

Fall 2021
GRADUATE COURSE OUTLINE

COURSE CODE: ARC2023HF
COURSE TITLE: Design Technology 2
PREREQUISITE COURSES: NA
CLASSROOM LOCATION:

- Zoom meetings, as required will be held at <https://utoronto.zoom.us/j/85392467144> (Passcode 441905)
- Our classroom is LM162 at the Last Miller Chemical Laboratories ([Room](#), [U of T Map](#))

CLASS HOURS:

- Weekly asynchronous background video and illustration of workshop content, ~ 1 hour
 - Uploaded prior to Mondays.
- Wednesdays 1 pm – 4 pm In person / synchronous workshop, 1 hour
 - Online Session Wednesdays 1 pm – 2 pm (via Zoom)
 - Session A Wednesdays 2 pm – 3 pm
 - Session B Wednesdays 3 pm – 4 pm

Session A's students will consist of those in Roberto Damiani's, Christos Marcopoulos's, Pina Petricone's, Mariana Leguia's, and Delnaz Yekrangian's studios. Session B's students will consist of those in Lukas Pauer's, Lisa Rapoport's, Laurence Holland's, Jon Cummings's, and Drew Adams's studios. We may balance the session loads out as necessary.

INSTRUCTOR NAME: J. Alstan Jakubiec
INSTRUCTOR EMAIL: alstan.jakubiec@daniels.utoronto.ca
OFFICE HOURS:

- J. Alstan Jakubiec – By appointment or on Fridays 10 pm – 12 pm.

OFFICE LOCATION: DA321 or Zoom (by request).

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COURSE DESCRIPTION:

This course introduces students to computational design methods rooted in the notion of environmental performance and learning from data. ARC1022 'Design Technology 1' introduced complex geometry and computational methods into the architectural design process. 2023 expands on this by introducing new methods of computational analysis, data management, and visualization for architectural decision making. As contemporary architects manage more of their environmental (and structural, signage, emergency, HVAC, etc.) portfolio, these skills are complimentary to the creation of holistically performing works of architecture. This course accompanies ARC2047 Building Science 4: Environmental Systems in that the computational techniques of thermal simulations are based on many of the physical concepts learned in 2047.



Students will use geospatial information system (GIS) software, daylighting, and thermal environmental simulations to computationally assess the performance of designs, using these tools to develop new geometries and systems for architectural design. The first three weeks of the course comprise a section on site analysis using GIS and urban-scale solar access simulations. Weeks 4 and 5 begin thermal simulations of energy use to assess architectural performance with special focus on façade design. Weeks 6, 7 and 8 expand on this with specific thermal performance metrics such as thermal comfort and computational methods to design interior spatial layouts for natural ventilation. Weeks 9, 10, and 11 integrate daylight, visual comfort, and electric lighting design as performative aspects of buildings to consider. Finally, week 12 is a holistic wrap-up using an in-depth case study as an example.

COURSE OBJECTIVES:

By the end of this course, a successful learner will be able to do the following:

- Use geospatial information systems to analyze and respond to the built and social contexts of an architectural site.
- Understand the basics of designing for daylighting and visual comfort and to relate these concepts to other thermal performance goals.
- Explain the computational workings of a thermal performance model which predicts energy use, environmental parameters, building operation, and thermal comfort.
- Use thermal models in concert with parametric architectural models to assess a design's performance in combination with other architectural outcomes.
- Use multi-zone thermal models to understand the flows of and resistances to natural ventilation in an architectural design.

