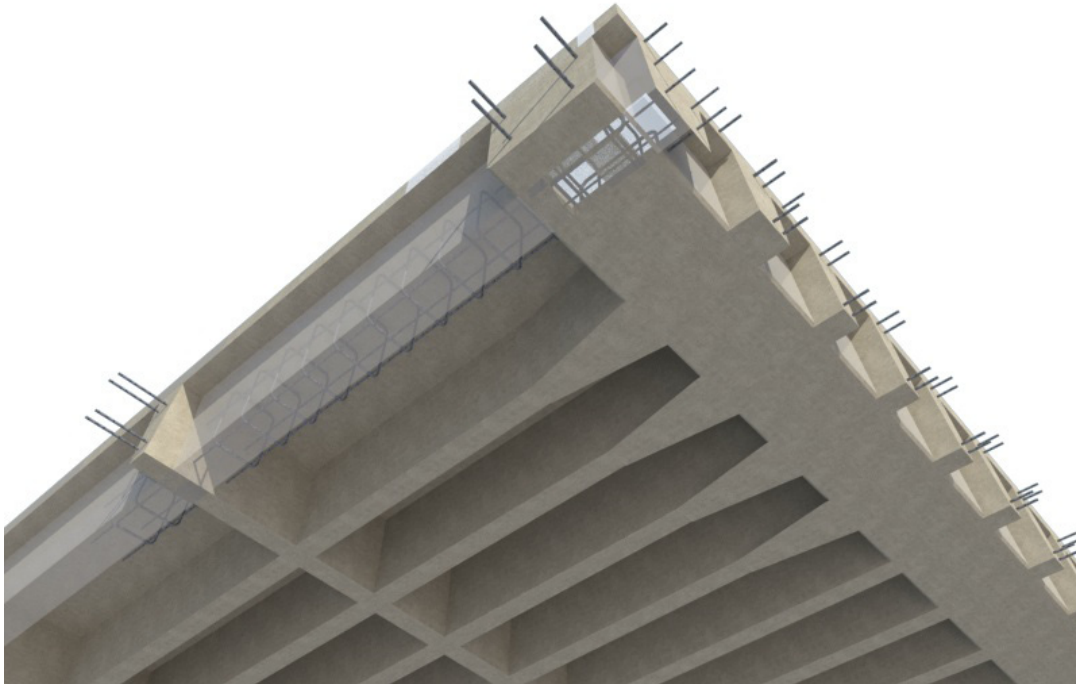


NEW YORK CITY COLLEGE OF TECHNOLOGY

*Spring 2015*



**ARCH 1230 BUILDING TECHNOLOGY II  
COURSE OUTLINE**

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COURSE COORDINATOR - PROFESSOR JASON MONTGOMERY

## DEPARTMENT OF ARCHITECTURAL TECHNOLOGY

### ARCH 1230

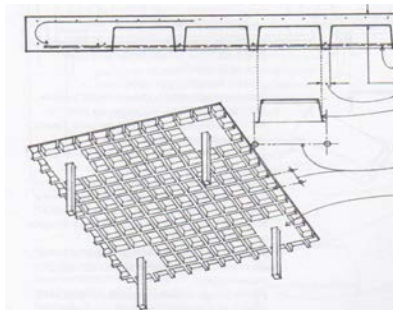
### BUILDING TECHNOLOGY II

1 classroom hour, 4 lab/studio hours, 3 credits

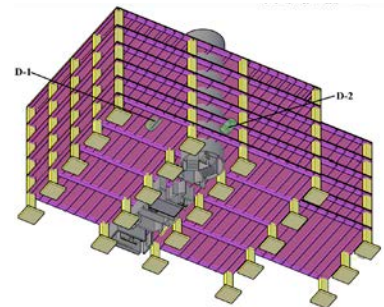
**Course Description:** This course will study the basic materials of construction as well as the theory and practice of building technology. The course will include investigation of the assembly of building components and methods of construction while developing proficiency in both analog and digital drawing building information modeling (BIM) techniques, and professionally presented construction drawing page composition.



LECTURE



READING + QUIZ



ASSIGNMENT

**Course Context:** This is the second 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:** ARCH 1130 Building Technology I with a grade of C or higher

#### **Required Texts:**

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

Ching, Francis. *Building Construction Illustrated, 4th Edition*. 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 weekly lectures focused on particular materials and methods of construction and studio lab time to acquire hand sketching and digital drafting and modeling skills while developing a series of case drawing and modeling investigations of the materials and assemblies discussed in the lectures. There will be one or more research assignments as well as several 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.

