School of Architecture | Georgia Tech | Fall 2026

ARCH 6508: Shape Grammars (3 credits)
CS 6492 Shape Grammars (3 credits)
ID 6508 Shape Grammars (3 credits)
ARCH 7030AE-MM3 (3 credits)

ARCH 4803 (Undergraduate offering)
CS 4803 (Undergraduate offering)
ID 4803 (Undergraduate offering)

Required Course for B.S.Arch., M. Arch 2, and/or M. Arch 3
Undergraduate and Graduate Offering

ARCH 6508 / ARCH 7030 / CS 6492 / ID 6508 Syllabus

Shape Grammars, 3 Credits

Fall Semester 2026

Instructor Information

Instructor: Athanassios Economou

Email: economou@gatech.edu

Office Location: Hinman 202

Office Hours: Tue 1:00-2:00pm

General Course Information

Course Description

Shape grammars is a powerful formal system for the generative description, interpretation, and evaluation of designs. Their unique difference with all other generative systems is that they perform entirely *visual computations* – shape rules are declared by drawing pairs of shapes and not by writing scripts or programming commands. Shape grammars are intended to form a basis for purely visual computation, and in this sense, they belong in the heart of design education and practice. The course discusses the foundations of shape grammar formalism, provides a constructive understanding of the formalism through hands-on workshops, and offers a generous overview of the history and logic of several of its applications in design research.

Course Learning Outcomes

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

- Learn the fundamentals of the shape grammar formalism including algebras of shape, shape rules, and parametric rule schemata.
- Develop an understanding of applications of the formalism in design research.
- Develop an ability to use the formalism through a series of iterative hands-on studies with the Shape Machine for Rhino —a shape grammar interpreter for a CAD modeler
- Develop an ability to generate 2D CAD models in DrawScript, a Turing-Complete, imperative programming language interpreted by Shape Machine

Required Course Materials

Kotsopoulos S (ed), 2025, Shape Computation: Fifty Years, 1972–2022, Mathematics and the Built Environment, Birkhäuser Cham, https://doi.org/10.1007/978-3-031-81623-9

Grading Policy

The grade for this course is divided as follows: 10 weekly Discussion board entries: 10 points, response essay @ 15 points, 3 studies @ 15 pts each = 45 pts and 1 final project @ 30 pts

Assignments

- 10 weekly Discussion board entries: 10 points
- 1 response essay @ 15 points
- 3 studies @ 15 pts each = 45 pts
- 1 final project @ 30 pts

Description of Graded Components

- **Weekly discussion entry (10):** A post of a question or a comment on the required weekly readings. Minimum entry 75 words
- **Essay**: A reflective response to a key paper/ reading of the class. Minimum length 1000 words
- **Study (3):** Generative specifications of 2D models in Shape Machine illustrating various techniques covered in the class. The deliverables are DrawScript code and a visual presentation of the findings (PowerPoint)
- **Project**: A constructive implementation of the lessons learned throughout the semester. The deliverables are DrawScript code, a visual presentation of the work(PowerPoint) and an illustrated essay (Word)

Grading Rubric

- A grade of "A" (90-100pts) represents "excellent" work. This grade reflects that your deliverables demonstrate a clear understanding of the course's themes and criteria, and is a self-motivated exploration that extends beyond the basic course requirements. Studies and projects that receive grades of "A" are exemplary projects in terms of concept, production, and craft.
- A grade of "B" represents "good" or "very good" work. This grade reflects that you have met the full requirements of the course, and that your deliverables are developed to the point where evaluation can be made relative to the studio's essential themes and criteria. The studies and the project demonstrate a reasonable degree of completeness, care, and insight.

- A grade of "C" represents "satisfactory" work. This grade reflects that you have met the basic requirements of the course, and your studies and project are somewhat underdeveloped. A grade of "C" is a baseline passing grade.
- A grade of "D" represents "unsatisfactory" work. This grade reflects that you have significant attendance problems, poor course performance, failure to meet deadlines, non-fulfillment of the basic requirements of the course,
- A grade of "F" represents "failing" work. This grade reflects a failure to meet the course requirements, including attendance, minimum requirements concerning presentation, and fulfillment of the course requirements.

Grading Scale

A 90–100%

B 80–89%

C 70–79%

D 60–69%

F Below 60%

Course Schedule

Please see the annotated class schedule on Canvas. This schedule is subject to periodic revisions; updated schedules will always be posted on Canvas.

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. The knowledge and skills defined here represent those required to prepare graduates for the path to internship, examination, and licensure, and to engage in related fields. The program must provide student work as evidence that its graduates have satisfied each criterion.

