



<b>Course Number</b>	<b>ARCH 404</b>	<b>Classroom</b>	<b>SH 274</b>
<b>Course Name</b>	<b>Architecture and Life Cycle Thinking: climate change and beyond</b>		
<b>Pre/Co-Requisites</b>	<b>ARCH 201</b>		
<b>Instructor</b>	<b>Dr. Getachew Assefa</b>	<b>Office Hours/Location</b>	<b>By appointment/Zoom</b>
	<b>Email: <a href="mailto:gassefa@ucalgary.ca">gassefa@ucalgary.ca</a></b>		<b>Phone: 403 616 1527</b>
<b>Class Dates</b>	Tuesdays, January 10 – April 11, 11:00am to 12:50pm – Lecture Thursdays, January 12 – April 6, 11:00am to 11:50pm – In-Class Lab Discussions		
<b>Instructor Email Policy</b>	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.		
<b>Name and Email of Teaching Assistant(s)</b>	TBD		

## Course Description

This course focuses on introduction to strategies for comparing performance of buildings and building products/aspects based on contributions to climate change and other environmental impacts. Concepts of circular economy, life cycle analysis, embodied energy, recycling/reuse of building materials are explored through the lenses of impacts such as resource depletion, carbon and water footprints, and waste generation.

In this course, students will learn about the factors that make some buildings and building products superior than alternatives in terms of life cycle environmental performance. Using the circular economy concept as a platform, the course explores life cycle perspective of building design in the selection of materials and energy; design considerations for disassembly, reuse and recycling of materials and products; and repurposing of building products for multiple uses in the same product or another life in new products; and repurposing of whole buildings. Embodied, operating and demolition stages of buildings will be examined using relevant environmental sustainability metrics. Students pursuing or aspiring design profession will benefit from understanding, measuring and doing elements of the course that are central to the lectures, guest lectures, assignments and project.

**Course Hours: 3 units; (2-1Tutorial)**

Calendar description:

<https://www.ucalgary.ca/pubs/calendar/current/architecture.html#47120>

## Online Delivery

Learning in this course will occur as per the scheduled dates and times included in this course outline.

Asynchronous learning includes reviewing lecture files and other resources that will be posted on the D2L site of the course. Students are required to take part in both lecture and In-Class Discussions. If unable to attend due to unforeseen circumstances, inform the instructor in advance to work out an alternative participation activity.

## Course Learning Outcomes

After completion of the course the students should be able to:

1. **Describe** and **explain** the concepts of life cycle thinking and life cycle assessment
2. **Describe** and **explain** the life cycle performance of buildings in light of architectural design
3. **Analyze** the material and energy aspects of buildings from a life cycle perspective including climate change and other environmental impacts
4. **Explain** and **analyze** the challenges and opportunities of using life cycle assessment through product category rules and environmental product declarations and for use in rating and certification of building materials and buildings

## Learning Resources

### **Recommended (NOT required) course textbook:**

Bowick, M., O'Connor, J., Meil, J., Salazar, J. (2021). Guidelines for Whole-building LCA. National Research Council Canada: Ottawa, ON. 106 pp. [Full Text Available on D2L]

**Additional readings** are also provided separately as a list.

### **Technology requirements:**

- D2L will be used as course platforms. Menti will be used as a tool for interactive sessions
- Most current laptops will have a built-in or external webcam, built-in or external speaker and microphone for Zoom classes.
- Broadband internet connection

## 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 Components

Assessment Method	Description	Weight	Aligned Course Learning Outcome
Quizzes: multiple choice	Five: top four will be taken for the final grades for each student	20(5X4)	All
Review	Individual written submission	10	All
Summary of In-Class discussion Lab	Individual written submission	10	All
Project component 1 – Goal, scope and context	Group written submission	10	3
Project component 2– Inventory of materials, energy and transport	Group written submission	5	3
Project component 3– assessment results and background materials	Group written submission	10	3
Project component 4– analysis, synthesis and interpretation	Group presentation	25	
Test covering whole course (Fill in the blanks(short answers)	Individual	10	All

## Assessment and Evaluation Information

### **Attendance and Participation Expectations:**

All students are expected to attend and participate in the In-Class Discussion Labs as groups and perform the review. All group members are expected to participate in the group work and each member's specific contribution should be clearly documented.

### **Guidelines for Submitting Assignments:**

Assignments should be submitted through D2L Dropbox before midnight of the deadline date.

**Final Examinations:**

There will be quizzes and a test but no final examination.

**Expectations for Writing** (<https://www.ucalgary.ca/pubs/calendar/current/e-2.html>): written submissions should have a clear structure using headings, citation of sources when appropriate, written in single spaced 12pts times new roman or equivalents (for Word document submissions) and clearly show the names of group members.

