CIV E 662 – Course Syllabus
Structural Timber Design
Fall 2025

Class time: Wednesday 14:00-16:50 **Location:** NRE 2-090

Instructor:

Hossein Daneshvar (He/Him), *PhD, PEng, PE, PMP, LEED Green Associate*
Assistant Professor
Department of Civil and Environmental Engineering
6-308 Donadeo Innovation Centre for Engineering (ICE)
Office hours: Available by appointment via email (hossein.daneshvar@ualberta.ca)

Course Description:

*3 (fi) (either term, 3-0-0) The objective of this course is to provide students with a solid understanding of wood as a structural material and an in-depth review of design provisions in Canadian timber design standards for selected members, connections and assemblies. The topics covered include basic wood characteristics, physical and mechanical properties of wood, a review of traditional and modern engineered wood products, and design of timber members subjected to bending and axial loads, connections and lateral load resisting systems. This course will help prepare students for graduate thesis research in a timber engineering topic and for performing structural design of timber structures.

Prerequisites: Structural engineering background at the BSc. Level

Teaching Assistant (TA):

Russell Ramil (He/Him), *Graduate Student, E.I.T.*
Office hours: Available by appointment via email (ramil@ualberta.ca)

Course Objectives & General Content:

The course lectures can be classified into two categories. The first category aims to provide students with a solid understanding of wood as a structural material, as well as an overview of modern structural wood products and systems. The second category discusses the provisions in the Canadian wood design standard related to the design of bending members, axially loaded members, connections, light wood and mass timber shear walls and diaphragms. The focus is on explaining the technical basis of the design provisions in the Canadian timber design standard. This course will help prepare students for graduate thesis research in timber engineering and for performing structural design of wood members, connections, and assemblies. The course material will primarily be delivered via lectures. Students' performance will be assessed based on class quizzes, design project reports, and the final exam.

Learning Outcomes:

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

1. To understand how wood would respond under different types of applied stresses.

2. To understand how physical and mechanical properties are affected by environmental factors and growth characteristics in wood.
3. To predict specific physical and mechanical properties of wood based on its specific gravity.
4. To recognize and understand the attributes of various traditional and modern structural wood products and systems.
5. To design timber members and timber-concrete composite members under bending action.
6. To design timber members subjected to axial load and combined axial and bending actions.
7. To design light and heavy timber connections with mechanical fasteners.
8. To design light wood and mass timber shear walls and diaphragms.

Land Acknowledgement:

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

Contingency Planning for Disruptions and Unforeseen Challenges:

If the instructor is unable to attend class in person, a live remote link, pre-recorded or post-recorded lectures will be made available through Canvas. Students are expected to stay up to date by checking announcements posted via email, in class, and on Canvas.

Text and References (Mandatory):

1. Wood Handbook (posted on Canvas for student use only; pending confirmation)
2. CSA O86-19 (posted on Canvas for student use only)

Text and References (Recommended):

- Wood Design Manual 2020 (contains CSA O86-19 Engineering Design in Wood) - can be purchased from Canadian Wood Council online with a student discount of 40% (https://webstore.cwc.ca/student-promotion/; pending confirmation by CWC)
- Introduction to Wood Design - can be purchased from the Canadian Wood Council online with a student discount of 40% Link to purchase from Canadian Wood Council website (https://webstore.cwc.ca/student-promotion/; pending confirmation by CWC) https://webstore.cwc.ca
- National Building Code of Canada 2020
  Link for free download from the National Research Council website
  https://nrc-publications.canada.ca/eng/view/object/?id=515340b5-f4e0-4798-be69-692e4ec423e8

Course Deliverables and Weights:

Course Deliverable	Due/Scheduled (Tentative[1])	Weight
Quiz 1 [2]	October 8, 2025	10%
Quiz 2 [2]	November 5, 2025	15%
Final Exam	December 17, 2025; 8:30 AM	30%
Report A	October 3, 2025	10%
Report B	October 31, 2025	15%
Report C	December 5, 2025	20%

[1] Subject to modification depending on the progression of the course.
[2] No makeup quiz is available.

