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 techniques.

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:


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 periodic site visits focused on particular materials and methods of construction and studio lab time to acquire hand drafting and digital drafting skills while developing a series of case drawing and modeling investigations of the materials and assemblies discussed in the lectures. Students are required to annotate required readings and develop a notebook/sketchbook that documents architectural and technical content from readings.

GRADE WEIGHTING

70% Modules 1-4
25% Sketchbook
5% Class Participation

EXTRA CREDIT:

Module 5: 10%
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 site visits through reading annotations and notebook/sketchbook. (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: Exterior Walls + Roof
   4.1. Allen and Iano, Designing Exterior Wall Systems Chapter 19, pp. 783-807
   4.2. Ching, Building Construction Illustrated, Chapter 6, pp. 6.02-6.30
   4.3. Ching, Building Construction Illustrated, Chapter 5, pp. 5.02-5.03, Chapter 7, pp. 7.22-7.25, pp. 7.39-7.50

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. Circulation: Egress + Stairs
   6.1. Allen and Iano, Making Buildings Chapter 1, pp. 3-27
   6.3. Ching, Building Construction Illustrated, Chapter 9, pp. 9.02-9.17
COURSE GRADING AND RUBRICS:

DRAWING MODULES: All drawing assignments will be graded on a 4 point scale for each rubric category. The final score will be the average of the sum of all points awarded divided by the number of categories applied to that module.

POINT DESCRIPTIONS:

0 = No Submission

1 = Submitted Work shows minimal understanding of architectural content and drawing technique.

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.
- 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 hand drawings and digital information in AutoCAD files.
- Annotations are extensive and exhibit deep understanding of technical elements of drawings.
• **Coordination** of drawings is consistent without errors and demonstrates rigorous examination and understanding of architectural and structural elements.

**DRAWING RUBRIC CATEGORIES (NOT ALL CATEGORIES APPLY TO ALL MODULES):**

1. Lineweight
2. Layout Lines
3. Grid
4. Scale
5. Dimensional Accuracy
6. Proportional Accuracy
7. Drawing Conventions (doors, stairs, notations, grid system…)
8. Lettering/Titles/Annotations
9. Drawing Coordination
10. Distinguishing Structure, Partitions, Transparency
11. Layers
12. CTB/Printing Method
13. Neatness/Organization
14. Correct Filename

Module 1: Rubrics 1-10,  Module 2: Rubrics 1-13,
Module 3: Rubrics 1-10,  Module 4: Rubrics 1-13
NOTEBOOK ASSIGNMENTS: **Notes and Sketches** will be graded on a 4 point scale for each rubric category. The final score will be the average of the sum of all point awarded divided by the number of categories applied to that module.

**POINT DESCRIPTIONS:**

0 = No Submission

1 = Submitted Notes and Sketches show minimal examination of the reading material.

2 = Submitted Notes and Sketches are approaching course level in their demonstration of understanding of architectural and technical content in the readings but notes and sketches are poorly organized and lacking rigorous documentation.

3 = Submitted Notes and Sketches achieve course level in their demonstration of understanding of architectural and technical content in the readings. Notes and sketches are well organized.

4 = Submitted Notes and Sketches exceed course level in their demonstration of understanding of architectural and technical content in the readings. Notes and sketches are well organized and exhibit a rigorous level of documentation. Major and minor topics are indicated clearly. Sketches show engagement to the technical material and are clearly annotated.

**NOTEBOOK RUBRIC CATEGORIES:**

1. Neat Handwriting

2. Annotation Technique of Text (systematic, clear method)

3. Care and Clarity of Sketches

4. Note Organization

5. Coverage of Reading Material

6. Accuracy of Technical Concepts

7. Organization of Submitted Files

8. Correct Filename for Digital Submissions
SUBMISSIONS:

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

DRAWING SUBMISSIONS:

ARCH1230_2017fa_Montgomery_lastname_firstname_module#_submission date_2017mmdd

SKETCHES AND NOTE SUBMISSIONS:

ARCH1230_2017fa_Montgomery_lastname_firstname_reading #_reading assignment title_submission date_2017mmdd

ALL MODULE DRAWING ASSIGNMENTS MUST BE SUBMITTED AS FOLLOWS:

1. Hand Drawings Neatly Trimmed, submitted in class on due date.

2. Jpeg Scans of all Hand Drawings must be uploaded to student e-portfolio site on a new PAGE setup with the title ARCH 1230. Each image must include a caption describing the drawing. Post a hyperlink to scanned drawings on the Openlab Course Site.

