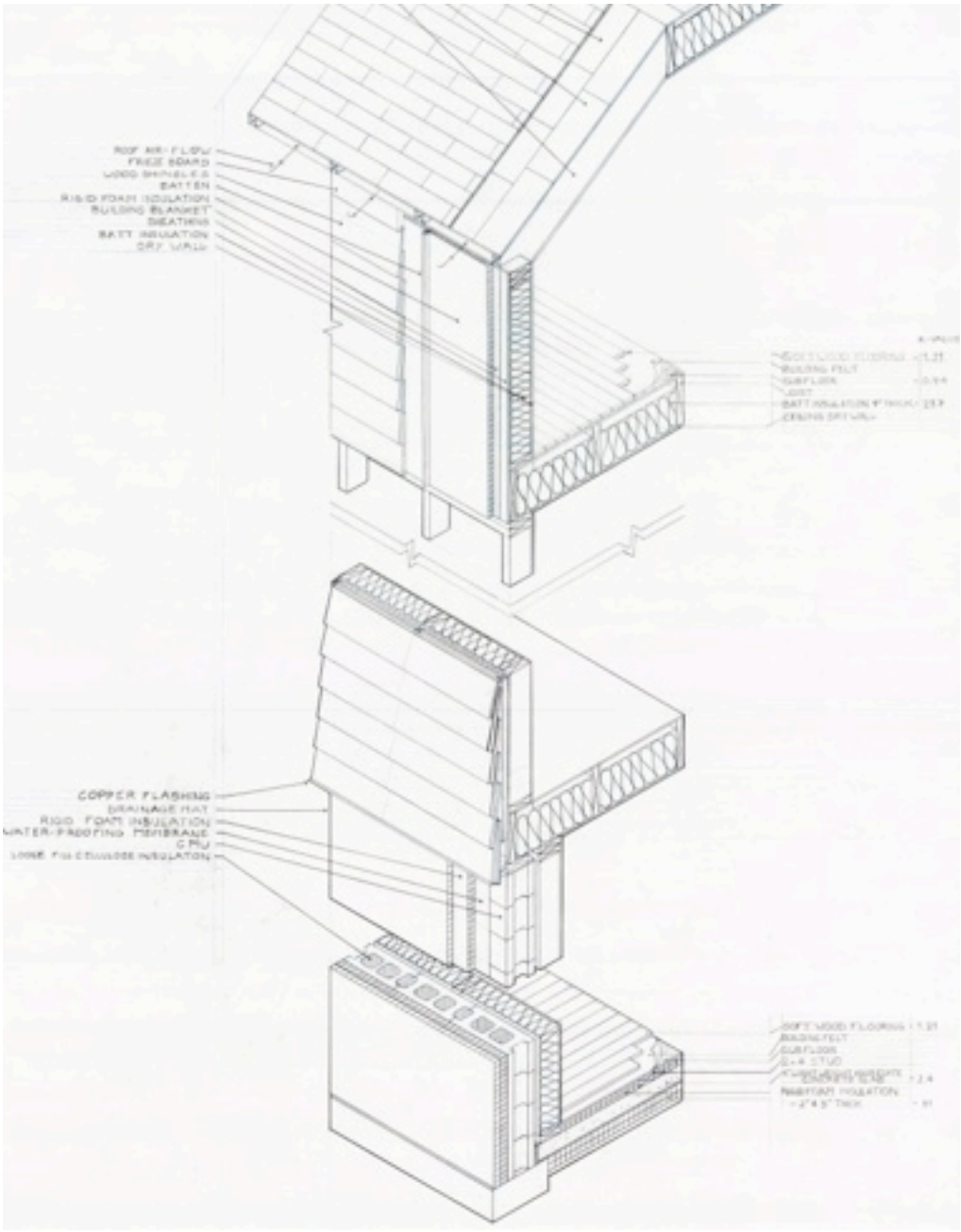
N E W Y O R K C I T Y C O L L E G E
O F T E C H N O L O G Y

FALL 2013



ARCH 1130_BUILDING TECHNOLOGY I
COURSE OUTLINE

COURSE COORDINATOR PROFESSOR JASON MONTGOMERY

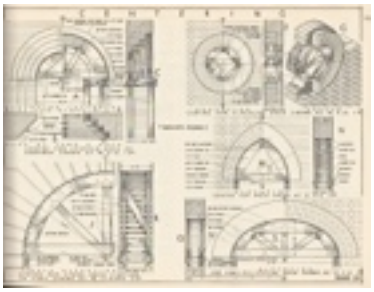
New York City College of Technology – City University of New York
300 Jay Street, Brooklyn, New York 11201

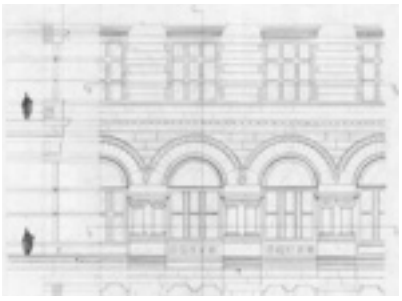
DEPARTMENT OF ARCHITECTURAL TECHNOLOGY

ARCH 1130 **BUILDING TECHNOLOGY I**
1 classroom hour, 4 lab/studio hours, 3 credits

Course Description: This course presents an introduction to basic materials of construction and the fundamental principles of architectural hand drafting and system analysis. The coursework includes weekly lectures, readings, and quizzes focusing on the study of material properties and applications with an emphasis on wood and masonry and shallow foundation systems. In addition, there is a series of architectural drawing assignments that includes surveying existing conditions, development of plans, elevations, sections, and basic details from foundation to roof of a case study structure.

LECTURE


READING + QUIZ


ASSIGNMENT

Course Context: This is the first course in the Building Technology sequence required for both the AAS and the BTech degrees offered by the Department of Architectural Technology. Each course in this sequence is a pre-requisite for the following course. There are four Building Technology courses.

Prerequisites: CUNY Proficiency in Reading
CUNY Proficiency in Mathematics

Required Texts:

Allen, Edward. *Fundamentals of Building Construction:* Materials and Methods, 5th Edition. John Wiley and Sons, 2008.