SCHEDULE:

Date	Topic	Assignment
(Week 0) 27 Aug.	<u>Lecture</u> Introduction to GIS. (As part of ARC2042 Site Engineering)	
(Week 1) 15 Sept.	<u>Lecture</u> Course introduction. Site and its physical context. <u>Workshop</u> GIS (A) – Geometric and spatial dataset utilization	Homework 1 assigned: Social and environmental site analysis.
(Week 2) 22 Sept.	<u>Lecture</u> Site and its social context. <u>Workshop</u> GIS (B) – Geospatial relational data, combining information and geometry	
(Week 3) 29 Sept.	<u>Lecture</u> Site and its environmental context. <u>Workshop</u> Sun and shadow mapping, solar irradiance	
(Week 4) 6 Oct.	<u>Lecture</u> Thermal modelling (A) <u>Workshop</u> Shoebox models (A): Build a shoebox model (geometry, materials), thermal comfort	Homework 1 due.*

* Assignments are due Friday at 11:59 pm of the week indicated on the schedule.

Date	Topic	Assignment
(Week 5) 13 Oct.	<u>Lecture</u> Thermal modelling (B) <u>Workshop</u> Shoebox models (B): Schedules, setpoints, building loads	Homework 2 assigned: Shoebox parametric modelling.
(Week 6) 20 Oct.	<u>Lecture</u> Thermal performance metrics—energy benchmarking, thermal comfort, operational carbon <u>Workshop</u> Thermal data analysis and metrics	
(Week 7) 27 Oct.	<u>Lecture</u> Free running buildings <u>Workshop</u> Assessing the resilience and passive climatization of building façades	
(Week 8) 3 Nov.	<u>Lecture</u> Multi-zone modelling for natural ventilation analysis <u>Workshop</u> Multizone thermal modelling	Homework 2 due.* Homework 3 assigned: Free-running building.
(Week 9) 10 Nov.	<u>Lecture</u> Daylight (A): Visual-experiential performance of architecture. <u>Workshop</u> Daylighting (A) – Visual comfort	
(Week 10) 17 Nov.	<u>Lecture</u> Daylight (B): Illuminance, metrics, and perception. <u>Workshop</u> Daylight (B) Climate-based daylighting calculations.	Homework 3 due.* Homework 4 assigned: Daylight analysis.
(Week 11) 24 Nov.	<u>Lecture</u> Electric Lighting: Luminaires, color, lighting design metrics, and lighting controls. <u>Workshop</u> Electric lighting.	
(Week 12) 1 Dec.	<u>Lecture</u> Course wrap up – integrated case study <u>Workshop</u> Group meetings to discuss final project progress	Homework 4 due.*
(Final assignment period)		Final project submission date TBD.

* Assignments are due Friday at 11:59 pm of the week indicated on the schedule.

Important Dates:

Fall 2021	
Labour Day (University Closed)	Monday, September 6, 2021
First day of F/Y Classes	Thursday, September 9, 2021
Final date to add F/Y courses	Monday, September 20, 2021
Thanksgiving (University Closed)	Monday, October 11, 2021
Last day to cancel without academic penalty	Monday, October 25, 2021
Last Day of F/Y courses	Wednesday, December 8, 2021
Final Examination Period	December 9 – December 21, 2021

Conflicts with religious observances should be brought to the attention of the course instructor and the Office of the Registrar and Student Services no later than the second week of classes. For more information, please see the [Policy on Scheduling of Classes and Examinations and Other Accommodations for Religious Observances](#).

EVALUATION:

Evaluation will be carried out in accordance with the University Assessment and Grading Practices Policy. Please refer to the policy located on the governing council website. http://www.governingcouncil.utoronto.ca/Governing_Council/policies.htm#G

Assignment	Due Date	Percentage of Final Grade
Homework 1	8 October	20%
Homework 2	5 November	20%
Homework 3	19 November	15%
Homework 4	3 December	10%
Final Project	TBD	35%

The graduate grading scale is listed as letter grades. The graduate grading scale is included below for your reference:

Graduate		
Letter Grade Scale	Grade Meaning	Numerical Scale of Marks
A+		90 – 100%
A	Excellent	85 – 89%
A-		80 – 84%
B+		77 – 79%
B	Good	73 – 76%
B-		70 – 72%
FZ*	Inadequate	0 – 69%

*FZ=Fail

Please refer to the University of Toronto Grading Practices Policy for additional information: <http://www.governingcouncil.utoronto.ca/Assets/Governing+Council+Digital+Assets/Policies/PDF/grading.pdf>.