3. AutoCAD drawings printed to Required Scale submitted in class on due date.

4. DWG files to be submitted on due date via email or shared cloud site: jmontgomery@citytech.cuny.edu

5. Jpegs of all AutoCAD drawings must be uploaded to student e-portfolio site on a new PAGE setup with the title ARCH 1230. Each image must include a caption describing the drawing. Post a hyperlink to scanned drawings on the Openlab Course Site.

6. Final Submission: Format All Modules as follows:
   1. Compile each module into 1 pdf file with multiple pages
   2. Reduce file size using Adobe Acrobat Pro or other software
   3. Name pdf file using required filename above
ALL SKETCHES AND NOTE ASSIGNMENTS MUST BE SUBMITTED AS Flip:

1. Hard Copy or Electronic Copy of All Pages of Reading Assignment with Annotations

2. Hard Copy of All Pages of Notebook / Sketchbook Neatly Bound/Stapled and Labeled

3. Jpeg Scans of KEY Pages (3 min for each reading assignment) of Notebook/ Sketchbook must be uploaded to student e-portfolio site on a new PAGE setup with the title ARCH 1230. Each image must include a caption describing the drawing. Post a hyperlink to scanned drawings on the Openlab Course Site.

FILE SIZES: All submitted files must be less then 10mb.

All students are responsible for managing file sizes. Acrobat Pro offers a Reduce File Size function. All scans should be at a maximum of 150dpi.
CLASS MEETING DETAILS AND ASSIGNMENTS

1 Course Introduction 2017-08-29

i. Pinterest Gallery Tour

ii. Discussion of Building Technology + Drawing to Understand Buildings

2 Module 1: Floor Plan Sketch Analysis 2017-08-31

i. Analysis 1: Library in Context
   1. Trace Context Plan
   2. Hatch Library (light)
   3. Draw Axial Lines (Long and Short Axis)
   4. Identity Entrance to Library

ii. Analysis 2: Figure Ground
   1. Trace Context Plan
   2. Hatch Built Space

iii. Analysis 3: Library Structure
    1. Trace Floor Plans
    2. Hatch Structural Elements

iv. Analysis 4: Library Circulation
    1. Trace Floor Plans
    2. Highlight Outline of Entrance, Lobby, Stair, Entrance to Main Reading Room

v. Analysis 5: Library Function
    1. Trace Floor Plans
    2. Hatch Book Cases
3 Site Walk Structural Typologies: Bearing Wall + Point Load
Structural Elements: Columns/Piers/Spanning Elements

i. Structural Elements Site Walk Brooklyn:
   a. Meet at Empire Stores 53-83 Water St, Brooklyn, NY 11201
      (Masonry Bearing Wall + Heavy Timber Posts)
   b. Brooklyn Bridge (Masonry Pier + Tension Steel Cables)
   c. Buildings in Brooklyn Bridge Park (Concrete Frames, Concrete Walls)
   d. Cranberry Street (Masonry Bearing Walls + Timber Joists)

4 Module 1: Plan Underlay: Grid + Schema

i. Plan Underlay
   1. Determine Scale and Sheet Size (1/8"=1'-0" recommended)
   2. Draw Centerlines of Primary Form
   3. Measure Carefully Grid Lines in Both Directions
   4. Labels Grids Following Convention (Circles 1" diameter, text 1/4"
      guidelines, letters left to right, numbers top to bottom)
   5. Measuring Off Gridlines, Draw Primary Geometry (Outside Face of
      Walls/Structure) Stay Schematic, Not too much detail.
   6. In lower right of drawing (2" away from sheet edges)
      a. Use 1/4" high guidelines for Drawing Title (i.e. Biliotheque S.
         Genevieve Plan Underlay)
      b. Use 1/8" high guidelines for ARCH 1230_Montgomery_date +
         Last name + first name
      c. graphic scale showing 1’, 4’, 8’, 16’, 32’ marks.
Module 1: Plan Overlays: Structure + Partition/Millwork