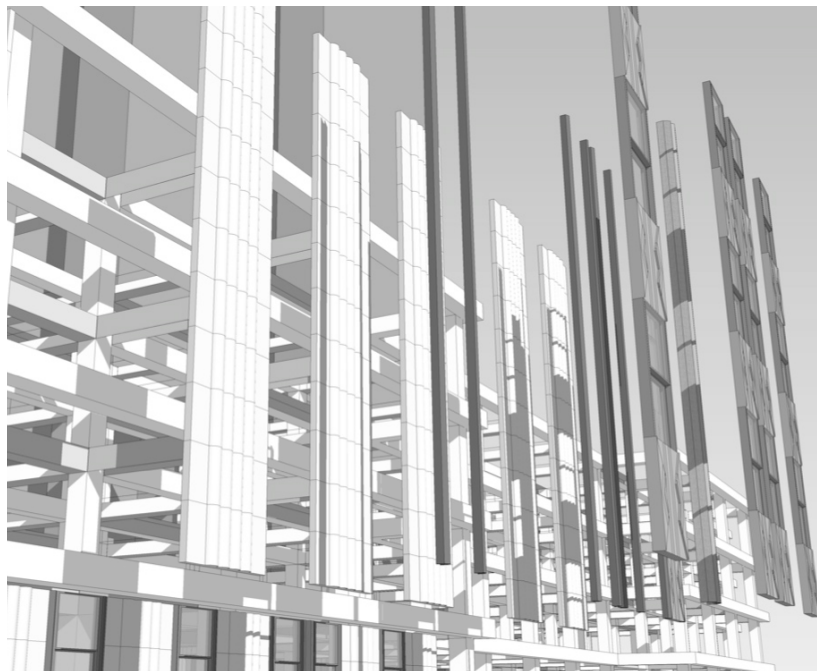
## GRADE WEIGHTING

60% Studio Lab Assignments

10% Quizzes

25% Final Exam

5% Class Participation



## LEARNING OBJECTIVES

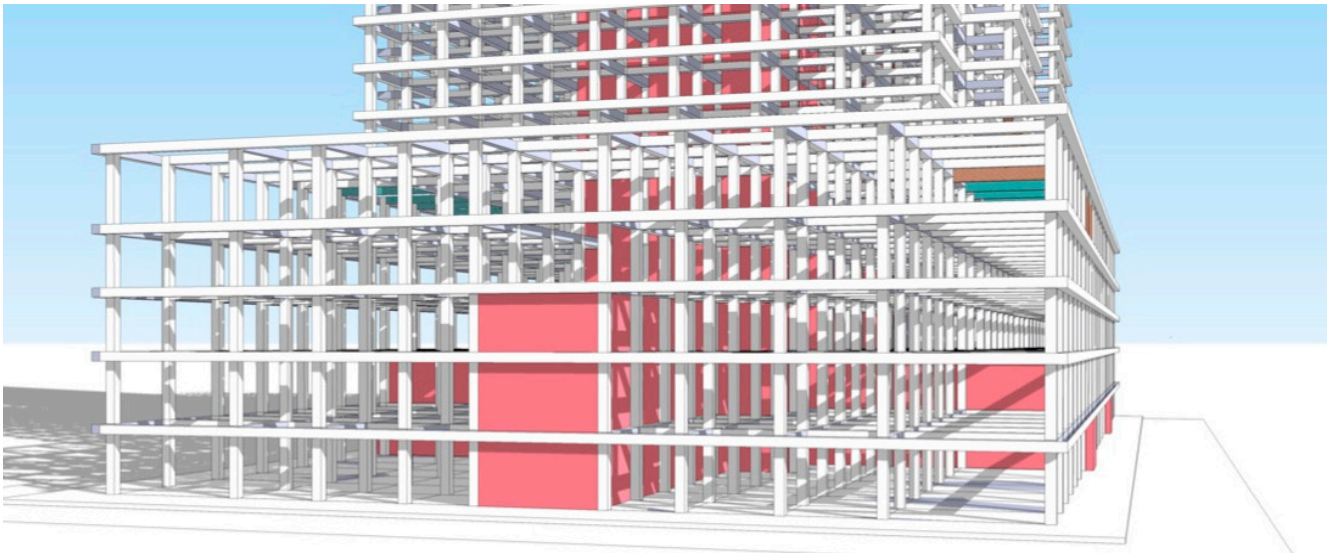
Upon successful completion of this course, the student will:

1. **Understand** the relationship of technology to tectonics and architectural character. (Knowledge)
2. **Recall and recite** the key terms and characteristics 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. **Define and compare** the environmental implications of specific materials and types of construction including embodied energy, sourcing, and the processing of materials. (Gen Ed)
6. **Generate** clear and concise talking points to guide oral presentations of lab assignment reviews. (Gen Ed)
7. **Manipulate and apply** geometric, proportional and scale systems. (Gen Ed)
8. **Apply** an understanding of the relationship of physiology and anatomy to building construction. (Gen Ed)
9. **Research, report on and apply** appropriate details of the selected materials and methods of construction through review of professional literature. (Gen Ed)
10. **Use and apply** procedural texts to supplement instruction on the use of hardware and software. (Gen Ed)
11. **Sketch and draft** details in orthographic and 3 dimensional views in analogue and digital media. (Skill)
12. **Develop** analog and digital models of construction assemblies. (Skill)
13. **Analyze** assemblies and details; demonstrate an understanding of fundamental construction types both by detailed research and visual observation. (Skill)
14. **Demonstrate** knowledge of building codes, professional construction drawing standards for composition, title blocks, annotation, and schedules. (Skill)
15. **Develop** a coordinated drawing set for the given building design(s) including plan diagrams, sections, and details of steel and concrete structures that illustrates and identifies the materials and construction types. (Skill)

## ASSESSMENT

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

1. Review research assignment focused on the analysis of assemblies and details and the relationship of technology to tectonics, human scale, and architectural character. (Los: 1, 8, 13)
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, 9)
3. Review students' drawing and modeling work where students must exhibit their visual representation skills (2-D and 3-D). (Los: 7, 10, 11, 12, 14, 15)
4. Assess the students' use of professional vocabulary and etiquette during discussions, studio work, and oral presentations. (Los: 3, 4, 6)
5. Inspect student submissions for quality of drafting including use of line weights, lettering, and proper use of scale. (Los: 7, 11, 14, 15)
6. Confirm the proper coordination of the students' submitted drawing sets. (Los: 14)
7. Review the quality and accuracy of the students' submitted analogue and digital models of construction assemblies. (Los: 11, 12)

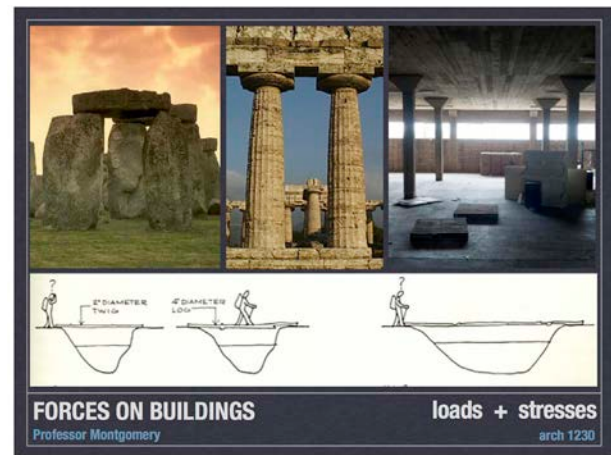
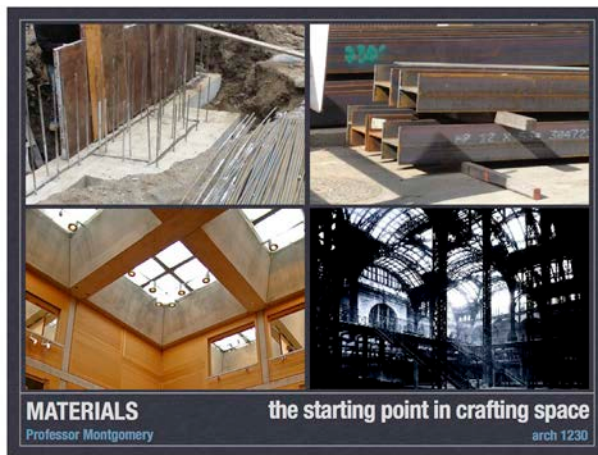




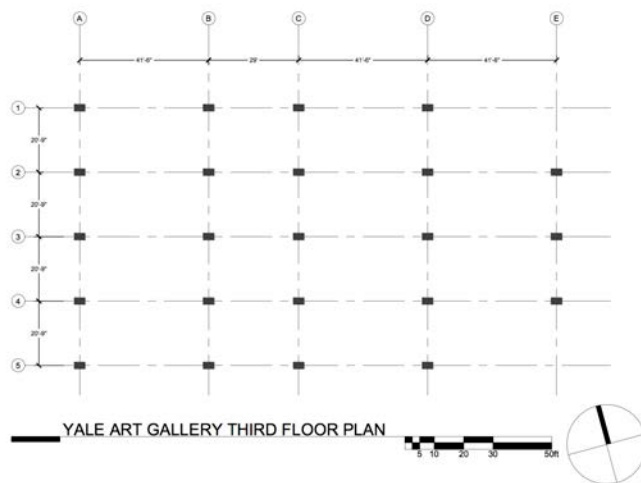
## WEEK BY WEEK SUMMARY

### WEEK 1:

**Week 1 Lecture: Course Introduction, 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 steel and concrete. Structural behavior of steel and concrete with concepts of statics, stress, bending, span and shapes.



