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High Line Project, New York City - Jean Nouvel

Arch 173: Building Construction 2

Winter 2023 Course Home Page

course outline

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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:

This is a study of the more advanced aspects of building construction, dealing with the intrinsic connection between conceptual design and technological aspects of a building's structural materiality: reinforced concrete, precast and prestressed concrete, steel framing systems; building envelope: building science, curtain walls, window walls, glazing and roofing systems; fire protective design and the evolution of an industrialized method of designing and assembling buildings.

Students will

- keep a detailed lecture notebook
- complete weekly detail sketches
- do a heat loss assignment
- complete an end of term major project in conjunction with Arch 113.

The term's knowledge will focus on a major design project that requires the students to design and detail a steel structure. This term's project will use the Canadian Institute of Steel Construction Competition, "Performance Space". [link](#). Submissions will consist of (minimum requirements) a plan @ 1:50, a wall section @ 1:10 and a structural axonometric @ 1:25. Rendered Rhino images are required (*in conjunction with Arch 113 requirements*). For more detailed requirements, please refer to the [project outline](#).

Teaching Assistants: [Janna Kholodova](#) and [Landers Gordon](#)

Log-in to LEARN: [here](#)

	<p>Schedule of Classes: Tuesdays, 9:30 to 12:30, e-classroom, Cambridge</p> <p>Office Hours: Tuesdays 12:30 pm to 1:30pm and by email. tboake@uwaterloo.ca</p> <p>NOTE: USE OF LAPTOPS IS NOT PERMITTED IN THIS CLASS. PLEASE TAKE NOTES IN YOUR SKETCHBOOKS.</p>
	<p>DUE DATES FOR ASSIGNMENTS:</p> <p>Weekly notes are to be taken in class and graded as such. They must be uploaded to LEARN by 10 pm on the evening of the class day. These are only worth 10% of the overall course grade and are my means of ensuring attendance.</p> <p>Sketches will be due to be submitted to LEARN the following week by 9:00am, prior to the start of the Tuesday class.</p> <p>R-value assignment due as per schedule below, by 9am, to LEARN.</p> <p>Final Project will be done in groups of 2 students. Be thinking of a partner. Sign up for groups on LEARN will be posted later in the term. This project is shared with Arch 113.</p> <p>LATE PENALTIES SEE BELOW</p>
<p>1</p> <p>Jan 10</p>	<p>COURSE INTRODUCTION About the course structure and expectations.</p> <p>DETAIL DRAWINGS:</p> <p>A review of the final project from Arch 172.</p> <p>The importance of drawings and detailing.</p> <p>The Drawing Guide</p>
<p>2</p> <p>Jan 17</p>	<p>MODERN STEEL FRAMING SYSTEMS An examination of current steel framing design, systems, detailing and case studies.</p> <p>READ: Allen: Chapter 11: Steel Frame Construction Course Notes: Steel images/course_pdf/172-ch5.pdf Allen: Chapter 12: Light Gauge Steel Frame Construction</p> <p>look at resources in the industry: Canadian Institute of Steel Construction: http://www.cisc-icca.ca/ American Institute of Steel Construction: http://www.aisc.org/ Canadian Sheet Steel Building Institute: http://www.cssbi.ca/</p> <p>WORK FROM THIS LECTURE WILL FEED INTO PROJECT REQUIREMENTS FOR ARCH 113!</p> <p>Here are some of my websites to assist with steel connection design:</p> <p>Steel: Fun is in the Details SSEF1/</p> <p>Steel Image Gallery: steel.html</p> <p>AESS Facebook Page: https://www.facebook.com/aess4u</p> <p>SKETCH 1</p> <p>Steel Structures PDF</p>

