

ARCH 1231 BUILDING TECHNOLOGY I

Axon and Structural Study Assignment

Description: Interior space is the resultant of a structural system that provides an armature for the envelope and finishes that surround and define the edges of space, including the floor below our feet, the ceiling over our head, and the walls rising around us.

Interior space requires span, the distance from one side of the space to the other. A structural element must be designed to safely achieve the spanning distance to support itself as well as any other loads that may act on it. The selection of a structural element is a process of assessing the pros and cons of all the possible options, which are rooted in the materials available, their properties, and the size and shape each material is fabricated into so it can serve as a functional structural element.

This assignment combines the development of a three dimensional representation of the selected floor(s) of the case study building and the application of a system(s) of structure to span across one or more spaces making a deck for a roof or a floor above the space. Each structural element will be sized using simple rules of thumb. The full system will be documented as an exploded axon and a section view of each element of the system. All elements are to be dimensioned, labeled, and annotated with details including the span dimension and the rule of thumb applied as well as the reference for the rule of thumb.

Assignment Context: This assignment is focused on applying the reading material to help build a deeper understanding and direct experience of the concepts discussed in the text.

Prerequisites: Understanding of three-dimensional projection, completion of the required readings.

Recommended Text:

[Ching, Francis. Architecture Graphics. John Wiley and Sons, 2009.](#)

Suggested Reference: See the City Tech [Openlab](#) for additional reference materials.

Plagiarism: Student work submitted must be original and developed individually. Tracing is not acceptable. All construction lines and notations during drawing construction are to remain visible at final submission. Drawings without construction lines (guidelines) will be downgrading significantly.

Assignment Specific Learning Outcomes / Assessment Method	
Learning Outcomes	Assessment Methods
Upon successful completion of this assignment the student shall be able to:	To evaluate the students' achievement of the learning objectives, the professor will do the following:
Develop coordinated, accurate, and consistent axonometric views demonstrating the proper use of axon drawing conventions.	Review student case study floor plans for accuracy, coordination, and consistency as well as the application of line weight and drawing conventions following assignment rubric.
Apply Information from the reading within the discipline.	Review student applications of disciplinary concepts in drawing assignments.
Understand and apply basic principles of structural characteristics of materials following rules of thumb.	Review student drawing assignments for accurate application of rules of thumb to sizing structural elements for a specific span.

Grading Rubric

	Approaching Benchmark	Benchmark	Approaching Capstone	Capstone
<p>Lineweight</p> <p>Distinguishing elements especially cut lines (poche), grid lines, transparent elements, finishes</p>	<p>Lines are consistent thickness and quality, in the correct alignment</p>	<p>In addition, two line weights are distinguishable, including cut line</p>	<p>In addition, three or more line weights are distinguishable, including some finish textures</p>	<p>In addition, transparency is clear, centerlines, grid lines, dimension lines are shown w/ correct line type and line weight.</p>
<p>Drawing Organization and Accuracy</p> <p>Setting out of grid and the relationship of elements to the grid is accurate</p>	<p>Structural Grid is established</p>	<p>In addition, structural grid is dimensioned accurately and labeled correctly</p>	<p>In addition, major elements (walls, columns) are accurately placed in relation to the structural grid</p>	<p>In addition, all axon elements are carefully located in relationship to centerlines and the structural grid</p>
<p>Construction / Guidelines</p> <p>Guidelines and constructions were utilized in the careful construction of each drawing</p>	<p>Guidelines are used for overall geometry of drawings</p>	<p>In addition, guidelines indicate orthographic projection for 3-d vignette construction.</p>	<p>In addition, guidelines indicate geometric center of spaces, perimeters of spaces, and grid locations of key elements</p>	<p>In addition, guidelines are accurate, working off of grid lines and centerlines to each major element and guiding alignments.</p>
<p>Ordering System</p> <p>The ordering system of the spaces is clearly understood.</p>	<p>General configuration of spaces and elements is depicted</p>	<p>In addition, relationships and alignments are accurate and guided by guidelines showing clear relationship</p>	<p>In addition, drawings articulate the ordering system through centerlines, geometric modules, gridlines, and guidelines</p>	<p>In addition, variations and subtleties in sizing and spacing of elements are recognized and accurately depicted.</p>
<p>Axon</p> <p>The key elements of the building are articulated and projected in three-dimensions</p>	<p>Key elements are shown in three dimensions.</p>	<p>In addition, 3-d projection is accurate and coordinated w/ plan</p>	<p>In addition, cut plane is clearly established through line weight</p>	<p>In addition, details are integrated into axon, including glazing, openings, and stairs.</p>
<p>Drawing Conventions</p> <p>Standard methods of drawing and documentation of key data and elements are utilized</p>	<p>Drawings are properly scaled and provided with a title including course #, student name, professor name, semester + year</p>	<p>In addition, elements follow projection conventions for axon drawings</p>	<p>In addition, grids and centerlines articulate geometry and relationship of parts</p>	<p>In addition, the drawings exhibit understanding of multiple layers of detailed information, including ceiling conditions, floor finishes, context and grade conditions</p>