**Week 1 Lab: Review of Lab Required Equipment and Protocols for Presentation:** Architectural Drawing Sets + Modeling: analog and digital tools and techniques. SketchUp, AutoCAD and BIM Software. **Introduction** Initial Drawing Assignment.



**Week 1 Homework:** Complete Initial Drawing Assignment

**Week 1 Reading:**

**Ching**, Building Construction Illustrated,  
Chapter 1, pp. 1.02-1.06,  
Chapter 2, pp. 2.02-2.30,  
Chapter 12, pp. 12.02-12.05, 12.08-12.09

## WEEK 2:

*Week 2 Lecture: **Concrete Construction:** History, cement and concrete, making and placing concrete, formwork, reinforcing, creep, prestressing, and innovations.*



*Week 2 Lab: **AutoCAD + Sketchup Fundamentals.** Introduce Assignment A*

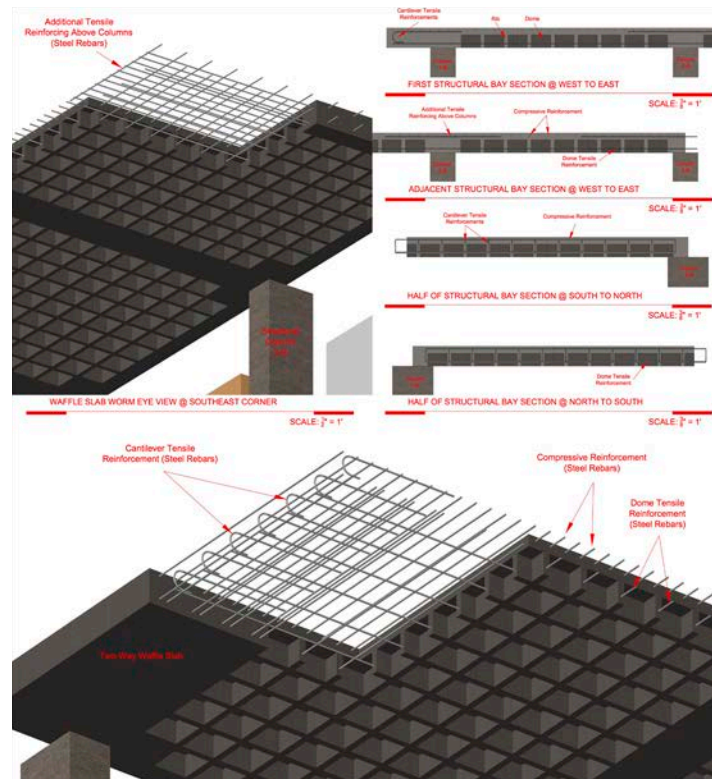
*Week 2 Homework: Assignment A*

*Week 2 Quiz: **Ching**, Chapters 1, 2, 12*

*Week 2 Reading:*

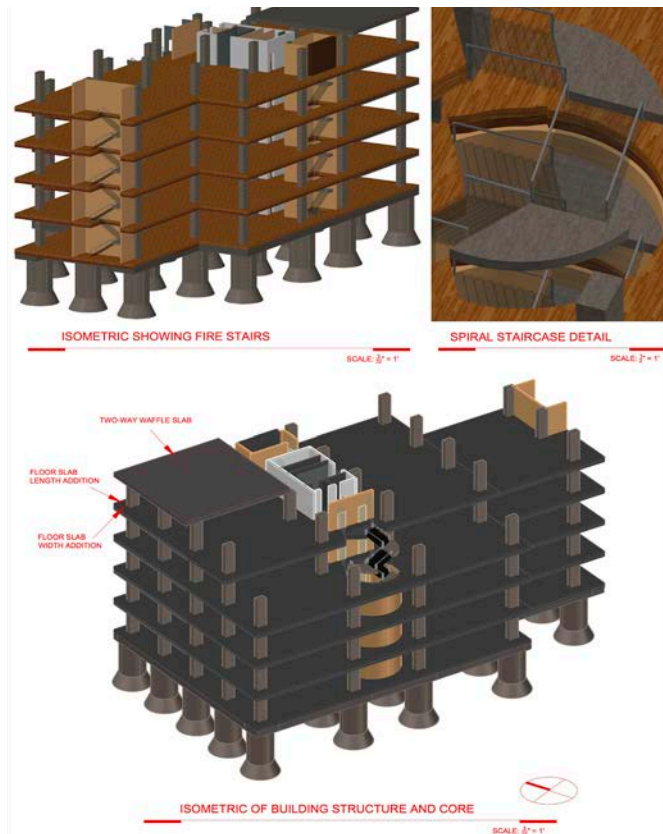
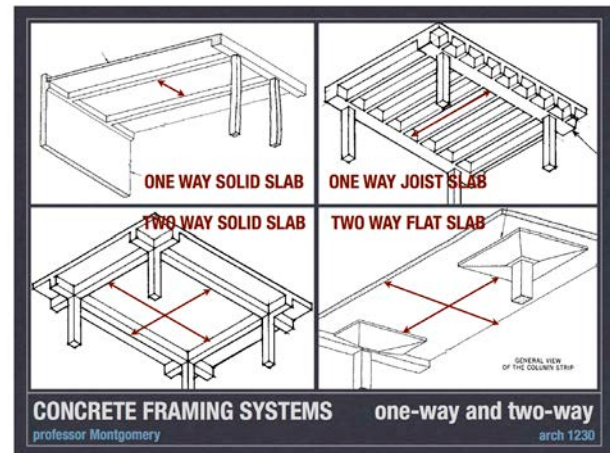
**Allen and Iano**, Concrete Construction  
Chapter 13, pp. 515-551

**Ching**, Building Construction Illustrated,  
Chapter 5, pp. 5.04-5.09,  
Chapter 12, pp. 12.04-12.05



### WEEK 3:

*Week 3 Lecture: Site Cast Concrete Construction:* Slab on grade, concrete walls, concrete columns, one-way systems, two-way systems, stairs, posttensioning, selecting a system, innovations, architectural concrete.



*Week 3 Lab: AutoCAD + Sketchup Fundamentals.* Review Assignment A Progress

*Week 3 Homework:* Assignment A

*Week 3 Quiz: Allen and Iano,* Chapter 13,  
**Ching**, Chapters 5 & 12

*Week 3 Reading:*

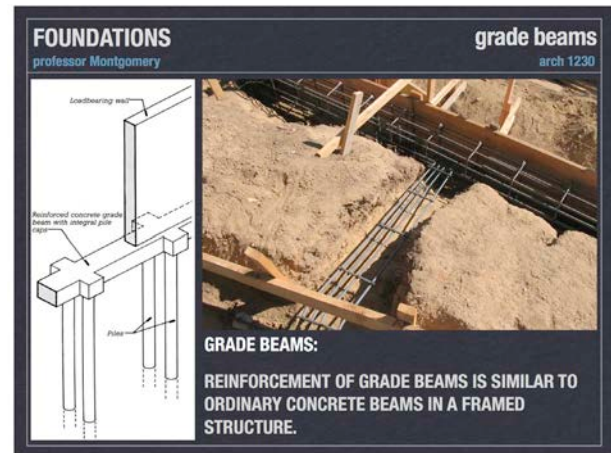
**Allen and Iano**, Sitecast Concrete Framing Systems, Chapter 14, pp. 553-609

