School of Architecture | Georgia Tech | Fall 2026

ARCH 6020: Media + Modeling II (3 credits)

Required Course for M. Arch 2 and M. Arch 3

Credit Hours:	3 credits
Classroom:	Computer Labs (358 and 359), Architecture West
Days and hours of class:	Tuesday / Thursday, 2:00 - 3:15 pm
Prerequisites:	ARCH 6010 (M.Arch 3)
Course Coordinator:	Hyojin Kwon - hkwon314@gatech.edu
Instructor, Section B:	Yichao Shi - yshi431@gatech.edu Office: Hinman Research Building Room 234 Office Hours: Tuesday 3:30 - 4:30 pm, by appointment
TA:	Yizhou Lin - ylin661@gatech.edu Office: Hinman Research Building Room 234 Office Hours: Monday 10:00 - 11:00 am, by appointment

Course Description (from the Catalog)

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

Course Overview

This course introduces fundamental concepts, techniques, and methods related to computational design, with a focus on the relationship between digital media and material artifacts. Students will learn how to think algorithmically, test computational techniques, and identify design opportunities within digital and physical modeling processes.

The course is organized around four related areas: digitization, simulation, materialization, and visualization. Through lectures, discussions, technical workshops, and design exercises, students will work with algorithmic drawing, imaging, modeling, animation, physics-based simulation, rendering, and selected digital and analog fabrication methods. Technical workshops will introduce Rhino/Grasshopper and related plugins for analysis, simulation, and animation, including Lunchbox, Weaverbird, Kangaroo, Ambrosinus Toolkit, and selected AI imaging tools such as DALL-E, StabilityAI, and Stable Diffusion.

The course asks how procedural and algorithmic modeling can extend architectural drawing and modeling methods, and how students can use digital media to support critical and creative design work.

Course Objectives

This course is designed to accomplish the following objectives:

1. Introduce key concepts in computational design, parametric modeling, digital simulation, and material translation.
2. Develop practical skills in Rhino/Grasshopper and selected plugins for architectural design tasks.
3. Connect digital modeling workflows with physical modeling and fabrication methods.
4. Support critical discussion about the strengths and limits of computational design tools.
5. Use computational methods to support design communication, experimentation, and collaborative work.

Learning Objectives

Those students who successfully complete the course will be able to:

6. Apply intermediate-level computational design techniques to create two and three dimensional architectural models.
7. Use Rhino/Grasshopper and related plugins for parametric design, simulation, and visualization tasks.
8. Assess the capacities and limits of computational design tools and processes.
9. Develop and present design projects that integrate digital and physical modeling techniques.
10. Work collaboratively on design projects, communicate ideas clearly, and integrate feedback.
11. Explore design opportunities through algorithmic thinking and computational processes.

Course Requirements and Deliverables

The presented concepts and techniques will be explored through a semester-long project organized into a sequence of assignments. Students will begin with parametric drawing and then explore modeling, form-making, material translation, digital simulation, and fabrication workflows. Assignments will address relationships among scale, materiality, structure, originality, authorship, and computational process. The final project will ask students to work in small groups and use workflows introduced in class within a collaborative design exercise.

Anticipated costs include materials for physical modeling exercises, which may be completed in groups and presented during reviews.

Assignments

Assignment	Description	Points
Assignment 1	Points, Lines, and Curves	100
Assignment 2	Attractors and 2D Vector Fields	100
Assignment 3	Attractors and 3D Surfaces	100
Assignment 4	Shape to System: 2D Parti, 3D Parti, System	300
Assignment 5	Image to 3D Form and Simulation	300

Required Texts/Readings/Special Materials

Required Readings

12. Payne, A., and ModeLab. Grasshopper Primer. http://grasshopperprimer.com/en/index.html
13. Rajaa, Issa. Essential Algorithms and Data Structures for Grasshopper. https://www.food4rhino.com/en/resource/essential-algorithms-and-data-structures-grasshopper

