/// ARCH 202bL: Architecture Design II: MATERIAL ///
University of Southern California - School of Architecture - Spring 2012

Professors:  Gail Peter Borden [coordinator]  Eric Nulman [coordinator]
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            Laurel Broughton
            John Frane
            Christoph Kapeller
            Brendan Muha
            Anna Neimark
            Aaron Neubert

2011 Catalogue Course Description: Continuing development of principles and processes; sequence of projects selected to broaden awareness of design issues at various scales in the urban context. Arch 202bL focuses on material exploration and fabrication skills as well.

Course Goals and Objectives: This studio is the fourth in a design sequence developing the connection between materials and architectural design. The translation of an idea into architecture is a complex process emerging out of site, mediated by program and budget, and executed to join the larger network of daily actions and events intrinsic to the city as a complete organism. Its expression ultimately comes through the presence, ability and tectonic of material. The focus of this studio is to develop a personal understanding of how a material and its associated systems of assembly are intertwined with the design process to generate the performance, form and experience of architecture. Building on the fundamental principles accumulated over the past three semesters, this studio will continue to develop the complexity and sophistication of your architectural design process. Throughout the semester we will explore the formal implications of material and representational composition. We will work with a wide palette of tools for representation and design development. The call will be to fabricate an architectural composition that employs and investigates the potential of the material and media in both its projected and tangible form. There will be a high emphasis on abstract making through conceptual modeling, design drawing, graphic capabilities and physical modeling.

National Architectural Accreditation Board (NAAB) Accreditation: The USC School of Architecture’s five year BARCH degree and the two year M.ARCH degree 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.

NAAB Student Performance Criteria (SPC) Addressed (if Bold: Course Identified on SPC Matrix for Criteria): In the context of the overall design sequence of the Bachelor of Architecture curriculum, this course contributes to the graduate attributes in the following areas. Note there are two levels of expected competence that apply to each skill: ability and understanding. Ability: skill in relating specific information to the accomplishment of tasks; students can correctly select the information that is appropriate to a situation and apply it to the solution of specific problems. Understanding: assimilation and comprehension of information; students can correctly paraphrase or summarize information without necessarily being able to relate it to other material or see its fullest implications.

A.1 Communication Skills: Ability to read, write, speak and listen effectively.
A.2 Design Thinking Skills: Ability to raise clear and precise questions, use abstract ideas to interpret information, consider diverse points of view, reach well-reasoned conclusions, and test alternative outcomes against relevant criteria and standards.
A.3 Visual Communication Skills: Ability to use appropriate representational media, such as traditional graphic and digital technology skills, to convey essential formal elements at each stage of the programming and design process.
A.5 Investigative Skills: Ability to gather, assess, record, apply, and comparatively evaluate relevant information within architectural coursework and design processes.
A.6 Fundamental Design Skills: Ability to effectively use basic architectural and environmental principles in design.
A.7 Use of Precedents: Ability to examine and comprehend the fundamental principles present in relevant precedents and to make choices regarding the incorporation of such principles into architecture and urban design projects.
A.8 Ordering Systems Skills: Understanding of the fundamentals of both natural and formal ordering systems and the capacity of each to inform two- and three-dimensional design.
B.12 Bldg Materials/Assemblies: Understanding of the basic principles utilized in the appropriate selection of construction materials, products, components, and assemblies, based on their inherent characteristics and performance, including their environmental impact and reuse.
Topical Outline: This semester will focus on a series of integrated design investigations following a case study.

[1] Material/Precedent The first segment will be the focused deployment of an architectural material case study. Through the unpacking of a precedent of specific historical significance, students in teams of two will produce a collection of analytical and representative models focused on the tectonic and material implications of design. As a formatted aggregation of diagrams and analytiques, each student will produce a cohesive analysis of their assigned archetype. The collective aggregate display of these precedents will produce a unified body of architectural research [2D and 3D] that will document a significant segment of architectural thought. This will simultaneously serve as a vehicle for a craft based development of each student’s representational abilities. (15% of Semester)

[2] Assemblies The second segment engages the relationship of connections and larger systems of assembly. Given a very specific unit and a limited collection of operations [cutting, drilling, notching] each student will develop an individual tectonic. Both the resulting joint conditions will be modeled [full scale to illustrate the detail] as well as the collective effect of the assembly. Assembly drawings will focus on the sequencing of the system and the collective field effect. (15% of Semester)