STRUCTURAL STUDY ASSIGNMENT

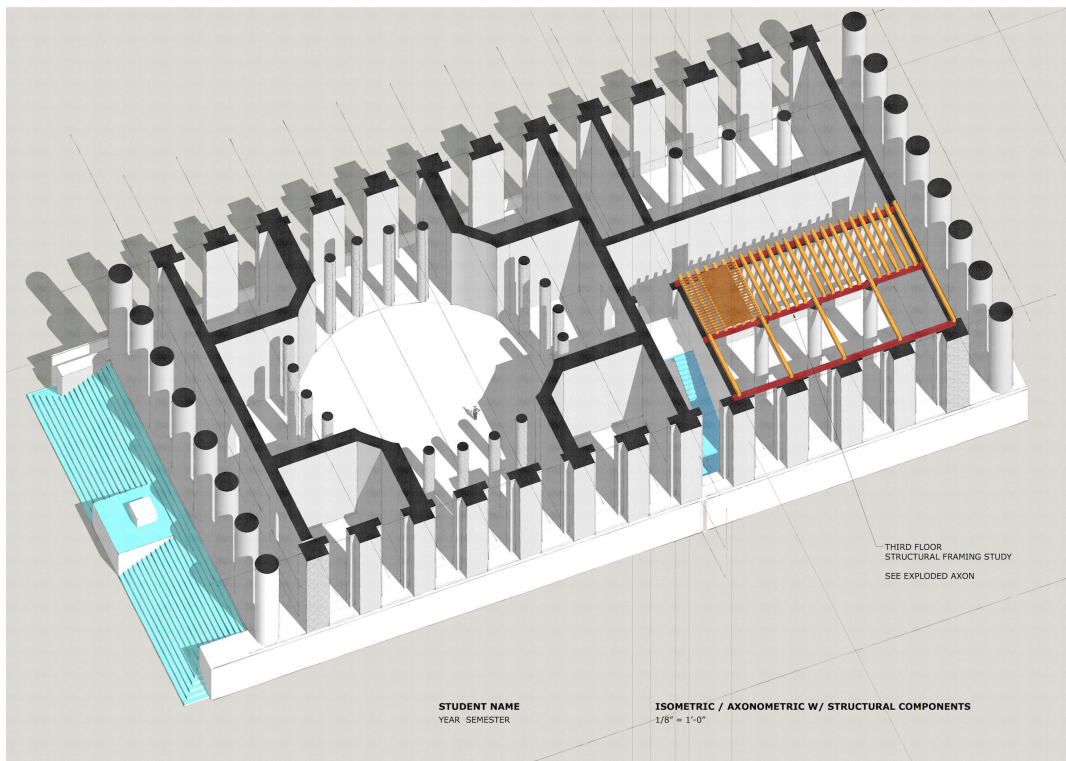
Assignment Schedule: See Syllabus

Deliverables:

- | | | |
|--------------------------------------|----------------------|---------------------|
| 1. Axon | Sheet Size: 22"x 34" | Scale: 3./32"=1'-0" |
| 2. Structural System Overlay on Axon | Sheet Size: 22"x 34" | Scale: 3/32=1'-0" |
| 3. Exploded Axon | Sheet Size: 22"x 34" | Scale: t.b.d |
| 4. Structural Components Sections | Sheet Size: 22"x 34" | Scale: t.b.d |

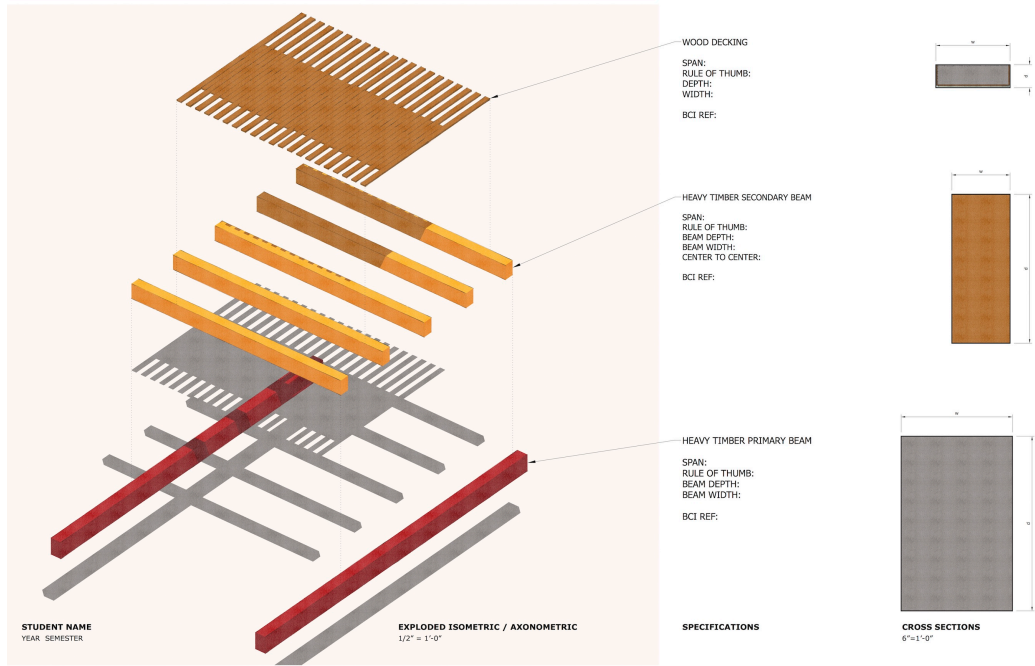
Extra Credit:

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|-----------------------------------|----------------------|-------------------|-----------|
| 5. Digital Model of Axon | Sheet Size: 22"x 34" | Scale: 1/8"=1'-0" | 15 points |
| 6. Digital Model of Exploded Axon | Sheet Size: 22"x 34" | Scale: t.b.d. | 15 points |



Mockup of Axon w/ Structural System

STRUCTURAL STUDY ASSIGNMENT



Mockup of Exploded Axon w/ Structural Element Sections+ Annotations