Recommended Readings

14. Carpo, Mario. The Second Digital Turn: Design Beyond Intelligence. Cambridge, MA: MIT Press, 2017.
15. Spuybroek, Lars, and Georgia Institute of Technology College of Architecture. Textile Tectonics (Research & Design). 2011.
16. Picon, Antoine. "Architecture and Materiality in the Digital Era." In The Materiality of Architecture, 105-35. Minneapolis: University of Minnesota Press, 2021. https://doi.org/10.5749/j.ctv1dwq1vq.
17. Canizares, Galo. Digital Fabrications: Designer Stories for a Software-Based Planet. Novato, CA: ORO Editions/Applied Research & Design, 2019.
18. Abrons, Ellie, and Adam Fure. "Postdigital Materiality." In Lineament: Material, Representation and the Physical Figure in Architectural Production, edited by Gail Peter Borden and Michael Meredith. New York: Routledge, 2017.
19. Alexander, Zeynep Celik, and John May. Design Technics: Archaeologies of Architectural Practice. Minneapolis: University of Minnesota Press, 2020. https://doi.org/10.5749/j.ctvtv938x.

Instructional Methods

Course information, including the syllabus, schedule, assignments, and announcements, will be conveyed through Canvas. The course will use a combination of lectures, discussions, technical workshops, and design exercises. Specific methods include lectures and readings for theoretical and historical context, hands-on workshops for software training, design exercises and projects, individual and group desk critiques, informal pin-ups, formal reviews, and project presentations.

Course Schedule

Please see the annotated class schedule on Canvas. This schedule is subject to periodic revisions throughout the term. Updated schedules will be posted on Canvas.

Date	Day	Week	Topic	Assignment / Due Date
08/25	TU	1	Introduction lecture by Hyojin Kwon	
08/27	TH	1	Grasshopper UI, data, data management, transformations I (move, rotate, scale, etc.)	
09/01	TU	2	Roof structure design	Issue: Assignment 01
09/03	TH	2	2D mapping: vectors, attractors, fields	Issue: Assignment 02
09/08	TU	3	2D mapping: architectural fields	Due: Assignment 01
09/10	TH	3	Mathematical surface I	Due: Assignment 02 Issue: Assignment 03
09/15	TU	4	Mathematical surface II	
09/17	TH	4	Transformations II - Boolean, lofting, etc.	
09/22	TU	5	Lecture by Yichao Shi - 2D Parti + Shape Grammar	Due: Assignment 03 Issue: Assignment 04.1
09/24	TH	5	2D Parti Shape Grammar case study	
09/29	TU	6	2D Parti Shape Grammar implemented with Grasshopper	
10/01	TH	6	Case study - 3D Parti / Massing	Due: Assignment 04.1 Issue: Assignment 04.2
10/06	TU	7	NO CLASS - Fall Break	
10/08	TH	7	Case study - building systems	Due: Assignment 04.2 Issue: Assignment 04.3
10/13	TU	8	Lunchbox / patterning / system	
10/15	TH	8	Weaverbird / patterning / system	
10/20	TU	9	Weaverbird / patterning / system	
10/22	TH	9	Kangaroo / optimization	
10/27	TU	10	Lecture by Hyojin Kwon - image to 3D, digital image, computational color	Due: Assignment 04.3 Issue: Assignment 05

Date	Day	Week	Topic	Assignment / Due Date
10/29	TH	10	Image to 3D, digital image, computational color	
11/03	TU	11	Image to 3D, digital image, computational color	
11/05	TH	11	Ambrosinus Toolkit / AI	
11/10	TU	12	Ambrosinus Toolkit / AI	
11/12	TH	12	Ambrosinus Toolkit - wall tectonic, facade system, morph	
11/17	TU	13	NO CLASS - Non-studio ARCH classes cancelled	
11/19	TH	13	NO CLASS - Non-studio ARCH classes cancelled	
11/24	TU	14	Desk crits / individual project feedback	
11/26	TH	14	NO CLASS - Thanksgiving Break	
12/01	TU	15	Desk crits / individual project feedback	
12/03	TH	15	Final project preparation and review coordination	
12/08	TU	16	Final review	Due: Assignment 05

