ARCH 303 Design and Construction 1 | Fall 2018

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tricks.in.trade: digital tips and techniques
Tyler Swingle tylrswngl@gmail.com (tutor)

Schedule:
Tuesdays and Thursdays, 11AM-5PM [Studio], Room MDHAR 115 -- *may vary by instructor*
Thursdays, 5PM-7PM [tricks.in.trade], Room MDHAR 115 -- *optional but strongly recommended*

McGill eCalendar Description:
https://www.mcgill.ca/study/2017-2018/courses/arch-303
An exploration of the design of buildings. Projects emphasize the major social, technological, environmental, and symbolic aspects of the design process. Introduction to specific modelling, presentation, and documentation techniques. Discussions, readings, field trips and practical exercises.

Course Description:
This studio course probes the interplay between the generation of geometric form and the articulation of architectural programme. Programme is construed broadly here to encompass the functional, behavioral, atmospheric, and narrative aspects of architectural space. The first part of the studio consists of short exercises in which students define and iterate formal systems (systems of shapes and relations in two- and three-dimensional space) to generate architectural conditions amenable to human habitation. Through these exercises, students are introduced to generative drawing, visual computation, and formal interpretation. In the second part of the studio, students edit, merge, and refine their formal systems in response to an urban context that they abstract as a set of physical and other parameters (social, cultural, environmental, demographic, ...). The students work iteratively to develop an architectural intervention that exhibits formal, programmatic, and material resolution with regards to a set of architectural priorities and intentions. Ultimately, the studio aims to promote the development of personal strategies for making and talking about physical form and to cultivate critical awareness of its valencies and implications.

In order to assist the students' exploration of new methods for generating and representing form, ARCH 342 Digital Representation is closely connected with these exercises. The Fall 2018 studio will also be supported by *tricks.in.trade: digital tips and techniques*, a new pedagogical initiative made possible through the 2018/19 eLATE Teaching and Learning Improvement Funds. The initiative is aimed at enhancing the teaching and learning of digital technologies and consists of a series of 2-hr tutorials run on Thursdays throughout the semester (schedule appended to the syllabus).

Learning Objectives

Throughout the course of the studio, students will learn to:

1. Define and develop a generative method through transformation rules and evaluate the architectural potential of resultant geometric configurations in two and three dimensions.
2. Translate between drawings and models (digital or physical) and creatively exploit gaps in moving between formats and media.
3. Document steps and decisions in their process of work.
4. Differentiate the intentional and interpretative aspects of transformative acts when working with drawings or models.
5. Abstract and diagram salient qualities from an urban context and articulate the implications of such abstraction.
6. Talk intentionally about the inter-relationship between geometric form and contextual forces -- social, technological, cultural, environmental, or other;
7. Resolve geometric form with respect to materials and construction.

Requirements

The four individual studio sections of the course will work on the same major projects for the term, share the same schedule for deadlines, and have equivalent deliverables. Each studio section will, however, operate within its own particular methodology set by its instructor(s). All students should meet the following requirements:

- Students are required to be present and work in studio (or model shop) throughout the scheduled studio time, and to meet with their instructors at least once per week. Students are expected to have substantial progress to show at each meeting with their instructors, and to present their work in a succinct and well-crafted manner.

- Students are strongly encouraged to participate in *tricks.in.trade: digital tips and techniques,* scheduled after studio on Thursdays. Synchronised with the studio schedule, these tutorials are planned so as to support and enhance performance in studio.

- Students should inform their instructor(s) in advance if they must be absent from a review or any other studio activity. Any work that was required for the missed day must be presented at the start of the next studio session or at another agreed time. The only acceptable reasons for missing a review are: 1. Medical issues, 2. Religious Holidays, 3. McGill related activities requiring a student's attendance (IE member of a sports team etc.). Items 2 and 3 require advance notice. Item 1 requires a medical note from a doctor.

- Students are required to present at all formal reviews. Withdrawing from a formal review without a valid reason forfeits half the graded value of the review and requires that the student's work be reviewed within 7 days of the missed formal presentation to avoid a complete forfeit.

- Each student will be required to submit documentation of their design work throughout the term. Instructions on the submission will be given towards the end of the term. Final documentation must be submitted before a final grade can be given in the course.

Software and Materials

- It is expected that **students will have personal laptops, or access to a computer**. Students should make sure they have access to the following software: Remake, Adobe lnDesign, Adobe Illustrator, Adobe Photoshop, Autocad, Rhinoceros 3D, VRay for Rhino, 3DS Max.

