COLUMBIA
GSAPP

AT3 Envelopes
Fall 2019

Syllabus

1. Course Description

This course introduces students to the technical design of building envelopes. Beginning with envelope design principals and system typologies, and moving on to performance criteria, documentation strategies, and considerations of project execution (fabrication, installation, cost), the course covers the tools and methods of façade design and prepares students to design advanced enclosure systems.

The course is taught as a hybrid lecture and design workshop. The lectures cover core concepts relevant to each phase of the façade design process. Students apply the lecture content to a semester-long enclosure design project that is coordinated with the companion course AT4 – Integrated Systems. Enclosure critics provide technical instruction to students via desk crits and design reviews, which are held jointly with the AT4 critic teams.

2. Course Schedule

The schedule below generally applies, but there are exceptions.
Refer to the detailed course schedule to confirm activities for specific dates.

Content	Date	Location
Lectures	Fridays, 9:30am – 12pm	Avery 114
Group Desk Crits	Tuesdays, 3pm – 6pm (after AT4 Lecture)	Rooms 504, 505, 408, 409, 412 (coordinated with AT4)
Reviews	SD – Tuesday, 10/1, 2pm – 6pm DD – Tuesday, 10/22, 2pm – 6pm 75% CD – Tuesday, 11/26, 2pm – 6pm CD Drawing Sets due – 12/13, 5pm	Rooms 504, 505, 408, 409, 412 (coordinated with AT4)
Site Visits	Refer to AT4 Syllabus	Construction Site
Instructor Office Hours	Tuesdays 3pm – 6pm, or by appointment	TBD
TA Office Hours	Monday 7 – 9 pm	5th Floor Studio South

3. Instructors & Critics

Professor: Gabrielle Brainard, geb2137@columbia.edu
Teaching Assistants: Ericka Song, ems2306@columbia.edu
Kate McNamara, kmm2310@columbia.edu

Technical Instructors:

Section H	Room #408	Encl	Katherine Chan	Walter P. Moore	kchan@walterpmoore.com
Section K	Room #505	Encl	Ryan Donaghy	SHoP Architects	donaghyr@gmail.com
Section P	Room #412	Encl	Alex Barmas	DeSimone Consulting Engineers	alex.barmas@de-simone.com
Section D	Room #504	Encl	Tom Reiner	Talweg Studio	tom@talwegstudio.com

4. Course Content

a. Lectures — Fridays, 9:30am – 12:30pm

The lectures present core concepts and cover material relevant to each phase of the enclosure design process.

- In schematic design, the focus is on understanding and defining façade types and materials.
- In design development, performance criteria are introduced, with a focus on structural and thermal performance requirements.
- In construction documents, we review the enclosure design and construction process (documentation, bid/award, fabrication, mock-ups, laboratory testing, installation, field inspection) and consider the relationship between design and cost.

b. Assignments

Individual assessments (quizzes and in-class assignments) will be incorporated into the lecture timeslot:

- Quizzes. Each lecture will begin with a short, multiple-choice quiz based on the content of the previous lecture. Quizzes will be given electronically and must be taken with a device capable of connecting to the internet (smartphone, laptop or tablet). Consider installing a QR code reader on your phone or tablet to quickly access the quiz link. If you don't have a device, see the instructor for a paper copy of the quiz. Missed quizzes may be re-taken for full credit (excused absence) or half credit (unexcused absence) at the end of the semester.
- Assignments. Short assignments will reinforce key concepts from the lecture. These assignments will involve freehand drawing, writing, or hand calculations. Where possible, we will begin these assignments in class, after the lecture. Bring paper (grid paper is recommended) and your preferred drawing tools to complete the assignments. Assignments will be scanned and submitted via Canvas.

c. Project workshops Tuesdays, 3:00pm – 6:00pm
Project reviews Tuesdays, 2:00pm – 6:00pm (note earlier start time)

Project workshops, conducted as group desk crits and/or pin-ups, are coordinated with AT4. Each student team will have an enclosure design critic, who will join the AT4 critics at key points in the semester. Enclosure critics will also participate in design reviews.

Students will focus on the development and documentation of at least two wall types – one opaque, one glazed. Documents will work from large to small: identifying system type, location and materials, dimensional coordination with other building systems (structure, MEP, interior finishes), incorporating performance criteria, and finally developing typical and atypical details and material specifications.

Throughout, the focus is on understanding and documenting the façade as a system made of component parts, leading to an economy, precision, and clarity of documentation.

d. Site visits Time TBD

Site visits are coordinated with AT4. Refer to the notes on jobsite attire in the AT4 syllabus.

