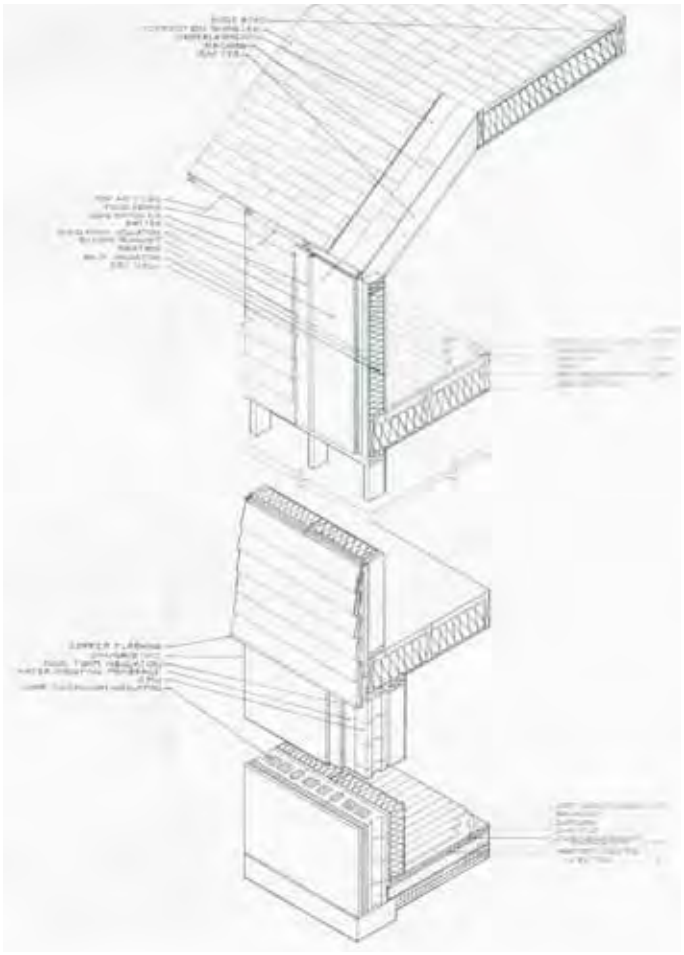
N E W Y O R K C I T Y C O L L E G E O F T E C H N O L O G Y

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

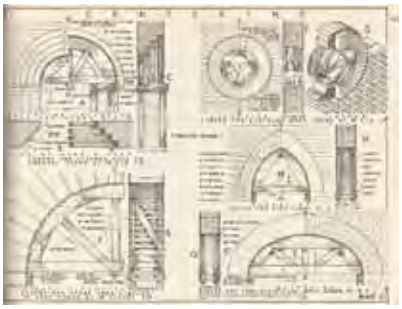
DEPARTMENT OF ARCHITECTURAL TECHNOLOGY

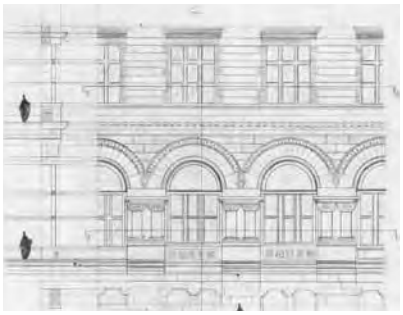
ARCH 1130 BUILDING TECHNOLOGY I

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 prerequisite 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.

BUILDING TECHNOLOGY II

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.

