UBC Civil Engineering Undergraduate Handbook

2021-2022

THE UNIVERSITY OF BRITISH COLUMBIA
Civil Engineering

CIVIL.UBC.CA

Welcome to Civil Engineering:
the program, the department, the profession

Congratulations on being admitted to one of the highest-demand engineering programs at UBC, and taking your first step toward a fulfilling career. Civil Engineering is a broad engineering discipline with a variety of unique and interesting sub-disciplines (see Section 5.1). The undergraduate (B.A.Sc.) degree in Civil Engineering at UBC is designed to provide you with a broad exposure to many of these sub-disciplines. You can focus your degree in your final year or add a minor or second degree to expand your skills and learning (see Section 6.5).

Some graduates from the program use the broad knowledge and skills they acquire as a "stepping stone" to non-engineering careers, such as in business or management, while many go on to practice engineering as licensed professionals. The program is accredited (see Section 6.2) by the Canadian Engineering Accreditation Board (CEAB) and thus meets the academic requirements needed to attain the "Professional Engineer" (P.Eng.) designation in Canada. Graduates who wish to become specialized engineering consultants in one of the sub-disciplines usually return to complete a Master's degree.

This handbook summarizes the most important information that a UBC Civil Engineering student needs to know. I hope you will find this handbook a useful resource, and wish you the very best in your studies and your career in Civil Engineering.

Dr. Bernard Laval, P.Eng.

Professor and Head, UBC Civil Engineering, head@civil.ubc.ca

Civil Engineering Handbook

1.0 Ensuring an Inclusive Environment > 05

1.1 Understanding Stereotypes, Prejudice, and Discrimination > 06
1.2 UBC Respectful Environment > 07
1.3 Some Ways to Contribute > 08
1.4 Bullying and Harassment > 09
1.5 Getting Help > 09

2.0 Academic Scholarship and Honesty > 11

2.1 Proper Citations: avoiding plagiarism > 11
2.2 Academic Honesty > 13

3.0 Professionalism > 15

3.1 EGBC Code of Ethics > 16
3.2 UBC Engineering Code of Ethics > 17
3.3 Employer's Code of Conduct > 17

4.0 Your Health and Safety > 19

4.1 Health, Safety and Environment (HSE) in the Department > 19
4.1.1 Your Responsibilities > 20
4.1.2 Preventing Common Incidents and Injuries > 20
4.1.3 Personal Protective Equipment (PPE) > 20
4.1.4 First Aid > 21
4.1.5 Emergency Situations > 21
4.1.6 Important Safety Contacts > 21
4.1.7 Civil Engineering Facilities > 22
4.1.8 Safety in the Field > 23
4.2 Student Health and Safety on Campus > 24
4.2.1 Personal Security on Campus > 24
4.2.2 Personal Belongings: Lost and Found > 24
4.2.3 UBC Services for Living Well > 25
4.2.4 Safety Abroad > 25

5.0 The Civil Engineering Profession > 27

5.1 Civil Engineering > 27
5.2 EGBC > 28
5.3 Engineers Canada > 28
5.4 Becoming a P.Eng. > 29
5.5 The Iron Ring > 30
5.6 Iron Pin Ceremony >30
5.7 Professional Societies > 30
5.7.1 Canadian Society for Civil Engineering (CSCE) > 30
5.7.2 Structural Engineers Association of BC (SEABC) > 31
5.7.3 Vancouver Geotechnical Society (VGS) > 31
5.7.4 Canadian Institute of Transportation Engineers (CITE) > 31
5.8 Entering the Workforce > 31
5.9 Salary Expectations > 32
5.10 Sustainability > 33

6.0 The Civil Engineering Program at UBC > 35

6.1 Program Objectives > 35
6.2 Accreditation: ensuring the quality of your education > 36
6.2.1 Twelve Graduate Attributes > 36
6.2.2 Complementary Studies > 37
6.3 Your Enrolment Services

Professional > 37
6.4 Academic Advising > 38
6.5 Course Planning and Selection > 39
6.5.1 Standard Timetables > 39
6.5.2 Fourth-year Technical Electives > 39
6.5.3 Minors and Dual Degrees > 39
6.5.4 Degree Navigator > 39
6.5.5 Degree Navigator - Students Not Taking Standard Course Load > 40
6.6 Managing Your Course Load > 40
6.6.1 Second Year Course Load > 40
6.6.2 Academic Standing and Promotion Requirements > 41
6.7 Academic Help > 41
6.8 Exams > 42
6.8.1 Exam Dates > 42
6.8.2 Other Information > 42
6.9 Awards > 43

7.0 Engineering Communication > 45

7.1 Competency in Communication > 45
7.2 Competency in Writing > 46
7.3 Competency in Speaking > 46
7.4 Competency in Global Understanding> 46
7.5 Writing Support> 47

8.0 Student Life @ Civil > 49

8.1 Student Organizations > 49
8.1.1 Civil Society > 49
8.1.2 Engineering Undergraduate Society (EUS) > 50
8.1.3 CSCE Student Chapter > 50
8.1.4 ITE – UBC Student Chapter > 50
8.1.5 Women in Engineering > 51
8.1.6 Engineers Without Borders > 51
8.1.7 Gears and Queers > 51
8.2 Student Teams > 52
8.2.1 Concrete Canoe Team > 52
8.2.2 Concrete Toboggan Team > 52
8.2.3 EERI Seismic Design Team > 52
8.2.4 UBC Steel Bridge Team > 53
8.3 Student Spaces> 53

9.0 UBC Engineering Co-op > 55

10.0 Civil Engineering Alumni > 57

11.0 Master's Degrees in Civil Engineering > 59

11.1 Types of Master's Degrees > 60
11.2 Minimum Entrance Requirements > 60
11.3 Areas of Specialization > 60
11.4 Application Deadlines > 61
11.5 Graduate Awards and Scholarships for M.A.Sc. Students > 61
11.6 Further Information > 61

Appendix – Technical Resources

1.0

Ensuring an Inclusive Environment

The Department of Civil Engineering is committed to providing all students with the best possible environment for learning – an environment that is dedicated to excellence, equity and mutual respect; an environment that is free from discrimination and harassment.

UBC is a diverse community. The Department of Civil Engineering celebrates that diversity and provides an inclusive environment for persons of all genders, racial and ethnic backgrounds, and sexual orientations.

All members of the Department are expected to respect others, no matter their gender, where they are from, what they believe, who they love, or the challenges they face; and to recognize that every member of our diverse community contributes to creating a richer environment. In addition, they will learn from others whose experiences are different than their own; challenge all forms of discrimination, prejudice and stereotyping; think about the impact of the words they use; and embrace diversity in order to create a community where all persons thrive. (Adapted from: *Commitment Statement* developed for student leaders at UBC).

1.1

Understanding Stereotypes, Prejudice, and Discrimination

Stereotypes, prejudice, and discrimination are related but different concepts. A stereotype is a thought that can be adopted about specific groups of individuals. These thoughts may or may not accurately reflect reality, and often occur without conscious awareness. That is, they can be embedded at a subconscious level. Prejudice is a preconceived, often unfavourable, judgment toward a person because they belong to a certain group. It is a feeling or emotional response prior to, or not based on, actual experience, and may include unreasonable attitudes that are resistant to rational influence. Discrimination is action that denies participation to people based on prejudice. It happens both intentionally and unintentionally. (Source: en.wikipedia.org, August 2014).

1.2

UBC Respecful Environment

In 2008, UBC introduced the Respectful Environment Statement to guide our responsibilities and principles as students, faculty and staff. The Statement is intended to support and implore us in building an environment in which respect, civility, diversity, opportunity and inclusion are valued:

> The University of British Columbia envisions a climate in which students, faculty and staff are provided with the best possible conditions for learning, researching and working, including an environment that is dedicated to excellence, equity and mutual respect. The University of British Columbia strives to realize this vision by establishing employment and educational practices that respect the dignity of individuals and make it possible for everyone to live, work, and study in a positive and supportive environment, free from harmful behaviours such as bullying and harassment. (Revised May 2014)

For more information on the UBC Respectful Environment Statement, vist **hr.ubc.ca/respectful-environment**

1.3

Some Ways to Contribute

Always use respectful language

Respectful language in the context of diversity can be complex.
Here are some suggestions:

- Avoid referring to a person's race, ethnicity, or country of origin unless it is necessary
- Use parallel terms of equal status and avoid terms that imply gender inferiority—do not refer to adult women as 'girls' in situations where you would refer to men as 'men'
- Be careful to not use words like: retarded, spaz, crazy, or lame as these words are embedded in a history of discrimination against people with disabilities
- Avoid assuming heterosexual orientation – instead of saying something like "bring your boyfriend/girlfriend," try saying "bring your partner"
- Avoid assuming someone has a particular gender identity—the UBC community includes trans and gender variant people, and the preferred pronouns may not be obvious

Address generalizations when they occur

Always question the validity of stereotypes. You might observe language or behaviour that perpetuates a particular stereotype and it is important to consider how this might fuel discrimination. Stereotypes and assumptions can relate to, but are not limited to:

- the perception of an individual's personal history, such as place of birth, based on their ethnicity or race
- how a person intends to balance a career and a family, based on their gender
- the perception that some people are naturally better at technical skills and others are naturally better at "soft" skills
- the perception of a person's experience with their disability—which may or may not be visible

Do not tolerate discriminatory remarks or humour

If you witness discrimination, in the form of offensive remarks or inappropriate jokes, have the courage to speak out against it. Letting someone know they have acted in a discriminatory manner, and then offering understanding, can be a powerful way to support a respectful environment.

