



# CIV E 676: BEHAVIOUR AND DESIGN OF MASONRY STRUCTURES

Fall 2025 (September 2<sup>nd</sup> – December 8<sup>th</sup>, 2025)



Department of Civil and Environmental Engineering  
University of Alberta, Edmonton, Canada

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, Inuit, and many others whose histories, languages, and cultures continue to influence our vibrant community.

<b>Lectures:</b>	M, 1:00 PM – 3:50 PM	<b>Location:</b>	NREF 2-080
<b>Instructor:</b>	Dr. Carlos Cruz-Noguez	<b>Instructor:</b>	Dr. Clayton Pettit
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## COURSE DESCRIPTION

CIV E 676 – LEC A1 – 3.0 Units (3-0-0)

Historical developments. Masonry units, mortars and grouts. Behaviour, strength, and stability of masonry under axial compression. Reinforced masonry in bending and combined axial load and bending. Ductility and joint control. Design application including discussion of code requirements.

## COURSE CONTENT DELIVERY SCHEDULE

All course material will be delivered in person and on campus. If in the unforeseen event that gatherings on campus are prohibited, the lecture material will be delivered and recorded online through Zoom during the scheduled lecture times. If the instructor has fallen ill and/or cannot host the in-person or online lecture, recordings of the lecture will be made available on Canvas.

## COURSE OBJECTIVES

Topics to be covered in this course include:

- Introduction, Masonry Materials, and Assemblage Testing
- Design of Masonry Beams
- Moment-Curvature Response of Masonry
- Unreinforced and Reinforced Out-of-Plane Masonry Walls
- Slenderness Effects in Tall Masonry Walls
- Columns and Pilasters
- Fundamentals of Earthquake Engineering and Seismic Analysis
- Unreinforced and Reinforced In-Plane Masonry Walls
- Ductility Requirements for Masonry Walls

**LEARNING OUTCOMES**

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

1. Describe the principles of mechanics, materials, and structural analysis behind the masonry code provisions.
2. Analyze reinforced and unreinforced masonry members under the framework of the Canadian concrete masonry standards.
3. Design reinforced and unreinforced masonry members under the framework of the Canadian concrete masonry standards.
4. Evaluate the seismic safety of masonry structures under earthquake loads.

**COURSE ASSESSMENTS**

Course assessments consist of four equally weighted assignments, a midterm exam, and a final exam. Details for each assessment are provided below.

<b>Assessment</b>	<b>Weight</b>	<b>Due Dates</b>
Assignments	30%	See Assignment Descriptions
Midterm Exam	30%	TBD
Final Exam	40%	December 15th, 2025

**COURSE WEBPAGE**

University of Alberta Canvas Dashboard ([canvas.ualberta.ca](https://canvas.ualberta.ca))

**TEXTBOOKS AND RESOURCES**

Mandatory:

- CSA S304-14 (Available through the University of Alberta library)

Recommended:

- Masonry Structures: Behaviour and Design (2<sup>nd</sup> Edition) by Banting, B. and Drysdale, R.

**ASSESSMENT POLICY**

- All assignments and exams must be completed individually.
- Assignments must be submitted by the specified due dates. Late assignments will not be accepted, and solutions will be posted after the due date.
- The midterm and final exam will be closed book. However, students are permitted to bring a self-prepared, two-page formula sheet and a calculator.
- No make-up midterm or final exam will be permitted. If a student misses the final exam, the student must apply for a final exam deferral with the Faculty of Engineering.
- Any suspected violation of academic integrity is required to be reported and may result in disciplinary action as per the Code of the Student Behaviour (available on the course Canvas webpage).

## **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**

The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. All students are expected to follow the University of Alberta's Student Code of Behaviour and Student Conduct Policy. The faculty 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. 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).

### **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 Code of Behaviour 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 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).

### **Term Work**

All term work 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. It is the responsibility of the student to pick up all of 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 the university guidelines and the Government of Alberta's Freedom of Information and Protection of Privacy Act.

## **HEALTH AND WELLNESS SUPPORT**

### **Counselling and Clinical Services ([uab.ca/CCS](http://uab.ca/CCS))**

Counselling and Clinical Services provides free, short-term mental health support, including access to counsellors, psychiatrists, and drop-in workshops. If you're struggling or need someone to talk to, they're here to help you take the first step.

### **Wellness Supports ([uab.ca/wellness](http://uab.ca/wellness))**

Wellness Supports offer free, one-on-one support to help you navigate challenges related to housing, finances, academics, personal wellness, life skills, family dynamics, and more. Reach out if you're facing difficulties or looking to make positive changes in any area of your life.

### **Sexual Assault Centre ([uab.ca/UASAC](http://uab.ca/UASAC))**

The Sexual Assault Centre provides free, anonymous, and confidential drop-in counselling for anyone impacted by sexual violence.

### **The Office of Safe Disclosure and Human Rights ([uab.ca/OSDHR](http://uab.ca/OSDHR))**

The Office of Safe Disclosure and Human Rights (OSDHR) advises confidentially on sensitive issues you may not feel comfortable solving on your own. Contact OSDHR if you want to get help or to make a report while keeping your privacy.

### **Helping Individuals at Risk ([uab.ca/HIAR](http://uab.ca/HIAR))**

If you're worried about someone, contact Helping Individuals at Risk (HIAR), who can help assess risk and connect individuals to support.

### **Immediate External Supports**

Health Link Alberta: 811

Suicide Crisis Helpline: 988

## **FINANCIAL AND ACADEMIC SUPPORT**

### **Office of the Student Ombuds ([uab.ca/ombuds](http://uab.ca/ombuds))**

The Office of the Student Ombuds offers confidential support for navigating complex problems, resolving academic or interpersonal conflicts, and understanding your rights as a student.

### **Student Service Centre ([uab.ca/ask](http://uab.ca/ask))**

The Student Service Centre can help you with questions about awards, scholarships, and other funding opportunities.

### **Campus Food Bank ([campusfoodbank.com](http://campusfoodbank.com))**

The Campus Food Bank is an independent charity that provides food support to University of Alberta students, staff, faculty, and alumni (up to five years after graduation).

### **Academic Success Centre ([uab.ca/ASC](http://uab.ca/ASC))**

The Academic Success Centre offers a range of services to support your academic journey, including help with studying, time management, writing, and more. It also provides accessibility and accommodation resources for students who face barriers to full participation in university life. If you need support or accommodations, they're here to help you succeed in an inclusive and equitable learning environment.