**Ching**, Building Construction Illustrated, Chapter 4, pp. 4.02-4.13



## WEEK 4:

*Week 4 Lecture: **Geotech + Excavations + Foundations:** Procedures and Consultants, Geotechnical Investigation, Soil Bearing Pressure. Foundation materials: concrete, wood, and steel. Foundation types: deep foundations. Underpinning existing foundations.*



## Week 4 Lab: Introduce Assignment B

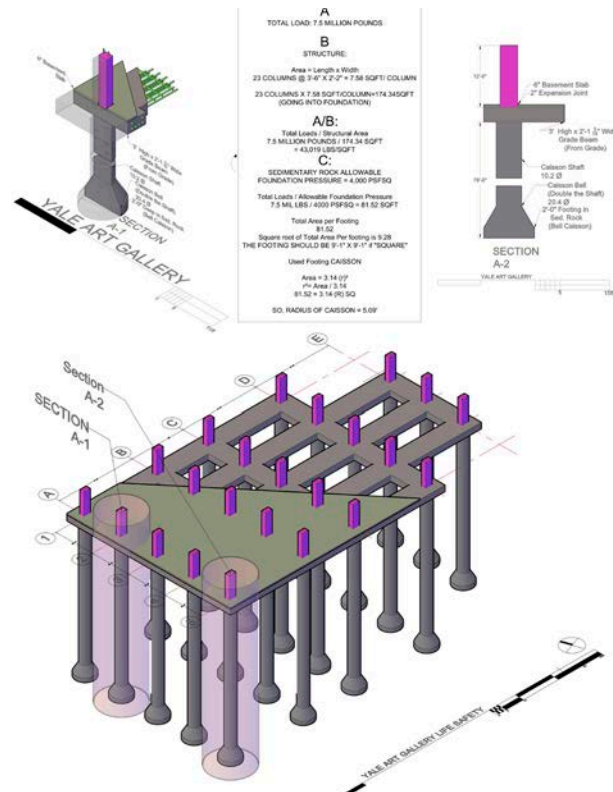
*Week 4 Homework: Continue Assignment B*

**Week 4 Quiz: Allen and Iano, Chapter 14, Ching, Chapter 4**

*Week 4 Reading:*

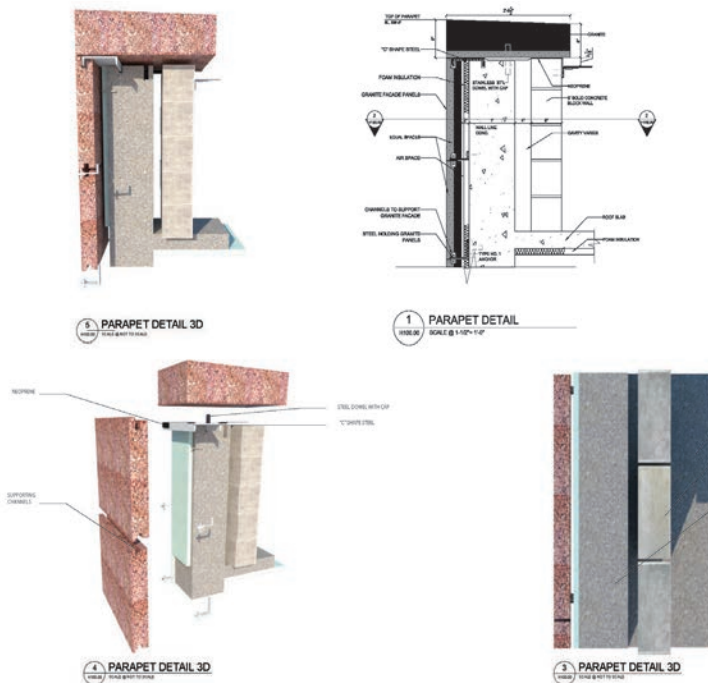
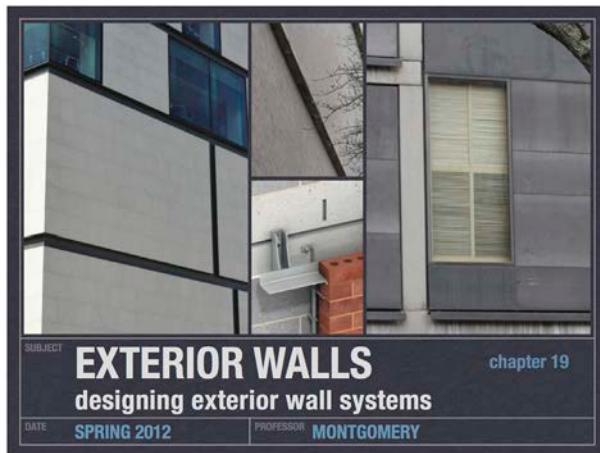
**Allen and Iano, Foundations**  
Chapter 2, pp. 29-38, pp. 56-71

**Ching**, Building Construction Illustrated,  
Chapter 3, pp. 3.02-3.26



## WEEK 5:

*Week 5 Lecture: Designing Exterior Wall Systems:* design requirements, environmental performance, water-tightness, sealant joints, load bearing versus curtain wall.



*Week 5 Lab: Pin Up:* Assignment B Progress

*Week 5 Homework:* Assignment B

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

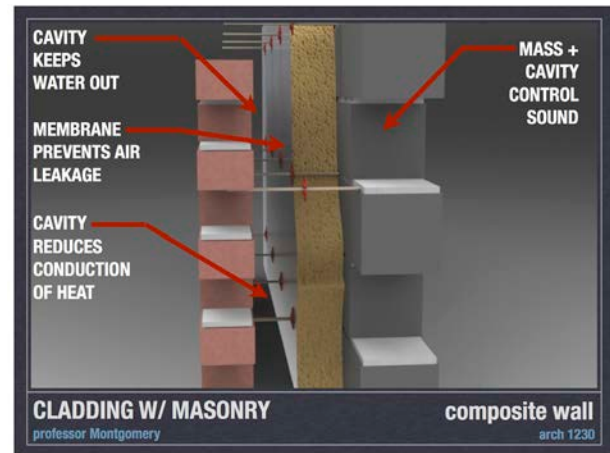
*Week 5 Reading:*

**Allen and Iano**, Designing Exterior Wall Systems Chapter 19, pp.783-807

**Ching**, Building Construction Illustrated, Chapter 5, pp. 5.02-5.03, Chapter 7, pp. 7.22-7.25, pp. 7.39-7.50

**WEEK 6:**

*Week 5 Lecture: Cladding with Masonry and Concrete:* masonry veneer curtain walls, stone curtain walls, pre-cast concrete curtain walls, EIFS, future directions.