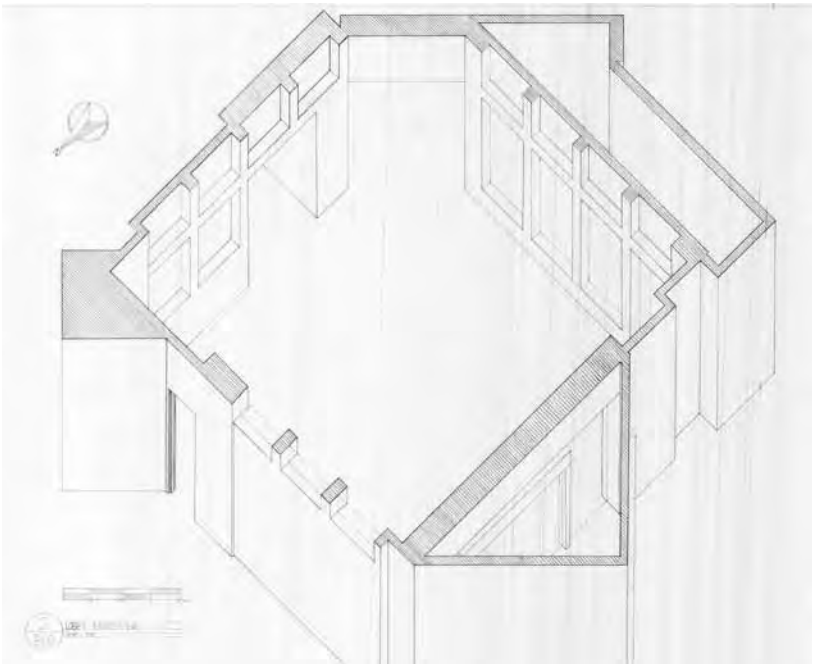
GRADE WEIGHTING

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. **Recall and recite** the key terms, properties, and fabrication techniques of the materials reviewed in the lectures and readings. (Gen Ed)
3. **Develop and apply** a professional vocabulary of architectural terminology. (Gen Ed)
4. **Understand and apply** professional etiquette to classroom situations. (Gen Ed)
5. **Recall and recite** the environmental implications of specific materials and types of construction. (Gen Ed)
6. **Manipulate and apply** geometric, proportional and scale systems. (Gen Ed)
7. **Apply an understanding** of the relationship of physiology and anatomy to building construction. (Gen Ed)
8. **Use and apply** procedural texts to supplement instruction on the use of hardware and software. (Gen Ed)
9. **Sketch and draft** details in orthographic and 3 dimensional views in analogue and digital media. (Skill)
10. **Develop** analog and digital models of construction assemblies. (Skill)
11. **Survey** Existing Conditions (Skill)
12. **Analyze** assemblies and details through research and visual observation. (Skill)
13. **Develop** a coordinated drawing set of diagrams and details of a masonry and/or wood structure. (Skill)

Upon successful completion of the special academic service learning project, the student will:

14. **Develop** an understanding of the value of service and engagement in a local community. (Gen Ed)
15. **Generate clear and concise talking points** to guide oral presentations at communtity meetings. (Gen Ed)
16. **Apply** professional skills in real life situations (skill)
17. **Understand and Apply** resilient construction techniques (skill)

ASSESSMENT

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

1. Review assignments focused on the analysis of assemblies and details and the relationship of technology to tectonics, human scale, and architectural character. (Los: 1, 7,12)

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: 2, 5, 17)

3. Review students' drawing and modeling work where students must exhibit their visual representation skills (2-D and 3-D). (Los: 8, 9, 10, 12, 13)

4. Assess the students' use of professional vocabulary and etiquette during discussions, studio work, and oral presentations. (Lo: 3, 4, 15)

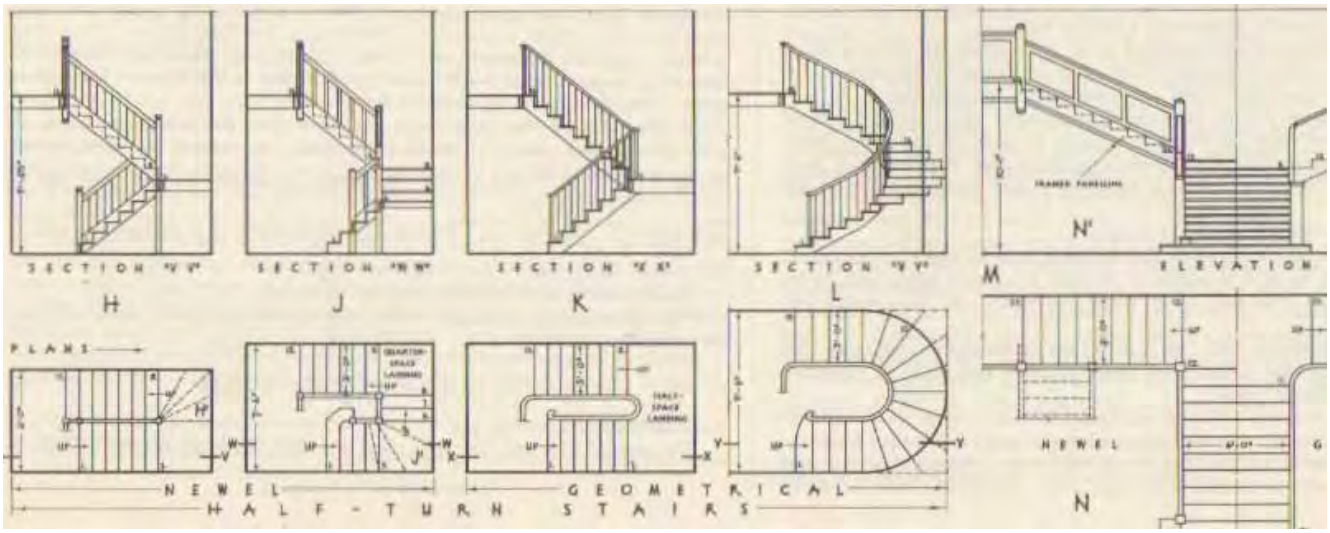
5. Review students' field notes and final drawings for accuracy in documenting existing conditions. (Los: 3, 11, 16)

6. Inspect student submissions for quality of drafting including use of line weights, lettering, and proper use of scale. (Los: 6, 9,13)

7. Confirm the proper coordination of the students' submitted drawing sets. (Lo: 13)

8. Review the quality and accuracy of the students' submitted analogue and digital models of construction assemblies. (Los: 6, 8,10,13)

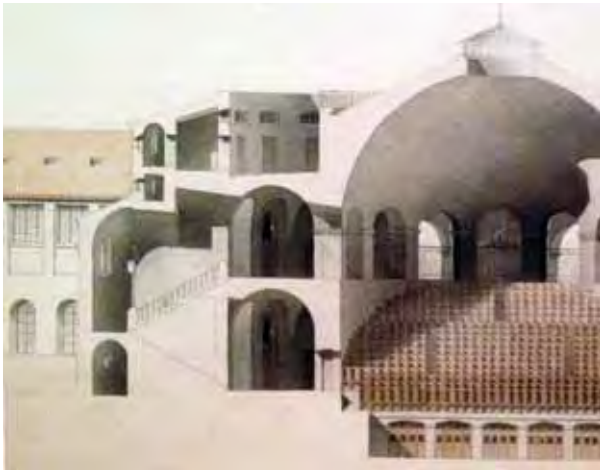
9. Review project work and reflections on acacemic service learning project. (Los: 14)