1.4

Bullying and Harassment

Bullying or harassment is objectionable and unwanted behaviour that is verbally or physically abusive, vexatious or hostile, that is without reasonable justification, and that creates a hostile or intimidating environment for working, learning or living.

Harassment can also be discriminatory in nature (e.g. harassment is based on someone's race, or gender or religion). At UBC, we distinguish discriminatory harassment from bullying or harassment that is not discriminatory based on the protected grounds in the BC Human Rights Code.
(Adapted from **bullyingandharassment.ubc.ca**)

Learn more about the differences between these types of harassment and how UBC has policies to protect faculty, staff and students at **bullyingandharassment.ubc.ca**

1.5

Getting Help

If you are experiencing discrimination or harassment at UBC, it is important for you to raise your concerns as soon as possible.

To obtain advice, assistance, or advocacy, contact Access and Diversity, the AMS Advocacy Office, or the Office of the Ombudsperson for Students. To learn more, visit **students.ubc.ca/campus/diversity/discrimination**

To find a supportive community, or to get access to other supportive resources, visit **students.ubc.ca/campus/diversity**

If you experience discrimination or harassment in a UBC Civil Engineering related activity, and confronting the person has not helped or you do not feel comfortable confronting them, contact the supervising faculty member. If that does not solve the problem or you still have concerns, contact the Head of the Department of Civil Engineering (head@civil.ubc.ca).

2.0

Academic Scholarship and Honesty

2.1

Proper Citations: Avoiding Plagiarism

Academic scholarship requires honest and accurate reporting of other people's ideas and material. Whenever you use someone else's words (phrases, sentences, or paragraphs), ideas, or figures, you must acknowledge the original source. The citation can be placed in the text, footnotes, or endnotes. Where direct quotations are made, they must be clearly delineated, for example, within quotation marks or separately indented.

Where part of a figure or the entire figure comes from another source, citation must be provided adjacent to the figure or in the figure caption.

Failure to provide proper citation is in the best case—poor scholarship (when there is no intent to deceive), and in the worst case—plagiarism. Students who are in doubt about citation requirements should consult with their instructor before handing in any work.

In this modern era, it has become very easy to cut-and-paste text or figures from one document to another. One of the most common forms of poor scholarship and plagiarism is the use of figures from other documents or the web without any citation. If you include a figure in your work that you did not create yourself from entirely your own ideas, you must provide citation.

When using a figure or other content from a web page, provide as much of the following information as is known: name of author(s), title of the work (in quotes), title of web page (in italics), date of last revision, URL, date accessed.

The UBC Library provides a guide for citing sources, documenting research, reporting results and avoiding plagiarism, visit **help.library.ubc.ca**

Your responsibility for academic scholarship extends beyond your years as a student. As a working professional, it will be very important that you continue to use proper citations whenever you incorporate other people's ideas and intellectual property into your own reports and publications.

2.2

Academic Honesty

Academic honesty is essential to the continued functioning of the University of British Columbia as an institution of higher learning and research. All UBC students are expected to behave as honest and responsible members of an academic community.

Students need to be aware that standards for academic honesty at the University of British Columbia may be higher than in some secondary schools and other institutions.

If an allegation of academic misconduct is made against a student at UBC, the Registrar may place the student on academic hold (student is blocked from all activity in the Student Service Centre) until the President has reviewed the case and made a final decision on the consequence.

Academic misconduct that is subject to disciplinary action includes, but is not limited to, engaging in, attempting to engage in, or assisting others to engage, in any of the following:

1. Cheating, which may include, but is not limited to:
   - use of or participation in unauthorized collaborative work
   - falsification of any material subject to academic evaluation
   - use or possession in an examination of any materials or devices other than those permitted by the examiner
   - unauthorized means to complete an examination such as receiving unauthorized assistance from another person, or providing that assistance
   - other dishonest practices
2. Plagiarism – submitting or presenting oral or written work or an idea of another person as your own.
3. Submitting previously completed work unless prior approval has been obtained.
4. Impersonating a candidate at an examination or other evaluation.
5. Submitting false records or information, or failing to provide relevant information when requested.

For more information on academic conduct, visit the Policies and Regulations section of the UBC Academic Calendar at **calendar.ubc.ca**

STUDENT
Ryan
STUDENT
Shawn Joseph
PD

3.0

Professionalism

Professionalism is the competence or character expected of a member of a highly trained profession. To become a professional engineer (P.Eng.), you must demonstrate that you are a person of good character and reputation. You need to be honest and trustworthy. When applying for an engineering licence, you will be required to answer questions that evaluate your character, and you will be asked to provide the names of character references.

Character is the combination of qualities that distinguishes one individual from another. Engineers Canada's Good Character Guideline defines good character as moral and ethical strength including such traits as integrity, candour, honesty and trustworthiness.

The public trusts that professional engineers have the technical and ethical competence to serve society and have a willingness to put the public interest first. Professional engineers need to demonstrate good character in order to maintain public trust, and with it the right of self-regulation.

In British Columbia, the Engineers and Geoscientists BC (EGBC) *Code of Ethics* provides guidance on professional and ethical conduct for professional engineers.

3.1

EGBC Code of Ethics

The following is taken directly from the EGBC Code of Ethics:

Registrants must act at all times with fairness, courtesy and good faith toward all persons with whom the registrant has professional dealings, and in accordance with the public interest. Registrants must uphold the values of truth, honesty, and trustworthiness and safeguard human life and welfare and the environment. In keeping with these basic tenets, registrants must:

1) Hold paramount the safety, health, and welfare of the public, including the protection of the environment and the promotion of health and safety in the workplace;

2) Practice only in those fields where training and ability make the registrant professionally competent;

3) Have regard for the common law and any applicable enactments, federal enactments, or enactments of another province;

4) Have regard for applicable standards, policies, plans, and practices established by the government or Engineers and Geoscientists BC;

5) Maintain competence in relevant specializations, including advances in the regulated practice and relevant science;

6) Provide accurate information in respect of qualifications and experience;

7) Provide professional opinions that distinguish between facts, assumptions, and opinions;

8) Avoid situations and circumstances in which there is a real or perceived conflict of interest and ensure conflicts of interest, including perceived conflicts of interest, are properly disclosed and necessary measures are taken so a conflict of interest does not bias decisions or recommendations;

9) Report to Engineers and Geoscientists BC and, if applicable, any other appropriate authority, if the registrant, on reasonable and probable grounds, believes that:

a) the continued practice of a regulated practice by another registrant or other person, including firms and employers, might pose a risk of significant harm to the environment or to the health or safety of the public or a group of people; or

b) a registrant or another individual has made decisions or engaged in practices which may be illegal or unethical;

10) Present clearly to employers and clients the possible consequences if professional decisions or judgments are overruled or disregarded;

11) Clearly identify each registrant who has contributed professional work, including recommendations, reports, statements, or opinions;

12) Undertake work and documentation with due diligence and in accordance with any guidance developed to standardize professional documentation for the applicable profession; and

13) Conduct themselves with fairness, courtesy, and good faith towards clients, colleagues, and others, give credit where it is due and accept, as well as give, honest and fair professional comment.

For more information on EGBC, see Section 5.2 of this handbook.

3.2

UBC Engineering Code of Ethics

In addition to the EGBC Code of Ethics, UBC Engineering holds their own code of ethics, which is recited during the Iron Pin Ceremony (see Section 5.1.1).

The UBC Engineering Code of Ethics reads:

UBC Engineering students, staff and faculty shall act at all times with courtesy; honesty, and respect to each other and society.

In keeping with their duty to the community; the engineering profession, and the public, they commit to creating a welcoming, respectful and ethical environment that values all members.

A UBC Engineer shall:

1) Uphold the academic integrity of the university and of the UBC Engineering degree, submitting work only when it is founded upon honest efforts and personal achievement
2) Commit myself to advance my body of knowledge, engage in professional development, and acknowledge the importance of lifelong learning
3) Conduct myself with respect and integrity when interacting with all members of our community and society at large, give credit where it is due and accept, as well as give, honest and fair professional comment
4) Report any hazardous, illegal, or unethical decisions or practices by any member of our community.
5) Extend public knowledge and appreciation of engineering and protect the profession from misrepresentation and misunderstanding.

3.3

Employer's Code of Conduct

Your future employer may have an organizational *Code of Conduct* that may include additional aspects of professional behaviour such as competency, conflict of interest, perception of conflict of interest, confidentiality, use of company documentation, respect for privacy, environmental responsibility, cultural sensitivity, equity, discrimination, harassment, occupational health and safety, alcohol and drug use, integrity, and ethical conduct.

4.0

Your Health and Safety

Health, safety and environment (HSE) is an integral part of engineering. For example, engineering design is the process of developing a solution that meets specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations. You will learn much more about this in your engineering design courses.