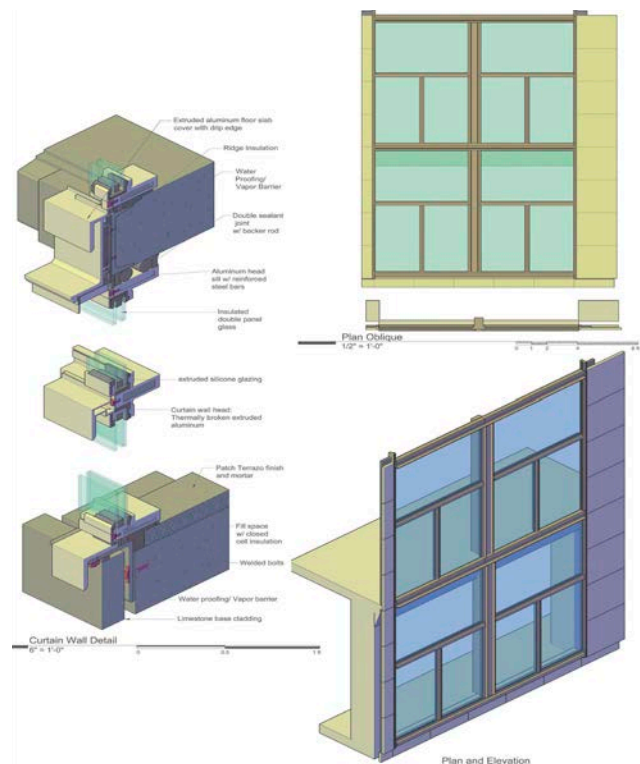
*Week 6 Lab: Drawing Wall Sections, Intro-*  
duce Assignment C

*Week 6 Homework:* Continue Assignment C

*Week 6 Quiz: Allen and Iano, Chapter 19,*  
**Ching**, Chapters 5 & 7.

*Week 6 Reading:*  
**Allen and Iano**, Cladding with Masonry and  
Concrete Chapter 20, pp. 809-837

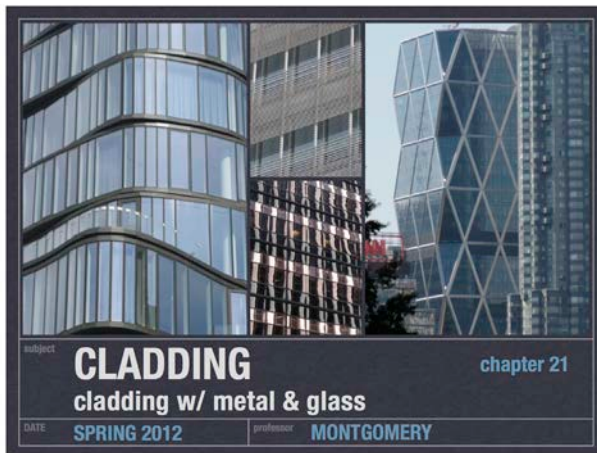
**Ching**, Building Construction Illustrated,  
Chapter 7, pp. 7.26-7.31





## WEEK 7:

*Week 7 Lecture: Cladding with Metal and Glass:* aluminum extrusions, aluminum and glass framing systems, modes of assembly, the rain screen principle, expansion joints, dual-layered glass cladding, curtain wall design process.



DETAIL AT FLOOR SLAB

*Week 7 Lab: Pin Up:* Assignment C Progress

*Week 7 Homework:* Assignment C

*Week 7 Quiz:* **Allen and Iano**, Chapter 20,  
**Ching**, Chapter 7.

*Week 7 Reading:*

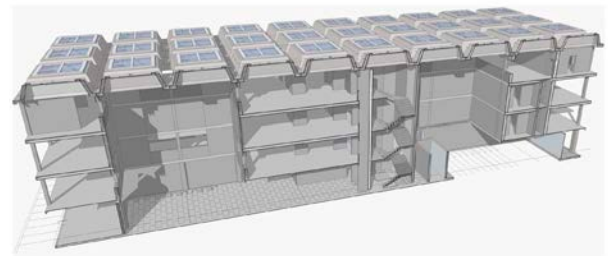
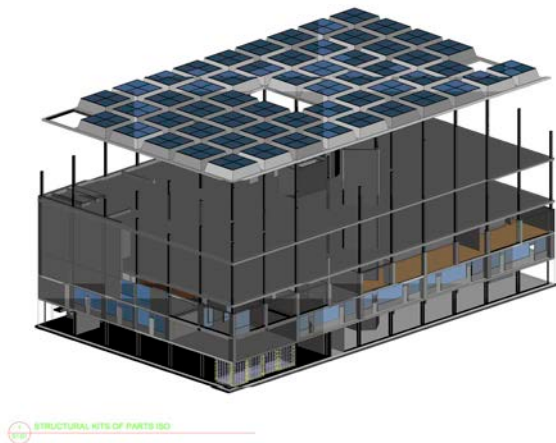
**Allen and Iano**, Cladding with Metal and Glass Chapter 21, pp. 839-867

**Ching**, Building Construction Illustrated, Chapter 8, pp. 8.28-8.33



**WEEK 8:**

*Week 8 Lecture: **Pin Up / Redmarks: Drawing Assignments B+C***

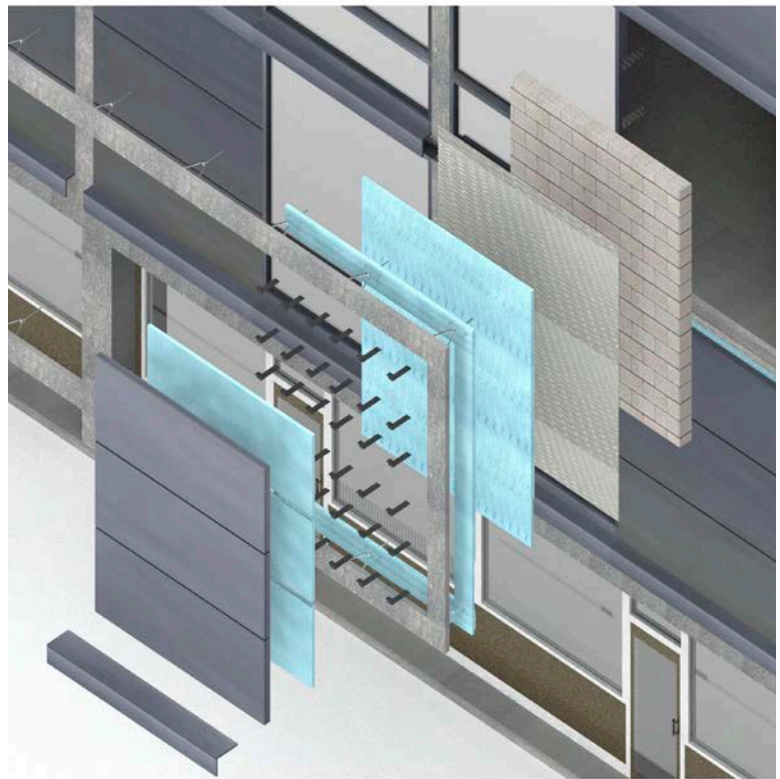


*Week 8 Lab: Desk Crits: Assignment C*

*Week 8 Homework: Assignment C*

*Week 8 Quiz: **Allen and Iano**, Chapter 21,  
**Ching**, Chapter 8*

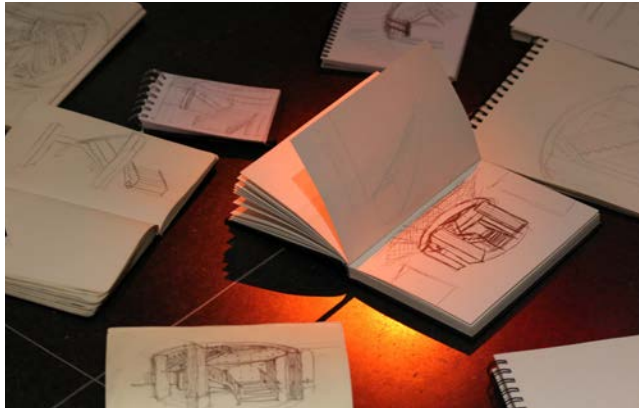
*Week 8 Reading: none*



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

*Field Trip: Case Study Building Site Visit*, New Haven, CT

Required weekend trip. Students to investigate case study building using sketchbooks and professional quality cameras. **Sketchbook and drawing materials required.**

