

Winter 2022–ARCH 126: Environmental Building Design

Course Information

Times and Locations

Wednesdays 9:30am-12:30pm – ARC 1101 (e-classroom) or on Teams when required by COVID-19 mandates

Instructors:

Anna Beznogova – abeznogo@uwaterloo.ca

Andrew Judge – Andrew.judge@uwaterloo.ca

Office hours: As needed

When to contact: Contact ANNA if you need special accommodations or have questions about the assignments that are not addressed in the assignment or class outlines. Also get in touch if you'd like to request a meeting/office hours to discuss course content.

TAs:

Lucy Lin – lucy.lin@uwaterloo.ca

Nilojan Jegatheeswaran – nilojan.jegatheeswaran@gmail.com

Office hours: As needed

When to contact: You can't find something in Teams or LEARN, are having an issue figuring out how something works in Teams or LEARN. General questions about the assignment. **Please make sure you look for the answer in the outline before asking your question!**

Territorial Acknowledgement

We acknowledge that the School of Architecture is located on the traditional territory of the Neutral, Anishinaabeg and Haudenosaunee peoples. The University is situated on the Haldimand Tract, the land promised to the Six Nations that includes 10 kilometres on each side of the Grand River. (see references here: <https://uwaterloo.ca/engineering/about/territorial-acknowledgement>)

Course Description

An introduction to environmental design practices leading to low carbon design. Topics of discussion include passive heating and cooling, solar geometry, climate and meteorological influences, microclimate, site design, daylighting, active systems, embodied energy, sustainable rating systems, sustainable design philosophies such as cradle to cradle, biomimicry and design for disassembly. Energy-related issues will be addressed and energy-based software design programs will be introduced. Understanding the role of design in an energy efficient or passive solar building will be a central learning outcome.

Learning Objectives

By the end of the course, students will be able to:

- Distinguish between sustainable design and green building design
- Describe how issues of environmental sustainability, social justice, and individual quality of life are interconnected
- Understand how the making of buildings affects each of these spheres locally and globally, and how design of the built environment shapes culture, as a manifestation of a particular philosophy or worldview
- Understand how sustainable design can form the basis of a design philosophy as opposed to being an “add on”
- Describe how buildings fit into material, energy, and water systems, and therefore how design can address larger issues faced in these systems
- Describe the differences between several sustainable rating systems
- Understand local climate and climate threats, and apply the appropriate principles of sustainable design and green building to a small building
- Recognize basic tenets of Indigenous land-based sustainability practices

Required Text

Norbert Lechner – Heating, Cooling, Lighting; any edition

Other readings will be distributed through LEARN or be available through Course Reserves.

Course Requirements and Assessment

Reflective Writing Assignment 1 – 10% - due **January 19**

Reflective Writing Assignment 1 Presentations – 5% - on **February 2** (3 mins to share your reflection)

Reflective Writing Assignment 2 – 10% - due **February 9**

Reflective Writing Assignment 2 Presentations – 5% - on **February 16** (3 mins to share your reflection)

Building Case Study – 20% total

- Case study outline due **February 16** (5%) - project selection + annotated bibliography
- final due **March 18** (15%) - essay

Building Catalogue / Final Project Siting – 15% - due **March 2**

Final Design Project – 35% - due **April 21**

Comprehensive descriptions of the deliverables for the assignments (including detailed evaluation criteria, submission procedures, etc.) will be shared in another document when the assignments are formally issued.