This chapter is on a related topic – your personal health and safety. The objective is to keep you healthy and safe, and to promote a strong culture of safety awareness, knowledge and practice.

4.1

Health, Safety and Environment (HSE) in the Department

The safety and well-being of students, faculty, staff and visitors is a paramount concern for the Department of Civil Engineering; but the responsibility for your safety is something we share.

The Department of Civil Engineering has an HSE Team made up of faculty, staff, and students that meets monthly to discuss issues of Health, Safety and Environmental impact, and to review any safety incidents. The minutes of each meeting are available on HSE bulletin boards in the Department.

The Department provides an HSE orientation for all students, staff and faculty members. As a Civil Engineering undergraduate student, you will work and learn in several of the Department's laboratory facilities. You will receive a general HSE orientation, as well as site-specific safety training.

The information below is not a comprehensive safety policy - it is an introduction to some important components of the Department's HSE Program. It does not replace formal HSE training. For more information on HSE in the Department of Civil Engineering, visit: **civil.ubc.ca**

4.1.1 Your Responsibilities

You are responsible for following all safety rules.
This includes, but is not limited to:

- Ensure you receive safety training for the work you are doing
- Use appropriate Personal Protective Equipment (PPE) correctly at all times
- Obey all warning signs
- Do not operate any equipment that you have not been trained to use
- Do not access labs after hours or on weekends, unless you have formal permission, and never work alone
- Do not engage in horseplay inside the labs
- Do not take shortcuts in your work—follow all instructions and procedures fully
- Maintain good housekeeping practices at all times in your work space
- Do not bring food or beverages inside the labs

4.1.2 Preventing Common Incidents and Injuries

Two of the most common causes of incidents and injuries are:

1. Slips, trips or falls (often due to poor housekeeping), leading to cuts, bruises, sprains, and broken bones
2. Improper material handling (lifting and moving things), causing back injuries

You can help prevent these injuries by striving for excellence in housekeeping and using good material handling techniques. Excellence in housekeeping means cleaning up after yourself, removing trip hazards, disposing of trash promptly, keeping clear routes of access to emergency exits, phones, and fire extinguishers, and more. Factors in good material handling include assessing the weight of an object, seeking assistance if you need it, and using your legs while keeping your back straight.

4.1.3 Personal Protective Equipment (PPE)

Incidents and injuries can also be prevented by the correct use of Personal Protective Equipment (PPE). PPE includes gloves, eye protection, proper footwear, respiratory protection, hearing protection and head injury protection (hard hats). Different tasks require different types of PPE – make sure you are using the correct type of equipment for your task. If you have any doubts, always ask. A TA or lab staff member can help you make sure you are using PPE correctly.

4.1.4 First Aid

Familiarize yourself with the locations of the first aid stations in the Department:

- The workshop (RH 146)
- The Environmental Lab (CEME 1301)
- The Civil Engineering front office area (CEME 2002)

If you need first aid, you can get it by:

- Informing your TA, course instructor or lab staff who will inform one of the Department First Aid attendants
- Going to the UBC hospital
- Dialing 911

After you have received First Aid, make sure you:

1. Report your injuries to the TA or person supervising you
2. Record first aid treatments in the Treatment Record Book located at each first aid station

4.1.5 Emergency Situations

UBC has several procedures in place to cover emergency situations. Check **ubc.ca/emergency**, for real-time emergency messages and information updates.

To receive UBC Emergency Text Alerts please log in to the UBC Student Services Centre and add your phone number to "Your Details."

4.1.6 Important Safety Contacts

EMERGENCY (Ambulance, Fire, Police, Spills)	911
FIRST AID (if local first aid attendant is not available and help is required)	911
HAZARDOUS MATERIALS RESPONSE	911
RCMP - POLICE (Non-emergency)	604-224-1322
CAMPUS SECURITY	604-822-2222
STUDENT HEALTH SERVICES	604-822-7011
POISON CONTROL CENTRE	604-682-5050
UBC HOSPITAL URGENT CARE DEPARTMENT	604-822-7222
LAB MANAGER: Scott Jackson	604-822-4143
UBC BUILDING OPERATIONS	604-822-2173
Student Safety Representative	studentsafetyrep@civil.ubc.ca

4.1.7 Civil Engineering Facilities

The Department of Civil Engineering has several laboratories, some of which you will use during your course work. You are not allowed in the labs without correctly wearing the appropriate Personal Protective Equipment (PPE).

Structures Teaching Laboratory – CEME 1001

Courses taught: CIVL 231, CIVL 235

This laboratory contains a small Universal Testing Machine (UTM) and is used as the coordination hub for the Survey Course (CIVL 235).

PPE Required: closed-toe shoes and safety glasses (safety shoes and/or hard hats may be required for specific tasks)

Undergraduate Geotechnical Laboratory – CEME 1006/1008

Courses taught: CIVL 210, CIVL 311, CIVL 413

These two rooms are used for conducting various soil mechanics experiments in small groups.

PPE Required: closed-toed shoes and safety glasses (safety shoes and/or earplugs may be required for specific tasks)

Environmental Laboratories – CEME 1301

These laboratories contain modern analytical instrumentation, including atomic absorption spectroscopy (AAS), inductively coupled plasma optical emission spectrometer (ICP-OES), flow injection analyzer, gas chromatographs (GC) and GC/mass spectrometer (GCMS), carbon analyzers, liquid chromatograph (HPLC), laser diffraction particle size analyzers walk-in environment chambers, cold rooms and freezers, in addition to high speed centrifuge, orbital shakers, refrigerated incubator shaker, high & low temperature ovens and bench meters of all types.

PPE Required: lab coat, gloves, closed-toed shoes and safety glasses

Materials Laboratory – CEME 1012

Courses taught: CIVL 420, 422, 430

Facilities are available to both undergraduate and graduate students. Includes a high-head area consisting of 158 m^2 for material storage. Comprehensive underground facilities effect the environmentally sound treatment of concrete water.

PPE Required: safety shoes and safety glasses

Hydraulics Laboratory – RH (Rusty Hut) 139

Courses taught: CIVL 315, CIVL 316

The undergraduate area consists of eight pieces of apparatus. Four are used in the CIVL 315 lab and all illustrate a facet of flow through closed pipes. Four are used in the CIVL 316 lab and illustrate facets of open channel flow. The graduate research part of the laboratory is equipped with large flumes, one of which is equipped with a wave generator. The facilities are adaptable to a wide range of research activities.

PPE Required: closed-toed shoes and safety glasses

Structures Research Laboratory – RH (Rusty Hut) 100

This 450 m^2 facility contains a 9 m x 22 m reaction floor that can be used with various moveable reaction frames and hydraulic loading systems for quasi-static testing of large-scale structural components, a large L-shaped reaction wall that is 4.9 m high with a surface area of 66 m^2; two universal testing machines; two MTS servo-controlled loading systems with a range of jacks suitable for programmed cyclic and fatigue testing; a computer-based data acquisition system, and a full-time hybrid testing system.

PPE Required: hard hats, safety glasses and safety shoes

Earthquake Engineering Research Facility (EERF)

This facility consists of a 4 m x 4 m shake table with 6 degrees of digitally controlled motion for studying the dynamic response of test models and components to simulated earthquake motion, a large linear shake table, and several digital systems for field vibration testing of structures.

PPE Required: hard hats, safety glasses and safety shoes

4.1.8 Safety in the Field

For some of your courses, you will be going on field trips or you may be working on a project that is off campus. If you are visiting a construction site or some other industrial operation, you will be required to wear Personal Protective Equipment (PPE). You will not be allowed on site without a high visibility vest, a hard hat, safety glasses and CSA approved safety shoes.

4.2

Student Health and Safety on Campus

There are many campus services that support your personal security and your physical and mental health.

4.2.1 Personal Security on Campus

UBC is generally a safe place, but the risk of crime is present, as it is on every university campus. Campus Security, RCMP, and AMS Safewalk strive to reduce the risk to students and to enhance the security of the UBC community.

Campus Security
UBC Campus Security strives to ensure the campus is a safe place to study, work, and live. Campus Security personnel patrol the UBC campus around the clock, in vehicles, on foot, and on bicycles, and you are welcome to address any of these personnel at any time if you have questions or need assistance.

They also maintain the Campus Blue Phones, which are located throughout the campus and can be used for emergencies, directions, and assistance. For crime prevention tips, security announcements, and more information on security services provided, visit **ubc.ca/emergency**

RCMP
UBC - Vancouver Campus is under the jurisdiction of The Royal Canadian Mounted Police (RCMP) for law enforcement. There is an RCMP detachment located on campus – dial 604-224-1322 for non-emergency situations. In the case of an emergency, always dial 911.

Safewalk
Safewalk is a free service provided by AMS that provides a co-ed pair of volunteer walking companions to any student who would prefer not to walk alone at night. The service is available most nights during the school year, and Safewalk volunteers will meet you anywhere on campus and escort you anywhere you need to go. To request Safewalk services, call 604-822-5355. For more information, visit **ams.ubc.ca/services/safewalk**

4.2.2 Personal Belongings: Lost and Found

If you lose a personal item in the CEME building, check first at the Civil Front Desk. Check next at Engineering Academic Services (Kaiser Building), where lost items are sometimes turned in, and finally check with UBC Campus Security.

