

School of Architecture | Georgia Tech | Fall 2026

ARCH 2020: Media + Modeling 2 (3 credits)

Required Course for B.S. Arch

Credit Hours:	3 credits
Days and hours of class:	MW 11:00 - 12:15
Prerequisites:	ARCH 1020 Media + Modeling 1
Co-Requisites:	ARCH 2016 Architecture Studio 2
Instructor:	Patrick Danahy

Course Description Advanced approaches to two and three dimensional modeling and representation in architecture using both manual and digital media and techniques.

Course Overview

This course introduces advanced methods of architectural representation through the integration of drawing, modeling, rendering, and physical fabrication. Emphasizing the relationship between material, geometry, and media, the course explores how architectural ideas are translated across two-dimensional and three-dimensional formats. Students engage in the study of vernacular precedent and develop techniques for constructing patterns, volumes, and material systems using both digital and physical workflows. Computational tools are used as instruments for generating variation, organizing information, and producing visual and spatial effects.

Course Objectives

The course develops advanced skills in architectural representation through the integration of drawing, modeling, rendering, and fabrication. Students learn to produce precise orthographic drawings that document and analyze architectural precedent and to translate these two-dimensional representations into three-dimensional geometries using digital modeling techniques. Computational tools are introduced as instruments for generating patterns, organizing information, and producing controlled variation. Through iterative modeling workflows, students construct complex forms and work across multiple scales, relating detailed material conditions to larger spatial systems. The course also emphasizes the development of material understanding through rendering, where students apply lighting, texture, and image composition to communicate architectural ideas. Finally, students translate digital work into physical artifacts, engaging techniques of layering, assembly, and fabrication to produce models that synthesize drawing, geometry, and material into a cohesive representational process.

Learning Objectives

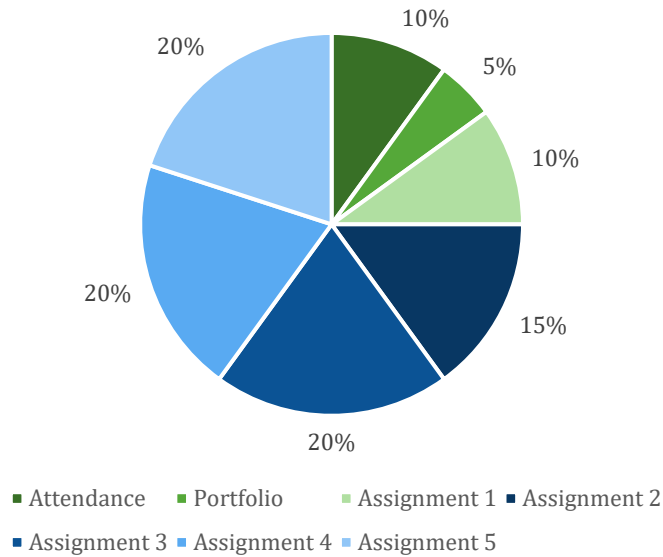
1. Advance basic orthographic drawing and drafting methods through physical and digital drawing methods
2. Learn basic algorithmic principles and visual scripting applications
3. Understand the basic relationships between digital models, parametric models, variables, inputs, and data
4. Understand basic principles of architectural geometry
5. Understand basic principles of mathematical form generation
6. Present ideas clearly digital models and vector-based graphics
7. Ability to use line-weights and drawing hierarchies to differentiate building elements
8. Develop an understanding of various building systems through diagrams, drawings, models
9. Ability to create a catalogue of design variations through parametric tools
10. Develop material systems through rendering and visualization techniques
11. Use lighting, texture, and composition to communicate architectural ideas

Course Requirements and Deliverables

All assignments have to be submitted to Canvas.

Assignments are weighted as follows:

Assessment Breakdown



Assignments

Assignment 1 – As-Built Drawing	10%
Assignment 2 – 2D Formation	15%
Assignment 3 – 3D Formation	20%
Assignment 4 – Rendering Materials	20%
Assignment 5 – Model	20%

85% Total

Portfolio

5%

Attendance

10%

100% Total

Reference Texts/Readings

Selected readings are used to support discussions of material, representation, and design methodologies.

Akos, Gábor, Robert McNeel Parsons, and Andrew Payne. *Foundations: The Grasshopper Primer*. 3rd ed. Mode Lab, 2014. (Available online)

Bennett, Jane. *Vibrant Matter: A Political Ecology of Things*. Durham, NC: Duke University Press, 2010.

Boucher, Matthew, Stefan Helmreich, Laura Kinney, and Skylar Tibbits. *Being Material*. Cambridge, MA: MIT Press, 2019.

Carpo, Mario. *The Second Digital Turn: Design Beyond Intelligence*. Cambridge, MA: MIT Press, 2017.

DeLanda, Manuel. *Assemblage Theory*. Edinburgh: Edinburgh University Press, 2016.

Issa, Rajaa. *Essential Algorithms and Data Structures for Computational Design in Grasshopper*. Robert McNeel & Associates, 2020.

Koehler, Daniel. *Compositional Intelligence: Computational Design Thinking*. London: Wiley, 2025.

