR 5	study	study	graduation

4-16 Schedule	WINTER Term 1 (Sept – Dec)	WINTER Term 2 (Jan – April)	SUMMER (May – Aug)
YEAR 2	study	study	work-term 1
YEAR 3	study	study	work-term 2
YEAR 4	work-term 3	work-term 4	work-term 5
YEAR 5	study	study	graduation

Coordinated International Experience and International Exchange

The 3rd year of the Geological Engineering Program is designed to be especially flexible to facilitate an international exchange experience. Options include doing so through the Applied Science [Coordinated International Experience \(CIE\)](#) or UBC’s [GoGlobal](#). Note that both work best when the courses you take at the host university target meeting your unconstrained technical elective requirements.

Appendix 1: List of Pre-Approved Technical Electives

Note: The courses listed here are “*pre-approved*” with respect to qualifying as being eligible to be counted towards the technical elective requirements in Geological Engineering. *Approval to register for these classes is at the discretion of the host department who may need to limit numbers due to classroom size.* It is also your responsibility to check that you have the necessary pre-requisites for the courses listed here. In some cases, instructors may be willing to waive the pre-requisites, but you will need to check with them or through their department to make this request. Also note that not all classes are taught every year. Please consult the [UBC Calendar](#) to confirm which classes are being offered in the current year.

APSC	367	Humanitarian Engineering: Politics and Practice	W 1
	402	Living Language: Science and Society	W 1
	461	Global Engineering Leadership	S 1
	462	Global Engineering Leadership Practicum	S 2
ATSC	313	Renewable Energy Meteorology	W 2
CIVL	301	Modelling and Decision-Making in Civil Engineering	W 1
	305	Introduction to Environmental Engineering Applications	W 2
	315	Fluid Mechanics II (<i>4 credits</i>)	W 1
	320	Civil Engineering Materials	W 1
	340	Transportation Engineering I	W 2
	406	Water Treatment and Waste Management	W 1
	407	Environmental Laboratory Analysis	W 1
	408	Geo-Environmental Engineering	W 2
	413	Design of Earth Dams and Containment Structures	W 2
	415	Water Resource Engineering	W 2
	416	Environmental Hydraulics	W 1
	417	Coastal Engineering	W 1
	418	Engineering Hydrology	W 2
	426	Virtual Design and Construction	W 1
475	Environmental Stewardship in Civil Engineering	W 1	
CONS	330	Conservation Science and Sustainability	W 2
	425	Sustainable Energy: Policy and Governance	W 2
	440	Conservation Decision-Making and Policy	W 1
	481	Conservation Planning in Practice	W 1
CPSC	330	Applied Machine Learning	W1 or W2
	340	Machine Learning and Data Mining	W1 or W2
	440	Advanced Machine Learning	W 2
DSCI	320	Visualization for Data Science	W 2

ENVR	410	Energy, Environment, and Society	W1 or W2
	420	Ecohydrology of Watersheds and Water Systems	W 2
	430	Ecological Dimensions of Sustainability	W 1
	440	Analytical Methods in Sustainability Science	W 2
EOSC	320	Sedimentology	W 2
	321	Igneous Petrology	W 1
	322	Metamorphic Petrology	W 2
	326	Earth and Life Through Time	W1, W2, S1
	331	Introduction to Mineral Deposits	W 1
	332	Tectonic Evolution of North America	W 2
	340	Global Climate Change	W1 or W2
	352	Geophysical Continuum Dynamics	W 2
	353	Seismology	W 2
	410	Geoscientific Data Analysis and Empirical Modelling	W 1
	420	Volcanology	W 1
	421	Advanced Sedimentology	W 1
	422	Structural Geology II	W 2
	424	Advanced Mineral Deposits	W 2
	430	Aqueous Geochemistry	W 1
	431	Groundwater Remediation	W 2
	442	Climate Measurement and Analysis (<i>1 credit course</i>)	W1 or W2
454	Applied Geophysics	W 2	
FRST	385	Watershed Hydrology	W 1
	443	Remote Sensing for Ecosystem Management	W 2
GEOG	302	Climate Justice	W 2
	310	Environment and Sustainability	W1, W2, S1
	312	Climate Change: Science and Society	W 1
	313	Environmental Justice and Social Change	W 2
	314	Analysing Environmental Problems	W 2
	316	Geography of Natural Hazards	W 1
	318	Sustainability in a Changing Environment	W2 or S1
	319	Environmental Impact Assessment	W 1
	410	Environment and Society	W1 W2 S2
	412	Water Management: Theory, Policy, and Practice	W1 or W2
	423	Development of Environmental Thought	W 2
	497	The Arctic	W 1
GEOS	305	Introduction to Hydrology	W 2

	308	Quaternary and Applied Geomorphology	W 1
	309	Geographical Sciences Field Course	S 1
	370	Advanced Geographic Information Science	W1 or W2
	373	Introductory Remote Sensing	W 2
	405	Fluvial Geomorphology	W 2
	406	Watershed Geomorphology	W1 or W2
	408	The Changing Cryosphere	W 1
IGEN	450	Pipeline Engineering	W 1
	451	Pipeline Systems and Infrastructure	W 2
ISCI	360	Systems Approaches to Regional Sustainability	W 1
	361	Field Course: Regional Sustainability	W2 or S1
MINE	302	Underground Mining and Design (<i>4 credits</i>)	W 2
	304	Rock Fragmentation	W 2
	310	Surface Mining and Design (<i>4 credits</i>)	W 1
	380	Mine Waste Management	W 2
	395	Mineral Deposit Modeling	W 1
	403	Rock Mechanics Design	W 2
	406	Mine Project Valuation and Risk Assessment	W 2
	420	Applied Geostatistics	W 2
	455	Mine Water Management	W 2
	470	Indigenous Peoples and Mining in Canada	W 1
	485	Cave Mining Systems: Design and Planning	W 2
	486	Mining and the Environment	W 2