Topics & Schedule

January 5 – Week 1 – Anna Beznogova

- **Topics:** Defining sustainable / environmental building design, commons, environmental psychology, biophilic design, biomimicry
- In-class activity / open ended personal question-reflection on what humans contribute to their environments
- **Readings:**
 - Felix Guattari “The Three Ecologies”
 - Biomimicry toolbox: <https://toolbox.biomimicry.org/introduction/>
 - 14 Patterns of Biophilic Design: <https://www.terrabinbrightgreen.com/reports/14-patterns/>
- **Resources:**
 - ILFI Biophilic Design Guidebook: https://living-future.org/wp-content/uploads/2019/01/18-0605_Biophilic-Design-Guidebook.pdf

January 12 – Week 2 – Andrew Judge

- **Topics:** Climate change, sustainable habitat design, perspective shift, local ecology, Indigenous worldview and epistemology
- **Assignments:**
 - Reflective Writing Assignment 1 introduction
- **Readings:**
 - "Earth Climate Future"
 - “Indigenous land based sustainability practices - A Method for Thriving and Reconciliation”

January 19 – Week 3 – Anna Beznogova

- **Topics:** Buildings and the material system, aspects of sustainability related to material selection, embodied carbon and energy
- **Assignments:**
 - Reflective Writing Assignment 1 is due (10%)
 - Building Catalogue / Final Project Siting assignment introduction
- **Readings:**
 - Addis and Gorgolewski selections to aid in assignment
- **Resources:**
 - Cradle to Cradle: <https://mcdonough.com/cradle-to-cradle/>
 - Cradle to Cradle products: <https://mbdc.com/how-to-get-your-product-cradle-to-cradle-certified/>
 - Design for Disassembly guide: https://kingcounty.gov/~media/depts/dnrp/solid-waste/green-building/documents/Design_for_Disassembly-guide.ashx?la=en
 - Carbon Crackdown: <https://www.architecturalrecord.com/articles/14489-continuing-education-carbon-crackdown>

January 26 – Week 4 – Anna Beznogova

- **Topics:** Continuation of material life cycles and building life cycle considerations for sustainability
- **Assignments:**
 - Discussion and questions about Building Catalogue assignment
- **Readings:**
 - CaGBC Zero Carbon Building Standard -
https://www.cagbc.org/CAGBC/Zero_Carbon/The_CaGBC_Zero_Carbon_Building_Program.aspx

February 2 – Week 5 – Andrew Judge

- **Topics:** Positioning the human in relation to environment, Anthropocene - humans reordering life on Earth, what do I take for granted?
- **Reading(s):**
 - Lewis, S. L., & Maslin, M. A. (2015). Defining the Anthropocene. *Nature*, 519(7542), 171-180. Chicago.
- **Assignments:**
 - Reflective Writing Assignment 1 Presentations (5%)
 - Reflective Writing Assignment 2 introduced

February 9 – Week 6 – Anna Beznogova

- **Topics:** Introduction to green building certification systems
- **Assignments:**
 - Reflective Writing Assignment 2 is due (10%)
 - Case Study assignment introduction
- **Readings:**
 - LEED Credit Category Overviews: <https://www.usgbc.org/guide/bdc#credit>
 - Living Building Challenge Basics: <https://living-future.org/lbc/basics4-0/>
 - LBC Petal Overviews: <https://living-future.org/lbc/> (scroll down to “Petals”)
- **Resources:**
 - LEED Credit Library:
<https://www.usgbc.org/credits?Version=%22v4.1%22&Rating+System=%22New+Construction%22>
 - LEED Scorecard: <https://build.usgbc.org/bdc41scorecard>
 - LEED v4.1 homepage: <https://www.usgbc.org/leed/v41>
 - Living Building Challenge: <https://living-future.org/lbc/>
 - Passive House: <https://www.passivehousecanada.com/passive-house-resources/>
 - Passive House in 90 seconds: <https://www.youtube.com/watch?v=CasrjYhZB1M>

February 16 – Week 7 – Andrew Judge

- **Topics:** Planning for future generations, polyphasic consciousness (consciousness development), polyculture and permaculture, how does design give back: creating consciousness embedded in

design, intergenerational use, regenerative building materials (thinking of relationship to forests, lands, and water), examples in Mayan architecture

- **Reading(s):**
 - Lumpkin, T. (2001). Perceptual diversity. Is polyphasic consciousness necessary for global survival? *Anthropology of Consciousness*, 12(1-2), 37-70.
- **Assignments:**
 - Reflective Writing Assignment 2 Presentations (5%)
 - Case study outline due (5%)

