



Course Number	ARCH 694	Classroom	Zoom
Course Name	Studio Research Selective (Energy and Environmental Performance)		
Pre/Co-Requisites			
Instructor	Dr. Chi Dara	Office Hours/Location	Virtual appointment
	Email: chinyere.dara1@ucalgary.ca	Phone: 3068504830 (cell)	
Class Dates	Mandatory real-time Zoom classes: Wednesdays 3:00pm – 6:00pm February 13 th – April 12 th		
Instructor Email Policy	Please note that all course communications must occur through your @ucalgary email, and I will respond to emails sent via student's @ucalgary emails within 48 hours.		
Name and Email of Teaching Assistant(s)			

Course Description

Buildings and the built environment are responsible for significant portion of Canada's total energy consumption, and related Greenhouse Gas (GHG) emissions. To reduce the negative impact of buildings on the environment, design decisions should be carefully considered, at the early design stages. Such design decisions include building massing and form, envelope design (opaque and transparent), systems design and materials selection, etc. Architects are usually responsible for such sustainable design decisions, and thus possess the means to create environmentally responsible buildings.

This course presents to students the tools and techniques to critically analyze the impact of their design decisions on energy and environmental performance of buildings. It explores industry-led sustainable practices, such as measuring embodied carbon of materials, energy-efficient design, sustainable construction, and whole building life cycle assessment; to gain better understanding of real-world application of various sustainable architectural concepts.

The course consists mostly of individual and group assignments, projects and design crits. Lectures, presentations, and tutorials will also be organized to support students' projects. The final project submission will cover development of baseline and iterative design as final design solutions/decisions for an improved energy and environmental performance (employing computer-based design aids).

Course Hours: 1.5 units; (3-0)

Online Delivery

The course lectures, presentations and design crits will be live Zoom sessions during the timetabled periods as indicated in the course schedule. The live Zoom sessions will be used for design crits, group exercises, tutorials, discussions and follow up on assignment progress.

This course will take place online via Desire2Learn (D2L) and Zoom. Students are required to participate in the asynchronous learning tasks using the D2L learning environment and synchronous Zoom sessions. If unable to participate live due to unforeseen circumstances, inform the instructor in advance to work out an alternative participation activity (e.g., watch the recordings, submit a brief reflection, and actively contribute to the follow-up online discussion). Lecture videos will be posted on D2L for asynchronous learning.

Course Learning Outcomes

Learning Outcomes:

This course will enhance the understanding of the integrated design process and will highlight the impact of building design and materials choices on energy and environmental performance.

Upon completion of this course, students will know and be able to:

1. Assess the main effect of building design, including massing, envelope design, and embodied carbon of materials through iterative design process.
2. Develop analytical and critical standpoint for the design of environmentally sustainable buildings.
3. Develop creative design methodologies for whole building performance analysis that integrate low carbon technologies together with energy efficiency and architectural functional design.
4. Develop skills to perform simple energy simulation and life cycle carbon assessment for different building assemblies and systems.
5. Research, analyze and propose strategies to reduce the building's operational energy and embodied carbon emissions compared to a baseline building while maintaining design intent and needs of the project.
6. Prepare and report final design choices/solutions that fully demonstrate an understanding of attaining zero carbon building design relative to industry practices.

Learning Resources

Recommended textbooks and report:

Matthews, H. S., Hendrickson, C. T., & Matthews, D. H. (2015). Life cycle assessment: Quantitative approaches for decisions that matter. e-book available, download for free at: <https://www.lcatextbook.com/>

Hachem, Caroline. (2020). Solar Buildings and Neighborhoods: Design Considerations for High Energy Performance. 10.1007/978-3-030-47016-6.

Bowick, M., O'Connor, J., Meil, J., Salazar, J., Cooney, R. (2022). National guidelines for whole-building life cycle assessment. National Research Council Canada: Ottawa, ON. 112 pp. e-copy available, download for free at <https://nrc-publications.canada.ca/eng/view/ft/?id=f7bd265d-cc3d-4848-a666-8eeb1fbde910>

Software: Autodesk Revit 2020 with Energy Simulation and Tally® as Add-in

Technology requirements (D2L etc.): In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Broadband internet connection
- [Student IT Resources](#)

Most current laptops will have a built-in webcam, speaker and microphone.