Ching, Francis. *Building Construction Illustrated.* John Wiley and Sons, 2008.

Recommended Texts:

Ramsey, Charles George, Harold Reeve Sleeper, and Bruce Bassler. *Architectural Graphic Standards: Student Edition (Ramsey/Sleeper Architectural Graphic Standards Series).* John Wiley and Sons, 2008.

Ching, Francis. *Architectural Graphics, 5th Edition.* John Wiley and Sons, 2009.

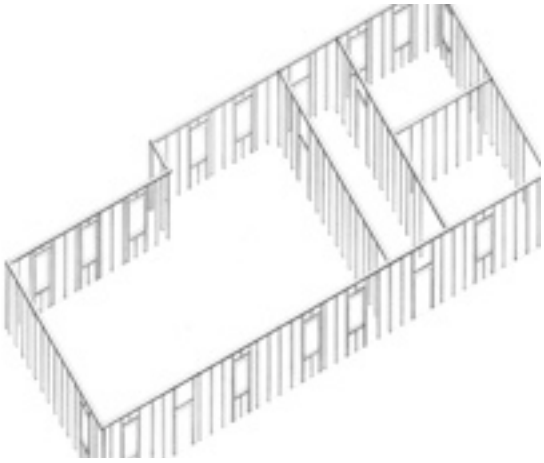
Attendance Policy: No more than 10% absences are permitted during the semester. For the purposes of record, two lateness are considered as one absence. Exceeding this limit will expose the student to failing at the discretion of the instructor.

Academic Integrity: Students and all others who work with information, ideas, texts, images, music, inventions and other intellectual property owe their audience and sources accuracy and honesty in using, crediting and citation of sources. As a community of intellectual and professional workers, the college recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, suspension and expulsion.

Course Structure: This course will combine a weekly lecture focused on particular materials and methods of construction and studio lab time to develop a series of drawings, modeling investigations, and assemblies discussed in the lectures. There will be quizzes based on key terms and concepts discussed in the class and in the assigned readings. There will be a comprehensive final exam. A portfolio will be developed to document the studio lab work as the semester progresses. Field trips will offer first hand on-site investigation of the materials and methods covered in the course.

GRADE WEIGHTING

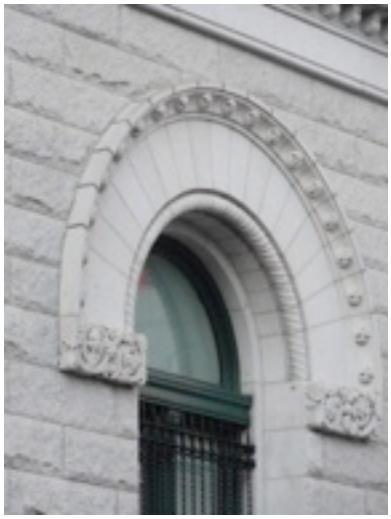
50% Studio Lab Assignments
20% Quizzes
25% Final Exam
5% Class Participation



LEARNING OBJECTIVES

Upon successful completion of this course, the student will:

1. **Understand** the relationship of technology to tectonics and architectural character. (Knowledge)
2. **Understand** the role of the architect in the community. (Gen Ed)
3. **Understand** through direct observation the problems of changing environmental conditions on communities. (Gen Ed)
4. **Work** in a team environment to address complex real-world problems (Gen Ed)
5. **Develop an understanding** of the value of service to a local community (Gen Ed)
6. **Recall and recite** the key terms, properties, and fabrication techniques of the materials reviewed in the lectures and readings. (Gen Ed)
7. **Develop and apply** a professional vocabulary of architectural terminology. (Gen Ed)



8. **Understand and apply** professional etiquette to classroom situations. (Gen Ed)
9. **Recall and recite** the environmental implications of specific materials and types of construction. (Gen Ed)
10. **Manipulate and apply** geometric, proportional and scale systems. (Gen Ed)
11. **Apply an understanding** of the relationship of physiology and anatomy to building construction. (Gen Ed)
12. **Use and apply** procedural texts to supplement instruction on the use of hardware and software. (Gen Ed)
13. **Sketch and draft** details in orthographic and 3 dimensional views in analogue and digital media. (Skill)
14. **Apply** principles of resilient construction to real-world case study. (Skill).
15. **Analyze** assemblies and details through research and visual observation. (Skill)

ASSESSMENT

To evaluate the students' achievement of the learning objectives, the professor will do the following:

1. **Review** drawing assignments focused on the analysis of assemblies and details and the relationship of technology to tectonics, human scale, and architectural character. (Los: 1, 10, 11, 15)

2. **Test** the students' ability to recall and recite the key terms and material of the readings and lectures through weekly quizzes and a final exam. (Los: 6, 9, 14)

3. **Review** students' drawing and modeling work where students must exhibit their visual representation skills (2-D and 3-D). (Los: 10, 13, 15)

4. **Assess** the students' use of professional vocabulary and etiquette during discussions, studio work, and oral presentations. (Los: 7, 8)

5. **Assess** student drawing submissions, oral presentations and written reflections for efficacy of teamwork and understanding of community needs resulting from changing environmental conditions. (Los: 3, 4, 5)

6. **Review** students' field notes and drawing assignments for accuracy in documenting/surveying community conditions. (Los: 3, 13)

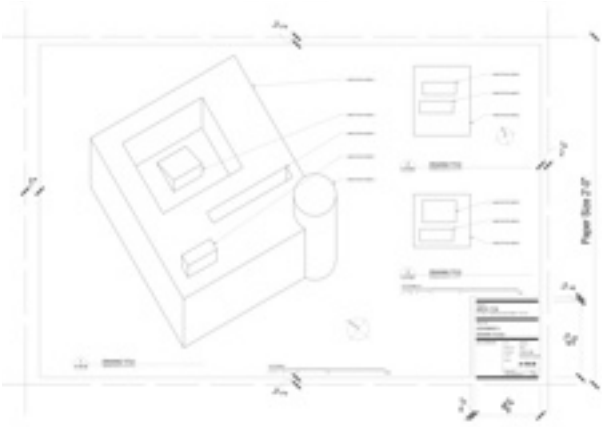
7. **Inspect** student submissions for quality of drafting including use of line weights, lettering, and proper use of scale. (Los: 10, 13)