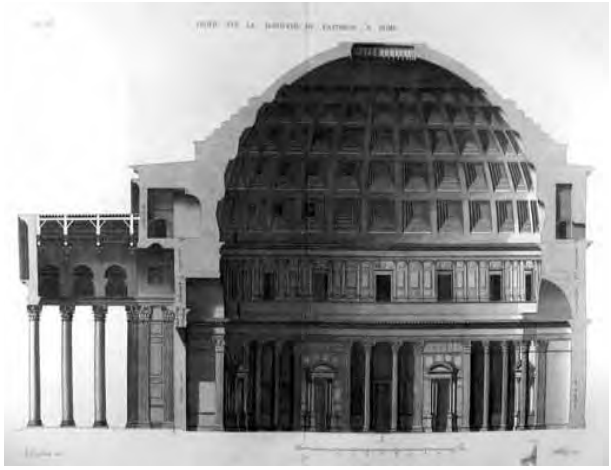


WEEK BY WEEK SUMMARY

WEEK 1:

Week 1 Class Sketch Exercise and Pin Up/Discussion: **Space, Light, and Air**





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.

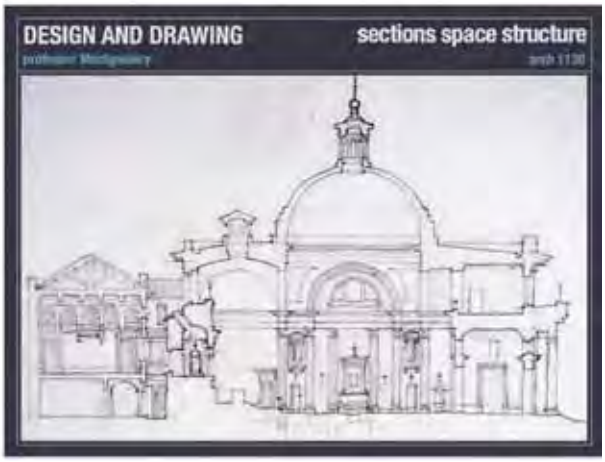
Week 1 Homework: Assignment A Documenting Space

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.



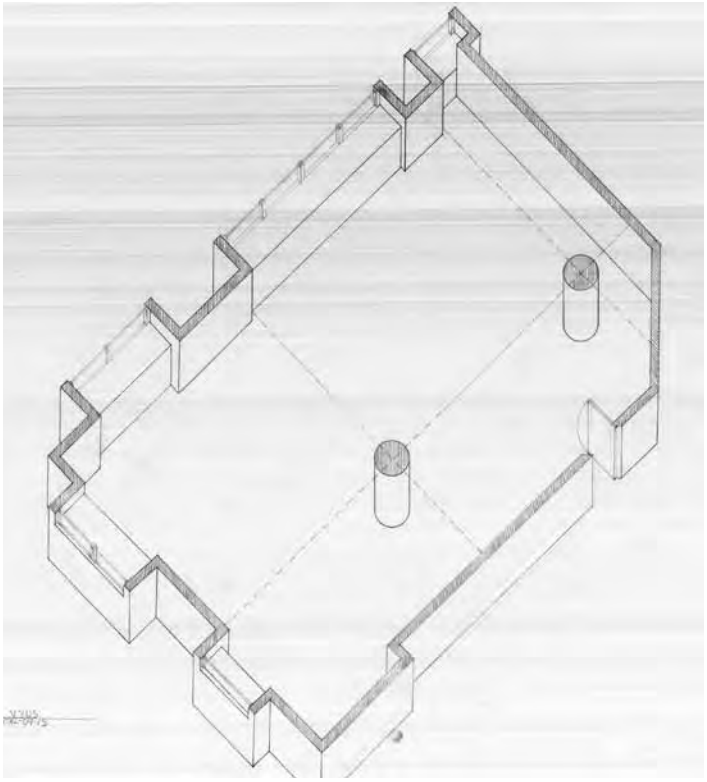
Week 2 Lab: **Class Workshop:**
Assignment A: Documenting Space

Week 2 Homework: Continue Assignment A.

