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:


Recommended Texts:


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 a midterm exam based on key terms and concepts discussed in the class and in the assigned readings.

GRADE WEIGHTING

60%  Studio Lab Assignments
20%  Sketchbook
15%  Midterm 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)
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READINGS:

1. Overview + Structural Typologies and Elements
   1.1. 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

2. Structure: Concrete
   2.1. Allen and Iano, Concrete Construction Chapter 13, pp. 515-551, Sitecast Concrete Framing Systems, Chapter 14, pp. 553-609
   2.2. Ching, Building Construction Illustrated, Chapter 4, pp. 4.02-4.13, Chapter 5, pp. 5.04-5.09, Chapter 12, pp. 12.04-12.05

3. Structure: Steel
   3.1. Allen and Iano, Steel Frame Construction Chapter 11, pp. 411-487
   3.2. Ching, Building Construction Illustrated, Chapter 4, pp. 4.14-4.22, Chapter 5, pp. 5.35-5.38, Chapter 6, pp. 6.06-6.14

4. Structure/Envelope: Roof + Spanning Elements
   4.1. Ching, Building Construction Illustrated, Chapter 6, pp. 6.02-6.30

5. Structure: Shallow Foundations + Geotechnical Investigation
   5.1. Allen and Iano, Foundations Chapter 2, pp. 29-38, pp. 56-71
   5.2. Ching, Building Construction Illustrated, Chapter 3, pp. 3.02-3.26

6. Structure/Envelope: Masonry + Exterior Walls
   6.1. Allen and Iano, Designing Exterior Wall Systems Chapter 19, pp. 783-807
   6.2. Ching, Building Construction Illustrated, Chapter 5, pp. 5.02-5.03, Chapter 7, pp. 7.22-7.25, pp. 7.39-7.50
   6.3. Ching, Building Construction Illustrated, Chapter 12 pp. 12.06-12.07, p. 12.10, Chapter 5 pp. 5.14-5.27

7. Egress + Stairs
   7.1. Allen and Iano, Making Buildings Chapter 1, pp. 3-27
   7.3. Ching, Building Construction Illustrated, Chapter 9, pp. 9.02-9.17
Notes:

COURSE GRADING AND POINT SYSTEM: All **drawing assignments** are valued at 100 points total unless otherwise noted. To receive 100% of your earned points, you must be present and ready at the beginning of class for all reviews of the assignment. Students not meeting this requirement will have a 15% reduction on their score for the assignment. **Sketchbook assignments** are valued at 50 points. To receive credit, carefully scan/photograph sketches and notes and upload to designated OpenLab project site.

REVIEWS: Pin-up reviews require printed or original drawing materials and models at the correct scale. Printing must **NOT TAKE PLACE** during CLASS TIME. Late printing will result in a deduction of points from the assignment grade.

ASSIGNMENT SUBMISSIONS: **ALL** assignment submissions must be uploaded to the designated Openlab Project site. A final grade will not be issued until the Openlab site includes all assignments and the final formal presentation in PDF format is submitted.

OPENLAB REFLECTION: With each assignment submission, provide a written description of your assignment and a short reflection on how the assignment is helping you develop a understanding of the technical content of the course.

FILE NAMING CONVENTION: All files submitted must follow the following format:

Drawing Submissions:

ARCH1230_2017sp_Montgomery_lastname_assignment#

Sketches and Note Submissions:

ARCH1230_2017sp_Montgomery_lastname_topic
CLASS MEETING DETAILS AND ASSIGNMENTS

1 Course Introduction 2017-01-30
   i. Pinterest Gallery Tour
   ii. Discussion of Building Technology + Drawing to Understand Buildings

2 Assignment A: Minor Case Study: Grid 2017-02-02
   i. AutoCAD Overview
   ii. Importance of using the Template and CTB files provided
   iii. 30”x 42” sheet size
   iv. Layers, Drawing Command
   i. Grid Layout
   ii. Assignment A: Minor Case Study Grid (100 points)
      i. Study Lovell Beach House drawings and photos on ARCH 1230
         Openlab Coordination Site under Case Studies tab:
         https://openlab.citytech.cuny.edu/arch-1230/minor-case-
         studies/lovell-beach-house/
      ii. Using Dimensions from Ground Floor Plan, develop Structural
          Grid through geometric center of each column.
      iii. Label Grid with letters A-E across top (left to right) and 1-3
           (bottom to top)
      iv. Format Structural Grid onto AutoCAD title block (using A101 First
           Floor Plan layout.) Scale to be determined. Change labels
           in title block, adding your name, project title, and date.
         to Openlab project site.
3  Structural Typologies: Bearing Wall + Point Load  
   Structural Elements: Columns/Piers/Spanning Elements  
   2017-02-06

   i.  Review of Structural Configurations based on Load Distribution
   
   ii. Reading Plans to understand Structural Typologies
   
   iii. SKETCHBOOK (50 points) : Notes + Sketches on Structural Typologies and Elements

