

## 4.105 Geometric Disciplines + Architecture Skills I

### Syllabus

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Class Times: Thursdays, 10:00am-1:00pm – rm. 5-234

Office Hours: Mondays, 1:00-2:00pm – rm 10-481M

Credits: 9 (2-2-5)

### Contact Information:

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### Grading Criteria + Completion Requirements:

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Attendance + Participation – 30%

Exercises – 70%

### Course Description:

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4.105 (Geometric Disciplines + Architecture Skills) is an intensive introduction to the architectural design process, learned primarily through a series of weekly or bi-weekly exercises, and centered around the notion of *figure*. In understanding figure as form, we will explore the ways in which we read, produce, rationalize, and represent geometry, from conventional orthographic drawing to digital modeling, physical maquettes, and prototypes. In understanding figure as numerics, we will engage computational, simulative, and analytical tools for the refinement of those geometries, acknowledging the representational aspects of our processes, while cultivating a deep understanding of the geometry that underlies those tools. And in understanding figure as process, we will center on the translations between form and material, object and drawing, digital and physical, producing an expansive space for the unfolding of various tectonics, systems of assemblies, materials, and workflows.

4.105 is part of a larger arc (together with a selection of Computation electives of the Spring), dedicated to establishing a common set of terms for the precise description of architectural objects. The exercises, lectures and workshops are designed to impart specific skills associated with their generation and representation. The conceptual basis of each exercise is in the interrogation of the geometric principles and material assemblies that lie at the core of each technique, thus “generalizing” the specific technique in order to display its wider generative possibilities. This process will also serve to exhibit the biases inherent in all representational techniques. Instances of representation throughout the history of architecture will illustrate the relationship between specific techniques and the kinds of architecture they engender. Pin-ups will address the entire range of issues associated with presenting architecture through drawings and models, including conceptual clarity, presentation manner and legibility. These exercises establish a reciprocal relationship with studio, and anticipate the instruments necessary to approach studio design problems.

Exercises will require 3-8 hours of work (outside class meeting times) each week to adequately complete. 4.105 is conceived as a course which serves design studio rather than interferes with it, therefore students should not exceed 8 hours of work per week on the exercises. In general, class meetings will include a pin-up, assignment presentation, and workshop. See attached course schedule for more information.

### Policies:

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Attendance at all class meetings is mandatory. If any meeting (lecture or workshop session) is to be missed, please notify the instructor prior to the scheduled class. Do not photograph or record any component of the course without express permission. Please remember to silence cell phones, and be courteous when using laptops in class. Most importantly, be respectful and engaged during fellow students’ pin-ups. The MIT online course management system, aka Learning Module, will be used extensively in the course. Lecture handouts and exercise descriptions will be available there shortly after class is held. Students will also be submitting exercises and materials through this system, and must do so by the assigned due date. MIT’s expectations and policies regarding academic integrity should be read carefully and adhered to diligently: <http://integrity.mit.edu>

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Syllabus

The following schedule is an adaptive outline, subject to adjustment and coordination with studio dates and topics

Month	Day	Date	Schedule
September	Th	07	<p><b>Introduction</b></p> <p>Lecture 01: Seeing (Biases in perception)</p> <p>Tutorial 01: Rhino</p> <p><i>Assignment 01: Readings</i>  <i>Robin Evans (Seeing Through Paper)</i>  <i>Robin Evans (Piero's Heads)</i>  <i>Robin Evans (Comic Lines)</i>  <i>Robin Evans (Forms Lost and Found Again)</i></p>
	Th	14	<p>Discussion of Readings</p> <p>Lecture 02: Drawing (Biases in representation)</p> <p>Tutorial 02: Grasshopper</p> <p><i>Assignment 02a: Model</i>  <i>Digitally model the Paul Revere House from a series of orthographic drawings, paying attention to precise techniques of projection and construction</i></p>
	Th	21	<p><b>Pin-up: Exercise 02 Oriented Reading</b></p> <p>Lecture 03: Surfaces (Biases in curvature)</p> <p>Tutorial 03: Surfaces (by J.Jih)</p> <p><i>Assignment 02b: Draw</i>  <i>Building from one of the drawing precedents, produce an analytic drawing that explicates, annotates, and narrativizes an aspect of the Paul Revere House</i></p>
October	Th	28	<p><b>Pin-up: Exercise 03 – Wireframe Precedent Model</b></p> <p>Lecture 04: Rationalization (Biases in construction)</p> <ul style="list-style-type: none"> <li>• <i>Jorn Utzon: Sydney Opera House</i></li> <li>• <i>Corbusier (Chandigarh, Firminy, Ronchamp)</i></li> <li>• <i>Ruth Asawa</i></li> <li>• <i>Buckminster Fuller</i></li> <li>• <i>Antoni Gaudi</i></li> </ul> <p><i>Assignment 03: Book of Expertise: Materials and Processes</i></p> <p><i>Mary Emma Harris: The Arts at Black Mountain College</i>  <i>Nicholas Fox Weber: Anni and Josef Albers: Equal and Unequal</i></p>
	Th	05	<p><b>Pin-up: Exercise 04 – Book of Expertise</b></p> <p>Tutorial: Discretization  <i>Guest Presentation: Danny Griffin on Auxetics</i></p> <p><i>Assignment 04: Tectonic Swatch</i></p> <ul style="list-style-type: none"> <li>• <i>monoclastic, synclastic, anticlastic, pick two</i></li> <li>• <i>or select two materializations of a single surface type</i></li> </ul> <p>Desk Crits</p>
	Th	12	<p>In-class working time</p> <p>Desk Crits</p>
	Th	19	<p><b>Pin-up: Material Model</b></p>