Week 2 Quiz: Complete Dummy Quiz

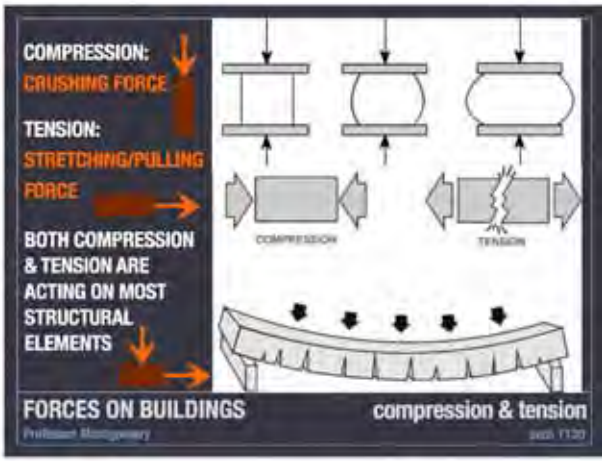
Week 2 Reading:

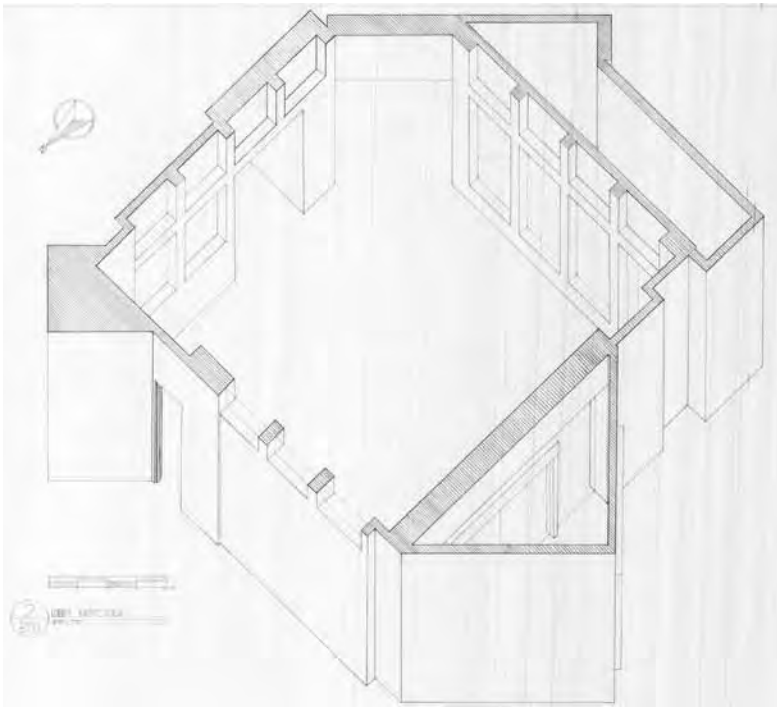
Ching, Architectural Drafting, Chapters 4-5, pp. 43-100



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 Lab: **Pin Up / Desk Crits:** Assignment A

Week 3 Homework: Continue Assignment A

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 4:

Week 4 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 4 Lab: **Pin Up / Desk Crits:** Assignment A

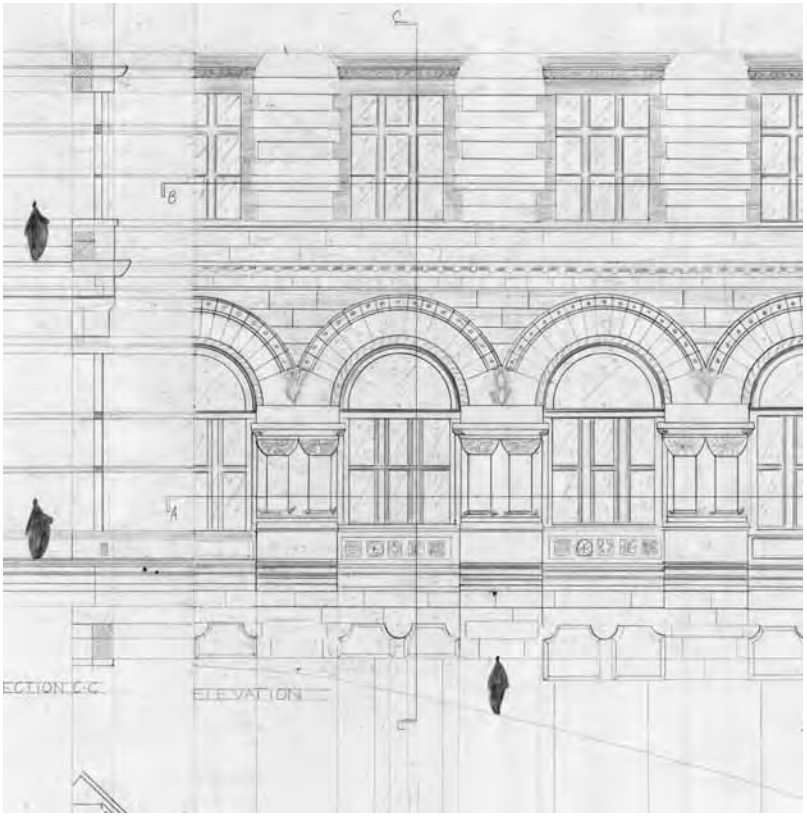
Week 4 Homework: Complete Assignment A

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

Week 4 Reading:

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

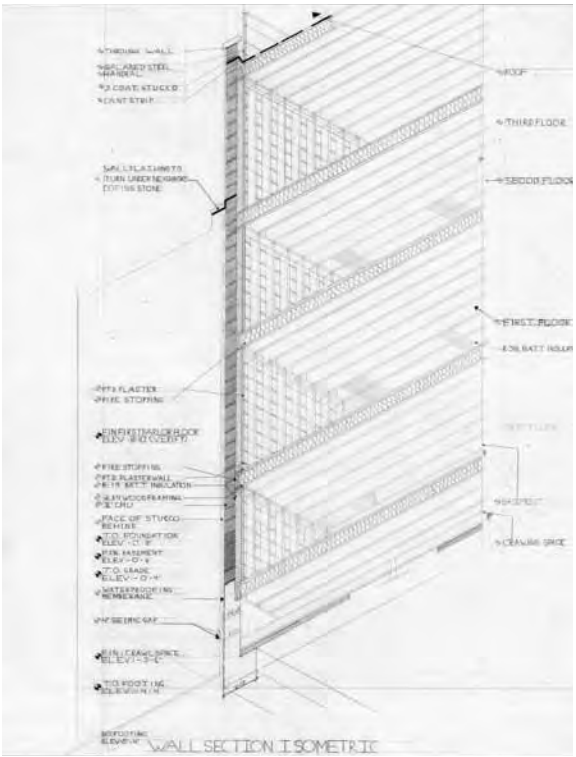
Ching, Building Construction Illustrated, Chapter 12, pp. 12.06-12.07, 12.10



WEEK 5:

Week 5 Lecture: **Masonry Wall Construction:** types of masonry walls, spanning systems, detailing, special problems, building code issues, uniqueness of masonry construction.

Week 5 Lab: **Start Up / Desk Crits:** Field Trip, Great Room Case Study, Assignment B



Week 5 Homework: Continue Assignment B

Week 5 Quiz: Allen and Iano, Chapters 8, 9 Ching, Chapter 12

Week 5 Reading:

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

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

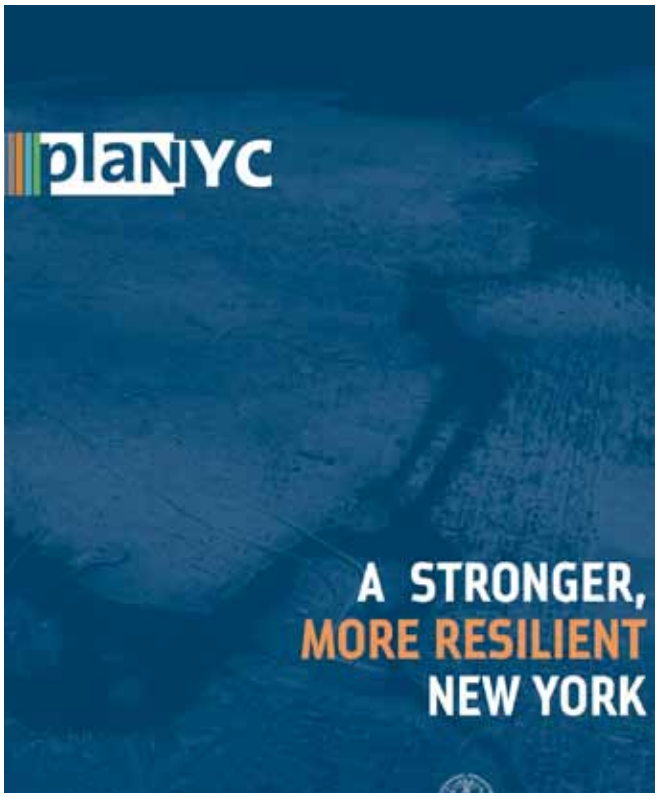
New York City College of Technology – City University of New York
300 Jay Street, Brooklyn, New York 11201

WEEK 5:

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

WEEK 6:

Week 6 Lecture: **Resilient Design in Post Sandy New York City:** review of types of damage to buildings and stratgies for resiliency



Week 6 Lab: **Pin Up / Desk Crits:** Assignment B

Week 6 Homework: Continue Assignment B

Week 6 Quiz: Allen and Iano, Chapter 10
Ching, Chapter 5

Week 6 Reading:

A Stronger, More Resilient New York, Selected Pages Reading #1

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

WEEK 7:

Week 7 Lecture: **Field Trip: Academic Service Learning Project**

Week 7 Lab: **Field Trip: Site Documentation**

Week 7 Homework: Complete Assignment B

Week 7 Quiz: A Stronger More Resilient New York, Selected Pages Reading #1

Week 7 Reading:

A Stronger, More Resilient New York, Selected Pages Reading #2

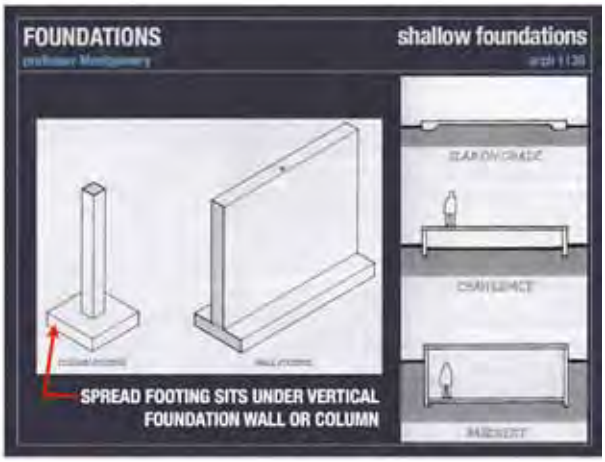
New York City College of Technology – City University of New York
300 Jay Street, Brooklyn, New York 11201

WEEK 7:

Week 7 Field Trip: **Academic Service Learning Project**

WEEK 8:

Week 8 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, water-proofing and drainage.