4  Assignment B: Minor Case Study: Floor Plans  
   2017-02-09

   i.  Floor Plan Conventions, Critical nature of gridlines, Using blocks
   
   ii. Assignment B: Minor Case Study Floor Plans (100 points)
       
       i.  Using Structural Grid as a block/ex-reference, develop coordinated floor plans for each level (Ground Floor, First Floor, Second Floor)
       
       ii. Pay careful attention to following elements:
           
           i.  Doors and windows (use dynamic blocks from template)
           
           ii. Stairs
           
           iii. Plumbing Fixtures
           
           iv. Dashed lines for “Plan Above” elements
           
       iii. Add text (a-anno-note), arrows, and drawing labels as per HABS drawings.
           
       iv. Format Floor Plans onto 3 separate title blocks (using A101 First Floor Plan, A102 Second Floor Plan layouts and add new layout called A100 Ground Floor Plan) Scale to be determined. Change labels in title block, adding your name, project title, and date.
           
Assignment C: Minor Case Study: Structural Skeleton

1. AutoCAD extrusions/3d forms/blocks
2. Tracking vertical and horizontal dimensions and coordinates
3. Assignment C: Minor Case Study Structural Skeleton (100 points)
   1. Using Structural Grid as a block/ex-reference, develop 3 dimensional model (in AutoCAD) of concrete piers, terraces, and wood floor and roof joists.
   2. Extra Credit (20% bonus for proper modeling): Model Stairs
   3. Add annotations describing the structural elements.
   4. Format Structural Skeleton isometric view onto AutoCAD title block (create new layout called Structural Iso) Scale to be determined. Change labels in title block, adding your name, project title, and date.
   5. Generate pdf file and jpeg file. (150 dpi). Upload jpeg file and pdf to Openlab project site.

Assignment D: Minor Case Study: Sections

1. Review Section Drawing Conventions, Continuity of Poche
2. Grid Lines for Vertical Dimensions (Key Levels)
3. Assignment D: Minor Case Study Sections (100 points)
   1. Develop Site “Short” Section
   2. Layout Levels
   3. Orthoganol Projection: Floor Plans as Block/Ex-Reference. Project guidelines up from Floor Plans
   4. Section must coordinate with all floor plans.
   5. Add annotations describing the building elements.
   6. Format Section view onto AutoCAD title block (create new layout called Section) Scale to be determined. Change labels in title block, adding your name, project title, and date.
7  Minor Case Study Drawing Development  
   2017-02-23
   i.  Continue Development on Assignments A-D. Bring 11x17 check set for redmarks.

8  Assignment E: Minor Case Study Presentation  
   2017-02-27
   i.  Pin-Up Review
   ii. Assignment E: Minor Case Study Presentation Set (100 points)
      i.  All Drawings must be properly formatted onto 30x42 title blocks.
      ii. All drawings must be at correct scale.

9  Assignment F: Major Case Study: Research  
   2017-03-02
   i.  Assignment F: Research the following Selected Case Study (100 points)
      i.  Location (provide clean google earth image with building + nearby context)
      ii. Architect, Date of Construction/Completion
      iii. Climate Characteristics of Site
      iv.  Solar Analysis
      v.  Features: Describe in your own words the quality of building, the primary space, the circulation sequence from the entrance, the materials and structure of the building, the daylighting strategy.
10 \textbf{Assignment G: Major Case Study: Grid} \hspace{1cm} 2017-03-06

i. Develop Structural Grid, Use Raster Image as necessary, scaled up to full size

ii. Assignment G: Major Case Study Grid (100 points)
   
i. Using Information from assignment F to lay out structural grid.
   
ii. Label Grid with letters across top (left to right) and numbers (bottom to top) along the side.
   
iii. Provide some indication of adjacent buildings/ landscape for context
   
iv. Format Structural Grid onto AutoCAD title block. Scale to be determined. Change labels in title block, adding your name, project title, and date.