February 23 – Week 8 – (Reading Week – no class)

March 2 – Week 9 – Anna Beznogova

- **Topics:** Buildings and the energy system, passive strategies for energy use reduction
- **Assignments:**
 - Building Catalogue / Final Project Siting – 15% – is due
- **Reading:**
 - Lechner Chapters 7, 9, 10, 11, 13

March 9 – Week 10 – Anna Beznogova

- **Topics:** Active building technologies that reduce energy use
- **Reading:**
 - Lechner Chapters 8, 14, 16

March 16 – Week 11 – Anna Beznogova

- **Topics:** Buildings and the water system
- **Assignments:**
 - Case Study assignment is due (15%) – **Friday March 18**
 - Final project introduction

March 23 – Week 12 – Potential guest lecture – TBD

- **Topics:** Human health considerations in sustainable building design

March 30 – Week 13 – Anna Beznogova

- **Topics:** Climatic resilience / resilient design
- **Assignments:**
 - Opportunity for final project discussion and questions
 - Office hours scheduling

April 21 – final assignment due (35%)

Course Delivery Platforms & Communication

To organize materials and communication outside of weekly in-person sessions, we will use the following:

LEARN – Official communication, work submission, and grade recording and release.

MS TEAMS – Used for supplementary discussions outside of in-person class time. Students will be added to the course team in the first week of class. Teams will also be used for sign-up sheets when needed, and for organizing course documents such as readings.

COVID-19 Special Statement

Given the continuously evolving situation around COVID-19, students are to refer to the University of Waterloo's developing information resource page (<https://uwaterloo.ca/coronavirus/>) for up-to-date information on academic updates, health services, important dates, co-op, accommodation rules and other university level responses to COVID-19.

In-person schedule: Time and location as specified above. Attendance and participation in all in-class sessions are expected for learning and skill development.

Emergency Remote Teaching/Learning Contingency for In-Class Sessions: If course activities are disrupted due to COVID-related UW mandated restrictions, the course will continue, albeit in an online environment. If in-person attendance is restricted or eliminated entirely we will pivot to using MS TEAMS to carry out remote class meetings. Attendance and participation in all live sessions are expected for learning and skill development. Contact ANNA as soon as possible if you are unable to attend live sessions.

As we pivot to online delivery, instructors may need to record lectures. In this case, the course's official *Notice of Recording* document will be found on the course's LEARN site. This document outlines shared responsibilities for instructors and students around issues of privacy and security. Each student is responsible for reviewing this document. Lectures will only be recorded when accommodations have been requested in advance.

Emergency self-isolation: Students who may be absent due to self-isolation requirements will be able to join the class remotely. This is a special consideration extended ONLY to those required to self-isolate by public health guidelines. Students must inform the instructor of this at least 24hrs prior to class meetings so that online access can be arranged. The course will also pivot to online meetings if the instructor faces any self-isolation requirements.

If you are unable to attend a session or meet a deliverable deadline, please let ANNA know immediately. If you are facing challenges that are affecting more than one course, please contact your Associate Chair or Director of your program. They will review your case and coordinate a reasonable and fair plan in consultation with appropriate others (for example: instructors, Department Undergraduate Studies Committee, Chair, AccessAbility Services, Engineering Counselling services, Registrar's Office).

Fair Contingencies for Emergency Remote Teaching

We are facing unusual and challenging times. The course outline presents the instructor's intentions for course assessments, their weights, and due dates in Winter 2022. As best as possible, we will keep to the specified assessments, weights, and dates. To provide contingency for unforeseen circumstances,

the instructor reserves the right to modify course topics and/or assessments and/or weight and/or deadlines with due and fair notice to students. In the event of such challenges, the instructor will work with the Department/Faculty to find reasonable and fair solutions that respect rights and workloads of students, staff, and faculty.

