



a place of mind

THE UNIVERSITY OF BRITISH COLUMBIA

Vancouver Campus

CIVL 202 – Civil Engineering II: ENGINEERING AND SUSTAINABILITY

Course Description

CIVL 202 introduces you to the changing landscape of engineering-for-sustainability. It asks you to consider:

- why sustainability is an important aspect of civil engineering practice;
- how engineers are currently addressing sustainability-related problems, and;
- what professional skills are needed to effectively address these sustainability-related problems.

You are introduced to bio-mimicry, life-cycle-assessment, the integrated design process, industrial ecology and more. You are also introduced to the sustainability science (i.e. complex systems theory) on which engineering-for-sustainability is based. You practice professional development skills, like:

- how to communicate effectively (with those unlike yourself) and;
- leadership,

so that solutions to gnarly (i.e. complex) problems can be found. Finally, you have the opportunity to engage in a community based experiential learning (CBEL) project that allows you to apply the knowledge and skills you gain in the course to a real world project, working with a real client (i.e. your community partner).

Instructor:

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Course Times

Plenary Sessions

Mondays, 11:00 – 12:00, Room: PHRM 1201

Weekly Tutorial Sessions – starting the week of January 4 – please check the SSC course schedule to find the most up-to-date location of each tutorial.

T2A:	W 11:00 – 12:30	AMIR	FSC 1613
T2B:	Th 15:30 – 17:00	BEHZAD	CEME 1210
T2C:	W 15:00 – 16:30	NEGAR	FSC 1615
T2D:	W 11:00 – 12:30	JOERG	CEME 1212
T2E:	W 11:00 – 12:30	JAMES	FNH 30
T2F:	Th 14:00 – 15:30	JOERG	CEME 1212
T2G:	Th 14:00 – 15:30	JAMES	CEME 1204
T2H:	T 15:30 – 17:00	NEGAR	CEME 1210

Course Format

The course consists of 8 topics (see the course schedule for details). There are Four major student activities that support you learning the topic material:

1. Attend a weekly plenary session that introduces the material for the week. (~11 hours)
2. Work on weekly assignments. (~4 hours per assignment)
3. Participate in, and organize, weekly small group discussions that focus on the open-ended issues raised in the topic materials and weekly assignments. (~17.5 hours plus preparation time).
4. Work on a CBEL Term Project. (~30 hrs)

1. Weekly Plenary Sessions

Each week kicks off with a Monday morning lecture that introduces you to the material you will learn when completing your weekly CIVL 202 assignment.

2. Assignments and On-line Learning Material

To help you complete your weekly assignments, you are provided with on-line material. Each course topic contains 3 or 4 lessons. The weekly assignments will help you prepare for the mid-term examination. The mid-term exam is very similar to the final examination.

3. Weekly Small Group Discussions

You will participate in small group discussions that aim to hone reflective thinking, knowledge organization, critiquing of your own ideas and the ideas of others, as well as the development of your oral communication and team leadership skills. The discussion topics relate to important societal, ethical, and bio-physical issues facing the civil engineering profession. *In addition to participating in these discussions, you and a partner are tasked with leading at least one 40-minute discussion.*

4. Term CBEL Project

CBEL is short for “Community-Based Learning”. For the CIVL 202 term project, you are asked to attend and participate in a real stakeholder meeting that is taking place within the Vancouver area. You are also asked to attend a preparatory meeting, and a follow-up meeting. MORE DETAILS OF THE CIVL 202 CBEL ACTIVITIES ARE AVAILABLE AT THE “CBEL AND ENGINEERING SUSTAINABILITY” CONNECT SITE. The term project deliverable is a document that describes the context of the stakeholder

meeting you attended and recommendations to your community partner on how to improve the stakeholder engagement process in which you participated.

Course Goals

This is an introductory survey course aimed at helping you develop a broad understanding of sustainability and engineering issues. During this course you are expected to develop knowledge, skills and professional attitudes that are relevant to engineering for sustainability. In addition to being introduced to engineering-for-sustainability knowledge like systems theory, life-cycle assessments, and the integrated design process, you grapple with open-ended problems related to engineering and sustainability by applying argumentation techniques. Also, you enhance your professionalism by working in teams and, in some cases, with non-engineers.

By the end of this course, you will be able to:

- Describe the drivers of sustainable development and demonstrate knowledge of the implications of climate change in Canada,
- Demonstrate professional development attitudes and skills related to:
 - describing sustainability guidelines for engineering practice
 - applying stakeholder analysis techniques,
 - presenting your opinion using structured argumentation,
 - becoming practised in personal reflection, and
 - describing essential components of engineering leadership
- Describe the significance of systems theory to civil engineering practice, provide examples of complex systems in civil engineering, create **sophisticated** concept maps, compare natural and built systems, and describe examples of resiliency in both natural and built systems.
- Articulate issues relevant to the creation of sustainable cities, compare and contrast the Integrated Design Process with older design processes, describe both the Living Building Challenge framework and the Seven Questions framework for sustainability assessments.
- Articulate issues relevant to creating a sustainable supply chain including biomimicry and industrial ecology, and explain the steps in an LCA.
- Articulate issues relevant to humanitarian engineering, distinguish appropriate from inappropriate technology, apply stakeholder analysis to a case study, and use sustainability assessment frameworks to compare and contrast case studies.
- Analyze, synthesize, and discuss relevant local and global societal and bio-physical issues that are relevant to civil engineering.
- Apply professional development skills and attitudes.