5. Textbooks / Learning Resources

The texts below are recommended. Required readings are noted in the detailed course schedule. PDFs of readings will be posted on Courseworks.

Aksamija, Alja. Sustainable Facades: Design Methods for High-Performance Building Envelopes. New Wiley: 2013.

Boswell, Keith. Exterior Building Enclosures: Design Process and Composition for Innovative Facades. New York: Wiley, 2013.

Herzog, Thomas. Facade Construction Manual. Basel: Birkhauser, 2008.

Knaack, Ulrich. Facades: Principals of Construction. Basel: Birkhauser, 2007.

Murray, Scott. Contemporary Curtain Wall Architecture. Princeton: Princeton Architectural Press, 2009.

Reichel, Alexander and Schultz, Kersten, eds. Enclose | Build (Scale). Basel: Birkhauser, 2015.

Schittich, Christian. Glass Construction Manual. Basel: Birkhauser, 2007.

Watts, Andrew. Modern Construction Envelopes. Wien: Springer-Verlag, 2011.

6. Grading and Assessment

Grading includes individual and group assessment, with a focus on the final group project. As cohesive group participation is critical to a successful project, grades for group work are assigned to the group. On rare occasions, individual grades may be awarded for exceptional or deficient performance within a group. Grading is based on the following criteria:

Criteria	Description		%
Assignments	- 5 assignments @ 3% each - Accuracy of content (drawing / calculation / text) - Clarity of presentation		15%
Attendance and Quizzes	- Lecture Attendance - 4 quizzes @ 1% each		10%
Final Project (coordinated with AT4)	Technical concept		*9%*
	Breadth of Development	Envelope Systems	*18%*
		Integration of Systems	*18%*
	Complexity and Quality of Deliverables	- Quality of drawing deliverables - Communication of concept and design in drawing form - Level of assembly drawn - Presentation at reviews and desk crits (equal presentation by all group members required)	*23%*
	Process and Professionalism	- Team collaboration - Punctuality - Preparedness for weekly crits - Assignment completion - Sketches, project organization - Responsiveness to critic feedback	*7%*
	Final Project Total		75%

Final grades are assigned based on the following scale:

Grade	%
High Pass	> 90%
Pass	60 – 90%
Low Pass	50 – 60%
Fail	< 50%

7. Absences and Make-up Work

It is important that you attend every class. Attendance will be taken – or a quiz will be given – at the beginning of each lecture. Attendance at desk crits and reviews will be taken by the enclosure critic and/or instructor.

An absence is “excused” if you are sick and submit a doctor’s note, or have a serious issue that causes you to miss class, such as a family emergency. All other absences are “unexcused.” Students may have up to two unexcused absences per semester. Students with three or more unexcused absences will have their final grade reduced, and may fail the course.

If you know you will be absent for any reason, email the instructor and TA at least 24 hours prior to class to arrange to complete make-up work. If you do not inform us ahead of time, you may not have the opportunity to make up the work that you missed.

If you miss a quiz due to lateness or absence, you will have the opportunity to make it up at the end of the semester. Late work (including quizzes) will receive a reduced grade.

8. Policies and Academic Integrity

- If you require an accommodation for a disability, please let the instructor know as soon as possible. Some aspects of the course may be modified to facilitate your participation and progress.
- All students are held to the academic policies of the University.
- Plagiarism is knowingly presenting another person’s ideas, findings, images or written work as one’s own by copying or reproducing without acknowledgment of the sources. It is intellectual theft that violates basic academic standards. In order to uphold an equal evaluation for all work submitted cases of plagiarism will be reviewed by the individual faculty member and/or the Dean. Punitive measures will range from failure of an assignment to expulsion from the University.
- Students who miss deadlines due to valid extenuating circumstances may submit the required work at a later date, as agreed upon with the instructor. University regulations limit such circumstances to serious personal illness and death in the immediate family. Unexcused late projects will not be accepted, incomplete projects will be evaluated in relation to their degree of completion, and a student will be allowed to present such work only with instructor approval. Lectures and demonstrations cannot be repeated. There is no excuse for late submittals, late attendance at reviews or pin ups, due to printer or computer problems. You have to organize your output ahead of time or find other resources outside the college to complete your work on time. Late work will be accepted only at the discretion of the instructors and is subject to a 5% grade deduction for every 24 hours past the deadline.
- The final course evaluations are important to the quality of instruction. Please take the necessary time to critically and constructively evaluate the course as well as the instructor’s quality of instruction and guidance in relation to your own participation in the course, engagement in the subject matter as well as your interaction with your peers and your instructor.