	Pedestrian Bridge PDF (no notes required of this one. Just FYI)
3 Jan 24	<p>MODERN REINFORCED CONCRETE: An examination of reinforced concrete construction practices, available systems, detailing and case studies.</p> <p>READ: Allen: Chapter 14: Sitecast Concrete Framing Systems</p> <p>Timeline of Concrete Construction: link</p> <p>SKETCH 2</p>
4 Jan 31	<p>PRECAST AND FIBRE REINFORCED CONCRETE: An examination of construction practices, case studies and the design and detailing of precast and frp systems.</p> <p>READ: Allen: Chapter 15: Precast Concrete Framing Systems Chapter 20: Cladding With Masonry and Concrete look at resources in the industry: http://www.pci.org/</p> <p>PRESTRESSED CONCRETE: An examination of construction practices, case studies and the design and detailing of prestressed systems.</p> <p>SKETCH 3</p>
5 Feb 7	<p>SOLID WOOD A look into heavy timber systems including glue laminated timber, heavy sawn timber, post and beam construction, and CLT (Cross laminated timber).</p> <p>Ontario Tall Wood Design Guide, CLT Primer</p> <p>More info on the Prince George Campus building in BC. case study</p> <p>Structural Insulated Panels connection details link</p> <p>SKETCH 4</p>
6 Feb 14	<p>BUILDING SCIENCE - Intro: Insulation types, Heat loss, Air Barriers and specific envelope detailing</p> <p>READ: If nothing else, this. https://www.buildingscience.com/documents/insights/bsi-001-the-perfect-wall Canadian Wood Frame House Construction: p. 198-215 Course notes: Building Science images/course_pdf/172-ch3.pdf Vapour barriers link Understanding Air Barriers link Building Science . com website - a fantastic resource!! Insulation types comparison link</p> <p>SKETCH 5</p> <p>HAND OUT: R-Value Assignment 5% link to detailed requirements for r-value assignment</p>
8 Feb 21	No class - Reading Week
7	<p>BUILDING SCIENCE - Part 2: Insulation types, Heat loss, Air Barriers and specific envelope detailing</p>

Feb 28	<p>READ: If nothing else, this. https://www.buildingscience.com/documents/insights/bsi-001-the-perfect-wall Canadian Wood Frame House Construction: p. 198-215 Course notes: Building Science images/course_pdf/172-ch3.pdf Vapour barriers link Understanding Air Barriers link Building Science . com website - a fantastic resource!! Insulation types comparison link</p> <p>SKETCH 6</p>
9 Mar 7	<p>R-Value Assignment Due 5%</p> <p>ROOFING SYSTEMS: An in depth investigation of flat and pitched roofing systems; BUR, inverted roofs; decision making regarding system choices; building failures. A brief look at the composition of green roofs.</p> <p>READ: Allen: Chapter 16: Roofing Canadian Wood Frame House Construction: p. 153-170 Course notes: Roofing images/course_pdf/172-ch7.pdf</p> <p>http://www.buildingscience.com/documents/insights/bsi083-mea-culpa-roofs/ http://www.buildingscience.com/documents/digests/bsd-102-understanding-attic-ventilation</p> <p>SKETCH 7</p>
10 Mar 14	<p>FIRE PROTECTIVE DESIGN: The Codes and Authorities Having Jurisdiction A discussion regarding life and fire safety in building design and the ramifications of the Building Code on Architectural Design choices and practice.</p> <p>READ: Allen: Chapters 22, 23 and 24: Interiors and Finishes Course notes: Residential Standards and Fire Protective Design images/course_pdf/172-ch9.pdf images/course_pdf/172-ch8.pdf Canadian Wood Frame House Construction: p. 216-222</p> <p>Article on how to manage smoke in open atrium spaces, helpful for open concept buildings. http://www.nrc-cnrc.gc.ca/ctu-sc/ctu_sc_n47 https://www.thestar.com/news/gta/2017/02/21/im-getting-burned-slaying-the-beast-that-was-the-badminton-and-racquet-club-fire.html</p> <p>SKETCH 8</p>
11 Mar 21	<p>THE HISTORY OF FACADES An overview of facade design and requirements through the ages.</p> <p>SKETCH 9</p>
12 Mar 28	<p>GLASS, GLAZING, WINDOWS AND CURTAIN WALL An in depth investigation of the properties and detailing of the materials and systems.</p> <p>READ: Allen: Chapter 17: Glass & Glazing Chapter 18: Windows and Doors Canadian Wood Frame House Construction: p. 191-204 Allen: Chapter 19: Designing Cladding Systems Chapter 21: Cladding With Metal and Glass</p> <p>ADDITIONAL READING:</p>