11 \textbf{Structure: Concrete} \hspace{1cm} 2017-03-09

i. Overview of Material Properties

ii. Concrete Structural Systems

iii. SKETCHBOOK (50 points) : Notes + Sketches on Concrete Construction
i. Floor Plan Conventions

ii. Critical nature of gridlines

iii. Using blocks

iv. Assignment H: Major Case Study Floor Plans (100 points)
   i. Using Structural Grid as a block/ex-reference, develop coordinated floor plans for each level (Ground Floor, First Floor)
   ii. Pay careful attention to following elements:
      i. Doors and windows (use dynamic blocks from template)
      ii. Stairs
      iii. Bookcases
      iv. Dashed lines for “Plan Above” elements
   iii. Add text (a-anno-note), arrows, and drawing labels
   iv. Format Floor Plans onto title block(s) (using A101 First Floor Plan, add new layout called A100 Ground Floor Plan) Scale to be determined. Change labels in title block, adding your name, project title, and date...

i. Overview of Material Properties

ii. Steel Structural Systems

iii. Connections

iv. SKETCHBOOK (50 points) : Notes + Sketches on Steel Construction
14 Structure/Envelope: Roofs + Spans 2017-03-20

i. Low Slope Roofs

ii. Pitched Roofs

iii. Spanning Elements

iv. SKETCHBOOK (50 points): Notes + Sketches on Roofs + Spans

15 Mid-Term Exam + Drawing Progress Review 2017-03-23

i. Exam Content: Reading Material, Class Discussions, Systems Presentations, Drawing Fluency

ii. Drawing Progress Review: Submit 30”x42” drawing set of assignments A-H.

iii. Sketchbook review

16 Structure: Shallow Foundations 2017-03-27

i. Geotechnical Investigation

ii. Foundation Principles

iii. SKETCHBOOK (50 points): Notes + Sketches on Shallow Foundations
17 Assignment I: Major Case Study: Structural Skeleton  
2017-03-30

i. File Set up

ii. AutoCAD extrusions/3d forms, grid, spanning elements, blocks (bay system)

iii. Tracking vertical and horizontal dimensions and coordinates

iv. Assignment I: Major Case Study Structural Skeleton (100 points)
   i. Using Structural Grid as a block/ex-reference, develop 3 dimensional model (in AutoCAD) structural elements: bearing walls, point loads, spanning elements, shear walls.

   ii. Add annotations describing the structural elements.

   iii. Format Structural Skeleton isometric view onto AutoCAD title block (create new layout called Structural Iso) Scale to be determined. Change labels in title block, adding your name, project title, and date...


18 Assignment I: Major Case Study: Structural Skeleton  
2017-04-03

i. Continue development of Assignment I

19 Structure/Envelop: Masonry + Exterior Walls  
2017-04-06

i. Overview of Material Properties

ii. Masonry Exterior Walls

iii. Bonding, Lintels, Arches

iv. Primary + Secondary Functions

v. Strategies

vi. Joints

vii. Exterior Wall Types

viii. SKETCHBOOK (50 points) : Notes + Sketches on Masonry + Exterior Walls
Assignment J: Typical Bay

1. Plan, Section, Elevation, Section Isometric

2. Assignment J: Major Case Study Typical Bay at Exterior Wall (100 points)
   i. Extract one structural bay from Structural Iso model.
   ii. Develop the exterior wall system from foundation to roof. Exterior openings to reflect proportion and placement from case study. Indicate support for exterior wall elements in relation to structure.
   iii. Develop the following coordinated drawings for the typical bay: plan, elevation, section and 3D bay isometric.
   iv. Annotate all elements of exterior wall system in all views where they are articulated.
   v. Format typical bay views onto AutoCAD title block (create new layout called Typical Bay) Scale to be determined. Change labels in title block, adding your name, project title, and date...

21 Assignment J: Typical Bay

i. Continue development of Assignment J

22 Assignment J: Typical Bay

i. Continue development of Assignment J
Building Code: Egress + Stairs  
2017-05-01

i. Life Safety and Egress

ii. Stair Design

iii. Develop plans and sections of monumental stair.

iv. SKETCHBOOK (50 points) : Notes + Sketches on Egress+Stairs

Assignment K: Stairs  
2017-05-04

i. Develop plans and sections of monumental stair.

ii. Assignment K: Major Case Study Monumental Stairs (100 points)
   i. Using floor to floor dimension, calculate the # of risers and riser heights for Monumental Stair. Calculate tread dimension and total length required for stair run.

   ii. Develop 3D model of stair.

   iii. Develop Plan and Section of Stair (Include Elevation Level tags in Section)

   iv. Annotation Stair elements, including stair calculations.

   v. Format stair views onto AutoCAD title block (create new layout called Stair) Scale to be determined, Change labels in title block, adding your name, project title, and date...


