

CIV E 789 Advanced Topics in Civil Engineering

Fall 2025 - September 03 to December 08

Class time: 17:00-20:00 Location: NRE 1-143

Instructor:

Robert Johnson, MaSc, P.Eng, He/Him

rcj1@ualberta.ca

Office Hours: 1 hour before lectures

Course Description:

*3 (fi) (either term, 3-0-0",) Principles of Concrete as a Construction Material. Introducing the components, properties, specifications and the fundamental applications of the material that builds our world, now and in the future.

Prerequisites: None

Course synchronous and asynchronous content delivery schedule:

This course will be taught in-person.

Land Acknowledgment:

The University of Alberta respectfully acknowledges that we are located on Treaty 6 territory, a traditional gathering place for diverse Indigenous peoples including the Cree, Blackfoot, Métis, Nakota Sioux, Iroquois, Dene, Ojibway/ Sauteaux/Anishinaabe, Inuit, and many others whose histories, languages, and cultures continue to influence our vibrant community.

Course Objectives & General Content:

The goal for this course is for students to develop a fundamental understanding of the components, properties, specifications, and applications of the material that builds our world, now and in the future.

Student objectives for this course will include:

1. Use engineering principles to relate the raw materials through production, testing, and placement of concrete to the properties of a finished structure.
2. Develop a fundamental knowledge of the specification process and how to use the specification process to achieve design objectives.
3. Apply their comprehension of the course subject matter to develop solutions to real-world problems.

Learning Outcomes:

By the end of this course, students should be able to:

1. Students will showcase their understanding of course materials through biweekly industry-styled reports, aligned with each course section, as well as a comprehensive final examination.
2. Deliver solutions to hypothetical clients based on real world scenarios.
 - a) Provide general project recommendations
 - b) Respond to raw materials inquiries
 - c) Present guidance on selecting a durable concrete
 - d) Use first principles to identify site constructability irregularities
 - e) Assess the viability of sustainable and/or novel solutions to problems.
3. Interrelate complex technical concepts from a comprehensive understanding of the course matter in a simplified manner.
4. Prepare reports that focus on clear, concise communication, eliminating unnecessary details while emphasizing key points.
5. Identify the most correct responses to simple queries, using their comprehension of the course's core concepts, by extracting key information from complex questions.

Marking Scheme:

Activity	(A)Synchronous	Due/Scheduled	Weight
RFI# 1-3 and 5-6 (Memos)	Synchronous	See Tentative Schedule	25%
RFI# 4 and 7 (Letter Reports)	Synchronous	See Tentative Schedule	30%
Final Cumulative Examination	Synchronous	December 4, 2025	45%

Instructors have the leeway to deviate from this average and can assign grades based on their own scheme. All grades are approved by the department chair (or delegate). The office of the Dean has final oversight on all grades.

Term Work

All term work solutions will be posted no later than the last day of classes. All term work will be returned to students by the final day of classes, with the exception of major term work due in the last week of classes. The latter will be returned by the day of the final examination or the last day of the examination period if there is no final examination in the course as per university policy; instructors will make accommodations to return these term work. It is the responsibility of the student to pick up all their term work at the specified time and place. Any unreturned term work, shall be retained and then shredded six months after the deadline for reappraisal and grade appeals. Final examinations will be kept for one year as required by university guidelines and the Government of Alberta's Freedom of Information and Protection of Privacy Act.

Calculator Policy

Only approved non-programmable calculators are permitted in examinations. Any calculator taken into an examination must have a sticker identifying it as an acceptable non-programmable calculator (gold sticker). Students can purchase calculators at the University Bookstore with the stickers already affixed. Calculators purchased elsewhere can be brought to the Student Services where the appropriate sticker will be affixed to the calculator.

Expectations for AI use

In this course, our primary focus is to cultivate an equitable, inclusive, and accessible learning community

that emphasizes individual critical thinking and problem-solving skills. To ensure a fair and consistent learning experience for all students, the use of advanced AI tools such as ChatGPT or Dall-E 2 is strictly prohibited for all academic (written/coding/creative/etc.) work, assignments, and assessments in this course. Each student is expected to complete all tasks without substantive assistance from others, including AI tools.

Any use of AI tool in your academic work may result in academic penalties and be considered an act of cheating and a violation as outlined in the relevant sections of University of Alberta (November 2022) [Code of Student Behaviour](#).

Text and References (Mandatory):

Cement Association of Canada. Design and Control of Concrete Mixtures (EB101), 9th Edition.

Website:

Website Accessible via CANVAS

Previous Examples of Evaluative Materials:

Sample RFIs and final exams will be posted on Canvas.

Did you know that the University of Alberta has various low-to-no-cost services to help students succeed? Visit <http://www.deanofstudents.ualberta.ca/> for information about the academic, wellness, and various other support services available to U of A students. It's never too early or too late to seek help!

University and faculty policies



Respect and professionalism



The Faculty of Engineering is committed to fostering and protecting an equitable, inclusive, and respectful work and study environment in line with University of Alberta policies and professional engineering industry standards.

The faculty prepares students to uphold industry standards to become a Professional Engineer (P.Eng). Therefore, respect, professionalism, and accountability must be upheld within the Faculty of Engineering and the University of Alberta.

Academic integrity and student conduct

The University of Alberta is committed to the highest standards of academic integrity and honesty, as well as maintaining a learning environment that fosters the safety, security, and the inherent dignity of each member of the community, ensuring students conduct themselves accordingly. Students are expected to be familiar with the standards of academic honesty and appropriate student conduct, and to uphold the policies of the University in this respect.