[3] Material Systems The third segment translates the relationship of part to whole within the larger system of a building. Engaging the limitations and capabilities within existing systems of materials, the project will use concrete masonry as a base framework, the modules, shapes, capabilities and effects of working within a system will be engaged. A simplified program will allow for the complexity of focus to be on the material application. (20% of Semester)

[4] Material Architecture The fourth and final segment will integrate process, material, and program in a specifically sited context. The program will require an integration of previous projects as well as site and material to develop a clear concept of design through making. Beginning with intensive research into three methodologies of casting, unit, and line, the engagement will develop a system through full scale performative material fabrication. Translating all or one of these systems into a building, the final project will resolve all the complexities of structure, materials, program, site, and experience all organized with a clarity and cohesiveness. The scheme will require a total aggregation of tectonics, history, and representation through design. This final segment of the studio will investigate the influence of material on a fixed program. The design will emerge from materiality and the application of construction to use: material logic. (45% of Semester)

[5] Lectures, Readings, Discussions Parallel to each design problem, a series of material themes will focus attention on history, representation, tectonics, and theory. These lectures, in combination with the technical information provided through the parallel lecture class of ARC 211 [Materials and Methods of Construction] will provide a holistic engagement of the relationship of design to material. The introduction of these diverse themes and complexities will overlay on the sequential development of each student’s individual design proposition. (5% of Semester)

NAAB SPC Time Allocation
Communication Skills 05%
Design Thinking Skills 05%
Visual Communication Skills 15%
Investigative Skills 10%
Fundamental Design Skills 05%
Use of Precedents 15%
Ordering Systems Skills 20%
Bldg Materials/Assemblies 25%

Course Prerequisites: ARCH 202aL.
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<thead>
<tr>
<th>DATE</th>
<th>STUDIO 2-6 M W F</th>
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<th>211 Projects</th>
<th>READINGS</th>
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* - Indicates faculty coordination meeting in Courtyard 1PM
/// CONTACT INFORMATION ///

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studio protocol
Grading: Final grade evaluations for this studio will be based on the following breakdown:

- Attendance / participation / readings: 5%
- Representation[s]: 5%
- Project 01: 10%
- Project 02: 15%
- Project 03: 15%
- Project 04: 30%
- Meeting NAAB SPC: 10%
- Digital Submission: 5%
- Portfolio quality: 5%

Each design exercise will be evaluated, reviewed, and graded by your instructor. Projects will be weighted according to their length and depth of investigation. Course evaluation is based on the following:

- Quality of design concept
- Ability to develop design concept
- Quality of presentation and representation
- Completion of work
- Progress, process, and improvement
- Participation and attendance

All work will be periodically evaluated so that you will have a clear understanding of your progress. Unsatisfactory reports will be issued to students whose work is not satisfactory. Incomplete grades are regulated by the University and may only be given in cases of extended documented illness or family emergencies. Please discuss either of these directly with your instructor.

General Grade criteria

- A: Excellence in every way
- B: Good quality work that may be deficient in some areas
- C: Average work that is satisfactory with some obvious deficiencies
- C- or below: Unsatisfactory/failing work, not passing

University guidelines pertaining to plagiarism also pertain to original design work. You are expected to do all of your own design and presentation work. Assistance in the form of model construction, drawings, or the flagrant appropriation of other designs will be considered non-original work and will be treated as plagiarism.

Attendance: Because essential course materials and concepts are discussed during studio time, attendance at all studio meetings, class lectures, and reviews is essential and required. More than three absences during the course of the semester will jeopardize successful completion of the course and will certainly reflect negatively in the student's final course grade. Your studio instructor must approve any excused absences in writing.

Portfolio: You will be required to submit a portfolio at the end of the semester. Your work and process should be thoughtfully presented in a portfolio no greater in size than 8.5” x 11”. Please take care and consideration of your work and regularly document it throughout the semester. Additionally, you will be required to submit to the USC digital drop box. [see digital submission guidelines]

Protocol: The studio environment can be one of the most inspiring aspects of architectural education, and it is your responsibility to make it into a desirable place to be. In order to maintain a creative atmosphere conducive to creative production, the following guidelines will be adopted:

Assignments: Requirements for projects will be handed out in writing. Daily or weekly assignments may be given verbally and may differ somewhat from section to section. All assignments are non-negotiable. Full completion of all assignments is critical to your success in this class. Full completion of all assignments is critical to your success in this class. In order to understand architectural design you must create work and present it using visual and graphic means.
Reviews: Reviews are among the most important activities of your architectural education. You can benefit immensely from the presentation and discussion of your and your classmates’ work. Full participation is required in all reviews. You are expected to be attentive, fully engaged and participating in questions and discussions, and present until the end of the session.