- Costs for drawing and modeling materials may vary from student to student. Students are encouraged to use the the School's Media Centre (https://www.mcgill.ca/architecture/resources/media-centre) and the Faculty's Workshops (https://www.mcgill.ca/engineering/faculty-staff/services-resources/machine-shop-and-services/locations).

Grading

ACTIVITY	% OF FINAL GRADE
Review 1	20%
Midterm Review	20%
Final Review	50%
Participation	10%
Total	100%

Student work will be evaluated as follows:
A: for a project that thoroughly addresses the stated themes, combines a challenging conception, successful organization, completeness, finely executed presentation, respect for deadlines, individual initiative and a consistent development throughout the term.
B: for a project that addresses the stated themes, combines a reasonable conception, workable organization , completeness, adequate presentation, and respect for deadlines.
C: for a project only partially successful with respect to themes, conception, organization and presentation, and a development process that indicates a difficulty in translating architectural ideas into drawings and models.
D: for a project that reflects a lack of ambition, effort and production, and indicates an inability to translate architectural ideas into drawings and models.
Please refer to the McGill University course calendar for letter grades and their percent equivalents.

Student Performance Criteria[1]
A1, A2, A3, A4, A5, A7, A8, B1, C2, C3, C4

A1. Design Theories, Precedents, and Methods
The student must demonstrate an *ability* to articulate a design process grounded in theory and practice, an understanding of design principles and methods, and the critical analysis of architectural precedents.

A2. Design Skills
The student must demonstrate an *ability* to apply design theories, methods, and precedents to the conception, configuration, and design of buildings, spaces, building elements, and tectonic components.

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[1] CACB CCCA. 2017. *CACB Conditions and Terms for Accreditation For Professional Degree Programs in Architecture*. 2017 Edition. Ottawa, ON.

A3. Design Tools
The student must demonstrate an *ability* to use the broad range of design tools available to the architectural discipline, including a range of techniques for two-dimensional and three-dimensional representation, computational design, modeling, simulation, and fabrication.

A4. Program Analysis
The student must demonstrate an *ability* to analyze and respond to a complex program for an architectural project that accounts for client and user needs, appropriate precedents, space and equipment requirements, the relevant laws, and site selection and design assessment criteria.

A5. Site Context and Design
The student must demonstrate an *ability* to analyze and respond to local site characteristics, including urban, non-urban, and regulatory contexts; topography; ecological systems; climate; and building orientation in the development of an architectural design project.

A7. Detail Design
The student must demonstrate an *ability* to assess, as an integral part of design, the appropriate combinations of materials, components, and assemblies in the development of detailed architectural elements through drawing, modeling, and/or full-scale prototypes.

A8. Design Documentation
The student must demonstrate an *ability* to document and present the outcome of a design project using the broad range of architectural media, including documentation for the purposes of construction, drawings, and specifications.

B1. Critical Thinking and Communication
The student must demonstrate an *ability* to raise clear and precise questions; record, assess, and comparatively evaluate information; synthesize research findings and test potential alternative outcomes against relevant criteria and standards; reach well-supported conclusions related to a specific project or assignment; and write, speak, and use visual media effectively to appropriately communicate on subject matter related to the architectural discipline within the profession and with the general public.

C2. Materials
The student must have an *understanding* of the basic principles used in the appropriate selection and application of architectural materials as it relates to fundamental performance, aesthetics, durability, energy, resources, and environmental impact.

C3. Structural Systems
The student must have an *understanding* of the principles of structural behavior in withstanding gravitational, seismic, and lateral forces, including the selection and application of appropriate structural systems.

C4. Envelope Systems
The student must have an *understanding* of the basic principles used in the design of building envelope systems and associated assemblies relative to fundamental performance, aesthetics, durability, energy, material resources, and environmental impact.

Policy Statements

Academic Integrity

McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see http://www.mcgill.ca/students/srr/honest/ for more information -- approved by Senate on 29 January 2003).

Submission of Work in English or French

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded. (Approved by Senate on 21 January 2009 -- see also the section in this document on Assignments and evaluation).

Anti-Piracy

© Instructor generated course materials (e.g., handouts, notes, summaries, exam questions, etc.) are protected by law and may not be copied or distributed in any form or in any medium without explicit permission of the instructor. Note that infringements of copyright can be subject to follow up by the University under the Code of Student Conduct and Disciplinary Procedures.

Inclusive Environment

As instructors of this course we endeavour to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with us and the Office for Students with Disabilities, 514 -398-6009.

Course Evaluations

End-of-course evaluations are one of the ways that McGill works towards maintaining and improving the quality of courses and the student's learning experience. You will be notified by email when the evaluations are available on Mercury, the online course evaluation system. Please note that a minimum number of responses must be received for results to be available to students.