CEAB PROGRAM LEARNING INDICATORS

The learning goals of CIVL 202 aim to support your development of the attributes required of all graduating civil engineering students by the Canadian Engineering Accreditation Board. The specific attributes that CIVL 202 will help you achieve are listed below.

6.1 Team Attitudes: Recognizes a variety of working and learning preferences and world-views; appreciates the value of diversity on a team

6.2 Responsibility: Assumes responsibility for one's work and participates equitably in team endeavours.

6.3 Leadership: Demonstrates capacity for engagement in leadership activities, including team leadership, adaptive leadership, or other forms of effectively influencing others.

6.4 Conflict Resolution: Applies principles of conflict resolution to resolve team issues and barriers to participatory decision-making.

6.5 Team Evaluation: Evaluates team effectiveness and plans for improvements.

7.1 Reading: Reads, understands and interprets an array of technical and non-technical writing

7.3 Public Discourse: Effectively engages in discourse with multiple stakeholders including the public, including via participatory decision making, public speaking, writing, technical meetings, and presentations

7.4 Comprehension: Listens to and comprehends information, including instructions, reports, design documentation, and the viewpoints of multiple stakeholders including the public.

8.1 Role of Engineer: Meaningfully interpret "... hold paramount the health, safety, and welfare of the public ... and the protection of the environment", and is able to describe the role of the civil engineer within society

8.2 Professional Behaviour: Demonstrates professional etiquette as described by APEGBC

9.1 Current Affairs: Demonstrates an awareness of current affairs, particularly as they relate to the civil engineering profession.

9.2 Sustainability: Is able to apply sustainability concepts, including holism (i.e., systems thinking as it relates to large-scale interactions between societal, economic, technical and ecological systems), knowledge integration, working with others, and engineering-relevant sustainability decision - support concepts such as life-cycle analysis, large-scale mass and energy balances, and multi-criteria decision matrices.

10.1 Ethical and Equitable Behaviour: Demonstrates behaviour congruent with academic integrity and equity expectations of UBC and the Faculty of Applied Science

12.1 Self-Regulated Learning: Demonstrates a motivation to learn and achieves learning outcomes through strategic action

12.2 Self-Efficacy: Demonstrates belief in one's own ability to achieve goals

12.3 Reflection: Demonstrates higher order thinking through reflective exercises and constructive self-criticism

Grade Distribution

CIVL 202 Marks Allocation

The marks for the course are assigned as follows:

<u>deliverable</u>	<u>mark</u>	<u>due dates</u>
Weekly Assignments*	10% (1% for each completed assignment)	approx weekly
Midterm	10%	Monday Feb 29 (11:00am)
CBEL Term Project Journal 1	2.5%	Friday Feb 6 (11:59pm)
CBEL Term Project Journal 2	2.5%	Within 3 days of attending the stakeholder event
CBEL Term Project (individual Mark)	15%	Friday April 2 (11:59pm)
Participation in Small Group Discussions	15%	weekly
Lead a discussion** (and submit references)	15%	Once during the term
Final Examination	30%	April Exam Period
Total	100%	

*Note that you are tasked with completing 9 out of 10 assignments. If you complete all 9 assignments, you will earn 1 bonus mark.

** With partner

Detailed descriptions of the deliverables listed above is available on the Home Page of the CIVL 202 CONNECT site.

For information about the CBEL Term Project (including the final report and the journal entries), go to the “CBEL AND ENGINEERING SUSTAINABILITY” CONNECT site.

Course Communication and the Use of Connect

The majority of the communication between you and Dr. Nesbit (e.g. important course announcements) will take place via the weekly plenary sessions and the CIVL 202 CONNECT site. CONNECT will be used primarily for the posting of documents and the submission of deliverables. Neither its email nor its chat capabilities will be used for this course.

Professional Conduct Expectations

- It is expected that all students are familiar with the APEGBC Code of Ethics, and that you will act in a Professional Engineering manner, working in cooperative teams, and respecting the opinions of your peers and your clients.
- ***Be aware of the plagiarism policies of the University of British Columbia.***
- All deliverables should be presented in a professional manner, and will be graded on content, presentation, including English standards.

Tips for Doing Well in CIVL 202

- Write all important dates in your daily calendar.
- Submit all assignments on or before the due date (marks deducted for late submissions).
- Fully participate in your weekly discussions. This means that you need to practice speaking up and sharing your ideas during the discussions. See your discussion TA if you need help with this.
- Plan the discussion you and your partner will lead well in advance of your discussion date!