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

**Criteria that must be met to pass:** there is no specific component that will be used as a criteria. It is the overall performance that will determine the final score.

Final grades will be reported as letter grades, with correspondence between letter grades, 4-points scale and percent based on the following grading scale.

## Grading Scale

Grade	Grade Point Value	Percent	Description
A+	4.00	92.5-100	Outstanding
A	4.00	85-92.49	Excellent - superior performance showing comprehensive understanding of the subject matter
A-	3.70	80-84.99	Very good performance
B+	3.30	76-79.99	
B	3.00	73-75.99	Good – clearly above average performance with knowledge of subject matter generally complete
B-	2.70	70-72.99	
C+	2.30	66-69.99	
C	2.00	63-65.99	Satisfactory – basic understanding of the subject matter
C-	1.70	60-62.99	Receipt of a grade point average of 1.70 may not be sufficient for promotion or graduation (see individual undergraduate faculty regulations)
D+	1.30	56-59.99	
D	1.00	50-55.99	Minimal pass – marginal performance

F	0.00	0-49.99	Fail – unsatisfactory performance or failure to meet course requirements
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Topic Areas & Detailed Class Schedule		
Course Schedule Date	Topic	Assignments/Due Dates
January 10 (Tuesday)	<b>L1: Course introduction</b>	
January 12 (Thursday)	Athena Impact Estimator	
January 17 (Tuesday)	<b>L2: Life cycle perspective of building design</b>	
January 19 (Thursday)	In-Class Discussion Lab 1 – barriers and enablers of sustainable buildings	
January 24 (Tuesday)	<b>L3: Circular economy concepts and tools</b>	
January 26 (Thursday)	In-Class Discussion Lab 2 – AIA award-winning projects list	
January 31 (Tuesday)	<b>L4: Climate change</b>	Quiz 1: L2 and L3
February 2 (Thursday)	In-Class Discussion Lab 3 - greenest buildings list	<a href="#">Project component 1 submission</a>
February 7 (Tuesday)	<b>L5: Resource depletion and wasting</b>	
February 9 (Thursday)	In-Class Discussion Lab 4 – top scoring LEED projects list	
February 14 (Tuesday)	<b>L6: Other environmental impacts</b>	Quiz 2: L4
February 16 (Thursday)	In-Class Discussion Lab 5 – impact calculations	
February 21	No classes – term break	
February 23	No classes – term break	
February 28 (Tuesday)	<b>L7: Materials in buildings</b>	Quiz 3: L5 and L6
March 2 (Thursday)	In-Class Discussion Lab 6 – Material impacts	<a href="#">Review submission</a>
March 7 (Tuesday)	<b>L8: Energy in buildings</b>	Quiz 4: L7
March 9 (Thursday)	In-Class Discussion Lab 7 – GHG and Energy	<a href="#">Summary of discussions submission</a>

March 14 (Tuesday)	<b>GL1: Architectural design workflow</b>	Jim Love – TBC
March 16 (Thursday)	Project time	Quiz 5: L8 Project component 2 submission
March 21 (Tuesday)	Virtual Tour - EEEL Building	Jim Love – TBC
March 23 (Thursday)	<b>L9: Communicating environmental performance and benchmarking</b>	
March 24 (Friday)		Project component 3 submission
March 28 (Tuesday)	Test Project time	
March 30 (Thursday)	<b>GL2: Climate declaration and Energy declaration in design of buildings in Sweden or In-Class Discussion Lab 8</b>	Mauritz Glaumann - TBC
April 4 (Tuesday)	<b>GL3: MacKimmie Tower</b>	Dialog - TBC
April 6 (Thursday)	<b>GL4: Passive Houses and Sustainable Buildings</b>	Frank Crawford - TBC
April 10 – 10 am		Project component 4 submission
April 11 (Tuesday)	Presentation	

## 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://ucalgary.ca/risk/sites/default/files/Covid-19%20Folder/COVID-19-Procedure-for-Sick-Students.pdf>

### **ACADEMIC ACCOMMODATION**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The Student Accommodations policy is available at <https://ucalgary.ca/student-services/access/prospective-students/academic-accommodations>.

Students needing an accommodation based on disability or medical concerns should contact Student Accessibility Services (SAS) in accordance with the Procedure for Accommodations for Students with Disabilities

(<https://www.ucalgary.ca/policies/files/policies/procedure-for-accommodations-for-students-with-disabilities.pdf>). Students who require an accommodation in relation to their coursework based on a protected ground other than Disability should communicate this need in writing to their Instructor.

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/](http://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](http://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 the course, academic matter, or a grade that they have been assigned, they must first communicate this concern with the instructor. If the concern cannot be resolved with the instructor, the student can proceed with an academic appeal, which normally begins with the Faculty.

<https://www.ucalgary.ca/secretariat/student-appeals>

**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