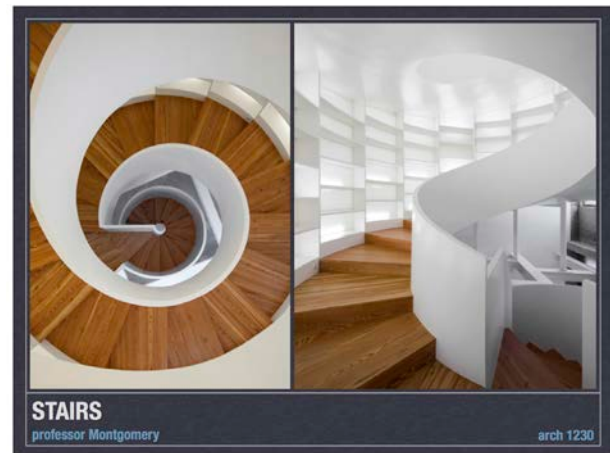
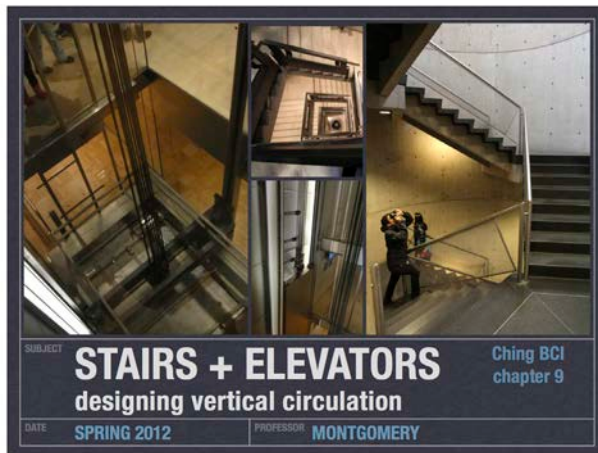


BUILDING TECHNOLOGY II

**WEEK 9:**

*Week 9 Lecture: Stairs and Elevators:* Functional requirements, design and code analysis.

**Introduction to Assignment D:** Stair Design + Documentation



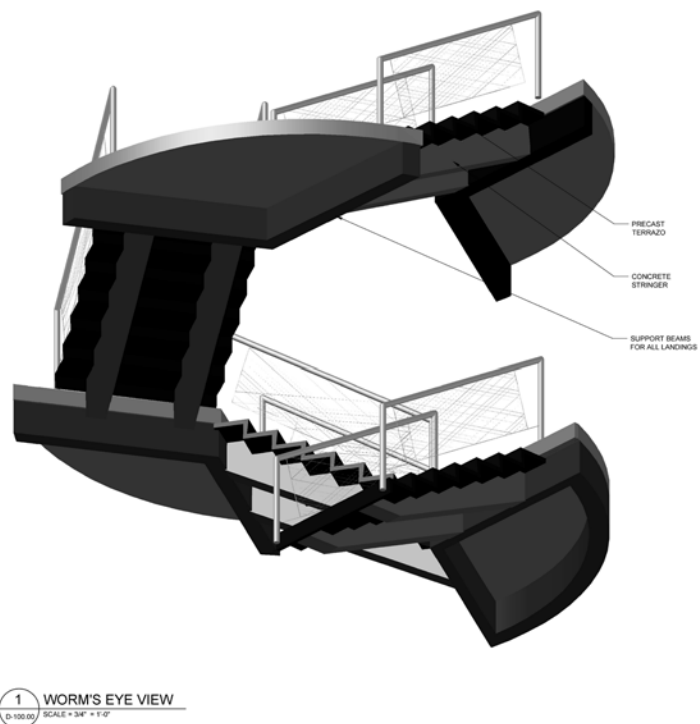
*Week 9 Lab: Drawing Stairs*

*Week 9 Homework:* Assignment D

*Week 9 Quiz:* none

*Week 9 Reading:*

**Ching**, Building Construction Illustrated, Chapter 9, pp. 9.02-9.17





**WEEK 10:**

*Week 10 Lecture: **Building Codes:*** Introduction to IBC, IRC, occupancy groups, construction types, fire resistance ratings, allowable building height and area calculations.



