ARCHITECTURAL TECHNOLOGY

INTRODUCTION / OBJECTIVES
This course will further your understanding of the logics and details of construction technologies as they contribute to the production of architecture. Both conventions and experimentations in building construction will be referenced in order to link technical considerations to design development.

We will regard buildings as constructed assemblies that are rooted in their sites, have ramifications in the material, connective and sequential construction choices made, and have financial considerations that affect their ultimate realization. Emerging technologies and concerns will be studied alongside proven techniques and traditional means, to encourage awareness of all facets of constructional potentials. You will learn fundamental detailing principles, and implement those principles in order to test through making.

We will view technology not as a post-facto concern applied to enable an architectural idea, but as one of many modes of concurrent thinking the architect must develop. Possibilities and limitations of various constructional systems will be explored, with an eye towards assembly systems being understood as the nexus of various kinds of performance:

- structural
- inclusion / exclusion: environmental management
- energy use / conservation / generation
- movement: expansion, deflection, vibration
- assembly / tolerance / sequence / disassembly
- aesthetics / concept
- digital integration

Tuesdays will generally be all-class lectures; Thursdays will generally be breakout sessions with individual faculty working with smaller groups of students on projects that implement lessons learned. Consult the course schedule for further info.

For third-year students, this course will be linked to the studio project at several occasions during the semester. Your goal should be to integrate the focuses of the two courses to strengthen the outcome of both.

EVALUATION AND GRADING
Final grades will be based on the following distribution:

- project 1: assembly analysis 10%
- project 2: part to whole 10%
- project 3: surface to section 10%
- project 4: section to chunk 10%
- integration & demonstration of Student Performance Criteria 10%
- quizzes (5 @ 2%) 10%
- midterm exam 20%
- final exam 20%

Your work must demonstrate at least a minimum level of competence in the following NAAB Student Performance Criteria areas. You can read more on each criterion at http://www.naab.org/accreditation/2009_conditions.aspx.

B.7 Financial Consideration
B.10 Building Envelope Systems
B.12 Bldg Materials/Assemblies

Unsatisfactory performance warnings will be issued to students whose work does not meet minimum requirements. University guidelines relative to plagiarism pertain to original design work. Note the minimum expectation for this course is 6 hours of time spent outside the classroom per week.
## CALENDAR

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>LECTURE</th>
<th>BY</th>
<th>BREAKOUT</th>
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<tbody>
<tr>
<td>1</td>
<td>T 01/10</td>
<td>introduction: tectonic logics; intro P1 history &amp; performance</td>
<td>EH</td>
<td>P1 initial review</td>
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<tr>
<td>R 01/12</td>
<td>site &amp; foundations principles, soils, grading</td>
<td>EH</td>
<td>P1 mid review</td>
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<td>2</td>
<td>T 01/17</td>
<td>monolith 1: concrete properties / technology reinforcing, formwork, joints, lifts</td>
<td>CK</td>
<td>quiz 1; P1 final review</td>
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<tr>
<td>R 01/19</td>
<td>monolith 2: concrete case studies; intro P2 surfaces, shells, frames</td>
<td>CK</td>
<td>P2 initial review</td>
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<tr>
<td>3</td>
<td>T 01/24</td>
<td>skeleton 1: steel properties / technology frame conventions, welds &amp; bolts, protection</td>
<td>SU</td>
<td>quiz 2; P2 mid review</td>
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<tr>
<td>R 01/26</td>
<td>skeleton 2: steel case studies &amp; alt. assemblies trusses, spaceframes, gridshells, heavy timber</td>
<td>CK</td>
<td>P2 final review</td>
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<tr>
<td>4</td>
<td>T 01/31</td>
<td>skin 1: cladding, panels, joints metals, precast, GFRC, attachments</td>
<td>JK/SU</td>
<td>quiz 3; field trip (tentative)</td>
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<tr>
<td>R 02/02</td>
<td>skin 2: multi-layer, performative, responsive rainscreens, double walls, active systems</td>
<td>GP</td>
<td>midterm exam</td>
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<tr>
<td>5</td>
<td>T 02/07</td>
<td>skin 3: curtain walls &amp; glazing; intro P3 stick-built, structural glass facades</td>
<td>GP</td>
<td>P3 initial review</td>
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<tr>
<td>R 02/09</td>
<td>spring break</td>
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<tr>
<td>03/12</td>
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<tr>
<td>6</td>
<td>T 03/14</td>
<td>apertures &amp; operability doors, windows, penetrations</td>
<td>GP</td>
<td>P3 mid review</td>
</tr>
<tr>
<td>R 03/22</td>
<td>movement: stairs, ramps, elevators tectonics, materials, guards</td>
<td>SU</td>
<td>quiz 4; P3 mid review</td>
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<td>7</td>
<td>T 03/20</td>
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<td>T 03/27</td>
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12 T 04/03  idiosyncrasies: tensile, monocoque etc.; intro P4 alternative technologies, fabrics ref: none
EH
R 04/05  P3 final review

13 T 04/10  bearing 1: light frame, sips wood & steel stick construction ref: Allen ch. 3, 5, 12
JK
R 04/12  quiz 5; P4 initial review

14 T 04/17  bearing 2: aggregations, masonry stacking, reinforcing, structural ref: Allen ch. 8, 9, 10
SU
R 04/19  P4 mid review

15 T 04/24  membranes & infiltration waterproofing, flashing, roofing ref: Allen ch. 6, 16
JK
R 04/26  P4 final review

17 T 05/08  final exam 2:00-4:00pm

READINGS / BIBLIOGRAPHY
There is no required text for this course, but citations are given above to chapters in your ARCH 211 textbook (Allen & Iano, Fundamentals) for referral.

