

A4715: Spring 2019

ReThinking BIM

Instructor:

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Time & Location:

Thursdays 7-9 pm // 115 Avery

INTRODUCTION

Our capabilities as architects today to create and leverage organized building data is continuously expanding the possibilities for designing and understanding what we build and how we can build it. At the same time, this kind of literacy is becoming even more essential as our daily lives are increasingly saturated with structured data; of which provides us with invaluable insights and feedback that alter our decisions, behaviors, and validate our ideas. This class puts forth the challenge for students to develop robust data driven methodologies and computational frameworks that intensify creative iteration and validate design solutions by utilizing various parametric design platforms to build tools and workflows for analysis, automation, simulation, optimization, representation, and so forth.

This course is intended to provide foundational knowledge of relevant modeling software and visual programming interfaces, while also discussing contemporary applications of these tools in the industry. Each lecture is split into two parts: the first being a discussion about a particular topic, and the second part being an instructional demo. In the first third of the semester, students will utilize Revit to model an existing piece of architecture in New York City as a means to learn the basics of the tools with several lectures and tutorials that address more advanced topics. Students will then re-design their initial draft with this new toolset according to a conceptual proposal put forth at the beginning of the semester. Post midterm the class will develop more advanced parametric and data-driven design methodologies that focus on achieving a revised set of design goals.

COURSE GRADING CRITERIA

- 50%: Final Project Submissions (including progress submissions)
- 35%: Weekly Assignment Postings (Individual non-final project submissions)
- 15%: Attendance and Participation

COURSE REQUIREMENTS

- Experience with at least one 3D modeling software
- Attendance of lectures and desk crits
- Completion of all assignments

SCHEDULE

Session	Date	Topics	Assignments
1	1/24	Intro to BIM & Parametric thinking, BIM in Practice <i>Demo:</i> Revit UI, Views, Links, Grids, Levels, Floors	Complete Tutorials Begin existing case study model
2	1/31	Collaboration in AEC, Data Exchange <i>Demo:</i> Revit Walls, Families, Type/Instance, Columns, Curtain Walls, Detailing, Templates	Complete Tutorials Progress case study model
3	2/7	Intro to Visual Programming Part I (Dynamo), Intro to Final Project <i>Demo:</i> Revit Beams, Circulation, Roofs, Schedules	Complete Tutorials Progress on case study models Conceptual Proposal
4	2/14	Parametric Components in Practice <i>Demo:</i> Revit Families and Adaptive Components	Complete Tutorials Build your own Family (individual) Progress on final project proposals
5	2/21	Composite Drawing Techniques <i>Demo:</i> Tips and tricks for developing drawings and renders from digital models	Complete Tutorials Composite drawings from project models.
6	2/28	Intro to Visual Programming Part II (Grasshopper), Interoperability Part I <i>Demo:</i> Adaptive Components Continued, Intro to Grasshopper UI	Build an adaptive component (group) Progress on final project
7	3/7	Desk Crits (No Class)	Progress on final project
8	3/14	Visual Programming Part III: Data Management <i>Demo:</i> (Grasshopper) Lists, Trees, panelization,	Complete Tutorials Grasshopper exercises
9	3/28	Interoperability in BIM, Environmental Analysis Part I <i>Demo:</i> Interoperability tools (w/ adaptive components), Intro to Grasshopper plugins	Complete Tutorials Progress on final project
10	4/4	Environmental Analysis Part II, Point Clouds in Practice <i>Demo:</i> Ladybug Demo, 3d Scanning and point clouds demo	Progress on final deliverables
11	4/11	Coding in the AEC industry, Data types <i>Demo:</i> Coding inside & outside Grasshopper and Dynamo	Progress on final deliverables
12	4/18	Desk Crits	Progress on final deliverables
--	5/9		FINAL Project Due

ASSIGNMENTS

Throughout the semester students are expected to keep up with the course assignments with due dates as shown in the schedule. The content and dates of submissions are subject to change where deemed appropriate. Further details on each of these submissions will be discussed during lectures.

Part I

The first portion of the course will revolve around the case study of the Lever House in Manhattan. Students will be expected to independently model the building in Revit utilizing the lessons learned from the first four sessions of the course. For the mid-term a Part I submission will be due for each team. This submission will include a developed existing conditions Revit model, an adaptive component that may or may not make its way into the final submission, and a first pass at some Composite Drawings that begin to show the direction of the final project submission. More details will be provided during lectures.

Part II (Final Submission)

The final submission for this course should consist of a proposal for an adaptation/intervention of the Lever House building modeled in Part I of the semester that utilizes the knowledge acquired throughout the course. Students should work in groups of two on a single submission. Each student's contributions should be made clear throughout the course submissions. If a student feels that they are able to apply the concepts from the course on a building other than the case study, this will also be an option, but should be discussed with the instructor first.

COURSE FORUM AND SUBMISSIONS

OVERVIEW

Submissions for assignments will be handled using our Discourse Forum. All enrolled students will need to create an account in our first class.

The discussion forum will be used by the instructors to post class material and by students to submit their assignments. Students will also be encouraged to use the platform to ask questions and engage others in class related discussions.

LINK

<http://forum.rethinkingbim.com>

COURSE RESOURCES

These are some basic sources that may be used throughout the semester. More detailed resources will be provided throughout the semester.

ReThinking BIM Tutorials: <https://vimeo.com/user4826920>

Dynamo Forum: <https://forum.dynamobim.com/>

Grasshopper/Rhino Forum: <https://discourse.mcneel.com/c/grasshopper>

Revit API Docs: <http://www.revitapidocs.com/>

Revit Architecture Forum: <https://forums.autodesk.com/t5/revit-architecture-forum/bd-p/133>

Lynda:

<https://www.lynda.com/Revit-tutorials/Revit-2017-Essential-Training-Architecture-Imperial/435133-2.htm>

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