Check with UBC Campus Security right away if you have lost a personal item of high value. To learn more, and to search the online lost and found items database, visit **lostandfound.ubc.ca**

4.2.3 UBC Services for Living Well

Medical services, counselling services, and more are in place to support all students on campus. For details about the services listed below, visit **students.ubc.ca/livewell/services**

UBC Student Health Service – free medical care to registered students, provided year round by family doctors and registered nurses

Nurses on Campus – personalized advice, outreach, and information on a variety of topics offered by registered nurses

UBC Counselling Services – free and confidential counselling for students facing challenges relating to mental health and mental illness

Access and Diversity – support and advocacy for students with disabilities or ongoing medical conditions

Equity & Inclusion Office - resources and support for awareness of the University's discrimination and harassment policies, and issues related to equity and inclusion, and human rights

Sexual Assault Support Centre – emotional, medical, and legal support for survivors of sexual assault in the UBC community

Student Services Wellness Centre – health promotion, education, and a safe space for discussion of your personal wellness, facilitated by trained student volunteers

AMS Speakeasy – free and confidential peer crisis support, information, and referrals to the UBC community, provided by trained student volunteers

4.2.4 Safety Abroad

UBC requires undergraduate and graduate students to register travel plans and, in some cases, seek authorization for a University activity. If you anticipate travelling abroad, please visit the Safety Abroad website for details **safetyabroad.ubc.ca**

University activities include conferences, research, volunteering, service learning, varsity sports and studying abroad. University activities do not include activities sponsored or organized by student clubs or the AMS or the Graduate Student Society unless the activity is funded, coordinated or sponsored by UBC. Students engaged in these activities are welcome, and encouraged, to use the Student Safety Abroad resources and registry.

5.0

The Civil Engineering Profession

5.1

Civil Engineering

Civil engineering is a professional engineering discipline that deals with the design, construction, and maintenance of the natural and built environment. It is a very broad field made up of several sub-disciplines such as environmental engineering, construction engineering, geotechnical engineering, hydrotechnical engineering, materials engineering, structural engineering, and transportation engineering.

Many of the sub-disciplines of civil engineering are themselves very broad and are made up of further distinguishable sub-disciplines. For example, hydrotechnical engineering includes water resources engineering, offshore engineering and coastal engineering. There are also sub-disciplines that bridge two or more of the main sub-disciplines. For example, geo-environmental engineering bridges nvironmental engineering and geotechnical engineering, environmental fluid mechanics bridges environmental engineering and hydrotechnical engineering, and earthquake engineering bridges geotechnical engineering and structural engineering. Finally, municipal or urban engineering is a very broad field that includes many of the sub-disciplines of civil engineering.

At academic institutions such as UBC, civil engineering is the name given to the academic programs that include the many sub-disciplines mentioned above. Once a graduate enters the profession and specializes in one of the sub-disciplines of civil engineering, they normally take on the name of the sub-discipline. For example, someone that practices in the sub-discipline of geotechnical engineering is usually referred to as a geotechnical engineer, and someone that practices in the sub-discipline of structural engineering is usually referred to as a structural engineer. Someone that practices in the broad field of municipal engineering is usually referred to in the industry as a civil engineer.

5.2

Engineers and Geoscientists of BC (EGBC)

The engineering profession is regulated worldwide to protect the safety, well-being and interests of the public. Engineering is subject to licensure that provides the title "Professional Engineer" (P.Eng.) or equivalent, and grants the right to practice professional engineering and the authority to take legal responsibility for engineering work.

In Canada, the practice of engineering is protected in provincial statutes. In British Columbia, Engineers and Geoscientists BC (EGBC) regulates engineering practice and oversees licensure under the authority of the Engineers and Geoscientists Act.

EGBC has over 29,000 members, and is governed by a Council of elected members and Provincial government appointees. A CEO and Registrar, reporting to the Council, are responsible for operational activities. The membership is engaged through branches and committees. They vote in elections and on specific matters from time to time. Key standing committees include the registration, discipline and investigation committees.

All engineering students at UBC are student members of EGBC. More information from EGBC such as resources for engineering students and information about the different roles that EGBC plays can be found at **egbc.ca**

5.3

Engineers Canada

EGBC and other provincial and territorial associations are constituent members of Engineers Canada, and EGBC liaises with this organization on regulatory matters.

Engineers Canada includes the Canadian Engineering Accreditation Board (CEAB), which is responsible for accreditation of engineering programs across Canada, and the Canadian Engineering Qualifications Board (CEQB), which is responsible for developing national guidelines for professional engineering qualifications, standards of practice, ethics and professional conduct. Engineers Canada is also

engaged in advocacy and promotion and in the development of national policies, positions and guidelines; and in liaison with international organizations and organizations of other countries.

More information about Engineers Canada, as well as resources for engineering students, can be found at **engineerscanada.ca**

5.4

Becoming a P.Eng.

Your journey to becoming a licensed Professional Engineer (P.Eng.) started on the first day of your undergraduate studies in engineering. Your B.A.Sc. in Civil Engineering at UBC is accredited by CEAB and fulfills the academic qualifications required to become a P.Eng. Additional requirements include: being a Canadian citizen or having permanent resident status; completion of four years of satisfactory engineering experience as an Engineer-in-Training (minimum one year in Canada); completion of the EGBC Law and Ethics seminar and Professional Practice Exam (PPE); English Language Competency via PPE essay and referee comments; and finally, evidence of good character.

Benefits of obtaining the P.Eng. designation include: the right to practice professional engineering; prestige, distinction and professional excellence; access to EGBC publications, services, professional development, employment resources, affinity programs and mentoring; and engagement in EGBC branches and professional committees.

Engineer-in-Training (EIT) status is granted to individuals who have obtained the academic requirements, i.e., have graduated from an accredited program such as UBC Civil Engineering, and are working toward the four-year work experience requirement. EITs are usually required to work under the supervision of a P.Eng. EITs participate fully in EGBC branch activities, and enjoy several member benefits.

There are other forms of membership in the profession, and other ways to practice engineering, besides obtaining the P.Eng. designation. See the EGBC website (in Section 5.2) for further information.

5.5

The Iron Ring

You will notice that many of the professors and graduate students in the Department of Civil Engineering wear a small stainless steel ring—called an Iron Ring—on the small finger of their working hand. The Iron Ring is symbolic and does not signify engineering credentials or a professional designation; however, most people wearing an Iron Ring are either a P.Eng. or an EIT. The tradition of the Iron Ring started in 1925. It serves to unite Canadian engineers in their profession, remind them of their ethical obligations and stand as a symbol of both the pride and humility of the profession.

Only those who have been obligated at an authorized ceremony of the "The Ritual of the Calling of an Engineer" (written by English poet Rudyard Kipling) may wear the Iron Ring. The Ritual is administered by The Corporation of the Seven Wardens, which has 25 camps across Canada. For UBC students, the ceremony is usually held around the third week of March. For more information on registration, payment and attendance visit **ironring.ca**

5.6

Iron Pin Ceremony

UBC's Iron Pin Ceremony marks students' entrance into the engineer and geoscientist community and defines the expectations throughout their university and professional career. Students pledge to uphold a common set of values and hold paramount the safety, health and welfare of the public. After reciting the UBC Engineering Code of Ethics, students and observers were presented with an iron pin by way of commemoration and reminder.

More information on the Iron Pin Ceremony is available at **ubcengineers.ca**

5.7

Professional Societies

Professional engineers who practice within one of the sub-disciplines of civil engineering often belong to one or more professional societies that serve and promote the sector of civil engineering that they practice. The following are four examples of organizations that exist within civil engineering. Note the information below was sourced from the organizations' websites.

5.7.1 Canadian Society for Civil Engineering (CSCE)

The Canadian Society for Civil Engineering (CSCE) is a learned society created to develop and maintain high standards of civil engineering practice in Canada and to

enhance the public image of the civil engineering profession. Membership in CSCE allows attendance at CSCE organized conferences, lectures, seminars and workshops at a reduced rate, and includes publications related to the profession. There are different grades of membership. For information on the UBC student chapter of CSCE, see Section 8.1.3 of this handbook.