Assessment

Grades will be evaluated based on the experimental ambition of the assignments, conceptual clarity, rigor and precision of execution, submitted models, digital files, presentations, review interactions, and class participation. Students will not receive a final grade until all required documentation for each assignment has been submitted as specified by the instructor in the associated assignment brief.

There will be five cumulative assignments. Detailed briefs with specific deliverables and grading criteria for each assignment will be distributed when each assignment is introduced to the class.

Grading Component	Weight
Course attendance + participation	10%
Assignment 1	10%
Assignment 2	10%
Assignment 3	10%
Assignment 4	30%
Assignment 5	30%

Grading Scale

Letter Grade	Percentage Range
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	Below 60%

No incompletes will be awarded without an appropriate reason or without a prior meeting between the student and the instructor, either in person or on Teams. All assignments must be completed to receive a passing grade in the class. Incompletes will be granted only under extraordinary circumstances.

CIOS

At the end of the term, students are asked to complete the online course evaluation for all courses at Georgia Tech: https://gatech.smartevals.com. CIOS scores and comments have different degrees of visibility based on role.

Reporting access by role	CIOS Scaled Results	CIOS Comments	TA's Scaled Results	TA's Comments
Instructor	Their own	Their own	All within their own course	All within their own course
TA Supervisor	N/A	N/A	All within their own course	All within their own course
Teaching Assistant	None	None	Their own	Their own
School Administration	All within their own unit	None	All within their own unit	All within their own unit
Students	All - summary only	None	None	None

More information is available here: https://academiceffectiveness.gatech.edu/surveys/cios/cios-faqs/studentfaq

Supplemental Information (required for all M. Arch courses)

Professional Standards Addressed

NAAB Conditions for Accreditation for Professional Degree Programs in Architecture (2020)

The accredited degree program must demonstrate that each graduate possesses the knowledge and skills defined by the criteria below. These knowledge and skills prepare graduates for the path to internship, examination, licensure, and related fields. The program must provide student work as evidence that its graduates have satisfied each criterion.

The criteria include two levels of accomplishment:

- **Understanding -** The capacity to classify, compare, summarize, explain, and/or interpret information.
- **Ability -** Proficiency in using specific information to complete a task, select relevant information, apply it accurately to a problem, and distinguish the effects of its use.

For the purpose of accreditation, this course will actively address the following Program Criteria (PC) and Student Criteria (SC):

- **PC.2 Design -** How the program promotes the role of design in shaping the built environment and conveys the methods by which design integrates multiple factors in different settings and scales of development.
- **SC.5 Design Synthesis -** Ability to make design decisions within an architectural project while demonstrating synthesis and consideration of user requirements, regulatory requirements, site conditions, ecological concerns, and accessible design.
- **SC.6 Building Integration -** Ability to make design decisions within an architectural project while demonstrating integration and consideration of building envelope systems and assemblies, structural systems, environmental control systems, and life safety systems.

Course Policies

Academic Integrity and Conduct

Georgia Tech aims to build 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, "Code of Conduct," http://www.catalog.gatech.edu/rules/19/, and section 22, "Student-Faculty Expectations," http://www.catalog.gatech.edu/rules/22/.

All persons in the classroom are expected to behave with courtesy toward others and in a way that does not interfere with the regular conduct of the class. Cell phones should be turned off when students enter the classroom and should remain off for the duration of the class unless needed for course work. Laptop computers should be used for course-related work. Students should not engage in private conversations while the instructor or other students are speaking. Anyone not following these expectations may be asked to leave.

AI Policy

AI use is assignment dependent.