Additional Classroom Conduct and Related Information

Guidelines for Zoom Sessions in Online Classes

Students are expected to participate actively in all Zoom sessions and to turn on their webcam. Please join our class in a quiet space that will allow you to be fully present and engaged in the Zoom sessions. Students must behave in a professional manner during the session. Students, employees, and academic staff are also expected to demonstrate behaviour in class that promotes and maintains a positive and productive learning environment.

Assessment and Evaluation Information

Attendance and Participation Expectations: students are expected to attend synchronous sections and participate actively in individual and group assignments.

Guidelines for Submitting Assignments: assignment should be submitted before the end of the day (before midnight) of the deadline date through D2L Dropbox.

Final Examinations: there is no scheduled final examination for this course other than projects.

Expectations for Writing (<https://www.ucalgary.ca/pubs/calendar/current/e-2.html>):

Late Assignments: assignments submitted late 1 mark per day late will deducted for each late submission of assignment.

Means of Evaluation

Evaluation will be based on:

Conceptual Baseline Design: 20%

- The preliminary energy and environmental impact performance analysis of conceptual baseline design (reference building) will rely on knowledge gained in the first two weeks and previous sustainability related courses.

Whole Carbon Envelope Design Project: 70%

- Project Part A – 45%: Written analytical report of improved design as low energy and low carbon design. The submission will demonstrate meeting at least 20% reduction in whole carbon Global Warming Potential (GWP) compared to baseline design to reflect industry-standard practices. It should cover reduction in embodied carbon emissions demonstrated through careful materials/systems selections, as well as targeted reduction in operational energy through passive and active solar design and other technologies.
- Project part B – 25%: Visual and verbal presentation highlighting five (5) low embodied impact building envelope elements/assembly and demonstrate application of least 2 out of the 5 proposed strategies in your Studio Design Project.

Participation: 10%

Participation grades will be accounted for during the design crits and tutorials.

Grading Scale

Grade	Grade Point Value	4-Point Range	Percent	Description
A+	4.00	4.00	95-100	Outstanding - evaluated by instructor
A	4.00	3.85-4.00	90-94.99	Excellent - superior performance showing comprehensive

				understanding of the subject matter
A-	3.70	3.50-3.84	85-89.99	Very good performance
B+	3.30	3.15-3.49	80-84.99	Good performance
B	3.00	2.85-3.14	75-79.99	Satisfactory performance
B-	2.70	2.50-2.84	70-74.99	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	2.15-2.49	65-69.99	All final grades below B- are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements.
C	2.00	1.85-2.14	60-64.99	
C-	1.70	1.50-1.84	55-59.99	
D+	1.30	1.15-1.49	50-54.99	
D	1.00	0.50-1.14	45-49.99	
F	0.00	0-0.49	0-44.99	

A student who receives a "C+" or lower in any one course will be required to withdraw regardless of their grade point average (GPA) unless the program recommends otherwise. If the program permits the student to retake a failed course, the second grade will replace the initial grade in the calculation of the GPA, and both grades will appear on the transcript.

The School of Architecture, Planning and Landscape will not permit the Flexible Grade Option (CG Grade) for any course offered by the School. (<https://www.ucalgary.ca/pubs/calendar/current/salp-3-3.html>)

CACB Student Performance Criteria

The following CACB Student Performance Criteria will be covered in this course at a primary level (other criteria will be covered at a secondary level): A1. Critical Thinking Skills; A2: Design Skills; A6. Human Behaviour, B3. Site Design, and B4. Sustainable Design.

(see CACB SPC matrix for further details)

Topic Areas & Preliminary Class Schedule

This is a tentative class schedule and may be updated before the first day of class

Course Schedule Date	Topic	Assignments/Due Dates
Feb 15	Course Introduction: Overview and Assessments. Sustainable design overview- Zero carbon building design, energy efficient buildings.	

Feb 22	No Class/Term Break	
Mar 1	Refresher: PassiveHouse design. Conceptual design and preliminary analysis (energy and environmental impact)	
Mar 8	Whole building life cycle assessment. Feedback Baseline Design.	Conceptual Baseline Design: 20%
Mar 15	No Class/ SAPL Winter Block Week	
Mar 22	Embodied carbon of materials; Balancing energy and emissions in design.	
Mar 29	Design Crits	
Apr 5	Design Crits	
Apr 12	Report Submission and Final Design Presentation	Design Project: 70%
Indicate the following dates: <ul style="list-style-type: none"> If applicable, dates, times and locations of all approved class activities scheduled outside of regular course hours 		

Guidelines for Zoom Sessions

Zoom is a video conferencing program that will allow us to meet at specific times for a “live” video conference, so that we can have the opportunity to meet each other virtually and discuss relevant course topics as a learning community.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor’s permission.

