School of Architecture | Georgia Tech | Fall 2026

ARCH 4803 cross listed with ARCH 6228: Analytical investigations in urban design (3 credits)

ARCH4803/ARCH6228 Syllabus

Analytical Investigations in urban design (3 credits)

Fall 2026

Instructor Information

Instructor: John Peponis

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Office Location: Room 112, Architecture East

Office Hours: Tuesday and Thursday 9.00am – 5.00pm by appointment

General Course Information

Course Description

Catalogue description: Measures of urban and spatial form. Analysis of street connectivity. Models of space use and spatial cognition. Comparison and evaluation of design alternatives.

Additional description: The course introduces analytical concepts, methods and performance models associated with space syntax and urban morphology. Lectures are followed by in-depth discussion of specific readings, with an emphasis on the relationship between research questions and methodology. In addition, students are asked to study forms of urbanism emerging within the Atlanta metropolis, particularly the architecture and urban design of central places away from the downtown-midtown central district. The interrelationship between questions asked, relevant data, methods of analysis and analytical measures, and conclusions reached will be the theme running throughout the course.

Course Learning Outcomes

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

1. Define and measure the properties of street connectivity and urban form that affect the social and cultural performance of urban areas.

2. Understand the relationship between urban form and urban life based on research evidence.

3. Link questions, data, methods and measures as parts of a research program.

4. Provide a quick and rough characterization of an urban area as the first step towards initiating research on a particular aspect of urbanism.

Note: For all M. Arch courses, see also "Professional Standards Addressed."

Required Course Materials

Background reference texts:

Berghauser Pont M, Haupt P, 2021 *Spacematrix. Space, density and urban form* (NAi010 Publishers, Rotterdam)

Garreau J, 1988 *Edge cities* (Doubleday, New York)

Jacobs A B, 1993 *Great streets* (MIT Press, Cambridge, MA)

Marcus L, 2025 *Measures and meanings of spatial capital* (MIT Press, Cambridge, MA)

Marshall S, 2005 *Street patterns* (Spon Press, London)

Martin L, March L, 1972 *Urban space and structures* (Cambridge University Press, Cambridge)

Southworth M, Ben-Joseph E, 2003 *Streets and the shaping of towns and cities* (Island Press, Washington)

Vaughan L, Peponis J, Conroy Dalton R, 2025 *Space Syntax: Selected Papers by Bill Hillier* (University College London Press, London)

When not available from the Georgia Tech Library, electronic copies of these texts will be provided by the instructor in shared Teams course folder.

Weekly readings:

These are listed in the course schedule. All readings will be made available by the instructor in a shared Teams course folder.

Grading Policy

35% of the grade will be based on the reports regarding key readings – see assignment description for expectations.

55% of the grade will be based on the case study report – see assignment description for expectations.

10% of the grade will reflect general participation in class.

Assignments

- **Assignment 1**, 40% of final grade: *Notes on selected class readings*

On alternate class days we will be discussing key readings in class – usually individual papers published in scientific journals. These readings will be related to the lecture delivered in the preceding class session. The lecture will offer a larger context for studying the readings.

In preparation for the discussion, you must submit a brief report on the reading before the start of the class that will be devoted to the discussion of the reading.

Specifically you report should:

- List the questions addressed in the paper, each question stated in a single phrase.

- List the data used in the analysis. For example: "manually drawn axial maps of three areas in London, one residential and one commercial". The first time you reference a representation of data which is not common, you should define it in a sentence or two. For example: "an axial map covers the street network by the fewest and longest straight lines possible".
- List the measures entailed in the analysis. The first time you reference a measure in the report you should define it in a sentence or two. No definition is needed in subsequent reports. For example: "integration describes the distance of a space from all other spaces measured according to the number of turns" – this definition applies to the integration analysis of an axial map.
- List the key conclusions, using a sentence or two for each conclusion.
- Offer a brief discussion of the argument you find most interesting in the paper, as well as your critical reflections on key aspects of method. using no more than 120 words.

The assessment of each reading report will be based on the satisfaction of the requirements above.

In general, the spirit of your report should be as follows: If, after some time, you wish to return to the paper, your notes should sufficiently refresh your memory so that you do not have to read the paper again.

- **Assignment 2**, 50% of the final grade: *Reasoned portrait snapshots of two areas in Atlanta*

By and large, and with notable exceptions, Atlanta is a landscape of enclaves, cul-de-sacs, and disconnected residential-only areas. However, pockets of mixed-use medium-density or high-density developments are increasingly emerging, revitalizing parts of the conurbation. The emphasis, this semester, will be on a sample of such areas, some better connected to their surroundings than others.

For each study, two areas must be chosen and compared. To guide your choice, the following list is offered: (1) Ashford Crossing; (2) Perimeter Center; (3) Atlantic Station, 17th Street; (4) Avalon, Alpharetta; (5) Buckhead Loop; (6) Buckhead Village; (7) Old Fourth Ward; (8) Sandy Springs Center; (9) Truist Part. Some of these areas are parts of 'edge cities' (See Garreau, 1988) that are well established by now. Some refer to urban centres that are emerging and still being formed. If you wish, you can study other areas of similar interest, subject to approval.