The criteria encompass two levels of accomplishment:

- *Understanding*—The capacity to classify, compare, summarize, explain, and/or interpret information.
- *Ability*—Proficiency in using specific information to accomplish a task, correctly selecting the appropriate information, and accurately applying it to the solution of a specific problem, while also distinguishing the effects of its implementation.

Program Criteria (PC) and Student Criteria (SC): The NAAB establishes PC and SC to help accredited degree programs prepare students for the profession while encouraging education practices suited to the individual degree program. For the purpose of accreditation, while this course will cover more criteria than the ones listed below, the following will be actively covered:

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.

PC.5 Research and Innovation—How the program prepares students to engage and participate in architectural research to test and evaluate innovations in the field.

PC.7 Learning and Teaching Culture—How the program fosters and ensures a positive and respectful environment that encourages optimism, respect, sharing, engagement, and innovation among its faculty, students, administration, and staff.

SC.4 Technical Knowledge—How the program ensures that students understand the established and emerging systems, technologies, and assemblies of building construction, and the methods and criteria architects use to assess those technologies against the design, economics, and performance objectives of projects.

Course Policies

Attendance and/or Participation

Active Participation at all class meetings is mandatory and crucial to the successful completion of the class. Attendance and participation will be collected through Canvas-based questions and surveys presented during class time. Excused absences will not count towards the calculation of a final grade. Institute expectations and restrictions:

SoA Attendance Policy

Active participation at all class meetings is mandatory. Absences will be excused only for medical or family emergencies, Institute-approved events, and religious holidays documented in writing. (Notify your instructor in writing during the first two weeks of the semester about any anticipated religious holiday absences.) 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.

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 your instructor and the Architecture Program Office to determine a course of action, and can result in an incomplete (I) or failing grade (F).

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

Academic Integrity

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.

Review Georgia Tech's Honor Code and the student Code of Conduct. Any student suspected of cheating or plagiarism will be reported to the Office of Student Integrity.

For expectations of student and instructor conduct, consult Code of Conduct (rules/19) and Student-Faculty Expectations (rules/22).

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body.

The Student-Faculty Expectations Agreement articulates some basic expectations that you can have of me and that I have of you. Simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment, obtain an accommodations letter, and discuss your special needs. Please also schedule an appointment with your instructor to discuss your learning needs.

Optional Policies, Expectations, and Resources

Limited Generative AI Use Permitted

Use of Generative AI (insert appropriate AI tool(s) here) is permitted but only within instructor-approved boundaries. Its use must be transparent and documented in a required AI Usage Statement with each submission, including: tool used and date of access, the input (prompt) provided, a copy of the output, and a description of how you used or edited the AI-generated content. Failure to disclose its use may be considered a violation of Georgia Tech's academic integrity policies.

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

Late submissions of assignments without previous arrangements will be graded down one-half letter grade for each calendar day they are overdue. Note that exceptions are made at Georgia Tech for approved Institute activities and religious observances

Inclement Weather and Digital Learning Days

In the event of inclement weather class will pivot to digital instruction and will follow conventions and regulations pertaining to Digital Learning Days for Modified Campus Operations as specified at: https://s1.policylibrary.gatech.edu/academic-affairs/digital-learning-days-modified-campus-operations.

Student Use of Mobile Devices in the Classroom

Full attention is required in class. Students using devices for anything other than active note taking may be counted as absent for the class period.

CIOS — Course Evaluations

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 roles:

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: CIOS Student FAQ

Campus Resources for Students

Undergraduate Student Academic Success Resources

A list of resources for undergraduate students' academic success and advising can be found at Success at Tech. Academic Support (a unit in the Office of Undergraduate Education & Student Success) provides free tutoring: success.gatech.edu/tutoring.

Graduate Student Academic and Professional Success Resources

A list of resources for graduate students is available on the Office of Graduate and Postdoctoral Education website.

Student Well-Being

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness-related resources has been compiled by the Office of the Vice President for Student Engagement and Well-being.

Library & Archives

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: https://library.gatech.edu/ Georgia Tech Archives: http://library.gatech.edu/archives

Approved Communication Platforms

Georgia Tech Approved Communication Platforms

Georgia Tech Values Statement

At Georgia Tech, we see different backgrounds and perspectives as essential to learning, discovery, and creation. We strive 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 our strategic plan, we want to create an environment of holistic learning where all individuals can grow and learn to lead healthy, purposeful, impactful lives.

SoA & College of Design Policies

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 forthcoming print publications, and in public exhibitions.

Ownership

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

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 & 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 reserves the right to refuse credit for any project executed outside the precincts of the College or 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. Perry Minyard, IT Support Administrator for the College of Design, is also a firefighter and EMT certified in performing CPR.