Work outside of class: You will need to spend a substantial amount of time on your projects outside of class time. Budget a minimum of two hours for each hour of class time. Note that this is a minimum time commitment of 24 hours per week in addition to the 12 hours of class time.

Discussion: Your classmates are a great resource. Productive discussion and exchange of ideas and techniques are strongly encouraged, particularly in the studio.

Work area: You must immediately set up and maintain a fully operational drafting area with both digital [laptop] and traditional media capabilities [mayline]. As always you are strongly encouraged to make the studio your primary place of work in order to benefit from the studio environment. The door access system is designed to provide security in the studios (although it is important to recognize that unsecured valuable items should never be left in the studio when it is not occupied – particularly when the class is absent from the studio during unlocked periods).

Defacement of property: Treat your workspace with respect; do not deface property. If you are spray painting or spray gluing anything, do so outside and use plenty of brown paper to avoid overspray on the surrounding areas. YOU MAY NOT SPRAY ANYTHING ON THE BRIDGES OF WATT OR HARRIS HALL. Instead, use the yard outside the shop or a designated spray booth.

Loud music: The studio is a collective space; please respect the fact that this is a working environment for all of you. If you require music while you work, use headphones – do not play the music out loud. Music out loud is ABSOLUTELY TABOO DURING STUDIO HOURS AND EVEN AFTER STUDIO HOURS. IN OTHER WORDS DO NOT DO IT….. EVER.

Telephones: Turn off all cell phones during studio hours and in lectures and reviews. If you are having an emergency of some kind that requires you to wait for a call, get the prior approval of your studio instructor to leave the phone on.

Professional etiquette: You are in a professional degree program, studying to become professional architects. As such, you should be careful to treat your work, your working environment and your colleagues with the highest level of respect.

Books: Each week students will be required to have 2 architecture books and 1 art book on their desks available for review during studio. These will collectively form a rotating library for the studio setting and serve as visual resources throughout the semester.

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

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 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. A list of university recognized religious holidays can be found at: http://www.usc.edu/programs/religious_life/calendar/
portfolio and digital submittals
Required Portfolio and Digital Submittals
Submit at the front desk in the main office on the second floor

The portfolio and digital archive is a graded submittal, and required for the satisfactory completion of the semester. The portfolio will be used as a printed record of the students’ projects for project review, discussion and coordination of grading. The digital submittal is generates an organized record of students’ achievements during the semester for personal archiving, use in publications, promotion, and accreditation.

There are three components to this submittal:
1. A Hardcopy Portfolio
2. A CD Digital Archive
3. Upload a folder to the Digital Drop Box

Item 1. Portfolio
The final requirement for the portfolio is a graded submittal. Reformat all content for legibility at the portfolio scale. The portfolio is a design submittal, layout must be clear, with a strong sense of graphic organization.

Content must Include the following chapters:
Project: All components of the four project requirements including model photographs.
Process: Models, sketches.

Consider what elements contribute to the positive presentation of your work. Here, quantity is not always an asset. Better to show measured deliberate, intelligent progress, than simply “how much work you did”.

Hard Copy Submittal Format: 8.5 X 11 ONLY. The layout can be different aspect ratios (such as 1:1 or 2:3 - use borders to help define these other ratios), but should be printed on letter size paper, maximizing printable area.

Due to the time frame, students will turn in portfolios as high resolution final mockups that can be produced “in-house”. This means bond paper and staples are acceptable. Instructors will not be returning these portfolios. While material deficits (binding, cover, paper quality, etc) will be acceptable, compromises in content representation will not be allowed. Prints should be high resolution, with excellent legibility, and clarity.

Item 2. CD Digital Archive
The CD should be submitted directly to your instructor. Note due to unreasonably large files submitted in previous years, DVDs will not be accepted.

Label: write with permanent marker: 202b, Instructor Last Name,Your Last Name,SP 12

Main Folder for all content: “202b_Instructor Last Name_Your Last Name_SP 12”
Note: All last names can be reduced to the first 6 letters

Content by required folders
Folder: “Final Boards”
Final Project Boards
202bLastnameProject 01FinBoard1.pdf
(for subsequent boards: ...board2 etc) PDFs with illustrator editing enabled and images embedded. This will allow us to extract images for stand alone use. Full size 200 dpi.