i. Structure Overlay
   1. Overlay New Drawing Sheet on Plan Underlay
   2. Carefully Trace Structural Grid Lines + Grid identification Tags
   3. Draw outline of each structural pier, column, and/or wall (only structural elements)
   4. Title following standards for Grid/Schema

ii. Partition/Millwork Overlay
   1. Overlay New Drawing Sheet on Structural Overlay
   2. Carefully Trace Structural Grid Lines + Grid identification Tags
   3. Draw outline of each non-structural partition and millwork representing book cases.
   4. Title following standards for Grid/Schema

Module 1: Plan Overlays: Transparency + Stairs

i. Transparency Overlay
   1. Overlay New Drawing Sheet on Structural Overlay
   2. Carefully Trace Structural Grid Lines + Grid identification Tags
   3. Draw outline of each window/door/cased opening in plan
   4. Title following standards for Grid/Schema

ii. Stairs Overlay
   1. Overlay New Drawing Sheet on Structural Overlay
   2. Carefully Trace Structural Grid Lines + Grid identification Tags
   3. Draw riser lines for all stairs on each level. Follow conventions for stair cutline and “up” arrow at each stair.
   4. Title following standards for Grid/Schema
Module 1: Final Floor Plans

i. Develop Final Floor Plans
   1. Overlay New Drawing Sheet on Underlay + Overlays
   2. Carefully Trace Structural Grid Lines + Grid identification Tags
   3. Using Careful Lineweights, draw each element from Overlays into final plan drawing
      a. No hatching permitted, lineweights should clearly indicate element drawn.
   4. Title following standards for Grid/Schema

Module 1 Presentation

i. Pin-Up Review
   a. All Drawings from Module 1 required
   b. First Group of Students Pinned Up by time of Class Start
   c. Business Causal Dress Required

ii. Module 1 Submission: 9/28/2017
Module 2: AutoCAD Floor Plans  2017-09-28

i. Commands
   i. line
   ii. polyline
   iii. x-line
   iv. circle
   v. ortho
   vi. copy
   vii. offset
   viii. distance
   ix. object snaps
   x. properties

ii. Practice: Geometry Assignment

Module 2: AutoCAD File Set Up  2017-10-03

i. AutoCAD File Set Up:
   a. Layers
   b. Units
   c. CTB
   d. Model Space
      a. Coordinate System
   e. Paper Space
   f. Blocks
   g. File Management (USB/CLOUD/HardDrive: 3 minimum storage locations)
      a. Lost Files Not Acceptable
11 Site Walk Structure: Concrete + Steel

i. Concrete+Steel Site Walk Hudson Yards
   a. Meet at Entrance to 7 train at 34th and Hudson Blvd East
   b. Javits Center (Steel Space Frame)
   c. Hudson Yards (Concrete + Steel Frame Construction)

12 Module 2: Plan Grid + Schema

1. Draw Centerlines of Primary Form
2. Measure Carefully Grid Lines in Both Directions
3. Labels Grids Following Convention (Circles 1” diameter, text 1/4” guidelines, letters left to right, numbers top to bottom)
6. Format to scale in paper space
7. In lower right of drawing (2” away from sheet edges)
   a. Use 1/4” high guidelines for Drawing Title (i.e. Biliotheque S. Genevieve Plan Underlay)
   b. Use 1/8” high guidelines for ARCH 1230_Montgomery_date + Last name + first name
8. Print using CTB file

13 Structure: Concrete + Steel

i. In Class Presentations, Site Walk Sketches and Photos
14 Module 2: Plan Development: Structure + Partition/Millwork 2017-10-17

i. Structure
   1. Using Blocks and Layers, draw outline of each unique structural pier, column, and/or wall (only structural elements)
   2. Place the blocks in the correct position on the structural grid.

ii. Partition/Millwork Overlay
   1. Using Blocks and Layers, draw outline of each unique non-structural partition and millwork representing book cases.
   2. Place the blocks in the correct position on the structural grid.

