

Dalhousie University
School of Architecture
Fall 2023
ARCH 5220.03 Adaptive Reuse
3 credit hours

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meeting times & locations: Tuesday, 9:30AM - 12:30 PM. online instruction with the exception of site visits. (See **Class Format** for specifics.) Lectures will be recorded and uploaded to the class Brightspace site.

Brightspace site address: fall Brightspace courses which will be created mid-July (Dal IT)

TEAMS class site: you will be provided a link to the site once you are registered for the course.

office: n/a - **online instruction**

availability outside of class hours: by appointment. My preferred method of contact is email.

emergency contact requirement: If there is an emergency, I will communicate with the class through the Outlook Adaptive Reuse Fall 2023 Group email list.

Equity, Diversity and Inclusion

The Faculty of Architecture and Planning is committed to recognizing and addressing racism, sexism, and other forms of oppression within academia and the professions of architecture and planning. We, the faculty, are working to address issues of historic normalization of oppressive politics, segregation, and community disempowerment, which continues within our disciplines today.

University policies

This course is governed by the academic rules and regulations set forth in the University Calendar and the Senate. <https://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog>
See the School's "Academic Regulations" page (tinyurl.com/dal-arch-regulations) for links to university policies and resources:

- Academic Integrity
- Accessibility
- Student Code of Conduct
- Diversity and Inclusion – Culture of Respect
- Territorial Acknowledgement: Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.¹
- Work Safety
- Fair Dealing policy
- Important Dates in the Academic Year (including add/drop dates)
http://www.dal.ca/academics/important_dates.html
- Dalhousie Grading Practices Policy
https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html

learning and support resources

- General Academic Support – Advising
https://www.dal.ca/campus_life/academic-support/advising.html

¹ For more information about the purpose of territorial acknowledgements, or information about alternative territorial acknowledgements if your class is offered outside of Nova Scotia, please visit <https://native-land.ca/>.

additional academic support

Lecture notes and additional resources will be posted on the class Brightspace site.

Software support along with content support is available from AP. In addition, the links to the library and copyright office are below.

- Dalhousie Libraries <http://libraries.dal.ca>
- Copyright Office <https://libraries.dal.ca/services/copyright-office.html>

ARCH 5220.03 Adaptive Reuse

Calendar Description

Through examples and case studies, this course introduces the issues of authenticity, sustainability, and relevant principles of practice as they apply to the adaptive reuse of heritage buildings. Once introduced, these issues are put into practice via re-designing an authentic, sustainable heritage building.

Additional Calendar Description: ARCH 5220.03 Adaptive Reuse Fall 2023

There is a need in built heritage conservation to fabricate replacement in-kind pieces; think of the need to replace a window or door. In these instances, it is paramount to get the details and materials of the piece being fabricated correct. Typically, the end result of this effort is a set of working drawings (and specifications) that can be used to build the piece in question.

There are a number of analog and digital tools one can use to generate these types of working drawings.

It goes without saying, but none of us can do our job without tools. From a pencil, tape measure to a program, tools make our jobs possible. Good tools make our jobs easier.

There has been an explosion of digital tools over the past several decades. By and large, most of us are digitally connected, literally and figuratively. We use digital tools to create images, predict building performance and draft 1:1 details. This last set of tools is the focus of this course.

I have used some of my time to create a digital parametric 1:1 detail tool. At this point it is a Grasshopper/RHINO creation using Visual Programming Language. I have named it TDL (True Divided Light) window maker. TDL window maker could be one of those add-ons you find on the Food4Rhino site.

TDL window maker can be used to build a digital model of a True Divided Light Window. At this point, the model can be the basis of a set of 2D shop drawings. At some point "down the line" TDL window maker will have the ability to use these working drawings to produce material takeoffs, calculate the window's embodied carbon and export this information into existing building energy performance models (e.g., THERM & WINDOW) to determine heat flow through the assembly.

In this course, you are not being asked to create your version of TDL window maker. I have asked earlier classes to do this task. What I found was that a student can spend most of their time coding and not doing what I think is more important given what you want to do, making tools like this better by not only making them user friendly but user relevant.