Folder: “Mid Boards”
Mid-term Project Boards
202bLastnameProject 04MidBoard1.pdf
(for subsequent boards: ...board2 etc, see note with “Final Boards”. This requirement only applies to the final project)
Folder “Process”
Model Photos/Process
Images of materials not on the boards useful in explaining your project. Must include any precedent studies, can include process drawings, sketches, research, diagrams, even slideshows. Model photographs must be included. Please label in a manner similar to the other files.

Folder “Portfolio”
Digital Portfolio
This is your portfolio as a single multi-page pdf
File: “202bSP012LastnamePort.pdf”

Folder “202b_Instructor Last Name_Your Last Name 012IDWRK”
Project images
Text: This is a statement explaining your project .
Filename: “lastname.doc”. Recommended length: 200-300 words.

Best Images: 4 images (+6 alternate)
This will be your submittal for consideration into IDWRK.
Image requirements:

• Image size 4” minimum dimension, 6” max dimension width or height.
• @ 300 dpi only. Tiff only.
• No text in images (except legible labels in plans/sections).

This is a compilation of your best project images and images that can be part of a concise representation of your project. IDWRK shows a maximum of 3 images, so avoid redundancy (for example: Diagrams + Rendering(s) + Systems can make a comprehensive composition). One image can consist of group of diagrams. Images will be a maximum of about 4” so very fine detail should not be essential to the reading.

Folder: “ALTERNATES”
6 alternate images that the editor can select from.

Please follow naming convention described in the digital drop box. arch‐pubs.usc.edu/upload/.

Item 3. Digital Drop Box
Upload the project image folder for IDWRK, “202b_Instructor Last Name_Your Last Name 012IDWRK” This is an absolute requirement.
Go to arch‐pubs.usc.edu/upload/. Follow instructions on file formatting and submittal. Make sure your file name and folder name convention is correct. This is the project image folder.
project descriptions
Material/Precedent: The first segment will be the focused deployment of an architectural material case study. Through the unpacking of a precedent of specific historical significance, students [in teams of two] will produce a collection of analytical and representative models focused on the tectonic and material implications of design.

The use of precedent as an analytical tool enables the designer to unpack the concepts, systems and principles organizing a design project. 64 projects have been selected for their quality, clarity, and architectural significance. 8 will be assigned to each studio. Students will work in pairs during the precedent project. Additionally the precedent will serve as the vehicle for the semester’s initial representational exercises. These representation exercises will be done individually but displayed as a series during the final review and exhibition of the precedent project.

As a formatted aggregation of diagrams and analytiques, each student will produce a cohesive analysis of their assigned archetype. The collective aggregate display of these precedents will produce a unified body of architectural research [2D and 3D] that will document a significant segment of architectural thought. This will simultaneously serve as a vehicle for a craft based development of each student’s representational abilities.

This investigation will occur through two chapters: [1] a series of daily representational exercises that focus on craft, technique and graphic presentation [see representation] [2] a series of larger detail drawings and models [see Precedent Analysis].

NAAB Student Performance Criteria Addressed (if Bold: Course Identified on SPC Matrix for Criteria): In the context of the overall design sequence of the Bachelor of Architecture curriculum, this project contributes to the graduate attributes in the following areas

A.3 Visual Communication Skills: Ability to use appropriate representational media, such as traditional graphic and digital technology skills, to convey essential formal elements at each stage of the programming and design process.
A.7 Use of Precedents: Ability to examine and comprehend the fundamental principles present in relevant precedents and to make choices regarding the incorporation of such principles into architecture and urban design projects.
A.8 Ordering Systems Skills: Understanding of the fundamentals of both natural and formal ordering systems and the capacity of each to inform two- and three-dimensional design.
B.12 Bldg Materials/Assemblies: Understanding of the basic principles utilized in the appropriate selection of construction materials, products, components, and assemblies, based on their inherent characteristics and performance, including their environmental impact and reuse.