Subject to Change

With the exception of the grading breakdown and grading standards, elements in the syllabus and schedule are subject to change.

tricks.in.trade - Digital Tips and Techniques

This workshop series introduces terms, techniques and typologies based on the 3D modeling software Rhinoceros. Each talk will be composed of a tutorial and a task. Students in groups of 3 will follow and replicate the tutorial on their computers, then work together in the group to perform short tasks that stem from the tutorial.

The series is part of a teaching and learning initiative designed and implemented by Prof. Theodora Vardouli through the support of the 2018/19 eLATE Teaching and Learning Improvement Funds. They will be held in MDHAR 115 from 17:00 -19:00, mostly on Thursdays, and taught by Tyler Swingle.

Tyler Swingle **tylrswngl@gmail.com**

Key Dates for Fall 2018

- Week 02: September 13th
  - **Points and Printers: Paper Planes Part 1**
- Week 03: September 20th
  - **Surfaces and Solids: the Split**
- Week 04: September 27th
  - **Developing the Diagram**
- Week 05: October 4th
  - **Greetings Grasshopper**
- Week 06: October 09th
  - **Physical Production: Paper Planes Part 2**
- Week 07: October 18th
  - **Maps: Managing GIS and OSM**
- Week 08: October 25th
  - **Solving and Solving Session 1**
- Week 09: November 1st
  - **Rendering**
- Week 10: November 8th
  - ***U2 Midterm***
- Week 11: November 15th
  - **Stop-Motion Movies: Making Movement and Moments**
- Week 12: November 22th
  - **Solving and Solving Session 2**
- Week 13: November 29th
  - ***U2 Pin Up***
- Week 14: December 4th
  - **U2 Final Review**

PART I

September 4 - October 2

W1	Sept 4 General introduction Individual section intros Studio setup Next: **Flattening** (text + five 8.5X11 sheets) Choose a ***thing*** on the McGill campus. The ***thing*** should exhibit formal characteristics that you find compelling. It should be larger than the size of your head but smaller than the size of your body. To do: 1.Write a description (50 words maximum) of the characteristics that drew you. Be as literal and descriptive as possible. 2. Produce three planar representations of the object, each drawn in an 8.5X11 sheet. For each projection you are allowed to use a maximum of 20 distinct lines or arcs to capture the aspects of the object that you find most salient. The orthographic drawings do not need to be to scale and can be positioned anywhere in the sheet. 3. Overlay your three drawings in a single 8.5X11 sheet to produce a field of lines (composite drawing). The drawings should overlap, at least in part. 4. Identify emergent shapes in the composite drawing -- shapes that resulted from the overlap and did not exist in any of the views -- and redraw them in a separate 8.5X11 sheet.	Sept 6 Due: *Flattening* Next: **Transforming** (five 8.5X11 sheets) 1. Define two-three transformations: copying, moving, scaling, mirroring, rotating, shearing, projecting, deforming or other. These transformations should draw inspiration from the object you recorded or from a disposition of the composite drawing. 2. In a separate sheet, apply these transformations to the emergent shapes that you identified in your last drawing. The application should be guided by a rule of the type: “when I see [shape], I do [transformation]”. 3. Make 5 new 8.5X11 drawings by applying these transformations to the emergent shapes.

W2	Sept 11 Due: *Transforming* Next: **Generating** (one 8.5X11 + two 17X22 sheets) Through rules and transformations, you have produced drawings indicating formal systems: sets of shapes and relationships. These shapes and relationships might be different than the ones you initially used or intended to have. For example, you might have started by adding and copying a component and ended up with a drawing that suggests more the subdivision of a boundary. The next step is to clarify what your formal system is and turn it into a generative system -- something that you can use to create new drawings. 1. For each of your five drawings (from *Transforming*) make a visual diagram capturing the principle of the formal system that you read in them. Present these diagrams in one 8,5X11 sheet. 2. Using these diagrams or combinations thereof in a generative way, make two new drawings in 17X22. Deploy lineweights to indicate depth (you can use or override lineweights existing from previous steps). The two new drawings will subsequently be referred to as Drawing A and Drawing B in the syllabus.	Sept 13 **PINUP (to be confirmed by instructor)** Next: **Lifting** (4 physical models) Scale down Drawing A and Drawing B by half so that they fit in a 8.5X11 paper. For each of the two drawings: 1. Using thin rigid elements (such as wood sticks, metal rods, plastic dowels, or other) lift points from your drawing in the Z axis up to a height of 8.5 inches. Points can be endpoints but also intersections of lines. Then use a flexible element (such as thread, metal wire, or other) to link these lifted points with lines in three-dimensional space. The endpoints of the lines can, but do not have to, be connected to the start points. 2. Reproduce the same model using rigid flat sheets of material (such as cardboard, metal or other). Cut the material as minimally as possible, i.e. try to crease and fold the sheets as much as you can.