The following are recommended texts that further the information presented; Watts and Deplazes in particular are excellent books, useful for both this course and design studio:

And of additional reference:
Architectural Graphic Standards. Wiley.
Patterson, Mic, Structural Glass Facades and Enclosures. Wiley, 2011.

Note that references to texts do not substitute for information presented in class.

CLASS ATTENDANCE
Attendance at all course sessions, including lectures, breakout sessions, exams and field trips, is required. Personal illness, family emergency, pre-approved academic reason, or religious observance may be excusable; notify your instructor of such situations as soon as possible and before the affected class session.

Unexcused absences from more than two classes will result in the lowering of your final grade by one-third grade per additional absence. False representation of your attendance may be considered a violation of ethics before the University.
A student not in class within the first 10 minutes is considered tardy; three tardies shall constitute an absence. Failure to be in attendance for the entire class session, unless approved by your instructor, may count as an absence. Late work may be accepted only for excused absences, and at the discretion of your instructor.

ACADEMIC INTEGRITY
USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: [web-app.usc.edu/scampus/university-governance/]. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The review process can be found at: [http://www.usc.edu/student-affairs/SJACS/].

RELIGIOUS OBSERVANCES
The University recognizes the diversity of our community and the potential for conflicts involving academic activities and personal religious observation. The University provides a guide to such observances for reference and suggests that any concerns about lack of attendance or inability to participate fully in the course activity be fully aired at the start of the term. As a general principle students should be excused from class for these events if properly documented and if provisions can be made to accommodate the absence and make up the lost work. Constraints on participation that conflict with adequate participation in the course and cannot be resolved to the satisfaction of the faculty and the student need to be identified prior to the drop/add date for registration. After the drop/add date the University and the School of Architecture shall be the sole arbiter of what constitutes appropriate attendance and participation in a given course. Any student concerned about missing class for a recognized religious holiday should bring this matter up with your instructor in the first week of classes. A list of recognized religious holy days may be found at: [http://orl.usc.edu/religiouslife/holydays/].

DISABILITY ACCOMMODATIONS
The University of Southern California is committed to full compliance with the Rehabilitation Act (Section 504) and the Americans with Disabilities Act (ADA). As part of the implementation of this law, the University will continue to provide reasonable accommodation of academically qualified students with disabilities so those students can participate fully in the University’s educational programs and activities. Although USC is not required by law to change the “fundamental nature of essential curricular components of its programs in order to accommodate the needs of disabled students,” the University will provide reasonable academic accommodations. The specific responsibility of the University administration and all faculty serving in a teaching capacity is to ensure the University’s compliance with this policy.

The general definition of a student with a disability is any person who has “a physical or mental impairment which substantially limits one or more of such person’s major life activities,” and any person who has “a history of, or is regarded as having, such an impairment.” Reasonable academic and physical accommodations include but are not limited to: extended time on examinations; substitution of similar or related work for a non-fundamental program requirement; time extensions on papers and projects; special testing procedures; advance notice regarding book lists for visually impaired and some learning disabled students; use of academic aides in the classroom such as note takers and sign language interpreters; early advisement and assistance with registration; accessibility for students who use wheelchairs and those with mobility impairments; and need for special classroom furniture or special equipment in the classroom.

Obtaining Accommodations:

General: Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to your studio instructor as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

Physical Accommodations: DSP will work with classroom scheduling, the course instructors and their departments, and the students to arrange for reasonable accommodations.

Academic Accommodations: Students seeking academic accommodations due to a physical or learning disability should make the request to the course instructor prior to or during the first week of class attendance, as well as registering with DSP as early in the semester as possible. Course instructors will require that a student present verification of documentation when academic accommodations are being requested.
SUSTAINABILITY INITIATIVE
The School of Architecture has adopted the 2010 Initiative for Sustainability, which includes the following language:

“The design should engage the environment in a way that dramatically reduces or eliminates the need for fossil fuel.”

This intention impacts our design process in a number of ways, including:
- orientation of buildings and site development to minimize negative environmental force impacts and take advantage of positive ones
- building modestly: providing the minimum space necessary to handle required programmatic needs
- maximum practical use of daylighting; careful use of orientation and provision of control/shading mechanisms to handle associated heat loads
- maximum practical use of passive solar techniques for heating and cooling
- maximum practical use of natural ventilation techniques; selection of hybrid systems for ventilation, heating and cooling which permit this

No school can lay a claim to Sustainability sensitivity that does not institute and vigorously pursue a recycling program. This recycling program is in force at all times. We pledge to provide adequate, well-marked recycling containers for each section and to provide a posted, printed recycling protocol so you know what goes where.

ACCREDITATION STATEMENT
The USC School of Architecture’s five-year Bachelor of Architecture program and the two-year Master of Architecture program are accredited professional architectural degree programs. All students can access and review the NAAB Conditions of Accreditation (including the Student Performance Criteria) on the NAAB Website, http://www.naab.org/accreditation/2009_conditions.aspx.