LATE WORK:

All assignments are due in class at the specified time and date. Late submission will result in a 5% deduction (of each assignment's total grade) per day (excluding weekends). In the case of illness or other special circumstance, notification should be given to the Instructors and the Registrar as soon as possible and before the deadline in question. A **Verification of Illness (Also known as a "doctor's note") is temporarily not required**. Students who are absent from academic participation for **any reason** (e.g., COVID, cold, flu and other illness or injury, family situation) and who require consideration for missed academic work should report their absence through the online absence declaration tool on ACORN. Additional information is available online: <http://www.illnessverification.utoronto.ca/index.php>

FINAL DUE DATE:

Due dates are set by the Instructor in the schedule and evaluation sections of this outline. All term work must be submitted on or before the deadline date stipulated by the instructor. Students who for reasons beyond their control are unable to submit an assignment by its deadline must obtain approval from their Instructor for an extension within the term. The last date of the fall term is December 21, 2021. Any work submitted after the stipulated deadline and before the end of term without an approved extension will not be accepted. Students will be required to petition to the School of Graduate Studies for an extension if they will be unable to submit their work by December 21, 2021. <https://www.sgs.utoronto.ca/policies-guidelines/coursework-extensions/>

Students are advised to contact their professors in advance of a deadline, where possible. Those students registered with Accessibility services should provide a letter from their advisor that confirms their registration and indicates their required accommodations. Please speak with Andrea McGee in the ORSS if you have any questions or concerns regarding their letter of accommodation and how to interpret the information. Otherwise, students should report their absence through the online absence declaration tool on Acorn and advisor their professor. Without any documentation, or where notice was not given, the ultimate decision is at the instructor's discretion.

Student Behaviour

All students registered at the University of Toronto are still required to conduct themselves in a respectful manner whilst undertaking studies online. The [Code of Student Conduct](#) applies and will be enforced regardless of the physical location where students are undertaking their studies. Offenses against other persons will not be tolerated whether committed in person or online.

Instructor Recording

All asynchronous lecture materials will be posted online through Quercus. If a student wishes to copy or reproduce any of this material for their own use, that is fine. Reproduction of course content online outside of Quercus is an infringement of copyright and is absolutely prohibited.

For questions about recording and use of videos in which your digital persona may appear, please contact Alstan.

In Class Student Recording of Course Content

Copyright Notice for Course Syllabi

Students may create audio-recordings of the lectures for their personal use. Recordings are intended to permit lecture content review so as to enhance understanding of the topics presented. Audio-recordings are not substitutes for attending class.

Students should note that since audio recordings are to be permitted, their voice may be recorded by others during the class. Please speak to the instructor if this is a concern for you.

In accordance with the Accessibility for Ontarians with Disabilities Act, 2005, persons who have special needs will be accommodated.

Students agree to the following terms when creating audio recordings of lectures:

- Recordings are not to be distributed without the permission of the instructor via the Internet, using social media such as Facebook, peer-to-peer file sharing such as One Drive or Dropbox, or other distribution channels.
- Recordings are not to be shared with other classmates unless they are to be used in collaborative assignments, or if the instructor permits for other reasons.

Non-compliance with these terms violates an instructor's intellectual property rights and the Canadian Copyright Act. Students violating this agreement will be subject to disciplinary actions under the Code of Student Conduct.

PREPAREDNESS AT UOFT:

Students are advised to register for UTAAlert, the University's alert system, at <http://alert.utoronto.ca/>. UTAAlert sends important messages to registrants via text, email, and phone.

ACCESSIBILITY NEEDS:

The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the University's courses and programs.

If you are a student who identifies with one or more of the broad categories below, we encourage you to register with Accessibility Services:

<https://studentlife.utoronto.ca/departments/accessibility-services/>.