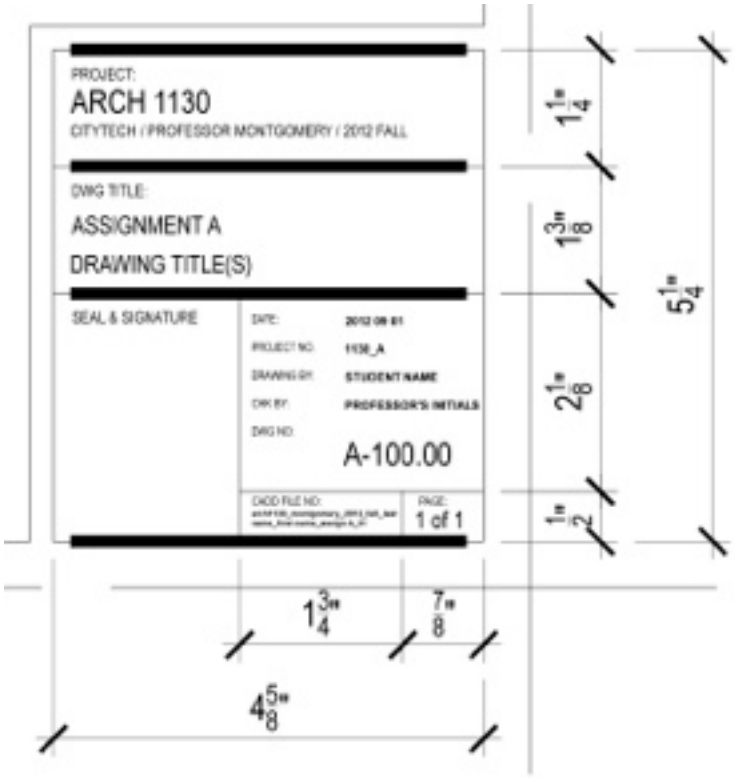
8. **Review** students' submitted drawing assignments for consistency with resilient design principles. (Los: 14)

WEEK BY WEEK SUMMARY

WEEK 1:

Week 1 Class Discussion: **Course Overview, Professional Practice, Sustainability, Architectural Education, and Architectural Curriculum**





Week 1 Lab: **Introduction to Architectural Drawing:** required hand-drafting equipment, explanation on how to set up a typical sheet, title block, line weights and lettering, annotation standards. Introduction to scanning files and formatting in jpeg or pdf formats. Review layout and requirements for Drawing Assignment A.

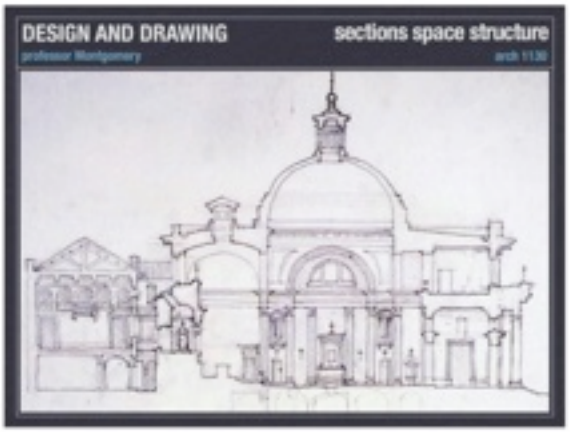
Week 1 Homework: Assignment A: Documenting Space

Week 1 Reading:

Ching, Architectural Drafting, Chapters 1-3, pp.1-42.

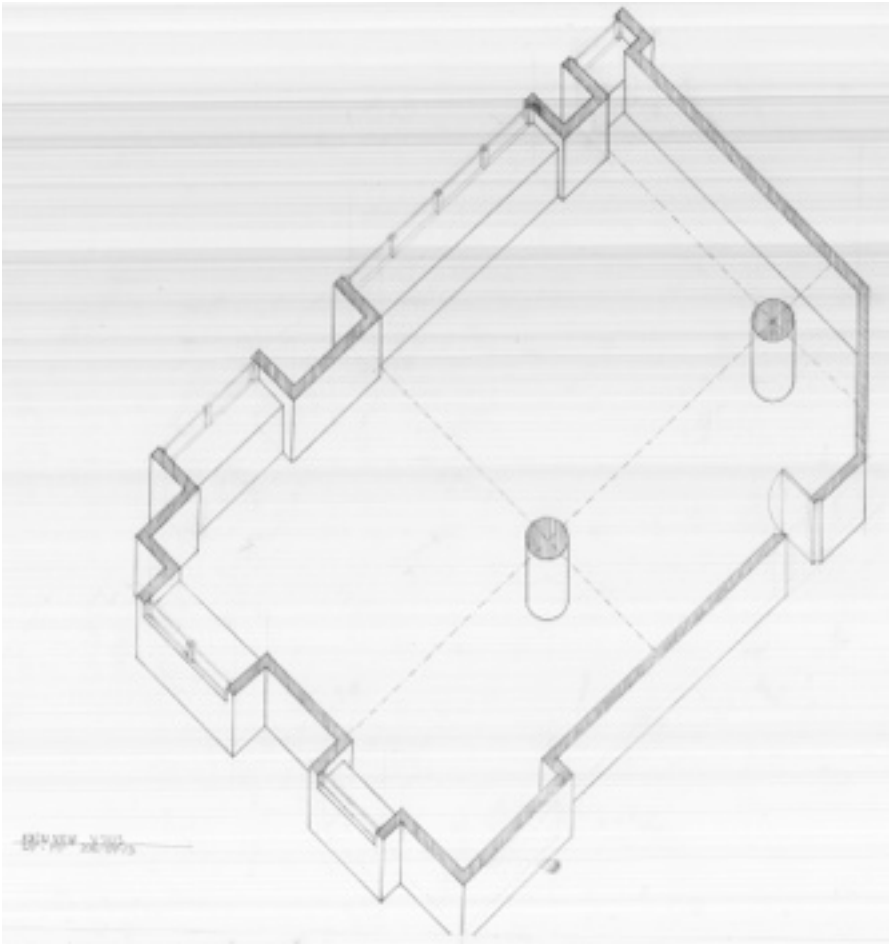
WEEK 2:

Week 2 Lecture: **Architectural Drawings, Scale and Dimension:** review types of architectural drawings (orthogonal and three dimensional,) demonstrate how to use an architectural scale. Site survey techniques.