Late Work

Assignments that are handed in late will receive an initial penalty of 5% on the first calendar day late and a 5% penalty per calendar day thereafter. After 5 calendar days, the assignment will receive a 0%.

Failure to participate in Reflective Writing Presentations will result in a grade of 0%. Not submitting the Reflections on time will make it difficult to participate in the Presentations.

Only in the case of a justified medical or personal reason will these penalties be waived, and only if these have been officially submitted to the [Undergraduate Student Services Co-Ordinator](#) and accepted by the Undergraduate Office.

Students seeking accommodations due to COVID-19, are to follow Covid-19-related accommodations as outlined by the university here: (<https://uwaterloo.ca/coronavirus/academic-information#accommodations>).

Late Pass Policy: Students are allocated **one** late pass for the term. This allows students to make **one** submission up to **24 hours** after the stated deadline without penalty and without any request for accommodation. Students are required to **communicate** with your instructor their intention to use a late pass before the relevant deadline. A Late Pass cannot be used for the Reflective Writing Presentations or the Final Design Project.

Passing Grades

The standard minimum passing grade in each ARCH course is 50% with the following exceptions: the minimum passing grade is 60% for all studio courses (ARCH 192, ARCH 193, ARCH 292, ARCH 293, ARCH 392, ARCH 393, ARCH 492, and ARCH 493). Grades below the specified passing grade result in a course failure.

Mental Health Support

All of us need a support system. We encourage you to seek out mental health supports when they are needed. Please reach out to Campus Wellness (<https://uwaterloo.ca/campus-wellness/>) and Counselling Services (<https://uwaterloo.ca/campus-wellness/counselling-services>).

We understand that these circumstances can be troubling, and you may need to speak with someone for emotional support. Good2Talk (<https://good2talk.ca/>) is a post-secondary student helpline based in Ontario, Canada that is available to all students.

Equity, Diversity and Inclusion Commitment

The School of Architecture is committed to foster and support equity, diversity and inclusion. If you experience discrimination, micro-aggression, or other forms of racism, sexism, discrimination against 2SLGBTQ+, or disability, there are several pathways available for addressing this:

A) If you feel comfortable bringing this up directly with the faculty, staff or student who has said or done something offensive, we invite you, or a friend, to speak directly with this person. People make mistakes and dealing them directly in the present may be the most effective means of addressing the issue.

B) you can reach out to either the [Undergraduate office](#), [Graduate office](#), or Director ([Anne Bordeleau](#)). If you contact any of these people in confidence, they are bound to preserve your anonymity and follow up on your report.

C) You can choose to report centrally to the Equity Office. The Equity Office can be reached by emailing equity@uwaterloo.ca. More information on the functions and services of the equity office can be found here: <https://uwaterloo.ca/human-rights-equity-inclusion/about/equity-office>.

D) [Racial Advocacy for Inclusion, Solidarity and Equity \(RAISE\)](#) is a student-led Waterloo Undergraduate Student Association (WUSA) service launching in the Winter 2019 term. RAISE serves to address racism and xenophobia on the University of Waterloo campus with initiatives reflective of RAISE's three pillars of Education and Advocacy, Peer-to-Peer Support, and Community Building. The initiatives include but are not limited to: formal means to report and confront racism, accessible and considerate peer-support, and organization of social events to cultivate both an uplifting and united community. You can report an incident using their [online form](#).

[Academic integrity, grievance, discipline, appeals and note for students with disabilities:](#)

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check [the Office of Academic Integrity](#) for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70, Student Petitions and Grievances, Section 4](#). When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. [Check [the Office of Academic Integrity](#) for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to [Policy 71, Student Discipline](#). For typical penalties, check [Guidelines for the Assessment of Penalties](#).

Appeals: A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals.

Note for students with disabilities: [AccessAbility Services](#), located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with [AccessAbility Services](#) at the beginning of each academic term.

Turnitin.com: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit the alternate assignment.