For information about the professional grades of membership or any other information about CSCE, visit **csce.ca**

5.7.2 Structural Engineers Association of BC (SEABC)

The Structural Engineers Association of British Columbia (SEABC) promotes the interests of structural engineers in British Columbia. Activities of the SEABC include seminars and discussion on technical matters relating to structural engineering. SEABC includes a Young Members Group (YMG) that provides young structural engineers with the opportunity to learn, get involved, meet others in their field, and have fun. "Young Members" includes young Structural Engineers, Structural Engineers who are new to the field, and those seeking professional registration assistance. For more information on SEABC visit **seabc.ca**

5.7.3 Vancouver Geotechnical Society (VGS)

The Vancouver Geotechnical Society (VGS) is a local section of the Canadian Geotechnical Society (CGS). The CGS is an independent, federally incorporated, non-profit learned society which exists to serve and promote the geotechnical and geoscience community in Canada. It encompasses a wide spectrum of scientific and engineering disciplines within the geo field. Membership to both the national society (CGS) and its Vancouver Section (VGS) is open to individuals from all sectors including private consulting, universities, industry, contracting, and public service. For more information visit **v-g-s.ca**

5.7.4 Canadian Institute of Transportation Engineers (CITE)

The Canadian Institute of Transportation Engineers (CITE) is an integral part of the Institute of Transportation Engineers (ITE) which consists of transportation professionals in more than 70 countries who are responsible for the safe and efficient movement of people and goods on streets, highways and transit systems. For more information visit **cite7.org**

5.8

Entering the Workforce

Many graduates from the Civil Engineering program at UBC use the knowledge and experience they gain from the broad academic program as a stepping stone to non-engineering careers, such as in business and management, or go on to other academic disciplines such as architecture or medicine.

Graduates from the Civil Engineering program at UBC who go on to practice as

professional engineers are employed by small and large consulting engineering companies—some providing more specialized services and others more comprehensive services; engineering companies that provide large-scale infrastructure projects; crown corporations such as B.C. Hydro; and various levels of government – municipal, provincial and federal governments, and government branches and agencies.

One of the easiest ways of entering the workforce is through the co-operative education (co-op) program. The UBC Engineering Co-op program gives students an early exposure to the engineering employment environment, and often leads to a full-time position upon graduation. See Section 9.0 of this handbook for further information on co-op.

Some graduates choose to work internationally after graduation, and this can be of great benefit to your career and to your development; however, it is important to remember that the requirements to obtain the P.Eng. designation include a minimum one year of Canadian work experience. On the other hand, many international students wish to remain in Canada to work after graduation, and there are generally good opportunities to do so.

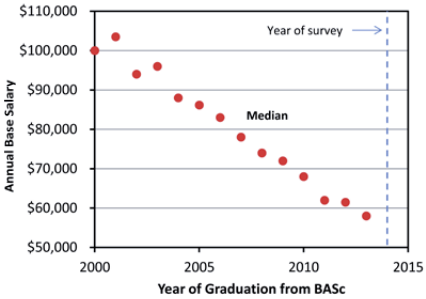
In your final year of the program, the EUS and the Careers Office can provide resources such as job postings, career advising, mentoring, and more. For information, visit **students.engineering.ubc.ca/build-my-career**

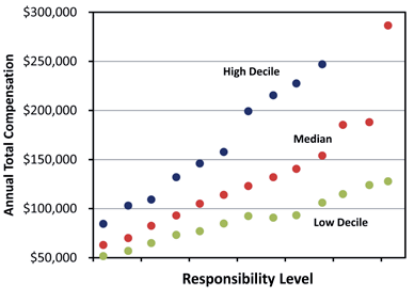
5.9

Salary Expectations

Graduates from an engineering program at UBC who go on to practice as professional engineers can find relevant information about typical annual salaries from an online survey conducted regularly by EGBC to determine typical compensation and benefits received by its members. A survey was done in May 2014, and more than 3,000 members participated. A complete summary of the information is available at **egbc.ca**

The following two charts summarize some useful information:





5.10

Sustainability

Sustainability is normally in reference to human sustainability on planet Earth. One of the most widely cited definitions is from the 1987 Brundtland Commission of the United Nations: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (wikipedia.org/wiki/Sustainability, August 2014).

Sustainability is a critical aspect of civil engineering practice and something that you will learn about during your studies at UBC and throughout your career. Civil Engineering has a unique and critical role to play in moving society toward sustainability.

Various organizations around the world have developed practical guidelines to help civil engineers adopt sustainability in their practice. The following are some examples:

- EGBC sustainability resources - **egbc.ca**
- CSCE Guidelines for Sustainable Development - **csce.ca**
- The U.K.'s Institute of Civil Engineering Best Practices in Environment and Sustainability - **ice.org.uk**

@U
E
You've got mail
Amanda

6.0

The Civil Engineering Program at UBC

6.1

Program Objectives

The objective of the Civil Engineering Program at UBC is to provide an outstanding civil engineering education that leads to graduates being exceptionally well prepared for careers in civil engineering and related disciplines. When you graduate, you will have:

- a broad knowledge base in civil engineering
- skills in areas such as design, problem analysis, leadership, teamwork and communication
- an understanding of the professional and ethical responsibilities of a professional engineer, and of the appropriate roles of the professional engineer in Canadian society

6.2

Accreditation: ensuring the quality of your education

In support of the objectives described above, the Civil Engineering Program maintains accreditation by the Canadian Engineering Accreditation Board (CEAB). Graduating from an accredited program means that you meet the academic requirements needed to obtain the P.Eng. designation in Canada.

6.2.1 Twelve Graduate Attributes

CEAB has identified the twelve attributes that all graduates from an accredited program need to acquire. The Department is committed to offering a program that goes beyond the minimum requirements, and is making continual improvements to the program to ensure this. The twelve graduate attributes are:

1. A knowledge base for engineering: Demonstrated competence in university level mathematics, natural sciences, engineering fundamentals, and specialized engineering knowledge appropriate to the program.

2. Problem analysis: An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions.

3. Investigation: An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data, and synthesis of information in order to reach valid conclusions.

4. Design: An ability to design solutions for complex, open-ended engineering problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations.

5. Use of engineering tools: An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern engineering tools to a range of engineering activities, from simple to complex, with an understanding of the associated limitations.

6. Individual and team work: An ability to work effectively as a member and leader in teams, preferably in a multi-disciplinary setting.

7. Communication skills: An ability to communicate complex engineering concepts within the profession and with society at large. Such ability includes reading, writing, speaking and listening, and the ability to comprehend and write effective reports and design documentation, and to give and effectively respond to clear instructions.

8. Professionalism: An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest.

9. Impact of engineering on society and the environment: An ability to analyze social and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.

10. Ethics and equity: An ability to apply professional ethics, accountability, and equity.

11. Economics and project management: An ability to appropriately incorporate economics and business practices including project, risk, and change management into the practice of engineering and to understand their limitations.

12. Life-long learning: An ability to identify and to address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge.

6.2.2 Complementary Studies

In addition to mathematics, natural sciences, engineering science and engineering design, you will take complementary studies courses in the areas of:

1. engineering economics
2. the impact of technology on society
3. methodologies and thought processes of the humanities and social sciences
4. oral and written communication
5. health and safety
6. professional ethics, equity and law
7. sustainable development and environmental stewardship

See the UBC Vancouver Academic Calendar to learn more about fulfilling the Complementary Studies requirements.

Visit Engineers Canada online to learn more about accreditation of engineering programs: **engineerscanada.ca/accreditation**

6.3

Your Enrolment Services Professional

Every undergraduate student at UBC has a dedicated Enrolment Services Professional (ESP). If you have questions about paying tuition, requesting transcripts, understanding general UBC policies and processes, and more, contact your ESP first. Check the Student Service Centre, under Personal Info > UBC Contacts, to find out who your ESP is and how to contact them. Your ESP is there to support you from the beginning to the end of your undergraduate degree. Learn more about what your ESP can do for you at **students.ubc.ca/about/esp**

6.4

Academic Advising

You will find the answers to many of your general questions about program requirements, registration procedures, and more online. Visit the FAQs at Engineering Academic Services (students.engineering.ubc.ca/faqs), and on the Civil Department website (civil.ubc.ca/undergrad_faq), for answers to the most common questions.

If you cannot find the academic information you need online, you may need to speak to an advisor. Academic advising is shared between the Civil Engineering Department and Engineering Academic Services.

You should contact a Civil Engineering Departmental Advisor for questions regarding:

- Program Requirements
- Off-cycle degree planning
- Pre-requisites for Civil Engineering courses
- Selection of Technical Electives
- General information about civil engineering
- Interpreting your Degree Navigator report
- Registration issues in Civil Engineering courses

If you want to meet with a Department Advisor, please email the advisor in advance to set up an appointment. Check the Civil website for undergraduate advisors' contact information **civil.ubc.ca/academic-programs**

You should contact Engineering Academic Services for questions regarding the following:

- Transfer credit from other institutions and equivalent courses at UBC
- Questions regarding the general first year engineering program at UBC
- Registration issues in APSC courses
- Personal counseling and academic accommodation/concession
- Exchange programs and credit equivalencies
- Registration in supplemental exams
- Application for academic concession for standing deferred exams

Check the Engineering Academic Services website for the location, hours of service, and contact details for advising at Engineering Academic Services at **students.engineering.ubc.ca**

6.5

Course Planning and Selection

As a Civil Engineering student, many of the courses you are required to take are common for all students in the program. Fourth-year technical electives and complementary studies electives are courses you can choose from predefined lists. The use of Standard Timetables makes registration easier, and visiting Degree Navigator frequently will help you stay on track for graduation.