Week 8 Lab: **Start Up/ Desk Crits:** Assignment C: Site Documentation

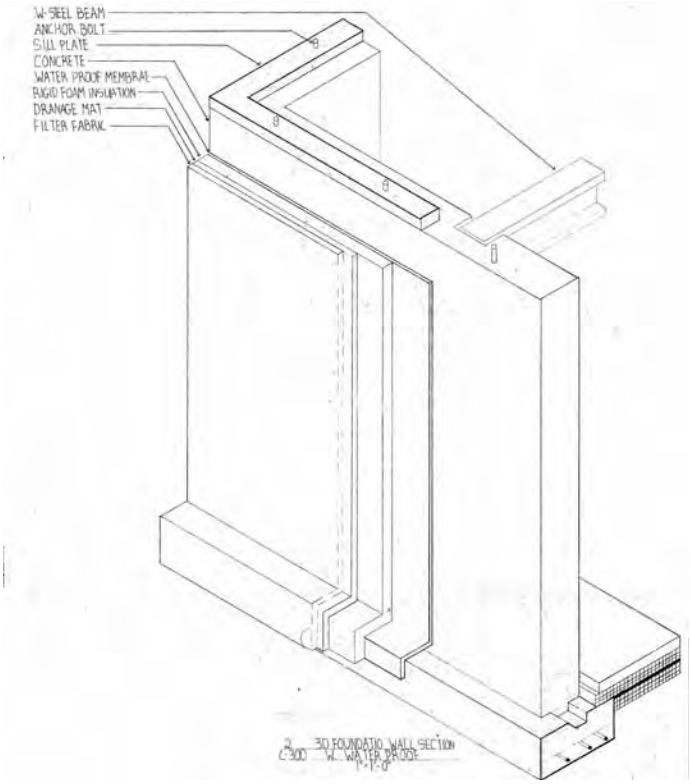
Week 8 Homework: Continue Assignment C

Week 8 Quiz: A Stronger More Resilient New York, Selected Pages Reading #2

Week 8 Reading:

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

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



WEEK 9:

Week 9 Lecture: **Wood:** Characteristics, structure, classification of trees and properties, softwoods and hardwoods, limitations, manufacture of lumber, grading of lumber, plywood, glue laminated lumber, composite boards, wood joining, types of wood construction.

Week 9 Lab: **Field Trip: Academic Service Learning Project**

Week 9 Homework: Complete Assignment C

Week 9 Quiz: Allen and Iano, Chapter 2, Ching Chapter 3

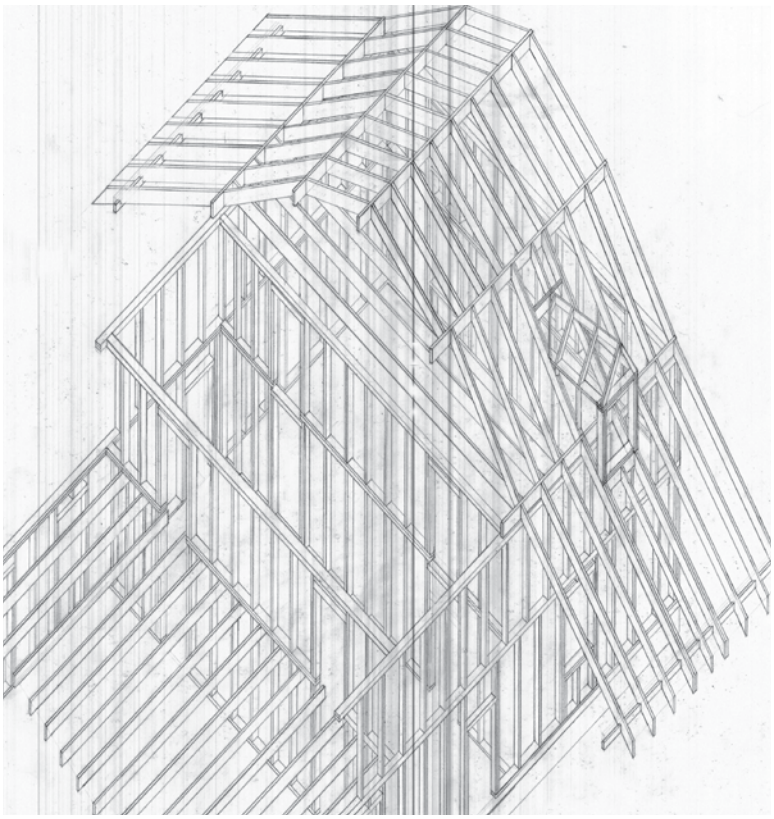
Week 9 Reading:

Allen and Iano, Wood, Chapter 3, pp. 85-129

Ching, Building Construction Illustrated, Chapter 12, pp. 12.12-12.14

WEEK 10:

Week 10 Lecture: **Heavy Timber Frame Construction:** history, heavy timber, light wood frame.