The Faculty recommended grade point average for a 600-level course is 3.3. 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 by the last day of classes. All term work will be returned to students by the final day of classes, except for major term work, which is 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 this term's work. It is the student's responsibility to collect 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. The final examination/report will be retained for one year as required by university guidelines and the Government of Alberta's Freedom of Information and Protection of Privacy Act.

Reports:

Reports are to be completed in **teams of two**, with one submission per team. While the workload for Reports B and C will be more substantial, students may divide tasks in any mutually agreeable manner. Nevertheless, each student is responsible for understanding all course material, regardless of task distribution. All reports must be submitted electronically through Canvas by the stated deadlines. **Late submissions will not be accepted unless prior arrangements have been approved by the instructor or the TA under exceptional circumstances.**

Additional Notes:

- As mentioned before, reports are completed in teams of two students. Students may choose their own partners and must email the TA their names and ID numbers. If you are unable to find a partner, the TA will assist in forming teams.
- There are multiple ways to approach the project as a team. Tasks may be divided (e.g., one student prepares drawings while the other performs calculations), or both members may work through all aspects independently and compare results. Real-time collaboration is also encouraged, particularly

for complex parts of the design. While tasks may be divided, **each student is expected to understand the complete submission** and fully participate in the team process.

- It is recommended to appoint a project manager for each report to coordinate the work and ensure timely submission. This role should be rotated among team members. Developing a clear work plan and schedule will help eliminate errors and improve the quality of the final report. Submissions should be professional, well-organized, and complete, reflecting the highest standards of engineering practice. Reports should include detailed calculations with correct units, rational assumptions, code references, and precise drawings suitable for a client or reviewer.
- Reports must be submitted as a single PDF file on Canvas before the stated deadlines. Only one team member needs to upload the report, and all members will receive the same grade.
- Reports A, B, and C build upon each other:
    a. Report A (Design Load Calculations) lays the foundation by determining design loads and critical load combinations.
    b. Report B (Gravity Load Resisting System) applies those loads to the design of roof, floor, and wall assemblies.
    c. Report C (Lateral Load Resisting System & Connections) finalizes the design by addressing shear walls, diaphragms, and connections.

Quizzes and Final Exam:

Two quizzes will be administered on tentative dates during the scheduled class period (14:00–16:50). The quizzes will evaluate achievement of the course learning outcomes and may cover material from lectures, assigned readings, or supplementary course content. Please note that the schedules for Quiz 1 and Quiz 2 are tentative and may be adjusted at the instructor's discretion, depending on the lecture flow. No makeup quiz is available. The final exam will be administered at the time and location announced by the University on Bear Tracks.

Lectures:

All lectures will be delivered in person at **NRE 2-090**. Lecture materials are provided for individual learning purposes only and are protected under copyright. Students are not permitted to record, reproduce, or redistribute lecture content in any form without prior consent from the instructor.

Communication:

To ensure a timely response, please include “CIV E 662” in the subject line of your message. Students are expected to maintain a professional tone in all communications. Emails will typically be answered within 1–2 business days. Office hours are available with both the instructor and the teaching assistant (TA). They are intended for general lecture questions, clarification of course content, class-related concerns, and academic or professional advising; however, they are not a substitute for class attendance. Students are strongly encouraged to attend all lectures on a regular basis. Questions specifically related to course reports should be directed to the TA.

Calculator Policy:

There is no calculator policy in this course; students are free to use the calculator they wish for all assessments.

Active Learning:

A central goal of this course is to deepen your understanding of key concepts, methods, and ideas in structural engineering. To achieve this, students are expected to come to class prepared to engage actively with the material. Participation may include contributing to discussions, working through problem-solving exercises, and collaborating with peers. Being ready to engage will enhance both your own learning and the collective learning experience of the class.

Time zone:

All times referenced in the lecture/lab schedule are local Edmonton time (GMT-6).

Device Policy:

Students are expected to maintain a focused and respectful learning environment. Cell phones must be silenced or turned off during lectures. Laptop computers may be used for note-taking or course-related activities only. Activities such as emailing, web browsing, or unrelated work during class are not permitted, as they can disrupt both your learning and that of others.