W3	Sept 18 Due: *Lifting* Next: **Spatializing** (2 digital models + one 8.5X11 sheet) In a 3D modeling software (e.g. Rhinoceros) place Drawing A in the xy axis and Drawing B in the xz axis so that they form the two faces of a parallelepiped. The two drawings should share an edge -- their long side. Assume that Drawing A is a plan and Drawing B is an elevation. 1. Make two digital three-dimensional models of the three-dimensional space evoked by these two drawings. There are different strategies for doing this: extruding both drawings and resolving collisions among the elements of the two models (by moving or deleting elements); using points or lines from one drawing as a way to lift elements from the other drawing in the Z axis; producing surfaces that are described by elements in both drawings;….) 2. In a 8.5X11 sheet identify and catalog new volumetric elements that emerge in the three dimensional space that you have modeled.	Sept 20 **Spatializing Cont'd**

W4	Sept 25 **PINUP (to be confirmed by instructor)** Next: **Culling Strategies** Document and diagram spatial strategies with architectural potential that you see in your three-dimensional models (physical and digital) – for example, a strategy for creating enclosures, a strategy for circulation, a structural strategy, possibilities of activities, modulation of climate, light, sound etcetera. The documentation should take the form of a grid with the four following columns: Photograph -- Descriptive Verb -- Interpretative Verb -- Diagram. Descriptive verbs are ones that can be directly matched to a design move and interpretative verbs are ones that more broadly speak about intentions or spatial effects. Examples of the former would be “span”, “lift”, “hover”, “bridge”, “divide”, “link" etc. These are all concrete spatial descriptors. Examples of the latter would be “flow”, “filter”, “adapt”, “grow”, “proliferate". These also describe spatial conditions but in a more metaphoric fashion. They are effects of more concrete operations.	Sept 27 Due: *Culling Strategies* Next: **Curating Work** Preparation and curation of work for the Oct. 4 review
W5	Oct 2 **PART 1 REVIEW**	

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PART II

October 4 - October 2

W5		Oct 4 Site introduction and visit Next: **Abstracting** (1 physical + 1 digital model) Identify three themes that correspond the physical (geometric or material) conditions of the site, for example, “boundaries”, “rhythm”, “datums”, “hardness”, “narrowness”, “built mass”… 1. Choose a different model-making method and a different material for representing each theme. Make a 1:500 physical model capturing all three themes. (You can present draft studies of each individual theme on Oct 9 before combining them in the final composite model). 2. Make a composite digital model combining the three separate themes.
W6	Oct 9 **Abstracting Cont’d**	Oct 11 **NEW YORK CITY TRIP**
W7	Oct 16 Due: *Abstracting* Next: **Locating** (three digital models) You are given a total volume of 4000-8000 cubic meters. Revisit the list of strategies from Part 1. These correspond to spatial dispositions of the formal system(s) that you developed. 1. Make digital 3D sketches deploying these strategies in response to conditions of the site. This step is about exploring potential deployments of your repertoire of forms and relations, by assigning scale and location. 2. For each digital model write a 100-word text describing your intervention from a physical (formal, geometric) perspective.	Oct 18 **Locating Cont’d**

W8	Oct 23 **PINUP (to be confirmed by instructor)** Next: **Mapping** (four 17X22 sheets) Identify three themes that correspond to programmatic, social, environmental, or other conditions of the site. 1. Using observation or digital datasets (e.g. GIS), produce three diagrams in 17X22 that map these conditions. 2. Make a composite drawing overlaying these diagrams on the abstract digital model of the site and print it in 1:500. 3. Revisit the 3D sketches from the "locating" exercise. For each digital model write a 100-word text speculating on the impact of your intervention in the conditions that you have diagrammed. 4. Informed by the above steps, write a 100-word fiction articulating a set of *intentions* toward the site. The fiction should capture salient physical, atmospheric, environmental, programmatic aspects that you wish to instill, based on your observations on the site.	Oct 25 **Mapping Cont'd**
W9	Oct 30 Due: *Mapping* Next: **Activating** (1 digital model and full set of orthographic drawings) 1. Modify your digital 3D sketches (or make new ones) to produce a sited 3D model that deploys your formal repertoire in accordance to your intentions. 2. Represent your intervention through orthographic drawings in 1:200.	Nov 1 **Activating Cont'd**
W10	Nov 6 Due: *Activating* Next: **Curating Work** Preparation and curation of work for the Nov. 8 midterm	Nov 8 **MIDTERM REVIEW**