Week 2 Lab: **Class Workshop:**

Assignment A: Documenting Space



Week 2 Homework: Complete Assignment A.

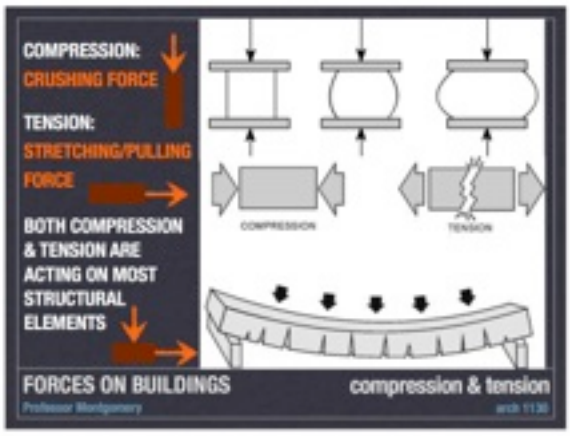
Week 2 Quiz: Complete Dummy Quiz

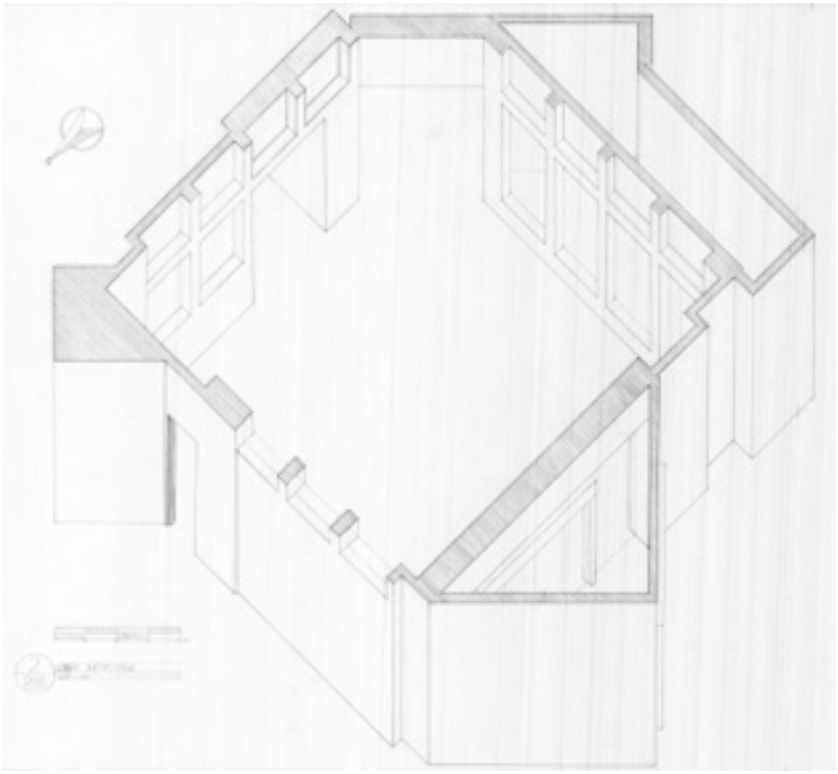
Week 2 Reading:

Ching, Architectural Drafting, Chapters 4-5, pp. 43-100

WEEK 3:

Week 3 Lecture: **Making Buildings: Materials and Systems:** Introduction to the scope of this course. Discussion on tectonics, sustainability, and economics as context for the work of the architect. Discussion on nature of materials + selecting construction systems, inherent properties. Introduction to wood and masonry. Structural behavior of wood and masonry with concepts of compressive and tensile forces, spanning capabilities.





Week 3 Field Trip: Great Room Case Study (Assignment B)

Week 3 Homework: Continue Assignment B.

Week 3 Quiz: Ching Architectural Graphics

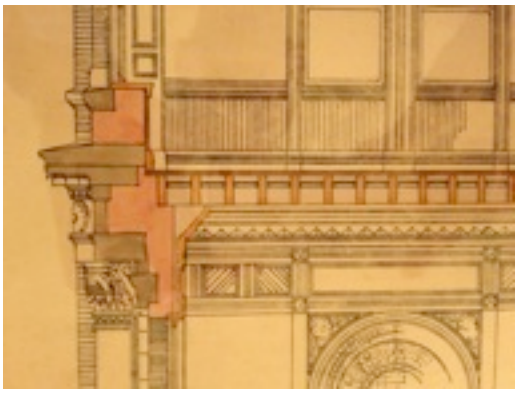
Week 3 Reading:

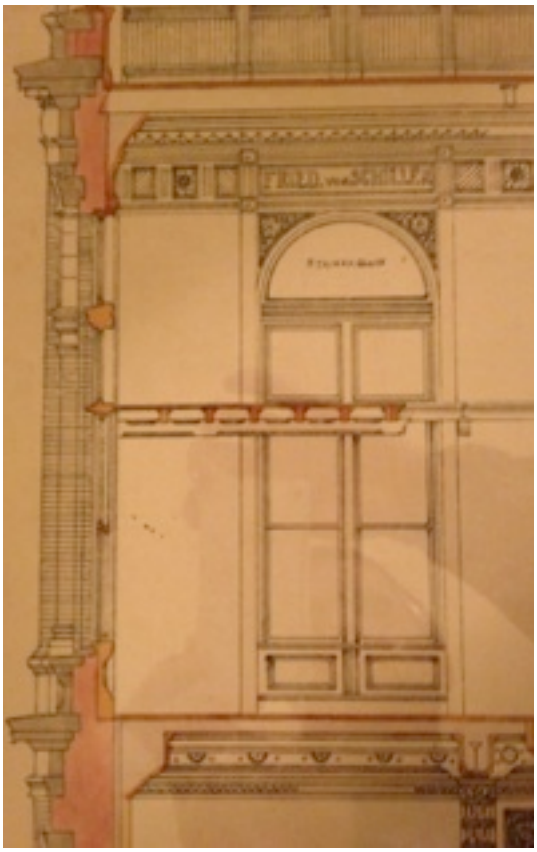
Allen and Iano, Making Buildings, Chapter 1, pp 3-27

