FALL 2023 | ARCH 671 | THE TECHNICAL REPORT
Weekly on Tuesdays 9:30am – 12:20pm in ARC 2026

INSTRUCTOR
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Office Hours: TBD

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 kilometers on each side of the Grand River.

COURSE DESCRIPTION
Students will investigate and report on technical issues as they relate to the development of the Comprehensive Building Project in the Parallel Design Studio. Innovation and integration in architectural design will be stressed with respect to structure, building envelope, environmental systems, sustainable assessment system, health and life safety, movement systems, site planning and the integration of information technology.

LEARNING OBJECTIVES
By the end of the course, students will be able to:
- Evaluate the function, intent, and appropriateness of building design with its associated environmental impact on a given site
- Explore the principles, techniques, and methods that correspond to enclosure design and sustainability measures
- Develop familiarity with the OBC and the basic life safety requirements
- Integrate proper structural design while describing assemblies and connections in addition to addressing lateral load resisting systems and stability issues
- Demonstrate an adequate understanding of building systems through the selection of mechanical systems, water and sanitary management, lighting, and electrical systems
- Explain how to minimize the consumption of resources through improving the building's energy performance, materials technology, and life cycle analysis
- Develop a basic understanding of how to estimate the cost of a building, as well as strategies to reduce the cost of building

CLASS
Classes are held weekly on Tuesdays from 9:30am – 12:20pm. Students are required to attend and participate in all scheduled reviews, presentations, lectures, and events that occur during these hours. Missing lectures and desk crits will result in deductions to your final grade.

Detailed schedules for each week will be communicated on a weekly basis. Generally, PDFs of the lectures will be uploaded to LEARN shortly after the lecture. Slides will not be posted prior to the lectures, and lectures delivered in person will not be recorded.

DELIVERABLES AND ASSESSMENT

The intent of the report is that as the details, systems, and strategies are clarified and tested, they will demonstrate your understanding of principles that enhance the energy performance of your project and will become integral with your project at the final presentation.

The format of the technical report is to be a series of self-explanatory drawings, diagrams, and three-dimensional illustrations. These need to explain the technical ambitions and sustainability strategies of your Arch 691 design. The use of drawings and diagrams is intentional and needs to be clearly organized to effectively communicate all sustainability principles and technical ambitions.

Building Site Design (10%)
Considering the impact of boundary conditions and urban context on your site design, use diagrams and text to show how the orientation and massing of your project enhances user comfort and building performance. Use diagrams and text to show how the proposed architectural and landscape elements of your project help to mitigate the impact of wind, sun, extreme weather, and climate change.

Building Code Analysis (5%)
Following the introduction of the OBC, provide the following:
- Produce written paragraphs describing the building classification, and produce relevant excerpts from the OBC
- Completed OBC Data Matrix
- Life safety plans that show exit travel distance, exits, and fire compartments

Building Structure (20%)
Include the following three components:
- Written paragraphs describing the building structural system and why it is appropriate for your building
- Diagrams for framing that demonstrate a path for gravity loads from roof to foundations
- Diagrams that demonstrate a lateral load resisting system and address stability issues
- Details drawings (key structural sections or axonometric) that demonstrate an understanding of structural systems and connections

* The framing and lateral load diagrams should be expressed as a series of scaled plan overlays. It is important to get the sense for span distance and structural depth.

Building Systems (20%)
- Energy sources and systems. Using diagrams and text to explain the energy principles employed, illustrating both passive and active strategies for the building and the site strategies.
- Water sources and systems. Using diagrams and text explain your choices for black water, grey water, rainwater, and potable water treatment.

Building Enclosure (20%)*
- At 1:10 show 2 contrasting (for example north and south) wall assemblies from roof to foundation. Wall assemblies will be marked based on clarity and ambition of chosen wall assemblies.

Carbon Report (10%)
Carbon analysis of the design is one critical dimension of the technical report. It is introduced to offer a better understanding of the project's environmental impacts. The aim is to explore the embodied and operational carbon associated with building materials and the amount of energy used to operate the building. Additionally, renewable sources for energy production will be utilized to examine wind and solar potentials.
Students will use the program Tally to produce calculations of:
- Embodied Carbon: using applied materials quantities of their project
- Operation Carbon: using program spaces specifics
- Renewable Energy: using integrated Wind and/or Solar systems details and Geothermal systems

Life Cycle Analysis (5%)
- Using diagrams and text, state the expected lifecycle of the primary materials used for two of the three following components: Structure, Envelope or Roof
- Outline the potential for these components to be recycled
- Develop a narrative of how your building can accommodate possibilities of future expansion, adaptive reuse

Costing (10%)
- List the key points from your "Costing" lecture
- Complete the cost summary sheet for your building using the elemental costs listed in the Yardsticks book for Costing
- Do the exercise on reducing the overall area of the building by 10%
- Verify and justify the carbon reduction based on the exercise to see how the embodied and operational carbon cutback was achieved due to area decrease

Assessment Criteria
- Completeness: have you addressed the requirements outlined?
- Coherence: have you demonstrated an understanding of principles that achieve your energy goals through your selected systems?
- Complexity and ambition: have you demonstrated an appropriately detailed understanding of the selected system?