- Attention Deficit Hyperactivity Disorder (ADHD)
- Autism Spectrum Disorder
- Brain Injury and Concussion
- Chronic Health
- Deaf and Hard of Hearing
- Learning Disability
- Mental Health
- Mobility and Functional
- Low Vision / Legally Blind
- Temporary Injuries

For any questions or assistance, please see the staff in the Office of the Registrar and Student Services.

ENGLISH LANGUAGE AND WRITING SUPPORT:

The University of Toronto expects its students to write well, and it provides resources to help. Please consult the University of Toronto writing site: <https://writing.utoronto.ca/> for advice and answers to your questions about writing. Please pay special attention to "Advice on Writing: Academic Writing."

The Writing Centre at the John H. Daniels Faculty of Architecture, Landscape, and Design (<https://www.daniels.utoronto.ca/students/student-services>) is a resource for Daniels students seeking assistance with academic writing through tutorials and individual consultations.

Academic writing carries with it certain expectations about properly citing, quoting, and referencing source material. Your research must be conveyed in a language commonly shared by others in the discipline. The style guidelines preferred by the Daniels Faculty are put forth in the Chicago Manual of Style and can be found here:

<http://www.chicagomanualofstyle.org/16/contents.html>

https://owl.purdue.edu/owl/research_and_citation/chicago_manual_17th_edition/chicago_style_introduction.html

The Centre for International Experience (CIE) English Language Support is also available to support students: <https://www.studentlife.utoronto.ca/cie/els>

ACADEMIC INTEGRITY:

Academic integrity is essential to the pursuit of learning and scholarship in a university, and to ensuring that a degree from the University of Toronto is a strong signal of each student's individual academic achievement. As a result, the University treats cases of cheating and plagiarism very seriously. The University of Toronto's Code of Behaviour on Academic Matters (www.governingcouncil.utoronto.ca/policies/behaveac.htm) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. The Code of Behavior on Academic Matters states: "It shall be an offence for a student knowingly [...] to represent as one's own any idea or expression of an idea or work of another in any academic examination or term test or in connection with any other form of academic work, i.e., to commit plagiarism." The Code also states: "Wherever in the Code an offence is described as depending on 'knowing,' the offence shall likewise be deemed to have been committed if the person ought reasonably to have known."

Potential offences include, but are not limited to:

In papers and assignments:

1. Using someone else's ideas or words without appropriate acknowledgement.
2. Submitting your own work in more than one course without the permission of the instructor.
3. Making up sources or facts.
4. Obtaining or providing unauthorized assistance on any assignment.

On tests and exams:

1. Using or possessing unauthorized aids.
2. Looking at someone else's answers during an exam or test.
3. Misrepresenting your identity.

In academic work:

1. Falsifying institutional documents or grades.
2. Falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, you are expected to seek out additional information on academic integrity from your instructor or from other institutional resources. For information about academic integrity at the University of Toronto, please see <https://www.academicintegrity.utoronto.ca/>.

Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com website.

For accepted methods of standard documentation formats, including electronic citation of internet sources please see the U of T writing website at: <http://www.writing.utoronto.ca/advice/using-sources/documentation>. Please also refer to “Reading and Using Sources: How Not to Plagiarize” on the University of Toronto writing site (<http://www.writing.utoronto.ca/>).

Student Work – Daniels Publishing Policy

On occasion, the John H. Daniels Faculty of Architecture, Landscape, and Design (the Faculty) will share, use, exhibit, display, broadcast, and distribute images of student work completed in this course in connection with the activities of the Faculty for promoting, publicizing, or explaining the activities of the school. Should you wish to ‘opt out’, please contact communications@daniels.utoronto.ca, otherwise, your participation in this course grants the Faculty permission to publish such images in PR/promotional materials such as marketing, advertising, fundraising, and any other Faculty-related publication. These images may appear in a wide variety of formats including but not limited to social media, website and print.