Assignment K: Stairs  
2017-05-08

i. Continue development of Assignment K
i. Develop 2 building sections (short axis, long axis)

ii. Assignment L: Major Case Study Building Sections (100 points)
   i. Using floor to floor dimension, calculate the # of risers and riser heights for Monumental Stair. Calculate tread dimension and total length required for stair run.
   ii. Develop 3D model of stair.
   iii. Develop Plan and Section of Stair (Include Elevation Level tags in Section)
   iv. Annotation Stair elements, including stair calculations.
   v. Format stair views onto AutoCAD title block (create new layout called Stair) Scale to be determined. Change labels in title block, adding your name, project title, and date…

27 Assignment L: Building Section 2017-05-15

i. Continue development of Assignment L

28 Assignment L: Building Section 2017-05-18

i. Continue development of Assignment L
Assignment M: Red-mark Review  2017-05-22

i. Assignment M: Red-mark Review (100 points)

   i. Pin Up 30”x 42” Drawing Assignments A-L
   
   ii. Red-mark drawings for errors and corrections, including drawing titles, annotation organization/formatting, spelling errors, line-weight refinement....
   
   iii. Red-mark to correct lack of coordination of drawings
   
   iv. All red-marked drawings to be submitted for Assignment M points.

Assignment N: Final Presentation and Reflection  2017-05-25

i. Dress Code: Business Casual

ii. Assignment N: Final Presentation and Reflection (100 points)

   i. Submit hard copy set of corrected 30”x 42” Drawing Assignments A-L
   
   ii. Submit 1 pdf file for Minor Case drawing set and 1 pdf file for Major Case Study drawing set. PDF files to be named following course naming convention (see above.)
   
   iii. Submit hard copy of Assignment M red-marked drawing set.
   
   iv. Write 200 word reflection on OpenLab course site summarizing the relationship between the discussions and readings on technical issues and the drawing assignments.
RUBRICS:

All Rubric Scores are based on the following scale: 0-1-2-3-4

0: no submission

1: Submission demonstrates a lack of understanding of rubric concept/skill.

2: Submission content is approaching expected level of achievement of rubric concept/skill. See below for more detail on expected level of achievement.

3. Submission content is at expected level of achievement. Examples of expected level of achievement:
   - Drawings are correctly scaled and formatted onto title block
   - Drawings show general understanding of line weights with some exceptions, showing the application of appropriate layers and use of correct CTB file when printing hard copies, pdfs, or jpegs
   - Drawing titles and annotations are included, identifying some of the basic elements of construction
   - Drawings are generally dimensionally and proportionally accurate but with some errors.
   - Drawings and student discussions exhibit general understanding of architectural and structural elements and configuration of case study but includes some errors.
   - Student work and oral presentations demonstrate general understanding of architectural drawings and the significance of coordination of drawing sets.

4. Submission content exceeds expected level of achievement. Examples of exceeding expected level of achievement:
   - Line weights are consistently applied and enhance legibility of drawings at multiple scales and outputs.
   - Layers are correctly and consistently applied and show rigorous control of digital information in AutoCAD files.
   - Annotations are extensive and exhibit deep understanding of technical elements of drawings.
   - 3D drawings are comprehensive, detailed, and coordinated with site and context.
• **Coordination** of drawings is consistent without errors and demonstrates rigorous examination and understanding of architectural and structural elements.

**Rubric Topics:**

a. Oral Discussion and Presentation  
b. Note taking / sketchbook development  
c. Lineweights and Layers  
d. Format  
e. Scale  
f. Printing/CTB file  
g. Titles/Annotations  
h. Dimensional Accuracy  
i. Proportional Accuracy  
j. Architectural / Structural Elements  
k. Structural Concepts / Development  
l. Foundation and Geotechnical Concepts  
m. Exterior Wall Concepts / Detailing  
n. Stair Design  
o. Drawing Conventions  
p. Drawing Coordination  
q. Technical Resolution of Stairs  
r. AutoCAD drafting techniques and methods