Ching, Building Construction Illustrated, Chapter 1, pp. 1.02-1.06, Chapter 12, pp. 12.02-12.03, 12.06-12.07, 12.10-12.14

WEEK 3:

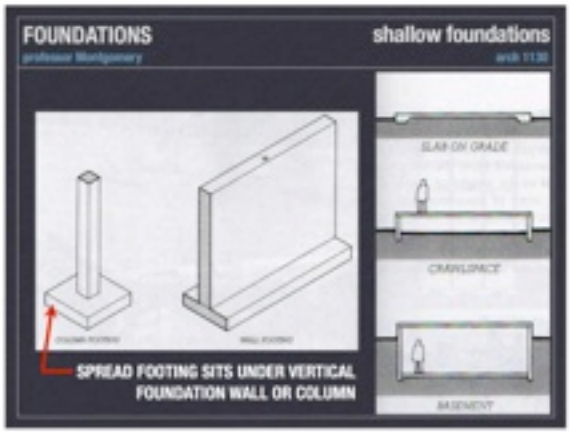
Week 3 Field Trip: **Great Room Case Study Site Documentation**



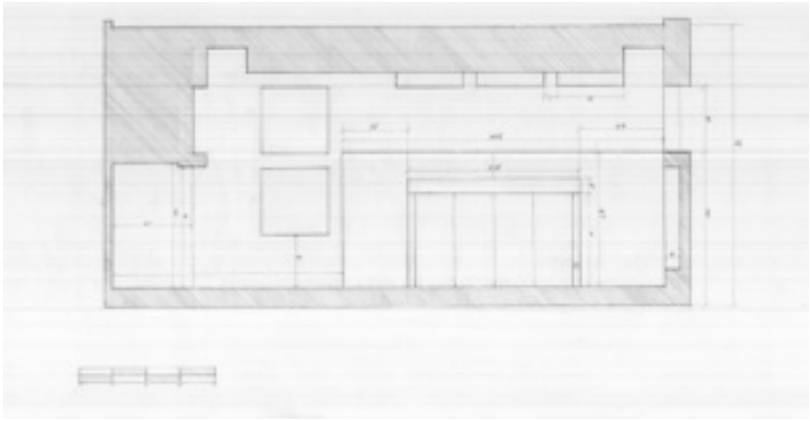


WEEK 4:

Week 4 Lecture: **Site Work and Shallow Foundations:** Overview of subsoil exploration, test borings. Review type of soils, frost line, and water table. Discussion of excavation and shoring, shallow foundation systems, waterproofing and drainage.



Week 4 Lab: **Pin Up/ Desk Crits:** Assignment B - Great Room Case Study.



Week 4 Homework: Complete Assignment B.

Week 4 Quiz: Allen and Iano, Chapter 1, Ching, Chapters 1 & 12

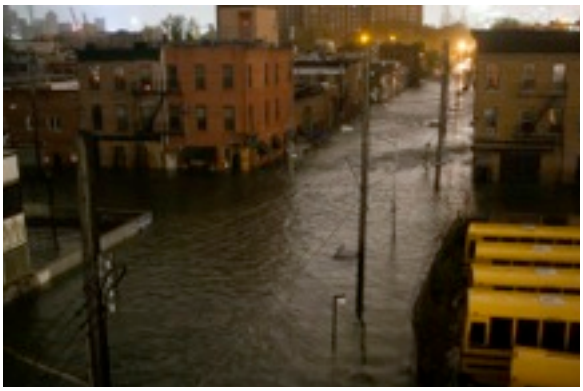
Week 4 Reading:

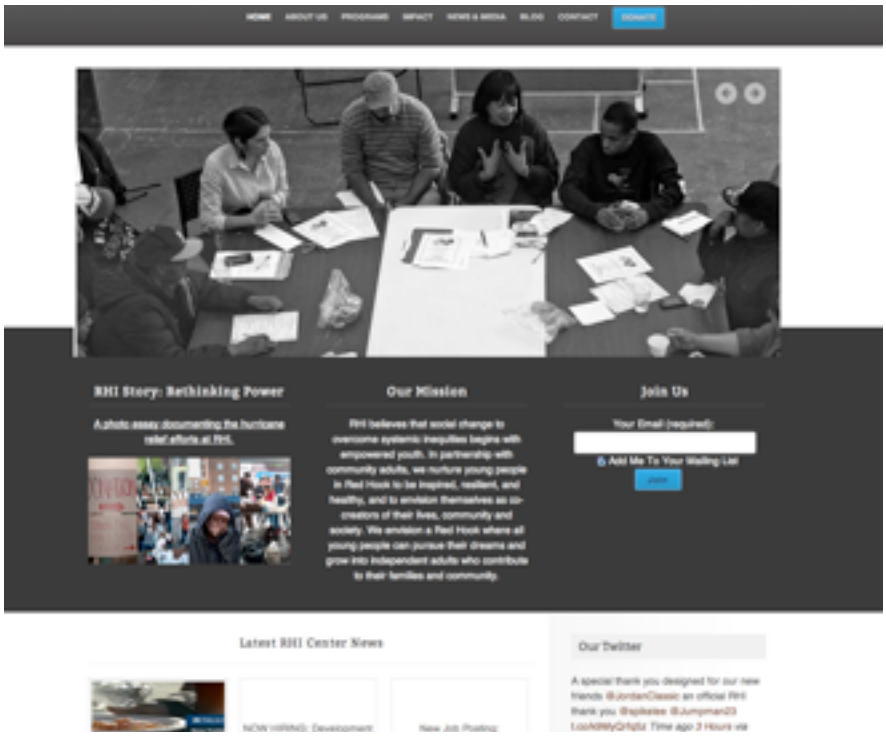
Allen and Iano, Foundations, Chapter 2, pp. 38-55, 71-83