So, for this course, think of yourself as part of the product development team. You have been asked to become acquainted with TDL window maker, be able to use it and then make it more user relevant. Along the way, you will be asked to identify some of the model's strengths and weaknesses and add to its value through finding solutions to one of several problem paths identified below.

The course is divided into 3 parts:

- 1) learn how an actual true divided light window is made through a review of its details & materials.
- 2) learn the software; and
- 3) develop the software.

Think of parts 1 & 2 as the foundation you will need to complete part 3. Parts 1 & 2 have been designed to give you an understanding of 1) what it means when one asks you for an in-kind replacement and 2) how a

parametric algorithmic model can be used to deliver on this ask. Part 3 asks you to apply this knowledge.

course competency & learning objectives

The key course competency is an ability to review an existing digital tool and adapt it to your needs. The primary learning objective is to understand that there is a connection between the physical and digital when it comes to the in-kind replacement of a building's parts.

Your learning is a consequence of completing the assignments. To this end, the lectures, support materials and reviews have been designed to work with, and help you complete, the assignments.

TDL window maker is a gateway to 1:1 detailing, and eventually, simulation & optimization. If you use RHINO as part "of your day to day", an understanding of TDL window maker will aid your ability to use RHINO & Grasshopper in your design workflow. The experience you gain in the course can also be used in other courses and MArch requirements, namely, your thesis.

Course time commitment and format

You are expected to spend 108 hours working on the course over the term. The 108 hours has been divided between online lectures and site visits (18 hours) and homework (90 hours). **The actual lecture time and site visits will be two hours (9:30am - 11:30am).** Attendance of these events is mandatory. Attendance of these events is mandatory. This is to give you the required homework time to complete the three assignments which has been budgeted at assignment 1: 16 hrs, assignment 2: 50 hrs & assignment 3: 24 hrs)

course pre-requisites, co-requisites and/or other restrictions

There are no course co-requisites. *The course pre-requisite is that you have access to RHINO 7 and Grasshopper along with an understanding of how to script in Grasshopper.* It is your responsibility to determine whether or not you meet the course pre-requisite.

course schedule

note: site visit & lectures will take 2 hours

week & date		lecture	assignment introductions and assignment due dates
1	Tuesday September 12	part 1: a true divided light window detail, repair & replace in-kind, authenticity/integrity	assignment 1: a true divided light window (25%)
2	Tuesday September 19	part 1: site visit Little Dutch Church: true divided light windows	
3	Tuesday September 26	part 2: an introduction to TDL sash maker	assignment 1 hand-in assignment 2: learning TDL sash maker (50%) assignment 3: under the hood of TDL maker (25%)
4	Tuesday October 3	part 2: site visit Round Church: true divided light windows	
5	Tuesday October 10	part 2: TDL window maker: sashes	
6	Tuesday October 17	part 2: TDL window maker: boxes	
7	Tuesday October 24	part 2: TDL window maker: a window	
8	Tuesday October 31	part 3: under the hood 1	assignment 2 hand-in
9	Tuesday November 7	part 3: under the hood 2	

10	study break		
11	Tuesday November 21	course wrap up discussion <i>SLEQ (Student Learning Evaluation Questionnaire) to be completed</i>	assignment 3 hand-in

course assignment: one design exercise divided into three parts

The course is about translating a set of physical relationships into a set of digital relationships. The physical relationships in this case are the ones present in a true divided light (TDL) window's details, materials and craftsmanship. The digital relationships are the profiles, locations, extrusions, unions and differences that make up a perspective, side or top/bottom view which in turn is used to create working drawings or complete a performance analysis. This translation will be done through, a TBC (to be created) Grasshopper add-on called TDL window maker.

TDL window maker is a parametric algorithmic model that turns out a digital representation of a physical in-kind true divided light window. TDL window maker is a data distribution model based on a 3-part logic:

- 1) insert a component profile at the location it would be placed in a window,
- 2) define the distance the profile would be extruded in the XYZ coordinate system, and
- 3) extrude the profile along this line. Once all the window components have been identified by their profile, located in the window space and extruded, this system is digitally joined together first piece by piece, and then as a whole.