Week 10 Lab: **Start Up / Desk Crits:** Introduce Assignment D: Academic Service Learning Project Site and Building Studies

Week 10 Homework: Continue Assignment D

Week 10 Quiz: Allen and Iano, Chapter 3, Ching, Chapter 12

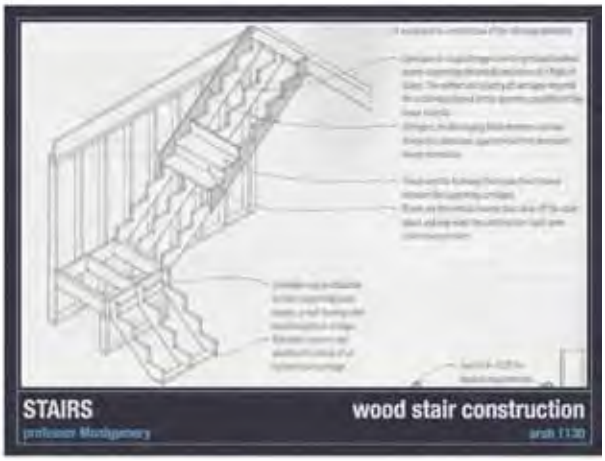
Week 10 Reading:

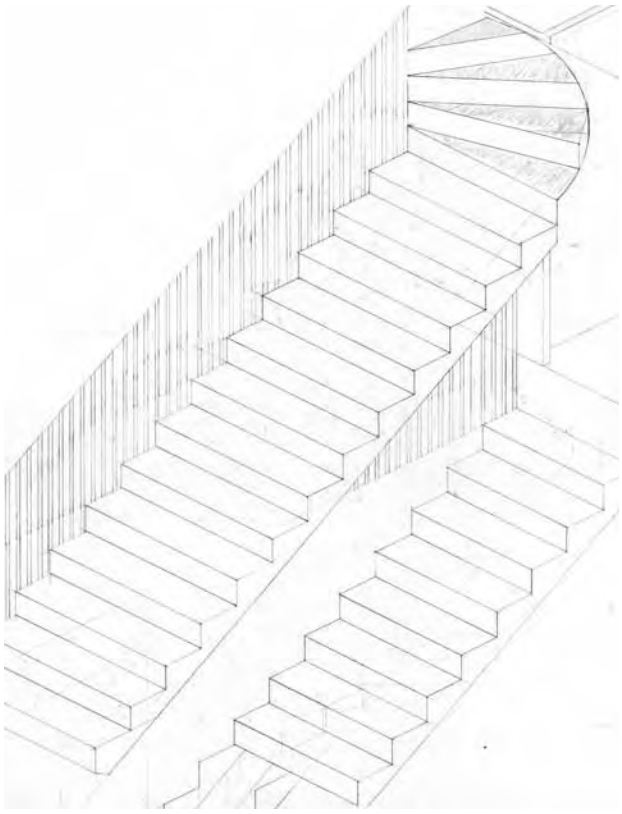
Allen and Iano, Heavy Timber Frame Construction, Chapter 4, pp. 135-159

Ching, Chapter 4, pp. 4.35-4.40, Chapter 5, pp. 5.02-5.03, 5.47-5.50, Chapter 6, pp. 6.16-6.30

WEEK 11:

Week 11 Lecture: **Designing Stairs:** code compliance, terminology, and calculation techniques, drawing conventions. In class stair design exercise.





Week 11 Lab: **Pin Up/Desk Crits:** Assignment D

Week 11 Homework: Complete Assignment D

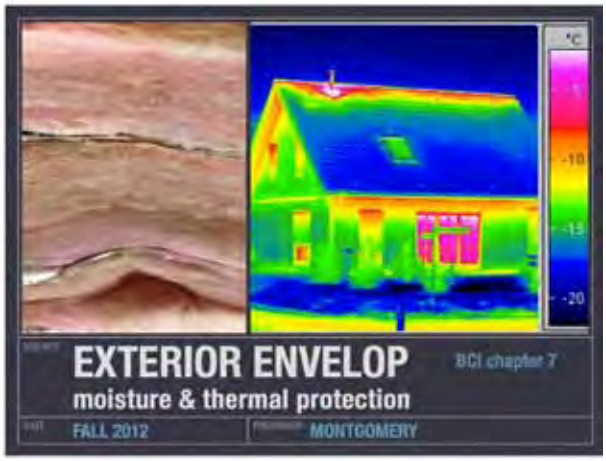
Week 11 Quiz: Allen and Iano, Chapter 4,
Ching, Chapter 4, 5, 6

Week 11 Reading:

Ching, Building Construction Illustrated, Chapter 9, pp. 9.02-9.13

WEEK 12:

Week 12 Lecture: **Exterior Envelop:** moisture & thermal protection including roofing, wall flashing, masonry veneer, siding, thermal insulation, moisture control, ventilation



Week 12 Lab - **Start Up / Desk Crits:** Introduce Assignment E: Academic Service Learning Report