15 Module 2: Plans Transparency + Stairs 2017-10-19

i. Transparency
   1. Using Blocks and Layers, draw outline of each unique window, door, cased opening.
   2. Place the blocks in the correct position on the structural grid.

ii. Stairs
   1. Using correct layers, draw riser lines for all stairs on each level. Follow conventions for stair cutline and “up” arrow at each stair.

16 Mid-Semester Review Modules 1 & 2 2017-10-24

i. Pin-Up Review
   a. All Drawings from Module 1 & 2 required
   b. First Group of Students Pinned Up by time of Class Start
   c. Business Causal Dress Required

ii. Module 2 Submission: 10/26/2017
Module 3: Section Drawings + Analysis

i. Section Analysis I Palazzo Farnese

1. Study Plan and Section to discover section cut line and view
2. Align Plan and Section on drawing board with Section above plan. Overlay with Drawing Sheet.
3. Draw Horizontal Level Lines for each floor level. Use drawing conventions for elevation tag and annotation (1/4” circles with cross hairs and diagonal hatch, 1/8” guidelines for level name (above) and height above datum (below) xx’-xx”)
4. Draw Structural Grid Lines thru Plan and Section. Label using conventions used in Module 1.
5. Trace a-sect-mcut line on section. Poche to be continuous.
6. Trace trusses on section.
7. Trace structural walls, columns, piers on plan.
8. In lower right of drawing (2” away from sheet edges)
   a. Use 1/4” high guidelines for Drawing Title
   b. Use 1/8” high guidelines for ARCH 1230_Montgomery_date + Last name + first name

ii. Section Analysis Labrouste Cantonal Asylum

1. Set up Section on Drawing Board and Overlay Drawing Sheet
2. Draw Horizontal Level Lines for each floor level. Use drawing conventions for elevation tag and annotation.
3. Draw Structural Grid Lines thru Section. Label using conventions used in Module 1.
4. Trace a-sect-mcut line on section. Poche to be continuous.
5. Using 1/8” Guidelines, Label all Windows and Skylights
6. In lower right of drawing (2” away from sheet edges)
   a. Use 1/4” high guidelines for Drawing Title
   b. Use 1/8” high guidelines for ARCH 1230_Montgomery_date +
18 Site Walk Structure/Envelope: Exterior Walls + Roof  

i. Structure/Envelope Site Walk Brooklyn
   a. Meet at Lobby Voorhees Hall
   b. 203 Jay Street
   c. New City Tech Building (Tillary and Jay)
   d. NYU Polytechnic Facade, Jay Street @ Metrotech
   e. Federal Courthouse Johnson Street @ Cadman Plaza

19 Module 3: Section Grid + Levels + Schema  

i. Section Underlays (2 Sections Required, Short and Long Section)
   1. For each section, use same scale and sheet size from Module 1
   2. Align Floor Plans from Module 1 as base for Section Projection.
      Establish Section Cut Line and View
   3. Draw Centerlines of Primary Form for Section based on Plan Centerline
   4. Draw the Floor Levels + Top of Cornice + Roof Ridge Line. Label following Conventions from Section Analysis
   5. Measure Carefully Grid Lines in Both Directions, Using Plan as Guide
   6. Labels Grids Following Convention (Circles 1” diameter, text 1/4” guidelines, letters left to right, numbers top to bottom)
   8. In lower right of drawing (2” away from sheet edges)
      a. Use 1/4” high guidelines for Drawing Title (i.e. Biliotheque S. Genevieve Section Underlay)
      b. Use 1/8” high guidelines for ARCH 1230_Montgomery_date + Last name + first name
      c. graphic scale showing 1’, 4’, 8’, 16’, 32’ marks.
Module 3: Section Structure+Partition/Millwork  2017-11-09

i. Structure Overlay
   1. Overlay New Drawing Sheet on Section Underlay
   2. Carefully Level + Trace Structural Grid Lines + Identification Tags
   3. Draw each structural pier, column, wall, truss (only structural elements). Distinguish line weights for elements cut in section or in distance beyond section cut.
   4. Title following standards for Grid/Schema

ii. Partition/Millwork Overlay
   1. Overlay New Drawing Sheet on Structural Overlay
   2. Carefully Level + Trace Structural Grid Lines + Identification Tags
   3. Draw each non-structural partition and millwork representing book cases. Distinguish line weights for elements cut in section or in distance beyond section cut.
   4. Title following standards for Grid/Schema
Module 3: Section Stairs + Transparency