Ching, Building Construction Illustrated, Chapter 3, pp. 3.02-3.21

WEEK 5:

Week 5 Field Trip: Case Study Site Visit





Week 5 Field Trip - Site Documentation

Week 5 Homework: Assignment C - Site Documentation

Week 5 Quiz: Allen Iano Chapter 2, Ching Chapter 3

Week 5 Reading: tbd

WEEK 5:

Week 5 Field Trip: **Case Study Site Documentation**

WEEK 6:

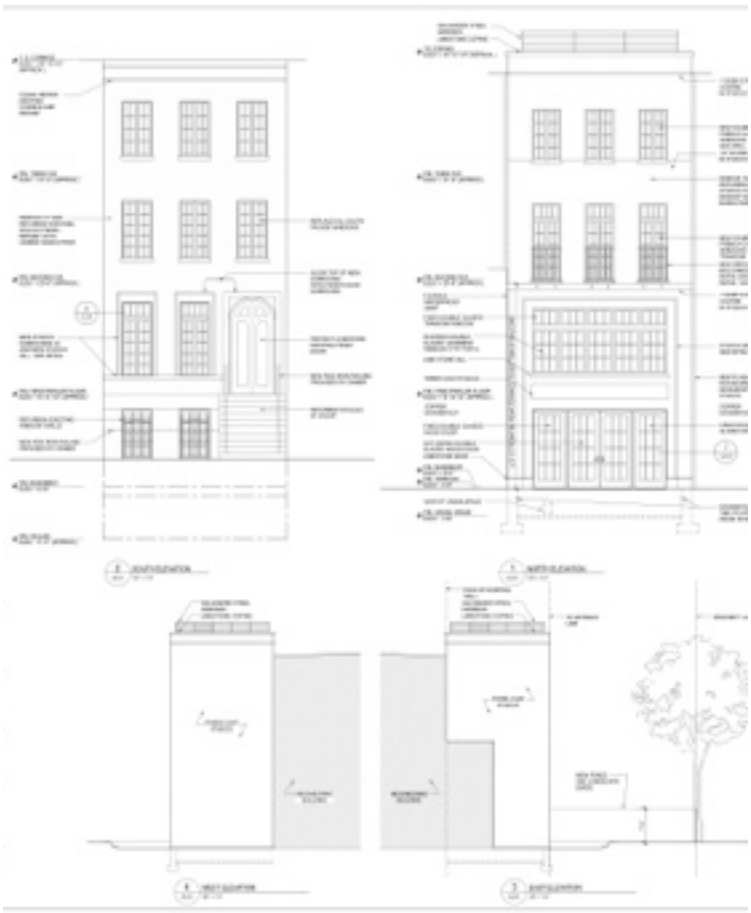
Week 6 Lecture: **Resilient Design in Post Sandy New York**

Week 6 Lab: **Start Up / Desk Crits:** Assignment D: Case Study Base Drawings

Week 6 Homework: Continue Assignment D: Case Study Base Drawings

Week 6 Quiz: no quiz

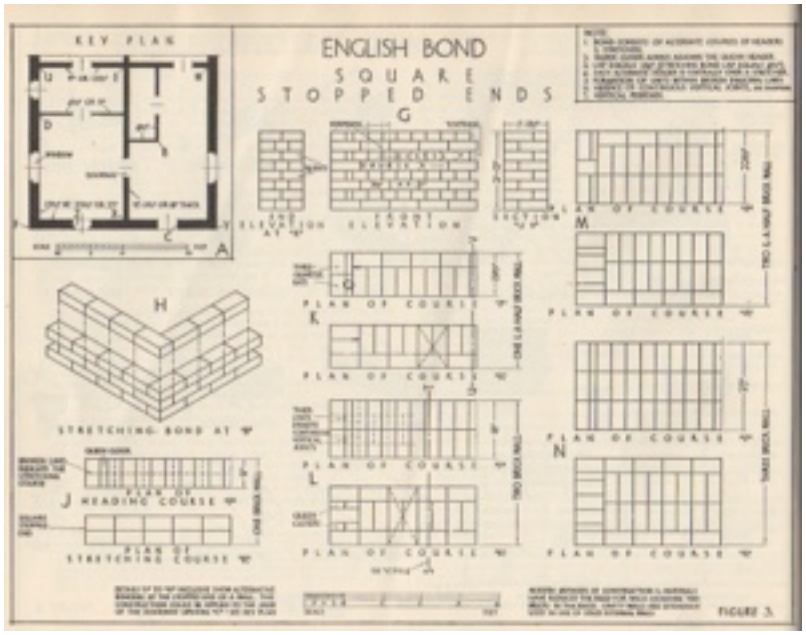
Week 6 Reading: tbd



WEEK 7:

Week 7 Lecture: **Brick & Stone Masonry:** structural characteristics, mortar, coursing, types of building stone, quarrying and milling stone, selecting stone for buildings, stone masonry construction, concrete masonry units

Week 7 Lab: **Pin Up / Desk Crits:** Assignment D: Case Study Base Drawings



Week 7 Homework: Complete Assignment D

Week 7 Quiz: Resilient Design

Week 7 Reading:

Allen and Iano, Brick, Chapter 8, pp. 297-336, Stone and Concrete Masonry, Chapter 9, pp. 337-375

Ching, Building Construction Illustrated, Chapter 12, pp. 12.06-12.07, 12.10

WEEK 8:

Week 8 Lecture: **Masonry Wall Construction:** types of masonry walls, spanning systems, detailing, special problems, building code issues, uniqueness of masonry construction.