The use of video conferencing programs relies on participants to act ethically, honestly and with integrity; and in accordance with the principles of fairness, good faith, and respect (as per the [Code of Conduct](#)). When entering Zoom or other video conferencing sessions (such as MS Teams), you play a role in helping create an effective, safe and respectful learning environment. Please be mindful of how your behaviour in these sessions may affect others. Participants are required to use names officially associated with their UCID (legal or preferred names listed in the Student Centre) when engaging in these activities.

Instructors/moderators can remove those whose names do not appear on class rosters. Non-compliance may be investigated under relevant University of Calgary conduct policies (e.g [Student Non-Academic Misconduct Policy](#)). If participants have difficulties complying with this requirement, they should email the instructor of the class explaining why, so the instructor may consider whether to grant an exception, and on what terms. For more information on how to get the most out of your zoom sessions visit:

<https://elearn.ucalgary.ca/guidelines-for-zoom/>

If you are unable to attend a Zoom session, please contact your instructor in advance to arrange an alternative activity for the missed session (e.g., to review the recorded session). Please be prepared, as best as you are able, to join class in a quiet space that will allow you to be fully present and engaged in Zoom sessions. Students will be advised by their instructor when they are expected to turn on their webcam (for group work, presentations, etc.).

The instructor may record online Zoom class sessions for the purposes of supporting student learning in this class – such as making the recording available for review of the session or for students who miss a session. Students will be advised before the instructor initiates a recording of a Zoom session. These recordings will be used to support student learning only and will not be shared or used for any other purpose.

University of Calgary Policies and Supports

COVID-19 PROCEDURE FOR SICK STUDENTS: <https://www.ucalgary.ca/risk/covid-19-procedure-for-sick-students>

UNIVERSITY OF CALGARY COVID-19 UPDATES: <https://www.ucalgary.ca/risk/emergency-management/covid-19-response>

ACADEMIC ACCOMMODATION

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/university-policies-procedures/student-accommodation-policy>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/university-policies-procedures/accommodation-students-disabilities-procedure>

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to their instructor (contact information on first page above).

SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/.

ACADEMIC MISCONDUCT

Academic Misconduct refers to student behavior which compromises proper assessment of a student's academic activities and includes: cheating; fabrication; falsification; plagiarism; unauthorized assistance; failure to comply with an instructor's expectations regarding conduct required of students completing academic assessments in their courses; and failure to comply with exam regulations applied by the Registrar.

For information on the Student Academic Misconduct Policy and Procedure please visit:

<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-policy.pdf>

<https://ucalgary.ca/policies/files/policies/student-academic-misconduct-procedure.pdf>

Additional information is available on the Academic Integrity Website

at <https://ucalgary.ca/student-services/student-success/learning/academic-integrity>.

COPYRIGHT LEGISLATION:

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf) and requirements of the copyright act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorised sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy (<https://www.ucalgary.ca/pubs/calendar/current/k.html>).

INSTRUCTOR INTELLECTUAL PROPERTY

Course materials created by instructors (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. These materials may NOT be reproduced, redistributed or copied without the explicit consent of the instructor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary.

SEXUAL VIOLENCE POLICY

The University recognizes that all members of the University Community should be able to learn, work, teach and live in an environment where they are free from harassment, discrimination, and violence. The University of Calgary's sexual violence policy guides us in how we respond to incidents of sexual violence, including supports available to those who have experienced or witnessed sexual violence, or those who are alleged to have committed sexual violence. It provides clear response procedures and timelines, defines complex concepts, and addresses incidents that occur off-campus in certain circumstances. Please see the policy available at <https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>

UNIVERSITY STUDENT APPEALS OFFICE: If a student has a concern about a grade that they have received, they should refer to Section I of the Undergraduate Calendar (<https://www.ucalgary.ca/pubs/calendar/current/i-3.html>) which describes how to have a grade reappraised. In addition, the student should refer to the SAPL's Procedure for reappraisal of grades

OTHER IMPORTANT INFORMATION

Please visit the Registrar's website at:

<https://www.ucalgary.ca/registrar/registration/course-outlines> for additional important information on the following:

- Wellness and Mental Health Resources
- Student Success
- Student Ombuds Office
- Student Union (SU) Information
- Graduate Students' Association (GSA) Information
- Emergency Evacuation/Assembly Points
- Safewalk