Students are particularly urged to familiarize themselves with the provisions of the [Student Academic Integrity Policy](#) and the [Student Conduct Policy](#), and avoid any behaviour that could

potentially result in suspicions of academic misconduct (e.g., cheating, plagiarism, misrepresentation of facts, participation in an offence) and non-academic misconduct (e.g., discrimination, harassment, physical assault). Academic and non-academic misconduct are taken very seriously and can result in suspension or expulsion from the University.

All students are expected to consult the [Academic Integrity website](#) for clarification on the various academic offences. All forms of academic dishonesty are unacceptable at the University. Unfamiliarity of the rules, procrastination or personal pressures are not acceptable excuses for committing an offence. Listen to your instructor, be a good person, ask for help when you need it, and do your own work – this will lead you toward a path to success. Any academic integrity concern in this course will be reported to the College of Natural and Applied Sciences. Suspected cases of non-academic misconduct will be reported to the Dean of Students. The College, the Faculty, and the Dean of Students are committed to student rights and responsibilities, and adhere to due process and administrative fairness, as outlined in the [Student Academic Integrity Policy](#) and the [Student Conduct Policy](#). Please refer to the policy websites for details on inappropriate behaviours and possible sanctions.

The College of Natural and Applied Sciences (CNAS) has created an [Academic Integrity for CNAS Students](#) eClass site. Students can self-enroll and review the various resources provided, including the importance of academic integrity, examples of academic misconduct & possible sanctions, and the academic misconduct & appeal process. Students can also complete assessments to test their knowledge and earn a completion certificate.

"Integrity is doing the right thing, even when no one is watching." – C.S. Lewis

The Faculty of Engineering expects an environment free of harassment, discrimination, and bullying. We encourage you to talk to the [Office of Safe Disclosure and Human Rights](#) about experiences, questions, or concerns. Additional resources and support for students are attached below.

Engineering students studying in the province of Alberta must also follow the [Code of Ethics](#) set by the Association of Professional Engineers and Geoscientists of Alberta (APEGA).

Course outline policies, course requirements, evaluation and grading information can be found in the [University Calendar](#).



Safety during learning activities



In all Faculty of Engineering courses, labs, seminars or other learning activities, safety is of paramount importance. In some cases, laboratory work in a program requires high standards for risk management to keep potential hazards safely under control.

Anyone found to be unable to function safely in the class, lab, seminar or other learning activity may be asked to leave or be removed for their and the safety of other participants and instructors in alignment with the [Student Academic Integrity Policy](#) and [Student Conduct Policy](#). As members, or prospective members, of the engineering profession, it is your responsibility to identify and inform the proper authorities of unsafe work.

Audio and video recording



Audio or video recording, digital or otherwise, of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan.

Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used solely for personal study and is not to be used or distributed for any other purpose without prior written consent from the content author(s).

Only those items specifically authorized by the instructor may be brought into the exam facility. Students must not bring any unauthorized electronic device into an examination room, including cell phones or other devices.



Student services and support

Health & Wellness Support

Counselling and Clinical Services

Free, short-term, appointment-based counselling and psychiatric services. Also offers drop-in workshops. Book an initial consultation. Visit uab.ca/CCS to learn more.

Wellness Supports Social Workers

Free one-on-one support for students in the areas of housing, finances, academics, personal wellness, life skill development, family dynamics, system navigation, and any area of life where there is a desire to invite change. Visit uab.ca/wellness to learn more.

Sexual Assault Centre

Free, anonymous, and confidential drop-in counselling. Visit uab.ca/UASAC to learn more.

The Office of Safe Disclosure & Human Rights (OSDHR)

The OSDHR advises confidentially on sensitive issues you may not feel comfortable solving on your own. Contact the OSDHR if you want to get help or to make a report while keeping your privacy. Visit uab.ca/OSDHR to learn more.

HIAR (Helping Individuals at Risk)

If you're worried about someone, contact HIAR, who can help assess risk and connect individuals to support. Learn more at uab.ca/HIAR.

Immediate External Supports

Health Link Alberta: 811
Suicide Crisis Helpline: 988



Academic support



Academic Success Centre

Access to a variety of services to maximize your academic success. Learn more at uab.ca/ASC.



Accessibility Resources

Connects students with disabilities to accommodations. Learn more at uab.ca/Access under accommodations + accessibility.



Decima Robinson Support Centre

Academic support for 100- or 200-level introductory calculus, linear algebra and statistics courses. Visit uab.ca/DSC to learn more.



Engineering Student Success Centre

The Faculty of Engineering provides drop-in tutoring for first-year courses. Visit uab.ca/ESSC to learn more.



Office of the Student Ombuds

Call for complex problems and conflict mediation. Learn more at uab.ca/ombuds.



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Financial support



Student Service Centre

For awards and other funding support. Learn more at uab.ca/ask.



Campus Food Bank

The Campus Food Bank Society is an independent charity supporting University of Alberta students, faculty, staff, and alumni for up to five years. For additional information visit their website at campusfoodbank.com.



Tentative Class Schedule CIV E 789

Week	Date	Topic	Assessment Timeline
1	Sep 4	Introduction to Concrete Materials	
2	Sep 11	Cementitious Materials and Water	RFI# 1
3	Sep 18	Aggregates and Admixtures	
4	Sep 25	Fresh Properties and Testing	RFI# 2
5	Oct 2	Hardened Properties and Testing	
6	Oct 9	Durability Properties	RFI# 3
7	Oct 16	Performance Specifications	
8	Oct 23	Specialty Applications and Specifications	RFI# 4
9	Oct 30	Concrete Mix Designs	
10	Nov 6	Batching and Delivery, Formwork, Placement, and Technology	RFI# 5
11	Nov 13	Reading Week	
12	Nov 20	In-place concrete from deposit to reclamation	RFI# 6
13	Nov 27	Sustainability and the Future of Concrete	RFI# 7
14	Dec 4	Final Examination	