Week 8 Lab: **Start Up / Desk Crits:** Assignment E: Case Study Framing Axonometric

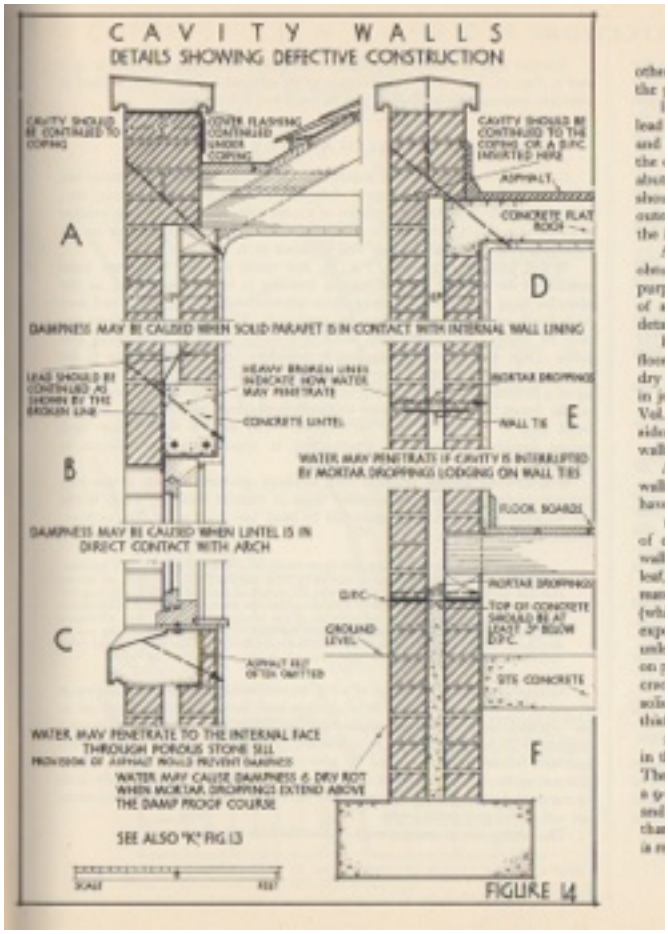
Week 8 Homework: Continue Assignment E

Week 8 Quiz: Allen and Iano, Chapters 8, 9
Ching, Chapter 12

Week 8 Reading:

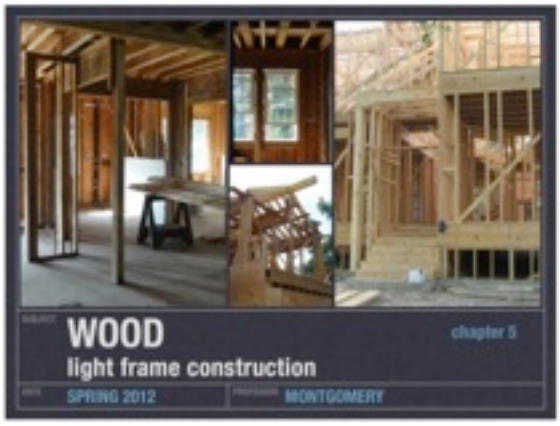
Allen and Iano, Masonry Wall Construction, Chapter 10, pp. 376-410

Ching, Building Construction Illustrated, Chapter 5, pp. 5.14-5.34



WEEK 9:

Week 9 Lecture: **Wood Light Frame Construction Part I:** history, platform frame, foundations for light frame structures, building the frame.



Week 9 Lab: **Pin Up / Desk Crits:** Assignment E: Case Study Framing

Week 9 Homework: Continue Assignment E

Week 9 Quiz: Allen Iano Chapter 10, Ching Chapter 5

Week 9 Reading:

Allen and Iano, Wood Light Frame Construction, Chapter 5, pp. 161-208

WEEK 10:

Week 10 Lecture: **Wood Light Frame Construction Part II:** building the frame, roofing, framing details.

Week 10 Lab: **Pin Up / Desk Crits:** Assignment E: Case Study Framing

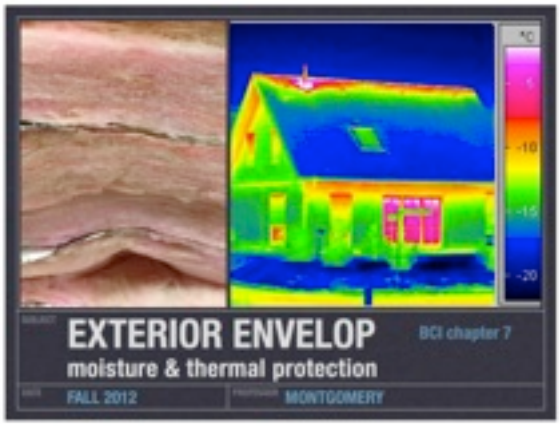
Week 10 Homework: Complete Assignment E

Week 10 Quiz: Allen and Iano, Chapter 5

Week 10 Reading: Ching, Building Construction Illustrated, Chapter 4 pp. 4.26-4.37, Chapter 5 pp. 5.41-5.46, Chapter 6 pp. 6.16-6.23

WEEK 11:

Week 11 Lecture: **Exterior Envelop:** moisture & thermal protection including roofing, wall flashing, masonry veneer, siding, thermal insulation, moisture control, ventilation



Week 11 Lab: **Start Up / Desk Crits:** Assignment F: Case Study Exterior Envelop