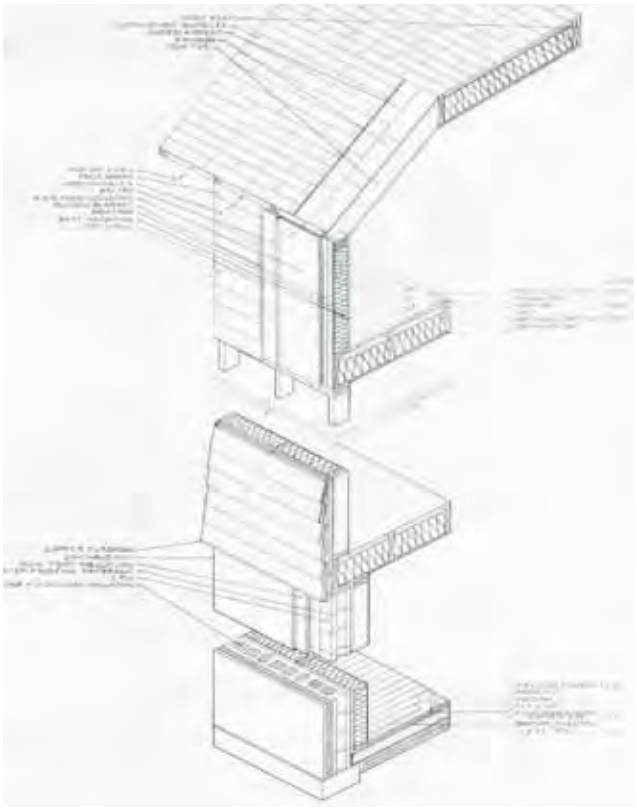
`

Week 12 Homework: Continue Assignment E

Week 12 Quiz: Ching, Chapter 9

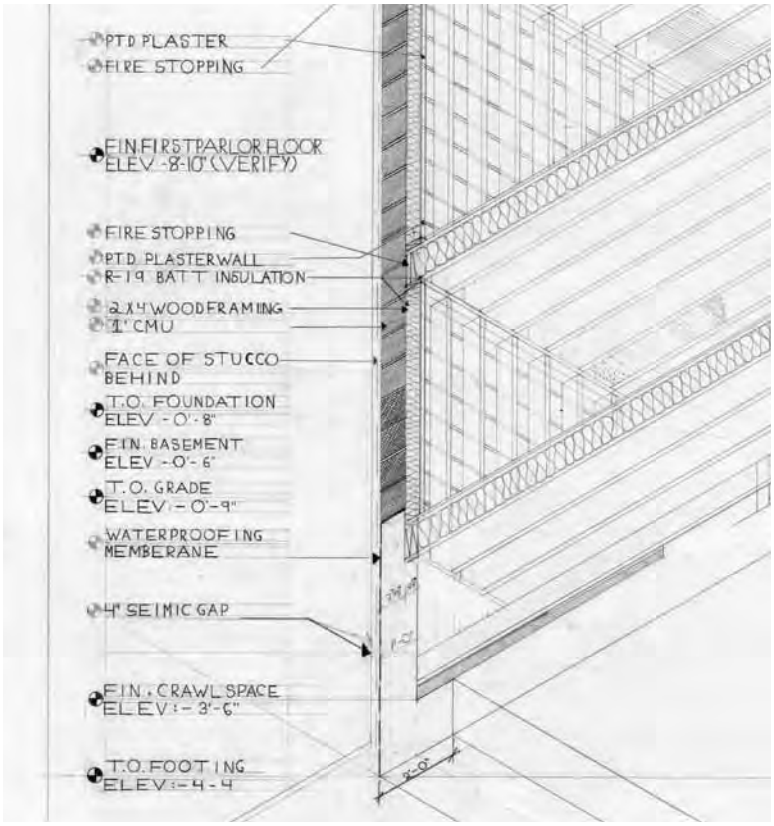
Week 12 Reading:

Ching, Building Construction Illustrated, Chapter 7, pp. 7.02-7.50



WEEK 13:

Week 13 Lecture: **Building Systems:** mechanical and electrical systems, systems integration.



Week 13 Lab: **PinUp / Desk Crits:** Assignment E

Week 13 Homework: Complete Assignment E

Week 13 Quiz: Ching, Chapter 7

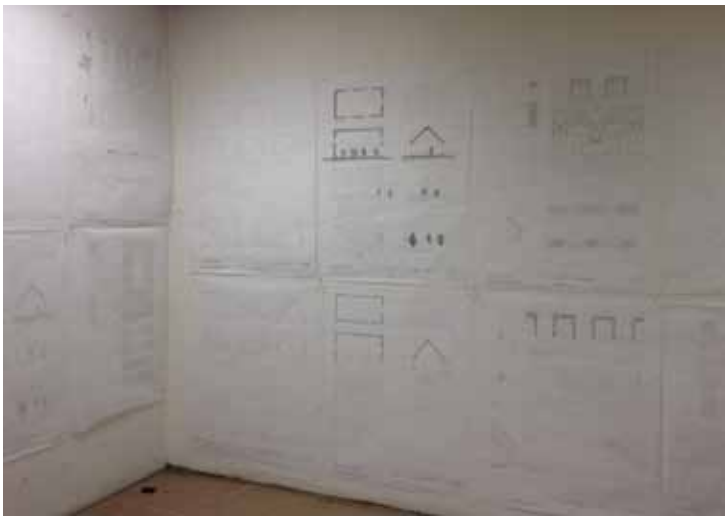
Week 13 Reading:

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

WEEK 14:

Week 14 Lecture: **Final Exam Review**

Week 14 Lab: **Academic Service Learning Final Presentation** (location to be determind)



WEEK15:

Week 15 Lecture: **Academic Servie Learning Project:** Reflection/Discussion

Week 15 Lab: **FINAL EXAM**