[1] Representation:

“...the power of a drawing is found not so much in it’s faithfulness to the subject but in its revelation of something you did not know or understand before.”
- Paul Hogarth

Drawing is the basic act of the architect. Generally thought of as a means of communication, our interest in it will be as a mode of thinking, a way to sharpen our ability to see, to perceive, to document, and to understand the physical world around us and to communicate ideas. Drawing is a thought process. Through drawing we discover the relationship of things, the integral, inseparable nature of form and content. This is a series of graphic media based exercises that develop a parallel track to the studio. These exercises will be: assigned during class, executed during this period, be specific in media and format, and will be turned in at the end of the studio period for a grade.
Requirements:
All drawings will be on 8”x8” panels – each student will use their assigned/selected case study as the content for their analytical series.

Each drawing will be executed during studio period. The project will be due at the end of each class. Each drawing will be graded by your studio faculty member. Once turned back, it is essential that these drawings are saved as their aggregate will be displayed as a component of the case study exhibition.

Each of the exercises requires a specific media. Plan in advance to have the proper media available and if necessary to add media [not replace] to the selection set

[1] plan – section - elevation – freehand sketched – ink pen on yellow trace
this drawing should focus on the interrelationship of the pieces

[2] program map – color pencil overlay on ink plan
zonal depiction of spatial functioning – graphic illustration should avoid the use of a key but rather install the information directly into the drawing

[3] isometric projections – first draw the primary elevation – project the side face and roof back at 30 degrees. As an underlay 2nd sheet use collage of xeroxed magazine clippings generate a rendered view. Have the collage underlay represent a specific informational aspect

[4] exploded axonometric – construct an exploded axonometric pulling the key pieces of the building apart as sections. Think about the organization of the extracted elements and their hierarchy.

[5] 2 perspectives – free hand sketch 2 perspectives then trace overtop with a hard-line representation to produce a more formal yet not fully constructed perspective

[2] Precedent Analysis

Format: The Precedent Analysis project drawings should be on 16”x16” panels. Each drawing should be centered laterally and vertically on the panel unless otherwise appropriate. For the precedent analysis there should be 12 panels. These 12 panels will be displayed in two columns 8’ high [see diagram]. One column will be representation documenting the project paying careful attention to its cataloguing and depiction. The second column will be analytical focused on an unpacking of the conceptual content.

Drawings:
1- detail plan
2- detail section
3- detail elevation and full elevation
4- detail axonometric
5- diagram field effect
6- material diagram [texture]
7- material diagram [color]
8- material diagram [weight]
9- material diagram [fabrication sequence]
10- material diagram [systems]
11- material diagram [structure]
12- 1”=3” detail model

Key to this project is the issue of craft. Developing an aesthetic and quality of the precedent’s representation and presentation will be paramount. ALL BASE DRAWINGS [1-4] SHOULD BE DONE IN AUTOCAD. These drawings will be turned in to examine file organization, layering and technical ability. [See digital submission for the specific requirements.]

The ensure large scale making from the commencement - due the first Friday of the semester will be an abstract effectual interpretation of the material tectonic of your precedent.
**Digital Submission:** In addition to the panels and models produced for the exhibition, the following files should be burned to a CD and turned into Professor Borden FOR A GRADE:

1. AutoCAD [dwg] files of the seven documentary drawings. These drawings should be 1:1 in scale and organized with the following layers [as relevant]:
   - black in order of descending pen weight – darkest to lightest
   - wall green pen #3
   - glass magenta pen #6
   - floor grey pen #9
   - detail grey pen #9
   - hardware grey pen #9
   - colors: [print in actual color]
     - vegetation green pen #83
     - water blue pen #51

**Layer organization:**
The use of layers in AutoCAD has multiples opportunities and responsibilities including:
- information organization [systems]
- pen weight [2D output]
- material mapping [3D modeling and rendering]

The importance of a well organized file and the associated information usage is essential. The AutoCAD drawings will be reviewed / graded to ensure clarity of file management.

2. [A] - PDFs containing scanned documentary images of the building and its original representation

3. [B] - PDFs containing the 8 representation sketches [individually done]

4. [C] - PDFs containing analytical panels

These files should be named as follows:

   ArchitectLastName_FacultyLastName_StudentLastName[s]_A.dwg
   example:
   Kahn_Borden_JohnsonDoe.dwg
   Kahn_Borden_JohnsonDoe_A.pdf
   Kahn_Borden_JohnsonDoe_B.pdf
   Kahn_Borden_JohnsonDoe_C.pdf
Aiello
Pope Leighey House, Frank Lloyd Wright
Frank Gehry House, Santa Monica
New Museum NYC, SANAA
Japanese Temple in Kyoto
Chapel of Saint Savior, Mies van der Rohe
Getty Center, Richard Meier
San Andrea, Alberti
Elgin Marbles, Parthenon