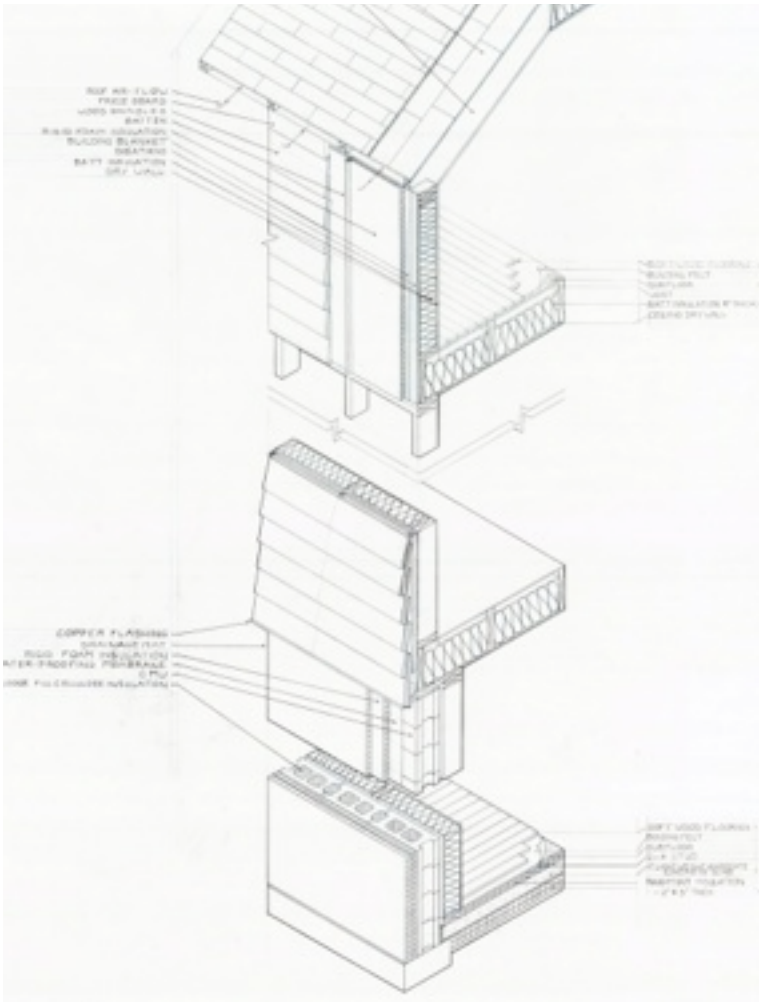
Week 11 Homework: Continue Assignment F

Week 11 Quiz: Ching Chapter 4, 5, 6

Week 11 Reading: Ching, Building Construction Illustrated, Chapter 7, pp. 7.02-7.50

WEEK 12:

Week 12 Lecture: **Building Systems:** mechanical and electrical systems, systems integration.



Week 12 Lab: **Pin Up / Desk Crits:** Assignment F: Case Study Exterior Envelope

Week 12 Homework: Complete Assignment F: Exterior Envelope

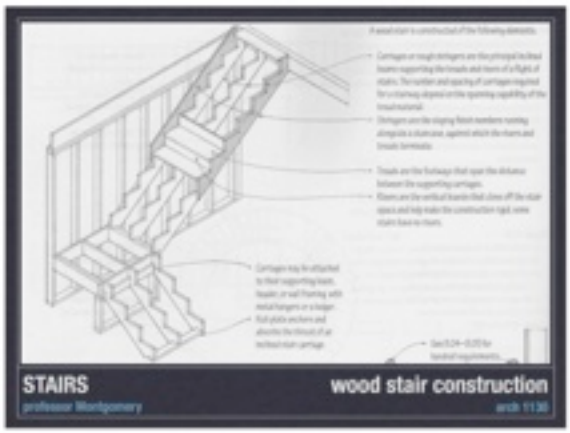
Week 12 Quiz: Ching, Chapter 7

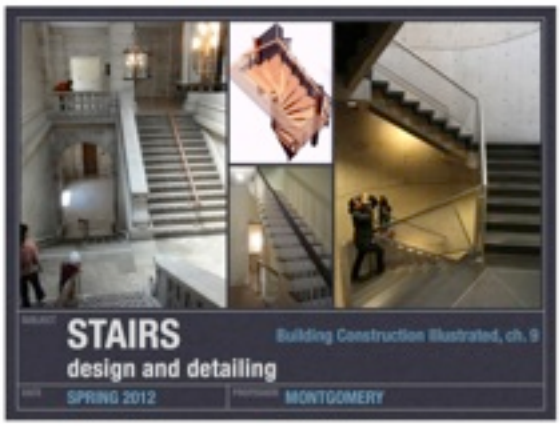
Week 12 Reading:

Ching, Building Construction Illustrated, Chapter 11, pp. 11.02-11.42

WEEK 13:

Week 13 Lecture: **Designing Stairs:** code compliance, terminology, and calculation techniques, drawing conventions





Week 13 Lab: **Start Up / Desk Crits:** Assignment G: Case Study Systems Diagrams

Week 13 Homework: Continue Assignment G

Week 13 Quiz: Ching, Chapters 4, 5, 6

Week 13 Reading: Ching, Building Construction Illustrated, Chapter 9, pp. 9.02-9.13

WEEK 14:

Week 14 Lecture: **Final Exam Review**

Week 14 Lab: Final Drawing Work (All late submissions due.)

WEEK 15:

Week 15 Lecture: **Final Exam**

Week 15 Lab: **Class Discussion / Reflection Due / Exhibition:** Assignments A-G

NOTES:

RED HOOK Community Organizations:

1. Rebuilding Together www.rebuildingtogether.org/sandy/redhook
2. Red Hook Initiative www.rhicenter.org

Academic Service Learning Project:

Reconstruction of a Storm Damaged Brownstone in Red Hook Brooklyn

Learning Objectives:

1. **Develop an understanding** of the value of service to a local community (Gen Ed)
2. **Generate clear and concise talking points** to guide oral presentations at community meeetings. (Gen Ed)
3. **Apply** professional skills in real life situations (skill)
4. Understand and Apply resilient construction techniques (skill)

Week #5:

lecture: Site Walk Through w/ Community Representative(s)

lab: Site Documentation

Week #6:

lecture: Resilient Design Principles and Techniques (DOB guest lecture?)

lab: base drawing development / site documentation organization

Week #7:

lecture: Brick and Stone Masonry

lab: base drawing development (plans, building sections, elevations)

Week #8:

lecture: Masonry Construction

lab: wire frame axonometric

Week #9:

lecture: Wood Framing Part I

lab: schematic design

Week #10:

lecture: Wood Framing part II

lab: structural frame axonometric

Week #11:

lecture: Exterior Envelop

lab: structural frame axonometric

Week #12:

lecture: Building Systems

lab: building systems diagrams (axon)

Week #13:

lecture: Stairs

lab: Exterior Envelope Assembly

Week #14:

lecture: prep for presentation

lab: prep for presentation

Week #15:

lecture: final exam

lab: Community Presentation