What to do:

1. Research each of the two places and find available information and maps, certainly of all open and publicly accessible spaces and also, ideally, of ground floor plans showing building entrances, common areas, shops, or facilities open to the public.
2. Visit each place and plan to spend a good part of at least a day, preferably a Saturday – more visits would normally be appropriate, but I know how many demands each of you is juggling. Bring with you the best available map of the immediate as well as the larger scale surroundings. Immediate surroundings should refer to the urban block and those surrounding it – here, by urban block we mean any urban area surrounded by streets accessible to the public. The larger scale surroundings should refer to an area approximately 800 meters wide (about half a mile). Where possible, define the larger scale area by using existing streets as the boundary, even if this results in an irregular shape.
3. During your visit to each area:

- Walk the area and make notes as appropriate, so that you can edit and improve the map to increase its accuracy as necessary.
- Observe space use in a sample of spaces. A "space", here, means a street segment between two intersections – but you should feel free to give any other explicit definition of a 'space' that seems relevant in the particular context. Make sure your path covers a variety of conditions as found in the area. As you walk along each space count the number of people you cross, distinguishing between those moving and those either sitting or standing. Include people that are directly and approachably visible to you whether they are on the street, or on a property facing the street. Include people on both side of the street. Walk you observation path at least five times, making sure that there is an interval of a at least five minutes between your observations. These counts are a "snapshot" of the liveliness of the area. If you plan your visit on a Saturday during normal active hours, you maximize the chances that the area will be lively.
- At the end of your observation rounds, take notes about each of the observed spaces, recording your impressions. Does it feel inviting? Does it feel safe? Does it feel vibrant and exciting? Is there a variety of activities taking place? Do you see different kinds of people (age, gender)? Do you see individuals or also groups (whether families or friends)?
- Take photographs of each space, sometimes emphasising the longest or most exciting available view, and sometimes zooming in on a particular object of interest, sometimes recording least attractive moments or places.

4. Study the area and use those techniques of analysis that you find most interesting and appropriate and can be usefully applied to the data you have available, as collected before and after the visit to the site. Remember that sometimes simple measures such as street widths, lengths of axial lines, number of intersections and distances between intersections, setbacks, block sizes, proportions of open space denoted as parking can be very telling. Use more sophisticated techniques with purpose.
5. Write a report. The report should include at least the following:
    - A brief statement of the question you will address. This question is likely to become clearer in your mind after the visit and after you study of the two areas. However, you must zoom-in on a question and not try to cover everything.
    - A description of each setting, using text, maps and photographs.
    - A comparative analysis of the two settings.
    - A discussion of your findings, highlighting key characteristics of the places, as well and key differences and similarities. Offer speculations about how the design of space supports or hinders patterns of occupancy, use, and everyday urban life. Make sure these speculations are as informed and reasoned as possible.
    - Identify a research question that you would pursue further given time and resources.

You may work individually, in pairs or in small groups (up to 4 people maximum). Collaboration makes sense. I do not want to impose it because coordinating schedules is not always easy. If you do work in pairs or small groups, make sure your approach is consistent across the two sites in all respects.

The assessment of your report will be based on how well you have responded to the above.

The date for submitting your final case study report on Teams is Tuesday December 15, by end of day.

The total length of your essay should not exceed 3000 words, excluding references and captions. Where necessary use appendices to report information or insights that do not fit into your main argument.

Note: you will be asked to present a preliminary report in class and you will also be asked to arrange for individual sessions with the instructor, outside class times. Thus, you will have feed-back on your progress towards the report.

Description of Graded Components

The assessment of your final case studies report will be based on the following.

1. Description of each of the two sites, including the production of drawings as required for making the description intelligible and as needed for analysis. It is expected that drawings will be developed in Rhino or similar software and be refined in Adobe Illustrator or similar software regarding line weights, graphic conventions and labelling.
2. Clarity and relevance of the questions asked.
3. Quantitative methods used: how clearly and rigorously they are applied, and how relevant they are to the argument.
4. Clarity and justification of conclusions and proposal for further research.
   These criteria carry equal weight.

Grades

- A grade of "F" indicates failure to meet course requirements, including attendance and timely submission of required reports.
- A grade of "D" means poor satisfaction of assignment requirements or incomplete submission of the reports requested.
- A grade of "C" means the basic requirements of the course have just been met, with a plausible but substantially underdeveloped case study report.
- A grade of "B" means basic requirements are met and the case studies report is developed enough for evaluation against the four criteria mentioned above.
- A grade of "A" means the work submitted clearly demonstrates understanding of course themes, satisfies assignment criteria, and demonstrates self-motivated exploration beyond basic 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 below. This schedule is subject to periodic revisions; updated schedules will always be posted on Teams and distributed by e-mail.

August 25, Tuesday. Course introduction and description of assignments.

August 27, Thursday. Urbanism, architecture, and the interface of scales.

September 1, Tuesday. Discussion of assignments.