Bauer
Creative Business Units, Thomas Heatherwick
Type Variant House, Vincent James
House In New Engand, Office Da
Truss Wall House, Ushida Findlay
Sao Paulo Museum Of Art, Lina Bo Bardi
Crystal Palace, Joseph Paxton
Louvre, I.M. Pei
Signal Station, Herzog and de Meuron

Broughton
Farnsworth House, Ludwig Mies van der Rohe
Cabanon, Le Corbusier
Swiss Pavilion, Peter Zumthor
E-1027, Eileen Gray
Casa da Musica, OMA/Petra Blaise
Mosque at Cordoba, Spain
Experience Music Project, Frank Gehry
Villa Muller, Adolf Loos

Frane
China Gatehouse, Office Da
Swiss Pavillion Expo 2000, Peter Zumthor
Majolika, Otto Wagner
Maisons Jaoul, Le Corbusier
Scottish Parliament Building, Enrique Miralles
Capsule House, Karuizawa
Holocaust Memorial, Peter Eisenman
Milam House, Paul Rudolph

Kapeller
Church of the Light, Tadao Ando
Archeology Museum, Henri Ciriani
Crematorium, Axel Schultes
Nemunoki Children's Art Museum, Shigeru Ban
Chapel of St. Benedict, Peter Zumthor
Fisher House, Louis I. Kahn
Criminal Courts Bordeaux, Richard Rogers
Air Force Academy Chapel, SOM

Muha
Church of Santo Volto, Mario Botta
House in a Plum Grove, SANAA
Hepworth Wakefield Gallery, David Chipperfield
Leicester Engineering Building, James Stirling
Yale Art & Architecture Building, Paul Rudolph
View House, Johnston Mark & Diego Arraigada
Church of Sant'Ivo alla Sapienza, Francesco Borromini
Gwathmey Studio, Gwathmey Siegel & Associates
<table>
<thead>
<tr>
<th>Name</th>
<th>Projects</th>
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</table>
| Neimark | Berlin Philharmonie, Hans Scharoun  
Rolex Learning Center, SANAA  
St. Catherine’s Market, Enrique Miralles  
Tel Aviv Museum of Art, Preston Scott Cohen  
Neue National Galerie, Mies van der Rohe  
Forum Building, Herzog & de Meuron  
Glasgow Riverside Museum of Transport, Zaha Hadid  
Casa del Fascio, Giuseppi Terragni |
| Neubert | MIT Chapel, Eero Saarinen  
Laban Dance Center, Herzog de Meuron  
Final Wooden House, Sou Fujimoto  
Freeman House, Frank Lloyd Wright  
Crystal Cathedral, Phillip Johnson  
Institute Arab, Jean Nouvel  
Habitat 67 - Moshe Safdie  
Riccola Storage Building, Herzog and de Meuron |
| Nulman  | Maximilian Schell, Ball-Nogues  
Palais de Justice Nantes, Jean Nouvel  
Netherlands Institute for sound and vision, Neutelings Riedijk  
National Space Center, Grimshaw  
UK Pavilion Shanghai Expo 2010, Thomas Heatherwick  
Los Manantiales, Felix Candela  
Pharmacological Research Laboratories, Sauerbruch Hutton  
Serpentine Pavilion, Toyo Ito |
Assemblies: The second segment engages the relationship of connections and larger systems of assembly. Given a very specific unit and a limited collection of operations [cutting, slotting, notching, truncating, splitting, etc.] each student will develop an individual tectonic. Both the resulting joint conditions will be modeled [full scale to illustrate the detail] as well as the collective effect of the assembly. Assembly drawings will focus on the sequencing of the system and the collective field effect.

Each student will have 27 units.

Each unit will be 2”x2”x12” nominal dimensions of douglas fir [not pine].

Each student will be limited to the development of up to 3 unit types

Each unit type will be limited to the use of up to 8 “cuts” per unit type

Glue [used sparingly] may be considered, but no other fastener.

The investigation will occur full scale and engage the technical craft of tectonic assembly.