6.5.1 Standard Timetables

A Standard Timetable (STT) is a pre-planned timetable which incorporates most of the courses required for a program. On your registration date, you will select one available STT to ensure you are registered in most of the courses you need, and then you will select the additional courses that you require individually. These additional courses you are required to take include math and statistics courses. Details are available in the Civil Engineering "FAQs" at **civil.ubc.ca**

6.5.2 Fourth-year Technical Electives

Technical electives are courses you choose in fourth year, based on what interests you, to round out your studies. Visit the Civil Engineering website for pre-approved technical elective guidelines. Departmental approval for a custom technical elective package may be granted if you can make a compelling case to the fourth year advisor. For further information visit **civil.ubc.ca/academic-programs**

6.5.3 Minors and Dual Degrees

If you are seeking a stronger foundation in business, science, mathematics or arts, consider enhancing your degree with a minor or a dual degree, which requires an additional term or two of coursework. Learn more at **students.engineering.ubc.ca**

6.5.4 Degree Navigator

Degree Navigator is an online advising tool designed to help you view your degree progress. Organizing the courses you need to complete your degree can be complicated and confusing, especially if you end up taking courses out of sequence or have transferred from another institution. It is your responsibility to learn how to use Degree Navigator in order to track your progress toward graduation.

Degree Navigator will help you:

- view course and program information as outlined in the UBC Calendar
- view your course list for each year
- view courses you have taken in the past, courses in progress, and those left to take
- plan hypothetical course scenarios for future sessions

To access Degree Navigator, log into the Student Service Centre, look under Registration, and click on Degree Navigator.

6.5.5 Degree Navigator - Students Not Taking Standard Course Load

There are many reasons why you might not be taking a standard course load. Examples include transferring to Civil Engineering from another engineering program or from outside UBC, taking a reduced course load, or retaking courses. If this is you, it is especially important that you pay attention to Degree Navigator. You may see crosses beside courses you think are equivalent to standard courses—this may be because it takes some time for transfer credits to show up in Degree Navigator. If you are unsure if you have received credit for a course, contact Engineering Academic Services to check its status.

6.6

Managing Your Course Load

Increase your chance for success by ensuring you are following Departmental guidelines on course load.

6.6.1 Second Year Course Load

The standard second year Civil Engineering program consists of 41 credits taken over two terms, and an additional four credit Plane Surveying course (CIVL 235) taken in the summer after the second term, for a total of 45 credits. Most students find this to be a very heavy course load. Set yourself up for success – do not take a credit load over 45 credits in second year.

You are urged to limit your credit load to the standard 45 credits because:

- You need to understand the material. Courses build on the basic science you learned in first year to provide you with the fundamentals of civil engineering. It is important that you take the time to understand the material you learn in second year as it will provide the foundation for your third and fourth year courses.
- You should avoid having to repeat a course. If you burden yourself with greater

than 45 credits, you will find it difficult to complete them all successfully, and if you receive a final grade of 49% or less for a course, you will have to repeat that course. Many second year courses are prerequisites for third year courses, and course schedules between different year levels often conflict, so repeating a course may delay completion of your program by a whole year.

If you have registered for more than 45 credits in second year, please reduce your course load before the start of term. If you require assistance dropping courses, please contact Undergraduate Student Support in the Department of Civil Engineering (undergradsupport@civil.ubc.ca).

6.6.2 Academic Standing and Promotion Requirements

All students are in Good Standing when first admitted to the Faculty of Applied Science. After your sessional academic average is determined at the end of each winter session, you will be assigned one of three academic standings: Good Standing, Academic Probation, or Failed Year. Your academic standing affects your promotion status: i.e., your eligibilty to continue in the program and be promoted to third or fourth year. Review the specifics of academic standing and promotion requirements in the UBC Calendar at **calendar.ubc.ca**

6.7

Academic Help

If you are facing challenges in your coursework and need assistance, get help early. Speak up during labs and problem sessions; your instructor or TA will be able to assist you with challenges as they arise. Your classmates are also a great resource—get to know them and make plans to study together for mutual benefit. You may also seek out other academic resources the UBC community has to offer—see next page for more detail.

The tutoring offered by the Engineering Undergraduate Society is primarily for students enrolled in first year engineering courses. Consider contacting AMS Tutoring to see if they can connect you with a tutor who specializes in civil engineering. Tutoring in various subjects is also offered through the UBC Learning Commons and the Math Learning Centre, described on the next page.

UBC Learning Commons

The Learning Commons refers to both a physical space (The Chapman Learning Commons, on Level 3 of the Irving K Barber Learning Centre) and a virtual space (the UBC Learning Commons website) where you can study, exchange ideas with other students, access student toolkits and resource guides, seek tutoring and peer academic coaching, attend workshops, and more. Visit the Learning Commons online to get started at **learningcommons.ubc.ca**

The Math Learning Centre

If you need help with math courses, consider visiting the Math Learning Centre. The Math Learning Centre is a study space for undergraduate students. Students working in the space are supported by graduate-level math students, who are there to answer your questions and help you develop your math learning skills. Check the Department of Mathematics for the location and schedule. See **math.ubc.ca**

6.8

Exams

Most Civil Engineering courses are subject to examination during the University's designated exam periods. Prepare yourself well in advance to write exams successfully. In addition to studying, this includes informing yourself of important exam dates, understanding expectations for student conduct during exams, and more.

6.8.1 Exam Dates

Final exams are held at the end of each term in December and April. You will find the start and finish dates for the upcoming formal exam periods published in the UBC Academic Calendar. Until your exam schedule has been posted, you should be prepared to be available for the duration of these exam periods. Avoid making travel plans until you know the exact dates of your scheduled exams.

You can expect the exam schedule to be released by mid-October for December exams, and mid-February for April exams. Please note that the first exam schedule released is subject to change.

Once it is released, you can view the complete exam schedule on the Student Services website **students.ubc.ca/enrolment**

For a look at your personalized exam schedule, visit the Student Service Centre.

6.8.2 Other Information

If you have problems to address, such as an exam clash or hardship, start by reviewing the FAQs found at: students.ubc.ca/enrolment. You will find guidelines there on how to proceed.

A deferred examination is when a student misses an exam due to illness or other unforeseeable event and applies to write an exam at a later date (an academic concession). If you missed an exam and think you are eligible to write a deferred exam, instructions on how to apply for academic concession can be found on the Engineering Student Service FAQ.

A supplemental examination may be available to students who failed a 400-level course, but received a final grade of at least 40% and have passed their year. Supplemental examinations are only offered during the deferred/supplemental examination period of July to August, including courses that terminate in December.

6.9

Awards

UBC Civil Engineering students are eligible for a number of awards. Many of these awards are monetary, and their values may be in the thousands of dollars. They are provided by the Department, the Faculty of Applied Science, and donors, and are often given to students demonstrating one or more of the following:

- Top academic performance
- Leadership
- Community service

Some of these awards are department-recommended, some are faculty-nominated, and some are student (self)-nominated. If you'd like to be considered for a department-recommended award, please send your CV to undergradsupport@civil.ubc.ca before the end of September. Bursaries are also available through Student Financial Assistance and Awards. Learn more about the different types of awards available to students on the APSC Awards and Scholarships web page at **students.engineering.ubc.ca/enrolment/get-funded**

7.0

Engineering Communication

A brilliant idea may be of little value if the idea cannot be communicated effectively. For Civil Engineering students, competent communication skills are critical for success in the courses, and once in the workplace, effective communication becomes even more important. Clearly explaining a design concept, communicating with colleagues or members of a project team, delivering presentations, describing safety procedures, recording findings from the field, or writing a proposal – are all critical for the success of a Professional Engineer.

7.1

Competency in Communication

Three concepts form the foundation of all of your communication.

1. Understanding your audience—every document or presentation is directed toward a specific individual or group that has a particular interest in your communication.

2. Understanding the purpose—every act of communication (speaking or writing) has an objective; what goal motivates you to speak or write?

3. Understanding genre conventions—every document needs to be presented in a way that responds to the needs of the audience who will read the report.

7.2

Competency in Writing

Engineering communication requires competence in writing. Knowledge of appropriate grammar use, sentence structure, punctuation and paragraph structure are a significant part of becoming a proficient and effective communicator. It is assumed that Civil Engineering students have previously acquired these foundational competencies; however, online resources are available for students that would like to further develop those competencies: **www.utsc.utoronto.ca/twc/grammar**

7.3

Competency in Speaking

Speaking effectively is critical for success in the engineering profession. In addition to giving presentations, speaking effectively during informal situations is also very important. Engineers present and discuss ideas with a variety of stakeholders: around board room tables, in the office with colleagues and in the field. Effective and competent speaking incorporates grammatically appropriate words and sentences. It also requires voice projection, clear enunciation, and (in the context of formal presentations) appropriate presentation of graphic images. All of these distinctions can result in a persuasive presentation that reflects knowledge of the topic.

7.4

Competency in Global Understanding

Engineering communication also requires knowledge of global issues, awareness of cultural nuances and understanding of ethical implications. Students and engineers need to be aware that different cultures have different ways of thinking and acting. Although universal principles should be part of every engineer's activities, particular situations require specific and ethically appropriate responses. See Section 1.0 of this Handbook for some related useful information about ensuring an inclusive environment.