Leach, Neil. *Architecture in the Age of Artificial Intelligence: An Introduction to AI for Architects*. London: Bloomsbury Visual Arts, 2021.

Mitchell, William J. *The Logic of Architecture: Design, Computation, and Cognition*. Cambridge, MA: MIT Press, 1990.

Negroponte, Nicholas. *Being Digital*. New York: Knopf Doubleday Publishing Group, 1996.

Pottmann, Helmut, et al. "Architectural Geometry." *Computers & Graphics* 47 (2015): 145–164.

Tedeschi, Arturo, and Davide Lombardi. "The Algorithms-Aided Design (AAD)." In *Informed Architecture: Computational Strategies in Architectural Design*, 33–38, 2018.

Thenhaus, Clark. *Unresolved Legibility in Residential Types*. Edited by Ryan Roark. New York: Applied Research + Design, 2019.

Vassallo, Jesus. "Seamless: Digital Collage and Dirty Realism in Architecture." *Log* 39 (2017): 45–65.

Woodbury, Robert. *Elements of Parametric Design*. Routledge, 2010.

Young, Michael. "The Affects of Realism: Or the Estrangement of the Background." *Architectural Design* 86, no. 5 (2016): 16–23.

Young, Michael. "The Art of the Plausible and the Aesthetics of Doubt." *Log* 41 (2017): 89–102.

Instructional Methods

Course information (syllabus, calendar, assignments) and announcements will be conveyed via Canvas.

The class is lecture/tutorial based. Students are encouraged to take notes and follow the workshop sessions by working on either given examples or their own design models. Throughout the 15 weeks the technical skills required for the course will be implemented through lectures and exercises. The technical skills will be implemented through exercises using various tutorials in Rhino, Illustrator, and Grasshopper. Conceptual understanding and implications for the design process will be explored through in-class work sessions that require student participation and engagement. There will be lectures that introduce various geometric principles and compositional aspects related to the assignments. During in-class workshop sessions students are expected to develop conceptual understanding and implications for the given design tasks.

Course Schedule

See annotated class schedule on Canvas. Please note: this schedule is subject to periodic revisions over the course of the term. Updated schedules will always be posted on Canvas.

Assessment

Consistently demonstrating levels of excellence in the following categories is essential to achieve a grade of A "Excellent": professionalism, participation, enthusiasm / self-drive, synthesis (design principles, tools and tactics), quality of deliverables per phase, project and / or task, development of expertise (digital / physical design, operation and production).

The grade scale for all individual components of the course as well as for completion of the final course grade will be as follows:

Points	Grade	Description
90-100	A	Excellent
80-89	B	Good
70-79	C	Satisfactory
60-69	D	Poor
0-59	F	Failure

Grading Rubric:

A – Excellent

Consistently exceeds expectations in design thinking, modeling, and representation. Demonstrates strong creativity, advanced technical skill in both manual and digital methods, and a clear understanding of course concepts. All work is complete, on time, and presented with professional refinement.

B – Good

Meets all requirements and often goes beyond them. Shows understanding of modeling principles, parametric thinking, and representation techniques, with generally strong execution and presentation, though lacking the highest level of innovation or polish.

C – Satisfactory

Meets basic course requirements with adequate understanding of modeling workflows and representation strategies. Work may be underdeveloped in concept, lack complexity in execution, or have inconsistencies in presentation quality.

D – Poor

Fails to meet several key requirements. Shows limited understanding of course methods, incomplete application of tools or techniques, and/or weak clarity in presentation.

F – Failing

Work is missing, incomplete, or unacceptable. Demonstrates little or no understanding of course material or engagement with modeling and representation processes.

There will be no incompletes awarded without appropriate reason nor without a prior meeting, either in person or on Teams, of the student and the instructor. All assignments must be completed in order to receive a passing grade in the class. Incompletes will be granted only under extraordinary circumstances.

Students are asked to complete the online course evaluation of all courses at Georgia Tech at the end of the term.

COURSE POLICIES**Academic Integrity and Conduct**

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. All Georgia Tech students should familiarize themselves with and abide by the Georgia Tech Honor Code: <http://www.catalog.gatech.edu/rules/18/>. Faculty shall report instances of academic dishonesty to the Office of the Dean of Students.

For expectations of student and instructor conduct more generally, consult section 19 of the catalog listed above, entitled “Code of Conduct,” <http://www.catalog.gatech.edu/rules/19/>, and section 22, entitled “Student-Faculty Expectations,” at <http://www.catalog.gatech.edu/rules/22/>.

All persons in the classroom are expected to behave with courtesy towards others and in a way that does not interfere with the regular conduct of the class. Cell phones are to be turned off when students enter the classroom and should remain off for the duration of class; laptop computers are to be used only for taking notes; and students should not engage in private conversations while the instructor or other students are speaking. Anyone who does not adhere to these basic courtesies will be asked to leave.

AI Policy

We treat AI-based assistance, such as ChatGPT, Copilot and Cursor, the same way we treat collaboration with other people: you are welcome to talk about your ideas and work with other people, both inside and outside of class, as well as with AI-based assistants.