Expectations for AI use:

In this course, our primary focus is on cultivating an equitable, inclusive, and accessible learning community that emphasizes individual critical, creative, and affective thinking, as well as disciplinary problem-solving skills. While it is reasonable to assume AI-use might accelerate some aspects of coursework, the determination has been made not to use such tools. To achieve the identified course learning outcomes, students must be given learning opportunities and tasks that enable them to develop and demonstrate their skills and knowledge across course- and discipline-specific projects, assignments, and assessments.

To ensure a just 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 work (written/coding/creative/etc) in this course, including reports/assignments and assessments. Each student is expected to complete all tasks without substantive assistance from others, including AI tools.

IMPORTANT: Please note that AI use is strictly prohibited in coursework, assignments, and assessments. Failure to abide by this guideline may be considered an act of cheating and a violation, as outlined in the relevant sections of the University of Alberta Code of Student Behaviour (November 2022).

Course Policies:

What you can expect from me

I am 100% committed to your learning, and you can expect feedback on your work and a response from me via email within two business days. I will not read emails on the weekends, except on the days preceding the final exam. Additionally, I will regularly check in with the TA to ensure that the provided material is sufficient. Finally, you can expect fair, unified, and consistent grading from me and the TA.

What we expect from you

We expect that you engage in all learning activities in this course. This means that it is crucial to thoroughly read the assigned lecture notes, engage in lecture sessions, submit the reports, and participate in class discussions. You must display honesty and engagement throughout the class as per the University of Alberta Graduate Handbook.

Please review the UofA and the Faculty of Engineering Code of Student Behaviour.

Academic Integrity

The University of Alberta places a very high value on academic integrity. Code of Student Behaviour outlines what students are prohibited from doing and gives the rationale for those rules.

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

Course Schedule (Tentative)

Date [1]	Week	Lecture Topic [2]	Note [1,2]
9/3/2025	1	00 Course Introduction 01 Design principles and loading	
9/10/2025	2	01 Design principles and loading 02 Physical properties of wood	Design project introduction (TA)
9/17/2025	3	03 Mechanical properties of wood	
9/24/2025	4	04 Structural wood products 05 Structural wood systems	
10/1/2025	5	06 Design of bending members	Report A due Oct. 3
10/8/2025	6	06 Design of bending members	Quiz 1: 01-04 (1.0/1.5h)
10/15/2025	7	07 Design of axially loaded members	
10/22/2025	8	08 Design of ductile connections	
10/29/2025	9	08 Design of ductile connections	Report B due Oct. 31
11/5/2025	10	09 Design of brittle connections, 10 Design of light wood frame shear wall and diaphragms	Quiz 2: 05-07 (1.5/2.0h)
11/12/2025	11	Reading Week	
11/19/2025	12	10 Design of light wood frame shear wall and diaphragms	
11/26/2025	13	11 Design of CLT shear wall and diaphragms	
12/3/2025	14	12 Other mass timber lateral load resisting systems Review	Report C due Dec. 5
12/17/2025 [3]		Final Exam (Location TBA)	Final Exam: 08-12 (2.0/2.5h)

[1] The due dates for the course deliverables and quizzes may change depending on the lecture progress
[2] Lectures may be modified/replaced/supplemented with live/recorded lectures, etc.
[3] Tentative Date on Bear track @ 8:30 am

Grading Scheme

According to University policy, final letter grades will be based on a combination of absolute achievement and relative performance within the class. A minimum grade of C- is required for credit. The following marking scheme may be used to determine the final grade; however, the instructor reserves the right to adjust the scheme at their discretion, depending on the overall performance of the class.

95% - 100% A+
85% - 94% A
80% - 84% A-
75% - 79% B+
70% - 74% B
65% - 69% B-
60% - 64% C+
55% - 59% C
50% - 54% C-
45% - 49% D+
40% - 44% D
< 40% F

The University of Alberta acknowledges that we are located on Treaty 6 territory, and respects the history, languages, and cultures of the First Nations, Métis, Inuit, and all First Peoples of Canada, whose presence continues to enrich our institution.

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.

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.