i. Transparency Overlay
   1. Overlay New Drawing Sheet on Structural Overlay
   2. Carefully Trace Level + Structural Grid Lines + Identification Tags
   3. Draw each window/door/cased opening in section
   4. Title following standards for Grid/Schema

ii. Stairs Overlay
   1. Overlay New Drawing Sheet on Structural Overlay
   2. Carefully Trace Level + Structural Grid Lines + Identification Tags
   3. Draw riser and tread lines for all stairs on each level. For risers and treads not visible in section use dashed lines.
   4. Draw hand rails and guard rails.
   5. Annotate Riser Count, Tread Count, Riser Size, Dimension Rise Between Landings, Total Rise
   6. Title following standards for Grid/Schema

Module 3: Presentation (Include Plan Drawings)

i. Pin-Up Review
   a. All Drawings from Module 1 and Module 3 required
   b. First Group of Students Pinned Up by time of Class Start
   c. Business Causal Dress Required

ii. Module 3 Submission: 11/28/2017
1. Align Floor Plans in model space for each Section View (use plan as block loaded into new dwg file. Rotate plan block as necessary)

2. Draw Section Cut Line through each Plan block

3. Establish Centerlines of Primary Form

4. Measure Carefully Grid Lines in Both Directions

5. Measure Carefully Level Lines

6. Labels Grids and Levels Following Conventions from Previous Modules


9. Format to scale in paper space

10. In lower right of drawing (2” away from sheet edges)
    a. Use 1/4” high guidelines for Drawing Title (i.e. Biliothque S. Genevieve Plan Underlay)
    b. Use 1/8” high guidelines for ARCH 1230_Montgomery_date + Last name + first name

11. Print using CTB file

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25 Site Walk Circulation: Stairs  

i. Circulation Egress Stairs Site Walk New York Public Library
   a. Meet at Front Steps New York Public Library
      476 5th Ave, New York, NY 10018
Module 4: Section Structure+Partition/Millwork

i. Structure Overlay

1. Draw each unique structural pier, column, wall, truss (only structural elements). Use blocks for repeating elements. Distinguish layers for elements cut in section (a-sect-mcut) or in distance beyond section cut (a-elev-0, a-elev-1, a-elev-2)

ii. Partition/Millwork Overlay

1. Draw each unique non-structural partition and millwork representing book cases. Use blocks for repeating elements. Distinguish layers for elements cut in section (a-sect-mcut) or in distance beyond section cut (a-elev-0, a-elev-1, a-elev-2)

Module 4: Section Stairs+Transparency

i. Transparency Overlay

1. Draw each unique window/door/cased opening in section

2. Title following standards for Grid/Schema

ii. Stairs Overlay

1. Draw riser and tread lines for all stairs on each level. For risers and treads not visible in section use dashed lines.

2. Draw hand rails and guard rails.

3. Annotate Riser Count, Tread Count, Riser Size, Dimension Rise Between Landings, Total Rise

4. Title following standards for Grid/Schema

Optional Module 5: Elevations

i. Develop Hand Drawn or AutoCAD Elevation(s) to same scale as Sections.

ii. Coordinate carefully with Sections and Plans, all elements to coordinate.

iii. Use Blocks for Repeating Elements.
Final Presentation (Include All Drawings Modules 1-4) 2017-12-14

i. **Final Review**
   a. All Drawings from Modules 1-4 required.
   b. First Group of Students Pinned Up by time of Class Start
   c. Business Casual Dress Required

FINAL SUBMISSION + Course Reflection 2017-12-19

i. Submit Hard Copies of Module 4+5

ii. Format All Modules as follows:
   1. Compile each module into 1 pdf file with multiple pages
   2. Reduce file size using Adobe Acrobat Pro or other software
   3. Name pdf file using required filename above
   4. Submit via email or share cloud site to:
      jmontgomery@citytech.cuny.edu

iii. Post a 100 word reflection on your learning during the semester to the Openlab Course Site. What aspects of the course worked best for you to learn and succeed? What aspects created the greatest challenge?
### AutoCAD Required Layers

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