NAAB Student Performance Criteria Addressed (if Bold: Course Identified on SPC Matrix for Criteria):

A.3 Visual Communication Skills: Ability to use appropriate representational media, such as traditional graphic and digital technology skills, to convey essential formal elements at each stage of the programming and design process.
A.8 Ordering Systems Skills: Understanding of the fundamentals of both natural and formal ordering systems and the capacity of each to inform two- and three-dimensional design.
B.12 Bldg Materials/Assemblies: Understanding of the basic principles utilized in the appropriate selection of construction materials, products, components, and assemblies, based on their inherent characteristics and performance, including their environmental impact and reuse.
[3] **Material Architecture** The third segment will integrate process, material, and program in a specifically sited context. The project will involve the research and design of a warehouse building for the storage of lumber.

**Objectives** This project explores the potential of complex tectonic assemblies created through the repetition of simple units with simple rules. Building on the traditional construction methods and material behaviors, the designed are encouraged to emerge from the relationship of units and connections; pieces and joints. The generative growth potential inherent in these components and their relational logics are explored through accumulation of parts and repetition of their rules of connection to establish the broader field effect. Teams of four students will compete to design a concrete masonry structure using concrete masonry units traditionally produced by NCMA Producer Members. Building on the knowledge of masonry provided through ARCH 211 and the block plant tour, students will apply this knowledge through a design project. The project will be done in teams of 4.

**Process** During the design process consider the localized unit, the collective chunk and the aggregated field of impact. Integrate a systemization of the connection [wet or dry] with a systemization of the unit [size color, position, etc.] Begin by developing small-scale study models for rapid experimentation. Work simultaneously with a positive and negative methodology. Building on the translation of the verb as action [as described in the Richard Serra reading] assign specific terms to the forms, method and functional performative qualities of joint and unit systems: roll, wave, bend, laminate, splice, stitch, nest, bind, lock, lace, bundle, fold, layer, pivot, notch, rest, nestle, (to name a few.) The more specific your terminology and functional and experiential intention behind it, the more control you will have over the deployment of the operations. Consider variation, evolution and localized growth systems that can operate within the tight modular constraints of existing units. The field effect of the larger accumulation will illustrate opportunities for evolutionary systems across the body of the composition. Engaging existing systems [structural, geometric, biological, technological, etc.] may provide insight into assembly logics and the relationship between formal decisions and part to whole relationships. Aggregation can and must occur horizontally and vertically, but has opportunities to engage depth, thickness and form to the surface itself.

**Issues** Some issues to consider during the design process for inspiration and response include: relationship to context; issues of access, control, and entry; programmatic arrangement and hierarchies; levels of user duration; sequence through project; scale of user groups and the associated scale of spaces; visual identity; material usage; structure; sustainability; service verses served spaces; and cohesion of programmatic elements.

**Programmatic Elements**
- Warehouse - single space with footprint of 100’ x 100’ one wall of operable door access
- Staging Field– large horizontal paved surface 100’ x 100’
- Maximum of 30’ height
- Office 100 sq.ft.
- Restroom

**Methodology** The program will require an integration of the process logic exercises as well as site and material to develop a clear concept of design through making. Resolving all the complexities of structure, materials, program, site, and experience all organized with a clarity and cohesiveness, the scheme will require a total aggregation of tectonics, history, and representation through design. The final segment of the project will investigate the influence of material on a fixed program. The design will emerge from materiality and the application of construction to use: material logic.
**Final Requirements** The designs will be represented through conceptual diagrams, site plan + plans, sections [lateral and transverse] including context, elevations including context, assembly sequence, axonometric + perspectival views, a digital model of the entire project and a physical fabrication of a fragment at 1”=1’. As they will be judged anonymously a brief essay describing the concept and features of the structure will also be required for the final boards. The entire project presentation will happen on three 24x36 horizontal orientation and hung one above another.

**NAAB Student Performance Criteria Addressed (if Bold: Course Identified on SPC Matrix for Criteria):**

A.2 Design Thinking Skills: Ability to raise clear and precise questions, use abstract ideas to interpret information, consider diverse points of view, reach well-reasoned conclusions, and test alternative outcomes against relevant criteria and standards.

A.3 Visual Communication Skills: Ability to use appropriate representational media, such as traditional graphic and digital technology skills, to convey essential formal elements at each stage of the programming and design process.

A.5 Investigative Skills: Ability to gather, assess, record, apply, and comparatively evaluate relevant information within architectural coursework and design processes.

A.6 Fundamental Design Skills: Ability to effectively use basic architectural and environmental principles in design.

A.8 Ordering Systems Skills: Understanding of the fundamentals of both natural and formal ordering systems and the capacity of each to inform two- and three-dimensional design.