The advantage of using a parametric model in this case is in its flexibility. Different sized windows of the same style can be created from this one collection of Grasshopper clusters. As the model develops and improves, it could become a Grasshopper add-on/plugin.

What has been described above is the degree of model development we will be exploring this term - analyzing and improving on the above logic. You are not being asked to re-create TDL window maker but first understand it and then customize it to better meet the way you work. Through this process, the assumption is that TDL window maker will become a better tool.

Think of the three course assignments as a set of linked steps.

Assignment 1: physical relationships

In this assignment, you will visit the Little Dutch Church, Halifax to study/document a TDL window's details and the connections between these details. Note: It is not good enough to document the details in isolation. You need to understand the relationship between them. Ask yourself the question "If you change one component's dimensions, - e.g., change the width or height of a piece of glass (glazing), - how do these changes change the dimensions of the components connected to this component?"

In other words, how does the change in glass width and/or height "ripple" through the window? Following along this line of inquiry, what is the "root of this component relationship tree" when it comes to a true divided light window? An answer to this question will give you a better understanding of what it means to be a window maker.

Assignment 1 deliverable (25%)

- 1) **details and materials:** for one window, identify all details, and materials in an elevation, section and plan (scale as appropriate). You can hand draw and/or digitally draw these details with a scale of your choosing but do not rule out 1:1, when identifying your assignment, please include your name and "ARCH 5220 2023 assignment 1"

Assignment 2: TDL window maker review

We will visit the St. Georges Round Church, Halifax. You will study one window and focus on a sash or the window box. While on site, you will record the required dimensions and profiles. You will then take this

information and input it into TDL window maker to create the corresponding digital component whether it be a sash or window box.

Assignment 2 deliverable (50%)

1) create a single sash or window box from the Round Church using TDL window maker. This can be a baked, rendered drawing in RHINO.

When identifying your assignment, please include your name and "ARCH 5220 2023 assignment 2". Please note that your file will be uploaded onto a computer different from yours for assessment.

Assignment 3: developing TDL window maker

Based on your work in assignment 2, you have a working knowledge of TDL window maker and you are aware of its strengths and weaknesses. In this assignment, you are asked to improve the software package's functionality. Below is a list of possible ways this improvement can happen:

- 1) user interface,
- 2) improving 2D drawing capability,

In each case, the working assumption is you would create or combine existing clusters into a workflow. You then test the workflow with two examples.

Assignment 3 deliverable (25%)

- 1) a Grasshopper script
- 2) a test of your script

When identifying your assignment, please include your name and "ARCH 5220 2023 assignment 2". Please note that your file will be uploaded onto a computer different from yours for assessment.

Note: While the assignment structure and grade weights will not change, the assignment deliverables and corresponding lectures could change.

assignment grade and submission

The term grade is the sum of the three assignment grades. You are expected to complete the work individually, but I also recognize you will be consulting with your colleagues. Please reference any collaboration in your work giving the appropriate credit. Plagiarized work found in a given assignment will result in a grade of 0% for that assignment.

Acknowledging the time involved to complete each assignment, the assignment grade weight breakdown is 25% for assignment 1, 50% for assignment 2 and 25% for assignment 3. Each assignment is due at beginning of class (9:30 AM) on the assigned due date with late work penalized according to the School of Architecture late work policy - see **Due Dates and Late Submissions** below. Please submit each assignment into the assignments' folder found in the course's Brightspace page.

AP will grade your assignment. The assignment grade will be in the range between A+ to -B- or F according to how the work compares to the **course grade scale & grading rubric** (see below). You can also expect either oral or written responses of your work.

Due Dates and Late Submissions

Deductions for late submissions encourage time management and maintain fairness among students.