7.5

Writing Support

The following resources are free of cost and may help you with your communications:

- Free editing of grammar and writing structure tutoring is available for UBC students at the UBC Writing Center in the UBC Learning Commons, located immediately north of the Hennings (Physics) building. Assignment editing provided by these free tutors is undertaken in a unique way, such that it is in compliance with the Student Code of Conduct. Many students improve their writing by a full grade level by using the services of the UBC Writing Center tutors.
- The Youtube channel entitled 'UBC Science Writing' has short animated videos that may be helpful. Topics covered include: concise writing, active and passive voice, communicating uncertainty, and many others.
- High quality, interactive, engineering specific writing resources and templates are also available online visit **monash.edu/rlo**

CHEERS to the ESC
VP Pizza
ESW

8.0

Student Life @ Civil

8.1
Student Organizations

8.1.1 Civil Society

The UBC Civil Engineering Society, or Civil Society, is a student society comprised of all undergraduate students in the UBC Civil Engineering Program. The Civil Society broadens learning beyond an academic degree and fosters pride in the accomplishments of our members. A group of volunteers fills various roles in the Executive and provide services, such as:

- Communicating with other student organizations and the Civil Engineering Department
- Organizing social events, such as the grad events, the holiday party, and the Alumni Dinner
- Participating in E-Week
- Publication of a weekly online newsletter—the Underground
- Publication of a yearly student agenda—the I-Beam
- Managing the Civil student spaces—Civil Loft and Design Studio

All civil engineering students are welcome to attend the weekly meetings in the Loft (CEME 2215). For the event calendar, academic resources, and merchandise, visit **ubccec.com,** email president@ubccec.com, or visit the UBC Civil Society's page on Facebook.

8.1.2 Engineering Undergraduate Society (EUS)

The Engineering Undergraduate Society (EUS) is an organization for all Engineering undergraduate students at UBC. You automatically become a member of the Society upon entering first year Engineering. The mission of the EUS is to support the academic, professional, and social needs of engineering students, encourage excellence in all aspects of student life, and celebrate the accomplishments of its members. The EUS provides a number of services relating to academics, professional development, student finances, and more. The EUS is also responsible for organizing social and sports events, professional development events, and student conferences and competitions each year. Their signature event is E-Week, which takes place in the third week of January each year and features dozens of social and professional events and fun student competitions.

To learn more about your Engineering Undergraduate Society (EUS), visit: **ubcengineers.ca** or email voice@ubcengineers.ca for answers to general questions about the EUS.

8.1.3 CSCE Student Chapter

The UBC CSCE Student Chapter strives to engage and empower students to become young leaders in the Civil Engineering industry by providing opportunities for professional development and interaction with industry members through guest lectures, facility and site tours, technical and professional development workshops and through the chapter's largest annual event, UBC CSCE Industry Night, which brings together 500+ students and industry members from all Civil Engineering disciplines for a night of networking.

Membership with UBC CSCE is free and all Civil Engineering students are welcome to attend chapter events. Students may also choose to become student members of the CSCE and receive additional benefits that include:

- Access to the CSCE's online magazine, Canadian Civil Engineer
- Reduced student rates on subscriptions to the Canadian Journal of Civil Engineering
- Discounts to local, regional, and national events hosted by CSCE Associations
- CSCE Scholarships

To learn more about the UBC CSCE Student Chapter, please email ubc.csce@gmail.com, visit **https://ubccec.com/csce**, or visit the UBC CSCE Student Chapter pages on Facebook and LinkedIn. For information on the Canadian Society for Civil Engineering (CSCE) see Section 5.6.1 of this handbook.

8.1.4 ITE – UBC Student Chapter

For information on the Canadian Institute of Transportation Engineers (CITE), which is an integral part of the Institute of Transportation Engineers (ITE), see Section 5.6.4 of this handbook.

The ITE Student Chapter offers Civil Engineering students the opportunity to better

understand the field of transportation engineering and the careers available in this discipline. The UBC ITE Student Chapter hosts events throughout the year, which include an annual industry night, field trips, guest lectures, conferences, and social events. To learn more, visit **ubcite.org**

8.1.5 Women in Engineering

Women in Engineering (WiE) is a student organization that aims to empower women to reach their full potential in engineering by advocating for gender diversity, equity, and inclusion. It was created by faculty and students to promote the recruitment, retention, and advancement of women in the engineering profession. WiE supports the student population via career and leadership development workshops and community building events; and organizes outreach initiatives for high school and elementary school students. Some WiE events include the Women in Science and Engineering (WISE) mentoring event, a non-traditional engineering careers panel, a workshop on identifying and addressing gender inequality in the workplace, and the December 6th Memorial.

WiE welcomes students of all genders. If you would like to sign up for their news and updates, or to join one of their committees, visit **wie.engineering.ubc.ca**.

8.1.6 Engineers Without Borders

The UBC chapter of Engineers Without Borders is a group of dedicated volunteers who work to advance the mission of the national Engineers Without Borders organization. Activities include advocacy, the promotion of evolving engineering, leadership development, member learning, youth outreach, supporting long-term Engineers Without Borders staff members working overseas, and more.
To learn more visit **ubc.ewb.ca**

8.1.7 Gears and Queers

Gears and Queers is an LGBTQ+ engineering club dedicated to creating an open, accepting space for queer and trans engineering students at UBC. They strive to build and support a community for queer and trans engineering students and provide a positive safe space on the UBC campus through social and professional events and a visible presence in engineering student life. For more information email **gears.and.queers@gmail.com** or visit their Facebook page.

8.1.8 UBC British Columbia Water and Waste Association - Student Chapter

The UBC British Columbia Water and Waste Association Student Chapter (UBC-BCWWA) is an AMS registered club for students who are interested in all things water related. They are an official student branch of our parent organization, the BC Water & Waste Association (BCWWA), whose members are the people who work every day to ensure safe, sustainable and secure water and wastewater systems that protect public health and the environment in British Columbia and the Yukon. The UBC-BCWWA hopes to promote interest in water issues as well as provide a platform to connect students with professionals in the water industry. To learn more, visit **bcwwa.sites.olt.ubc.ca**.

8.2

Student Teams

Student teams provide excellent opportunities to gain experience in real world design, leadership, competition, and team work, and to create lasting memories with your fellow students. The following teams are geared toward Civil Engineering students, and also recruit students from other departments in engineering as well as other faculties.

8.2.1 Concrete Canoe Team

The Concrete Canoe Team offers students an opportunity for hands-on experience with concrete design, and to participate in an annual concrete canoe competition. The yearly challenge is to design, fabricate and race a 20-foot long canoe made of concrete, which must be durable enough to be used in multiple races with two or four paddlers onboard. Members of the Concrete Canoe Team develop creativity and ingenuity in the planning, design, analysis, construction, and finishing of a concrete canoe, while developing their understanding of concrete. To learn more, visit **facebook.com/ubcconcretecanoe** or email **ubcconcretecanoe@gmail.com**

8.2.2 Concrete Toboggan Team

The Concrete Toboggan Team offers students an opportunity to design, build, and race a concrete toboggan in the annual Great Northern Concrete Toboggan Race—the oldest and largest engineering student competition in Canada. The toboggan must weigh less than 350 pounds, seat five riders, complete with a roll cage, braking and steering systems. Members of the Concrete Toboggan team get the chance practice technical skills such as concrete design, steel design, and construction management, and non-technical skills such as teamwork, organization, and communication. The team already meets the Faculty's 50/50 gender ratio goal, and is open and supportive to students of all departments. To learn more visit **ubctbog.com**

8.2.3 EERI Seismic Design Team

The EERI Seismic Design Team provides students with the opportunity to apply the complex theories of seismic design to a hands-on project. The team competes in the annual Undergraduate Seismic Design Competition (SDC), hosted by the Earthquake Engineering Research Institute (EERI) Student Leadership Council. Members of the team gain experience in teamwork, design and analysis, construction difficulties, professional presentation and more. Visit the UBC EERI Seismic Design Team or the EERI Student Leadership Council (SLC) Facebook Pages or email **ubc.eeri.seismic@gmail.com**

8.2.4 UBC Steel Bridge Team

The UBC Steel Bridge Design Team allows Civil Engineering students to apply their technical knowledge from the classroom to a unique steel design challenge, while making connections with other students in their program and professionals within the industry. Every year, the team designs, fabricates and constructs a 20-foot long bridge to bring to competitions across North America, where the bridge is evaluated for strength, constructability, and economy. For more information visit **ubcsteelbridge.ca**, check out their Facebook page, or contact **ubcsteelbridge@gmail.com**.

8.3

Student Spaces

Civil Engineering Students have two dedicated student spaces in CEME for studying and socializing. Passcodes for each space are changed each term, and are provided to all Civil students via email. These spaces are maintained by students—please keep it clean, respect the posted hours of access, and be considerate of others. If you need the passcode again, notice any damage or have any suggestions, email facilities@ubccec.com.

The Loft (CEME 2215)

The Civil Loft is a social space just for Civil Engineering students, maintained and managed by the Civil Society. Students built the loft structure in the 1980's to give students extra space to study, nap or play video games. Other amenities include microwaves, desks, couches, vending machines, a foosball table, a sound system, and lockers for rent.