B.12 Bldg Materials/Assemblies: Understanding of the basic principles utilized in the appropriate selection of construction materials, products, components, and assemblies, based on their inherent characteristics and performance, including their environmental impact and reuse.

**Awards** This project will participate in a formal competition sponsored by the NCMA with associated cash prizes. The winning entry at the school level will go on to compete at the national level.

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<tr>
<th>Award</th>
<th>Prize</th>
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<tr>
<td>Best Design – First Place (awarded to the entry with the highest total score across all judged criteria)</td>
<td>$1,000, plus up to $1,000 in reimbursed travel expenses to present the winning design at the NCMA Annual Convention, and a certificate *</td>
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<tr>
<td>Best Design – Second Place</td>
<td>$500, and a certificate *</td>
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<tr>
<td>Best Design – Third Place</td>
<td>$250, and a certificate *</td>
</tr>
<tr>
<td>Best Concrete Masonry Hardscape Design</td>
<td>$1,000, and a certificate *</td>
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* Due to University limitations prizes may have to awarded in gift certificate format.

**Judging and Evaluation** Judging will be quantitative. Each member of our panel of judges will score each entry on the following criteria:

a. Aesthetic Concept (the visual appeal of the design, including: overall appearance; the use of color, shape, and texture; and integration with the surrounding landscape)

b. Innovative Use of Concrete Masonry Materials (novel use of standard concrete masonry products)

c. Functional Use of Concrete Masonry Materials (how well the design utilizes the various capabilities of traditional concrete masonry units as a building material)

d. Constructability (how well the design takes into consideration its ability to be actually built)

e. Concrete Masonry Hardscape Design (aesthetic appeal and function of complementary concrete masonry hardscaping materials)
The fourth and final segment will integrate process, material, and program in a specifically sited context. The project will involve the research and design of an outdoor swimming pool and recreation center. With segmented materials and varied users, the movement of both animate and inanimate objects establishes rituals, trends, and sequences that govern the building’s use and identity. Systemization of materials establishes the reading of the architecture. The practical durability and performance of the material combined with the raw functional and physical interaction to make the architecture. Each student will organize the program, site and the material response.

Material Logics To begin your research, multiple process logics should be engaged. Focusing on [1] casting [plane, subtractive removal, positive/negative, void, surface and continuity, etc.] [2] unit [aggregation, chunking, field effect, etc.] [3] line [bone, member, stick, cage, etc.]. The method will require a working methodology and modeling appropriate to the material and tectonic. The investigation will be about the evolutionary qualities of form and the associated tectonic solutions of detail. Each process must engage: Material, Structure, Light Control/Visual Access and when applicable- Enclosure.

Methodology The program will require an integration of the process logic exercises as well as site and material to develop a clear concept of design through making. Resolving all the complexities of structure, materials, program, site, and experience all organized with a clarity and cohesiveness, the scheme will require a total aggregation of tectonics, history, and representation through design. The final segment of the project will investigate the influence of material on a fixed program. The design will emerge from materiality and the application of construction to use: material logic.

Programmatic Elements
- Lobby with Information/Security Desk – 300 sf
- Locker Room/Bathroom/Shower area – 75 Lockers, 8 Stalls, 5 showers ea. M&F
- Vending Area/ Snack Bar – 100 sf
- Offices – 350 sf
- Storage – 100 sf
- Laundry – 100 sf
- Proportion of Water to Land 50% - 50%
- Toddler Pool - 10’ x 10’
- Shaded Seating – 300 sf
- Life Guard Station – 80 sf
- Exterior green space/play area – 1000 sf

NAAB Student Performance Criteria Addressed (if Bold: Course Identified on SPC Matrix for Criteria):

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<tr>
<td><strong>Ed Allen</strong></td>
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<td><strong>Victoria Ballard Bell</strong></td>
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<td><strong>Thomas Thiss-Evensen</strong></td>
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<td><strong>Richard Weston</strong></td>
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**General Reference and Suggested Reading**

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<thead>
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<tbody>
<tr>
<td>Robin Evans</td>
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<td>Sanford Kwinter</td>
<td>“Architecture and the Technologies of Life.” (AA Files 27. 1994. p.3-4.)</td>
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<tr>
<td>Mirko Zardini</td>
<td>“Skin, Wall, Facade.” (Lotus International #82. September 1994, p.38-51.)</td>
</tr>
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