Use of Generative AI tools in this course will vary from assignment to assignment. Some assignments may allow or require Generative AI usage, while other assignments may limit or prohibit its use. Students should check the instructions for each assignment to determine what usage is allowed or required. Students should not assume that because Generative AI was allowed for one assignment, it is allowed for other assignments.

When Generative AI use is allowed, responsible use is expected. All submitted work must include a brief AI Usage Statement outlining which tools were used, when they were used, what prompts or questions were given, and how the AI output informed or shaped the final submission.

All submitted work must reflect the student's own understanding and work. Generative AI should not be used to fabricate data, cite non-existent sources, or bypass learning objectives. All graphic content created with AI tools should be labeled as AI-generated or AI-assisted. Failure to follow assignment guidelines for Generative AI, including using it when not permitted or failing to disclose it when required, may be considered a violation of Georgia Tech academic integrity policies. When in doubt, students should consult the instructor before using Generative AI.

Accommodations for Students with Disabilities
Any student with a disability who 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. Students should also schedule an appointment with the course instructor to discuss their learning needs.

Active Participation / Attendance
Active participation at all class meetings is mandatory and central to successful completion of the class. Absences will be excused only for medical or family emergencies, Institute-approved events, and religious holidays documented in writing. Students must notify the instructor in writing during the first two weeks of the semester about any anticipated absences for religious holidays. Late arrivals may be counted as absences.

Absences due to special or unforeseen circumstances must be discussed with the instructor as early as possible.

Missing three classes without an approved excuse will result in a letter grade reduction. Missing more than three classes, excused or unexcused, may result in a meeting with the instructor and the Architecture Program Office to determine a course of action, and may result in an incomplete grade (I) or a failing grade (F) in this course.

Students are encouraged to submit any class absence verification related to documented illness, hospitalization, accidents, death in the family, family emergencies, or lengthy illnesses to the Dean of Students: https://studentlife.gatech.edu/request-assistance

Approved Communication Platforms
Students should use Georgia Tech approved communication platforms for course communication. More information is available here: 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 and/or digital examples of their work to their instructors or administration for archiving no later than one week after the end of term. By enrolling, each student grants a license to reproduce and display their work online, in print publications, and in public exhibitions.

FALL 2026 ARCHIVE

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 available in the College of Design shop on the ground floor of the East Architecture Building.

Course Expectations and Guidelines
Per the Georgia Tech 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 credit for any project executed outside the precincts of the College or otherwise produced without proper coordination with the faculty.

Emergencies
In case of emergency, including fire, accident, or criminal act, please call the Georgia Tech Police at 404-894-2500. Perry Minyard, IT Support Administrator for the College of Design, is also a firefighter and an Emergency Medical Technician certified in CPR.

Extensions, Late Assignments, and Re-Scheduled / Missed Exams
Students may request extensions if they become sick or face another documented emergency. Late assignments or missed pin-ups will not be penalized when they are health related and properly communicated to the instructor. Students should be able to provide documentation for health-related or non-academic reasons when requested. Career fairs and off-campus interviews should be communicated to the instructor before the absence and planned accordingly.

Library and Archives

Need to do research but do not know where to start? Contact the Architecture Library subject specialist, Catherine Manci (catherine.manci@library.gatech.edu), for research help and information on available resources. Contact the 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

Georgia Tech Values Statement

At Georgia Tech, different backgrounds and perspectives are essential to learning, discovery, and creation. We seek to remove barriers to student success and to build a welcoming community where everyone has the opportunity to contribute to our mission. As outlined in the strategic plan (https://strategicplan.gatech.edu/values), Georgia Tech seeks an environment of holistic learning where all individuals can grow and learn to lead healthy, purposeful, impactful lives.

Ownership

For continuous improvement efforts, such as accreditation and periodic program reviews, the School may select samples of student work submitted to satisfy course requirements. This includes digital files, papers, drawings, models, and other course-related materials. Collected samples may be returned to students upon request.