However, all work you submit must be your own. You should never include anything in your assignment that you did not write directly without proper citation. You need to use quotation marks for exact phrasing; both direct quotes and paraphrasing require citations (e.g., in-line citations or footnotes/endnotes, as specified by the instructor).

It's important to understand that including anything you did not write in your assignment without proper citation will be treated as a serious academic misconduct case. If you are unsure where the line is between collaborating with AI and copying AI, we recommend the following heuristics:

Heuristic 1: Never hit “Copy” within your conversation with an AI assistant. You can copy your own work into your original composition but do not copy anything from the AI conversation directly back into your assignment.

Instead, use your interaction with the AI assistant as a learning experience, then let your assignment reflect your improved understanding.

Heuristic 2: Do not have your assignment and the AI agent open at the same time. Like above, use your conversation with the AI as a learning experience, then close the interaction, open your assignment, and let your assignment reflect your revised knowledge.

This heuristic avoids directly integrating AI into your composition environment: just as you should not let a classmate write content or code directly in your submission, you should also avoid using tools that directly add content to your submission.

Deviating from these heuristics does not automatically qualify as academic misconduct; however, following these heuristics guarantees your collaboration will not cross the line into misconduct. Also, remember that overreliance on AI tools can significantly impact the development of fundamental skills. Additionally, AI environments contain mistakes and ingrained biases that can misrepresent your ideas, intentions, and the demonstration of learning objectives.

All graphic content created with AI tools should be labeled as AI-generated or AI-assisted. Experimentation with various AI tools is highly encouraged but needs to be clearly identified.

Exception: In certain parts of this course, particularly during lectures on coding and customizing components, the use of AI tools such as code generators, debuggers, or AI-based coding assistants is permitted and encouraged as part of the learning process. These tools can help enhance your understanding and improve your coding skills. However, even in these instances, the final work you submit must be your own, reflecting your understanding and knowledge. Proper attribution should be given if AI tools significantly contributed to your final submission.

Accommodations for Students with Disabilities

Any student with a disability, that may require accommodation, should contact the Office of Disability Services at 404-894-2563 or visit <http://disabilityservices.gatech.edu> to make an appointment to discuss their special needs and obtain an accommodations letter. They should also schedule an appointment to speak with the course instructor to discuss their learning needs.

Active Participation/Attendance

Active Participation at all class meetings is mandatory and crucial to successful completion of the class. Absences will be excused only for medical or family emergencies or for Institute-approved events and religious holidays documented in writing. (According to a new policy, you must notify your instructor in writing during the first two weeks of the semester about any anticipated absences for religious holidays.) Late arrivals will be counted as absences.

NOTE: Absences due to special and/or unforeseen circumstances must be discussed with the Instructor as early as practically possible.

Unexcused absences will result in grade reduction; more than three may result in a grade of F "Failure".

Approved Communication Platforms

https://gatech.service-now.com/home?id=kb_article_view&sysparm_article=KB0023604

Archiving

At the end of the semester, all students are required to submit physical examples of their work and/or digital examples no later than one week after the end of term, to their instructors or administration for archiving. By enrolling, each student grants a license to reproduce and display their work online, in forthcoming print publications, and/or public exhibitions.

College of Design Facility Rules and Guidelines

Please consult the [Georgia Tech Student Handbook](#) regarding the use of facilities and all Institute policies. Aerosol sprays of any kind are strictly banned from the studio and surrounding areas. A spray-painting booth is now in operation in the College of Design shop, on the ground floor of the East Architecture Building.

Course Expectations & Guidelines

Per the [GT Catalog](#), all work produced in the College of Design as part of a degree program becomes the property of the College; it may be retained or returned at the discretion of the faculty. The faculty of the School of Architecture also reserves the right to refuse for credit any project executed outside the precincts of the College or otherwise produced without proper coordination with the faculty.

Emergencies

In case of emergency (e.g., fire, accident, or criminal act), please call the Georgia Tech Police at 404-894-2500. Please note that Perry Minyard, IT Support Administrator for the College of Design, is also a firefighter and an Emergency Medical Technician (EMT) certified in performing CPR.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Students may request extensions on completing the course from their instructor if due to illness or family emergencies. Late assignments or missed pinups will not be penalized if they are health related. The student should be able to provide documentation to the instructor for any health-related / non-academic reason.

Library & Archives

Need to do research but don't know where to start? Contact your Architecture Library subject specialist, Catherine Manci (catherine.manci@library.gatech.edu), for research help and information on available resources. Contact your Architecture Archives liaison, Jody Thompson (jody.thompson@library.gatech.edu), for assistance with archival research and collections. Georgia Tech Library website: <https://library.gatech.edu/>
Georgia Tech Archives website: <http://library.gatech.edu/archives>

Ownership

Physical copies of student work submitted to the school to satisfy course requirements—including, but not limited to, digital files, papers, drawings, and models—become the school's property. The School of Architecture has no obligation to safeguard such materials and may, at its discretion, retain them, return them to the student, or discard them.