*Week 10 Lab: Pin Up:* Assignment D

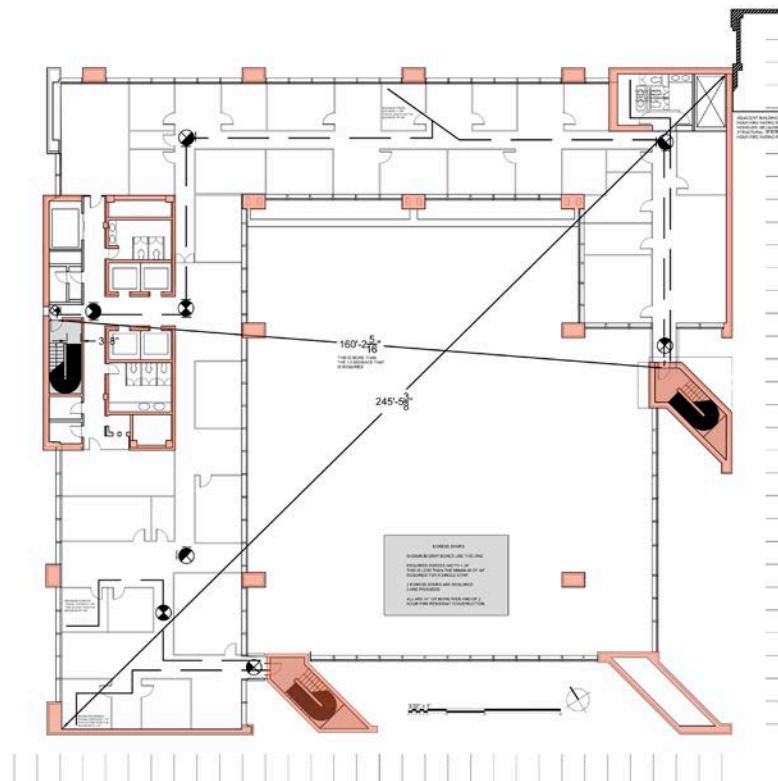
*Week 10 Homework:* Assignment D

*Week 10 Quiz:* **Ching**, Chapter 9

*Week 10 Reading:*

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

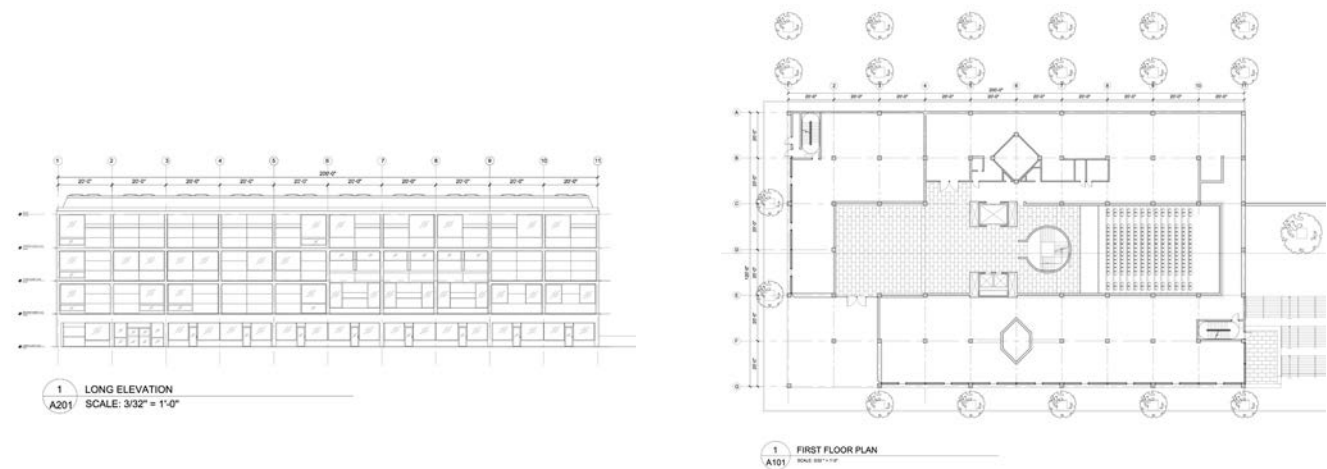
**Ching**, Building Construction Illustrated, Appendix, pp. A.10-A.13





**WEEK 11:**

*Week 11 Review: Progress Set*

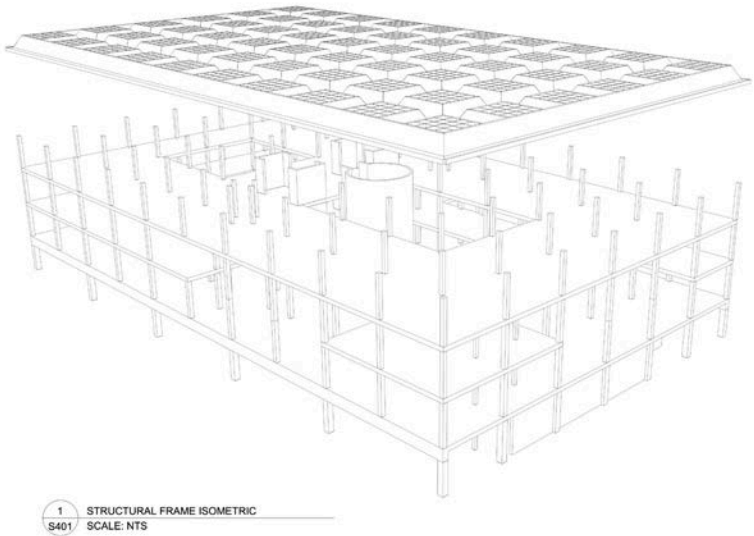


*Week 11 Lab: Introduce Assignment E*

*Week 11 Homework: Assignment E*

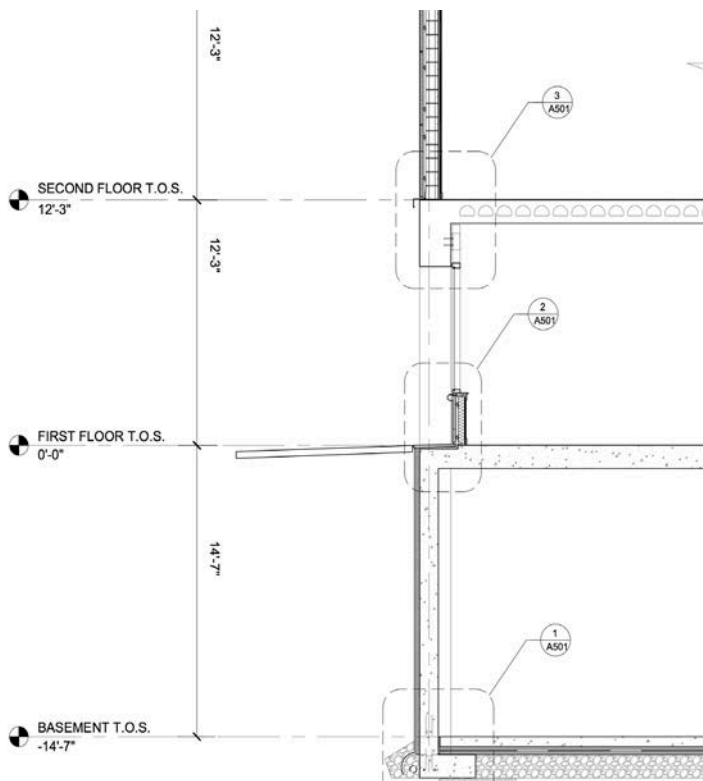
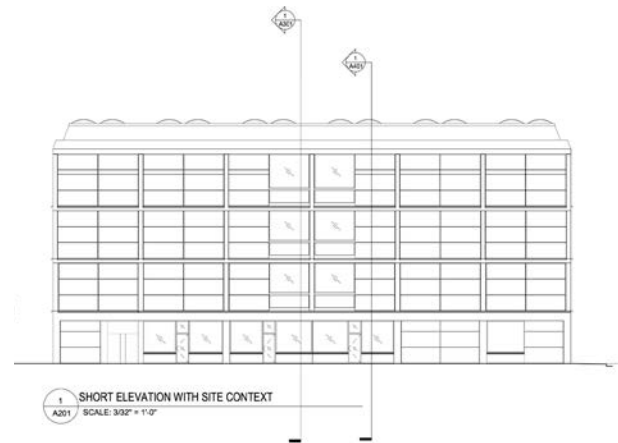
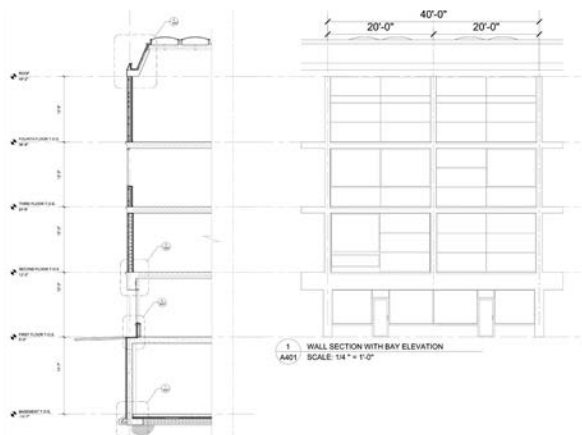
*Week 11 Quiz: none*