	Due date	Is a late assignment accepted?	If so, what is the deduction per weekday? *	Is there a final deadline for a late submission?	What happens after that?
Assignment 1	September 26	yes	3%	9:30 AM Tuesday, October 3, 2023	receives 0% and no comments
Assignment 2	October 31	yes	3%	9:30 AM Tuesday November 28, 2023	receives 0% and no comments
Assignment 3	November 21	no	n/a	n/a	n/a

* For example, if an assignment is evaluated at 75% before applying a 3%-per-weekday deduction, it would receive 72% for being 1-24 hours late; 69% for 25-48 hours late; etc.

Note:

The following University or School policies take precedence over course-specific policies:

- No late assignments are accepted after the last day of weekly classes (the Friday before review week).
- With a Student Declaration of Absence (maximum two per course), an assignment may be submitted up to three weekdays late without penalty. An SDA cannot be used for the final assignment.
- With a medical note submitted to the School office, a course assignment (including a final assignment) may be submitted more than three weekdays late without penalty. The number of weekdays depends on how long you were unable to work, as indicated in the medical note. If more than one course is affected, you should consult with the Undergraduate/Graduate Coordinator to set a new schedule of due dates.
- A student with an accessibility plan that allows for deadline extensions does not need to submit an SDA.

If you need to complete a Student Declaration of Absence form,

<https://cdn.dal.ca/content/dam/dalhousie/pdf/campuslife/Health%20and%20wellness/FINAL%20Student%20Declaration%20of%20Absence%20Form.pdf> please submit it to me via email.

course grade scale & grading rubric

https://www.dal.ca/dept/university_secretariat/policies/academic/grading-practices-policy.html
<https://www.dal.ca/tinyurl.com/dal-grading>

Your course grade will be in the following range.

letter grade	percent
A+	90-100
A	85-89
A-	80-84
B+	77-79
B	73-76
B-	70-72
F	< 70

Please note that your assignment grade scale includes C & D grades (see below).

Course Grading Rubric

A+ (90 - 100%): excellent

The work is an example of best practice. There is considerable evidence of original thinking; outstanding grasp of subject matter; and evidence of extensive knowledge base. It can be included in a publication others can use to teach or study from.

A (85-89%): excellent (competent)

The work is an industry ready document but not an example of best practice. It would not be used in a publication others would use to study or teach from because it is derivative - imitative of the work found in other publications.

A- (80-84%): excellent (conditionally competent)

The work is an industry ready document with minor revisions. One or more aspects of the work is either missing or not developed.

B+ (77-79%): good (understand)

The term's work shows evidence of a grasp of subject matter; some evidence of critical capacity and analytical ability; reasonable understanding of relevant issues; evidence of familiarity with the subject. The work is not industry ready. It shows a *weakness* in one or more areas. The work can be completed with minor supervision.

B (73-76%): good (aware)

The term's work shows evidence of a grasp of subject matter; some evidence of critical capacity and analytical ability; reasonable understanding of relevant issues; evidence of familiarity with the subject. The work is not industry ready. It has *substantial weaknesses* in multiple areas. The work requires direct supervision to complete.

B-(70-72%): good (conditionally aware)

The term's work shows evidence of a grasp of subject matter; some evidence of critical capacity and analytical ability; reasonable understanding of relevant issues; evidence of familiarity with the subject. The work is passable graduate work. It shows a *minimal understanding* having considerable weakness and/or errors in one or more areas. The work requires direct supervision with explicit directions to complete.

F: fail – The term's work does not meet the requirements of the course's deliverables and/or is absent.

Note the terms in the () are AP's terms to distinguish + through - work and are intended to complement but not replace the University's terminology.

Your assignments will be graded on an A, B, C, D & F scale. The **A+ - B-, F Course Grading Rubric** applies to your assignments as well as the **C & D Course Grading Rubric** below:

C+ (65-69%), C (60-64%), C- (55-59%)

Satisfactory: Evidence of some understanding of the subject matter; ability to develop solutions to simple problems.

D (50-54%)

Marginal Pass: Evidence of minimal familiarity with the subject matter; minimal analytical and critical skill.

For the whole course, a final assignment grade below B- will be recorded as an F.

AP

June 22, 2023