*The minimum passing grade for all projects and assignments in this course is 70%, Grades below this passing grade result in a course failure.

SUBMITTALS
Assignments will be uploaded to LEARN. Digital submissions should be 11"x17" PDFs.

LATE SUBMISSIONS

Assignments that are handed in late will receive an initial penalty of 10% on the first calendar day late and a 5% penalty per calendar day thereafter. After 5 calendar days, the assignment will receive a 0%.

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 Graduate Student Services Co-Ordinator and accepted by the Graduate Office. Students seeking accommodations due to COVID-19 are to follow COVID-19-related accommodations as outlined by the university here.

REFERENCE MATERIALS AND TEXTS

Short readings and selected resources will be provided throughout the term. Guest lecturers and critics may assign readings before they present. Familiarity with any readings and assignments are required for class discussion and evaluation.

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 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 the event classes pivot to online, instructors will deliver live lectures through Microsoft Teams at the same time as scheduled for in-person lectures.

RULES AND REGULATIONS

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 their 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 their 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 they have 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 alternate assignment.

Generative Artificial Intelligence
Generative artificial intelligence (GenAI) trained using large language models (LLM) or other methods to produce text, images, music, or code, like Chat GPT, DALL-E, or GitHub CoPilot, may be used in this course with proper documentation, citation, and acknowledgement. Permitted uses of and expectations for using GenAI will discussed in class and outlined on assignment instructions.

Recommendations for how to cite generative AI in student work at the University of Waterloo may be found through the Library. Please be aware that generative AI is known to falsify references to other work and may fabricate facts and inaccurately express ideas. GenAI generates content based on the input of other human authors and may therefore contain inaccuracies or reflect biases.

In addition, you should be aware that the legal/copyright status of generative AI inputs and outputs is unclear. Exercise caution when using large portions of content from AI sources, especially images. More information is available from the Copyright Advisory Committee. You are accountable for the content and accuracy of all work you submit in this class, including any supported by generative AI.

Fall 2023 | Arch 671 Integrated Schedule

Week	Date	Subject	Delivery Format	Assignment
2	Tuesday, September 12, 2023	**Introduction to the Technical Report and Life Cycle Analysis**	Lecture	
	Thursday, September 14, 2023	**Sustainability - Building and the Environment**	Lecture	**Assignment:** Passive Site Strategies due on Sep 21 by 11:59pm
3	Tuesday, September 19, 2023	**Building Systems**	Guest Lecture and Q+A	
	Thursday, September 21, 2023	**Building Code Analysis**	Guest Lecture and Q+A	**Assignment:** Building Code Analysis due on Sep 28 by 11:59pm
4	Tuesday, September 26, 2023	**Building Structure**	Guest Lecture	
	Thursday, September 28, 2023	**Carbon Report**	Lecture	**Assignment:** Preliminary version of Tally due on Oct 17 by 11:59pm
5	Tuesday, October 3, 2023	**Building Costing**	Guest Lecture + Exercise	**Assignment:** Costing exercise due at end of class
6	Tuesday, October 10, 2023	*Reading Week – No Class*		
7	Tuesday, October 17, 2023	**Building Structure**	Desk Crit - guest critics	
8	Tuesday, October 24, 2023	**Building Structure**	Desk Crit - guest critics	
9	Thursday, October 26, 2023	**Building Structure Review**	Review - guest critics	
10	Tuesday, October 31, 2023	**Building Structure Work Session**	Desk Crit	**Assignment:** Building Structures due by 11:59pm
11	Tuesday, November 7, 2023	**Building Systems**	Desk Crit - guest critics	
12	Tuesday, November 14, 2023	**Building Systems**	Desk Crit - guest critics	
13	Tuesday, November 21, 2023	**Building Systems Work Session**	Desk Crit	
14	Thursday, November 23, 2023	**Building Systems Review**	Review - guest critics	
15	Tuesday, November 28, 2023	**Work Session**	Desk Crit	**Assignment:** Building Systems, Tally & LCA due by 11:59pm
16	Tuesday, December 5, 2023	**Work Session**	Desk Crit	
	Monday, December 18, 2023			**Final Report submitted to Learn by 11:59pm.**