*Week 11 Reading: none*



## WEEK 12:

### Week 12 Review: Progress Set



Week 12 Lab: Introduce Assignment F

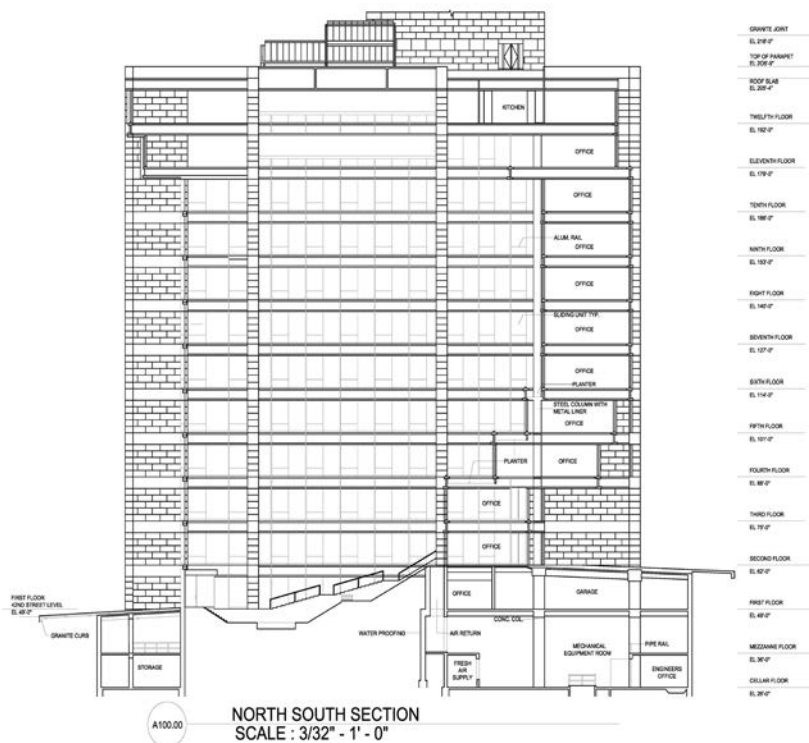
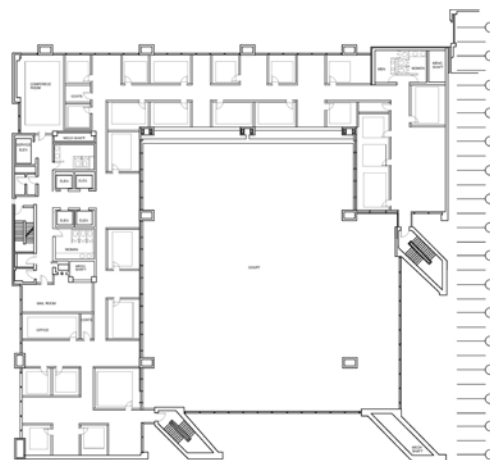
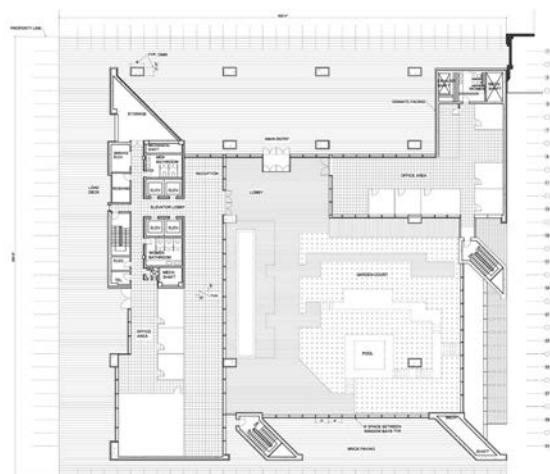
Week 12 Homework: Assignment F

Week 12 Quiz: none

Week 12 Reading: none

WEEK13:

Week 13 Review: Progress Set



GRANITE JOINT  
EL. 27'-0"  
TOP OF PARAPET  
EL. 28'-0"  
ROOF FLOOR  
EL. 28'-0"  
TWELFTH FLOOR  
EL. 162'-0"  
ELEVENTH FLOOR  
EL. 158'-0"  
TENTH FLOOR  
EL. 154'-0"  
NINTH FLOOR  
EL. 150'-0"  
EIGHTH FLOOR  
EL. 146'-0"  
SEVENTH FLOOR  
EL. 142'-0"  
SIXTH FLOOR  
EL. 138'-0"  
FIFTH FLOOR  
EL. 134'-0"  
FOURTH FLOOR  
EL. 130'-0"  
THIRD FLOOR  
EL. 126'-0"  
SECOND FLOOR  
EL. 122'-0"  
FIRST FLOOR  
EL. 118'-0"  
MECHANICAL FLOOR  
EL. 114'-0"  
COLLAR FLOOR  
EL. 110'-0"

Week 13 Lab: Desk Crits: Assignment F

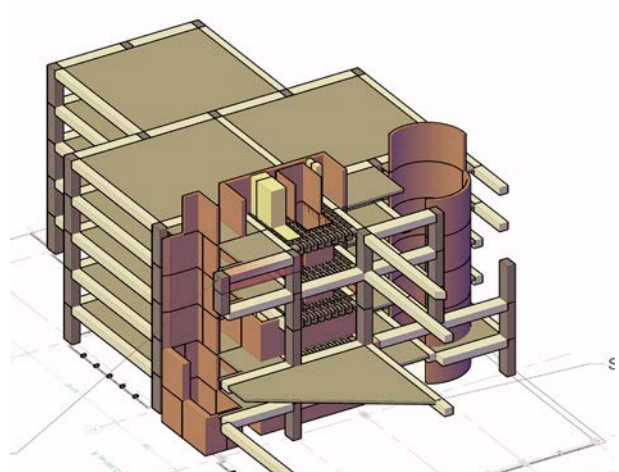
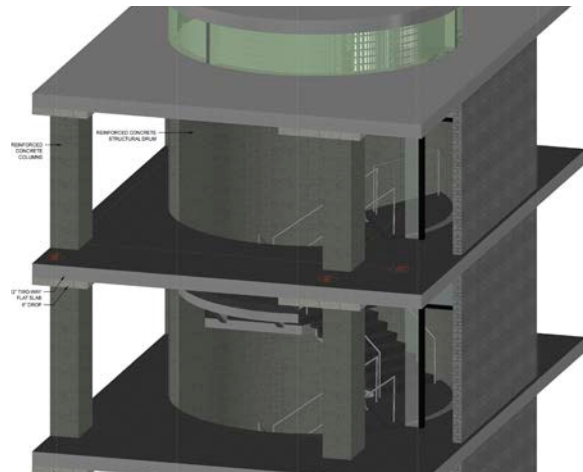
Week 13 Homework: Assignment F

Week 13 Quiz: none

Week 13 Reading: Final Exam preparation

**WEEK 14:**

*Week 14 Review: Progress Set*



*Week 14 Lab: Desk Crits: Assignment F*

*Week 14 Homework: Assignment F*