	<p>http://www2.buildinggreen.com/blogs/window-performance-magic-low-e-coatings http://www.efficientwindows.org/lowe.cfm http://www.glassguides.com/index.php/archives/2677</p> <p>Window selection tool (scroll to the bottom for some Canadian cities): http://www.efficientwindows.org/selection.cfm</p> <p>You need to figure out how to log into Building Green Suite. This is an amazing resource that we subscribe to and has valuable information. We have a subscription to this through our library. Just go to the Research Databases page http://journal-indexes.uwaterloo.ca/ and click on the letter B or look under "Architecture" and choose Building Green Suite. Remember to login to the library site https://login.proxy.lib.uwaterloo.ca/login first if working outside of the School building to access the full database.</p> <p>I want you to find this article on Building Green Suite and read it please. It covers many aspects of window selection that are not covered at all in Allen. It is called "Choosing Windows: Looking Through the Options". I suspect you need to actually log in to make this link work. http://www.buildinggreen.com.proxy.lib.uwaterloo.ca/auth/article.cfm/2011/1/27/Choosing-Windows-Looking-Through-the-Options/</p> <p>SKETCH 10</p>
12 Apr 4	<p>THE ARCHITECTURE OF ASSEMBLY: A study of the impact of industrialized building processes on architectural design strategies.</p> <p>READ: Course notes: Architecture of Assembly images/course_pdf/172-ch10.pdf</p> <p><i>50 Architects You Should Know: Mies, Neutra, Pei, Rogers, Meier, Foster, Gehry, Nouvel</i></p> <p>Q&A REGARDING FINAL TERM PROJECT</p> <p>No sketch or notes assignment for this week.</p>
Apr 28	<p>FINAL PROJECT INFORMATION link Final Project due at 11:59 pm via LEARN</p>

Reference Texts and other Materials:

CMHC. Canadian Wood Frame House Construction. Available as a downloadable PDF. [here](#)

Allen, Edward. Fundamentals of Building Construction: Materials and Methods. Current edition.

If you are using an older Edition, please refer to the chapter titles (rather than numbers) and read the appropriate sections. Honestly, whatever you can get your hands on will do.

Recommended:

[Understanding Steel Design: An Architectural Design Manual](#). by Terri Meyer Boake. Birkhauser 2012.

[Architecturally Exposed Structural Steel Design](#). by Terri Meyer Boake. Birkhauser 2015.

Canadian Institute of Steel Construction Guide for Specifying AESS. by Terri Meyer Boake.
[\(download free PDF\)](#).

Evaluation:

The final term grade will consist of an average of submitted work as follows, however, FAILURE TO ACHIEVE A PASSING GRADE IN THE TERM PROJECT WILL CONSTITUTE FAILURE OF THE COURSE.

Late Penalties:

Projects or assignments submitted after the due date or due time will be penalized 5% per calendar day of lateness, with no

maximum. There are no late passes in this course.

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.

Self declaration of illness form: <https://uwaterloo.ca/quest/help/students/how-do-i/self-declare-absence-undergraduate-students>

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

DETAIL SKETCHES: 10 @ 4% = 40%

SKETCHBOOK/WEEKLY NOTES SUBMISSION: 14.3% You are required to keep a sketchbook/notebook for this class. The notes are submitted weekly to LEARN in PDF format.

HEAT LOSS / R-value: 5%

FINAL DESIGN: 40.7% a set of drawings (minimum requirements)

large scale wall section @1:10

structural axonometric @ 1:25

floor plans @ 1:50

details - scale as appropriate

perspective view -- these drawings are all part of your Arch 113 final assignment.

(please note that the "scales" for the drawings are nominal and infer how much detail should be included - as you are drawing digitally, you will need to include a graphic scale on your boards and size them to suit your overall layout).

Avoidance of Academic Offenses

Winter 2023 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.

Self declaration of illness form: <https://uwaterloo.ca/quest/help/students/how-do-i/self-declare-absence-undergraduate-students>

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

At the School of Architecture, we are committed to foster and support equity, diversity and inclusion. We recognize however, that discrimination does occur, sometimes through an isolated act, but also through practices and policies that must be changed. If you experience discrimination, micro-aggression, or other forms of racism, sexism, discrimination against LGBTQ2S+, or disability, there are different pathways to report them:

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 ([Undergraduate Office](#) or [Terri Boake](#)), graduate office ([Tina Davidson](#), [Robert Jan van Pelt](#)), or director ([Maya Przybylski](#)). If you contact any of these people in confidence, they are bound to preserve your anonymity and follow up on your report.

C) You may also 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>.

Academic Integrity: To create and promote a culture of academic integrity, the behaviour of all members of the University of Waterloo is based on honesty, trust, fairness, respect and responsibility.

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, <http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm>

Discipline: A student is expected to know what constitutes academic integrity, to avoid committing academic offenses, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 - Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline, <http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm>

Appeals: A student may appeal the finding and/or penalty in a decision made under Policy 70 - Student Petitions and Grievances (other than regarding a petition) or Policy 71 - Student Discipline if a ground for an appeal can be established. Read Policy 72 - Student Appeals, <http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm>

Note for students with disabilities: The Office for Persons with Disabilities (OPD), located in Needles Hall, Room 1132, 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 the OPD at the beginning of each academic term. Once registered with OPD, please meet with the professor, in confidence, during my office hours to discuss your needs. Professors cannot accommodate without the authority of the OPD.

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