			In-class working time Desk Crits
	Th	26	<b>Pinup: Material Model</b>  <b>Guest Lecture: George Legendre, Professor of Practice, Harvard GSD</b>  Desk Crits
November	Th	02	<b>Guest Lecture: Linda Zhang of Pararaum, Waterloo Architecture</b>  <i><b>Launch Final Exercise: Figure</b> (encourage pairs, groups. Number of group members corresponds to required size of final model)</i>
	Th	09	<b>Guest Lecture: Iman Fayyad of Project IF, Syracuse Architecture</b>  Desk Crits
	Th	16	<b>Guest Lecture: Carl Dworkin of Preston Scott Cohen Architects, Harvard GSD / Penn Design</b>  <b>MID-REVIEW: Figure</b>
	Th	23	No Class – Thanksgiving
	Th	30	<b>Guest Lecture: Cameron Wu / Michael Young (TBC)</b>
December	Th	07	<b>Guest Lecture: Ted Baab (TBC)</b>  Desk Crits
	Th	14	<b>FINAL REVIEW (tentative date TBC)</b>

### Completion Requirements:

Completion of each of the exercises, rigor in process and clarity in representation, as well as the overall progress of the semester (including attendance) will be fundamental to completing the course.

### Evaluation Criteria and Grading:

The following criteria will be used for the evaluation of student's work, both in terms of helping their progress and in final grading. (01) Thesis: How clearly is the student articulating the conceptual intentions? (02) Translation of Thesis: How well is the student using their thesis to develop a design response to given problems? (03) Representation Appropriateness: How well matched is their choice of representational means to their intentions? (04) Representation Quality: How accomplished are they with drawing, modeling, digital representation, etc? To what degree does their representations convey what they ought to? (05) Oral Presentation Skills: How clearly are they presenting their ideas orally, whether at their desk, in class discussions, or to a more formal jury? (06) Participation in Discussions: How actively and how constructively are they involved in class discussions, both formally and informally? (07) Response to Criticism: How

do they effectively take advantage of criticism from instructors, classmates and outside jurors? (08) Auto-Critical Skills: To what extent are they able to critique their own work regularly and effectively? (09) Attendance – see below.

**A: Excellent** - Project surpasses expectations in terms of inventiveness, appropriateness, verbal and visual ability, conceptual rigor, craft, and personal development. Student pursues concepts and techniques above and beyond what is discussed in class.

**B: Above Average** - Project is thorough, well researched, diligently pursued, and successfully completed. Student pursues ideas and suggestions presented in class and puts in effort to resolve required projects. Project is complete on all levels and demonstrates potential for excellence.

**C: Average** - Project meets the minimum requirements. Suggestions made in class are not pursued with dedication or rigor. Project is incomplete in one or more areas.

**D: Poor** - Project is incomplete. Basic skills including graphic skills, model-making skills, verbal clarity or logic of presentation are not level-appropriate. Student does not demonstrate the required design skill and knowledge base.

**F: Failure** - Project is unresolved. Minimum objectives are not met. Performance is not acceptable. This grade will be assigned when you have excessive unexcused absences.

**Attendance:** Attendance for the full duration of each class is mandatory. The studio is an exceptional learning environment that requires your physical presence as well as your intellectual presence. You are allowed three excused absences for the semester. An excused absence is defined as one that was discussed with and approved by the professor at least 24 hours prior to the date of absence, or a family or medical emergency that is confirmed by your physician or a dean in Student Support Services. Absences beyond the three allotted will result in a decrease in your final grade. If you miss six or more studio classes, you will be asked to drop the subject or receive a failing grade.