September 3, Thursday. What is a city? Discussion of two articles:

Bettencourt L M A, West G B, 2010, "A unified theory of urban living" *Nature* **467** 912-913

Bettencourt L M A, 2013, "The origins of scaling in cities" *Science* **340** 1438-1441

September 8, Tuesday. Describing streets and street networks. Lecture on key ideas.

September 10, Thursday. Describing streets and street networks: Discussion of:

Hillier B, Hanson J, Peponis J, Hudson J, Burdett R, 2025 (Original publication 1983), "Space syntax. A different urban perspective", in *Space Syntax. Selected Papers by Bill Hillier* Eds L Vaughan, J Peponis, R Conroy Dalton (UCL Press, London) pp 195-221

September 15, Tuesday. Describing urban blocks. Lecture on key ideas.

September 17, Thursday. Describing urban blocks: Discussion of:

Siksna A, 1998, "City center blocks and their evolution: a comparative study of eight American and Australian CBDs" *Journal of Urban Design* **3** 253-283

September 22, Tuesday. Descriptions of density. Lecture on key ideas.

September 24, Thursday. Descriptions of density. Discussion of:

Berghauser Pont M, Haupt P, 2005, "The spacemate: density and the typomorphology of the urban fabric" *Nordic Journal of Architectural Research* **4** 55-68

September 29, Tuesday. 'Natural movement', co-presence, and 'virtual community. Lecture on key ideas.

October 1, Thursday. 'Natural movement'. Discussion of:

Hillier B, Penn A, Hanson J, Grajewski T, Xu J, 2025 (original publication 1993), "Natural movement. Or, configuration and attraction in urban pedestrian movement", in *Space Syntax. Selected Papers by Bill Hillier* Eds L Vaughan, J Peponis, R Conroy Dalton (UCL Press, London) pp 390-436

October 6, Tuesday. FALL BREAK

October 8, Thursday. Space and land use. The idea of central places. Lecture on key ideas.

October 13, Tuesday. A discussion of:

Scoppa M, Peponis J, 2015, "Distributed attraction: the effects of street network connectivity upon the distribution of retail frontage in the City of Buenos Aires" *Environment and Planning B: Planning & Design* **42** 354-378

October 15, Thursday: Introduction to DepthMap.

October 20, Tuesday: Analytical tools.

October 22, Thursday: Analytical tools

October 27, Tuesday: Urban form and spatial cognition. Lecture on key ideas.

October 29, Thursday. A discussion of:

Hillier B, 2025 (Original publication in 2002), "A theory of the city as object. Or how spatial laws mediate the social construction of urban space", in *Space Syntax. Selected Papers by Bill Hillier* Eds L Vaughan, J Peponis, R Conroy Dalton (UCL Press, London) pp 514-555

November 3, Tuesday: The idea of spatial capital

November 5, Thursday. A discussion of:

Marcus L, 2010, "Spatial capital. A proposal for an extension of space syntax into a more general urban morphology" *Journal of Space Syntax* **1** 30-40

November 6, Thursday: Seminar on progress of Atlanta case studies

November10, Tuesday: Discussion of case studies

November 12, Thursday: Discussion of case studies

November 17, Tuesday: Discussion of case studies

November 19, Thursday: Discussion of case studies

November 24, Tuesday: Discussion of case studies

November 26, Thursday: THANKSGIVING

December 1, Tuesday: Discussion of case studies

December 3, Thursday: Review and conclusion

Attending SoA lectures during studio time on Mondays or Wednesdays from 12:30–1:30 p.m. is required for M. Arch students and highly recommended for B.S. Arch, M.S., and Ph.D. students.

Course Policies

Attendance and/or Participation

Attendance to all classes is required and essential as this is a tightly scheduled and tightly paced course – new material is introduced in every class. While an effort will be made to help those who miss a class with legitimate and documented justification, it must be understood by all that it is impossible to repeat class material. Were many students are confronted with distracting obligations, such as a career fair, an effort will be made to reschedule the delivery of important content provided the instructor is warned at least two weeks in advance. The general policies outlined below hold for this class.

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.

Attendance of SoA lectures during studio time on Monday or Wednesday from 12:30–1:30 p.m. is required for M. Arch students and highly recommended for B.S. Arch, M.S., and Ph.D. students.

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.

Collaboration, Group Work, and Use of Generative AI

Students working in groups will be asked to self-assess the relative effort put by each individual into the group report and the self-assessment will be taken into account when grading the case studies report.

AI tools are available to be used like any other resource, subject to proper academic standards. In this course, 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 your final submission. Use of Generative AI must comply with Georgia Tech's Honor Code and academic integrity guidelines.

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

All students must submit reading reports on time, even if they are sketchy and/or incomplete. No exceptions. Revised reports on any reading assignments submitted by Tuesday December 15 will be taken into account in order to improve the corresponding grade.

Inclement Weather and Digital Learning Days

If campus operations are affected by weather or any other adverse circumstance the class will be held on line after arrangements to that effect are made.

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

Reporting access by role	CIOS Scaled Results	CIOS Comments	TA's Scaled Results	TA's Comments
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.

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.