The Design Studio

The Civil Engineering Design Studio is an academic space within the Department of Civil Engineering meant primarily for group-based learning activities. Located on the first floor of CEME, this innovative two-level space provides a computer lab, two closed meeting rooms and about twelve additional meeting areas for student project teams, as well as state of the art projection facilities for specialized lectures. The space is used for organized class activities, student meetings, and group work. When the Design Studio is not being used for group-based learning activities, Civil Engineering students can use it for quiet study.

9.0

UBC Engineering Co-op

The UBC Engineering Co-op Program gives you the opportunity to complete five work terms during your undergraduate experience. These work terms are usually composed of sixteen weeks of full-time employment, which enhances your undergraduate experience by giving you paid, relevant, technical work experience that may lead to full-time employment after graduation.

The UBC Engineering Co-op Program Office serves as a liaison between co-op students actively seeking employment and prospective employers, and offers dedicated support to students from the beginning to the end of their co-op experience such as partner organization information, past student stories, tips for job search techniques and international work term support.

The application period takes place after your first year in the undergraduate engineering program. There are eligibility requirements pertaining to GPA, communication skills, and personal intent, as well an interview process.

For further information on UBC Engineering Co-op Program, visit **coop.apsc.ubc.ca**

UBC
ENGINEERS
CFES
FCEQ
OLINA
SNIPPIT

10.0

Civil Engineering Alumni

Civil Engineering boasts some of the most approachable and engaged alumni in all of UBC Engineering. They contribute significant financial support to the Civil Engineering Department – if you have received a scholarship or award, have gone on a field trip, or are part of a student competition or design team, chances are you have benefitted from the generosity of alumni.

It's also easy for current Civil students to connect with and learn from our wonderful alumni. The Engineering Alumni Relations Office organizes several events and programs annually that bring students and alumni together. Civil Engineering industry nights introduce students to seasoned Civil alumni and other professionals, who enthusiastically share their invaluable career experience, knowledge and job advice. Students make valuable connections that sometimes result in a job after graduation. For information on upcoming industry nights in the Civil Engineering Department, please visit **engineering.ubc.ca/alumni**

Current students can also interact with alumni through Engineering's Tri-Mentoring program, E-Week's Old Red New Red event in February, and the Women in Science and Engineering Mentoring evening in March; or students can invite an alumnus to be a guest speaker at a student-run event. If you would like to engage with an alumnus directly or participate in one of Applied Science's many alumni networking events, please contact Erneida de Guzman in the Alumni Relations Office at **erneida.deguzman@ubc.ca**.

Remember that your relationship with UBC and the Department of Civil Engineering does not end when you complete your final exams in fourth year. Consider staying connected with Civil Engineering and giving back as an engaged alumnus, so that you too can have a positive impact on Civil Engineering students.

MEL

11.0

Master's Degrees in Civil Engineering

Graduates of the broad undergraduate (B.A.Sc.) degree in Civil Engineering who want to work as a specialist in one of the sub-disciplines described in Section 5.1 of this handbook are strongly recommended to complete a Master's degree in Civil Engineering with a specialization in that sub-discipline. For some sub-disciplines, such as geotechnical engineering or structural engineering, the Master's degree is pretty much a requirement to obtaining employment.

Students who know what sub-discipline they want to specialize in often enter the Master's degree immediately following the completion of their B.A.Sc. degree, while others spend a couple of years obtaining work experience before returning to school to complete a Master's degree. Some engineering companies will hire B.A.Sc. graduates under an arrangement where the student completes the Master's degree part-time while working.

11.1

Types of Master's Degrees

The Department of Civil Engineering offers two different Master's degrees. The Master of Applied Science (M.A.Sc.) degree normally involves 18 credits of course work and a 12-credit thesis. Most faculty members in the Department of Civil Engineering believe the Master of Applied Science (M.A.Sc.) degree is the preferred Master's degree because it provides students with both breadth (from 18 credits of course work) and depth from working closely with a faculty supervisor on a research project (the 12-credit thesis). As faculty members are limited in how many M.A.Sc. research projects they can supervise, admittance to the Master of Applied Science degree is competitive, and meeting the minimum entrance requirements is normally not sufficient to ensure admittance to the program.

The other Master's degree in Civil Engineering is the Master of Engineering (M.Eng.) degree, which is entirely a course-based degree (30 credits of coursework is required). Industry generally does not recognize the difference between the two Master's degree, and many students complete the M.Eng. degree because it is easier to gain admittance and it generally takes less time to complete the degree.

11.2

Minimum Entrance Requirements

The minimum entrance requirements to either of the two Master's degree programs for a graduate from the B.A.Sc. degree in Civil Engineering at UBC is one of the following:

- a minimum overall average of B+ (76%) in third- and fourth-year level courses
- academic standing with at least 12 credits of third- or fourth-year level courses in the A grade range (80% or higher) in the field of study

For further information on the admission requirements visit: **engineering.ubc.ca/admissions**

11.3

Areas of Specialization

At UBC, the main areas of specialization for a Master of Applied Science (M.A.Sc.) degree are:

- Civil Engineering Materials
- Environmental Fluid Mechanics
- Environmental Systems Engineering
- Geo-Environmental Engineering
- Geotechnical Engineering

- Hydrotechnical Engineering
- Project & Construction Management
- Structural & Earthquake Engineering
- Transportation Engineering

The Master of Engineering (M.Eng.) degree is offered in many, but not all, of the areas of specialization listed above. Consult the Department website for further information **civil.ubc.ca/academic-programs**

11.4

Application Deadlines

For **September admissions** –

- January 31 of the same year (7 months prior)

11.5

Graduate Awards and Scholarships for M.A.Sc. Students

UBC's graduate programs have competitive tuition rates, and UBC offers scholarships and top-up packages to the very best applicants to the M.A.Sc. program.

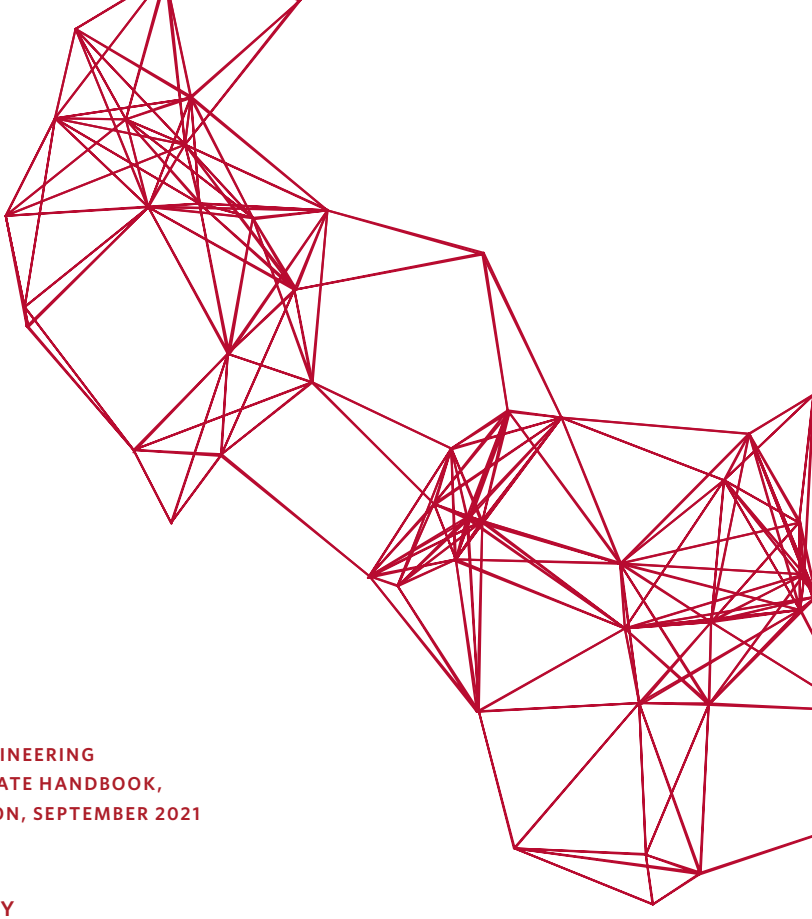
The Department of Civil Engineering is committed to providing funding to many of its top M.A.Sc. students in the form of Research Assistantships and Top-Ups. In addition to the NSERC Top-up, GSI Merit Awards are available. Visit **civil.ubc.ca/academic-programs/graduate-program/funding**

11.6

Further Information

For more information on all graduate degree programs in Civil Engineering, including the Ph.D. degree, visit **civil.ubc.ca**

Notes



UBC CIVIL ENGINEERING UNDERGRADUATE HANDBOOK, EIGHTH EDITION, SEPTEMBER 2021

PUBLISHED BY

Department of Civil Engineering
The University of British Columbia
2002-6250 Applied Science Lane
Vancouver, BC V6T 1Z4

FOLLOW US

Instagram.com/ubccivil
Facebook.com/ubccivil
Twitter.com/ubccivil
Youtube.com/ubccivil

CONTRIBUTORS

Faculty, staff and students in the Department of Civil Engineering, with additional contributions from staff in the Faculty of Applied Science, and UBC Access and Diversity.

We welcome your feedback – please send any corrections or suggestions on how this handbook can be improved to **communications@civil.ubc.ca.**