

ARCH 1231 BUILDING TECHNOLOGY I
1 lecture hour and 4 lab/studio hours, 3 credits

Course Description: An introduction to basic materials of construction and the fundamental principals of hand drafting and system analysis. The coursework includes surveying existing conditions, development of plans, elevations, and sections, and basic details as well as the study of material properties and applications.

Course context: This course is positioned between the Intro to Architecture course and the higher-level building technology courses. This course will prepare you for further exploration of building technology, technical documentation, and understanding of structure, materials, and building assemblies.

Prerequisites: ARCH 1101 Introduction to Architecture

Required Texts:

Allen, Edward. *Fundamentals of Building Construction: Materials and Methods*, John Wiley & Sons, 2014.
Ching, Francis. *Building Construction Illustrated 5th Ed.* John Wiley and Sons, 2014.

Recommended Text:

Ching, Francis. *Architecture-Form, Space, & Order.* John Wiley and Sons, 2007.

Suggested Reference: See the City Tech Openlab for additional reference materials.

Attendance Policy: Participation in class discussions and activities is critical to successfully completing the course and learning the material. Students should make every effort to attend each class and be there on time.

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 combines class discussions based on the readings, site investigations, and drawing labs. Students are required to maintain a combined notebook/sketchbook for all readings and site investigations. Students will learn to develop architectural drawings by hand as well as using digital tools.

Contact Info:

Professor:	Roy Leone, AIA CPHD
Email:	rleone@citytech.cuny.edu
Text messages:	646-408-6238 (always include your name in message)
Office Phone:	718-243-9088 (Matter of Architecture PLLC)
Office Hours:	Thursdays 10:15-11:00AM; please make an appointment

Grading:	10%	Module 1
	20%	Module 2
	30%	Module 3
	35%	Module 4
	5%	Participation + Class Protocols

MODULE 1: 100 pts

Drawing Assignments:

Plan+2 Sections+ Axon 75

Reading Notes: 16

Sketchbook Assignments: 4

Assessment Exercises: 5

MODULE 2: 200 pts

Drawing Assignment:

2 Plans 118

Reading Notes: 64

Sketchbook Assignments: 18

MODULE 3: 300 pts

Drawing Assignments:

2 Axons + Sections 232

Reading Notes: 68

MODULE 4: 350 pts

Drawing Assignments:

Plan/Section/Elev Dtls + Axon 267

Reading Notes: 72

Sketchbook Assignments: 6

Assessment Exercises: 5

CLASS PARTICIPATION 50 pts

Discussions 50 pts

Grading Details: see course grade sheet for specific points for each required elements

Class Submission Requirements/Protocols:

All files must be submitted via Dropbox or OneDrive with the following folder directory and file naming conventions. All images must be formatted using Adobe Illustrator per provided templates. All work must be scanned or photographed following professional standards and edited as required for clarity and resolution

Course Folder: ARCH 1231_2019_01_Lastname_Firstname

Sub Folders: 2019_01_Module 1_Lastname
2019_01_Module 2_Lastname
2019_01_Module 3_Lastname
2019_01_Module 4_Lastname

Files: All submissions must be in PDF format (not jpeg). All files (drawings, reading notes, sketch assignments) must be named as follows:

Lastname_Firstname_ARCH1231_201901_ProfessorLastName_Module#_assignment title_YYYYMMDD.pdf

For example:

Skywalker_Luke_ARCH1231_201901_Leone_Module2_firstfloorplan_20190125.pdf

Organa_Lea_ARCH1231_201901_Leone_Module3_reading7_steelbeams_20190326.pdf

Reading Notes MUST be submitted as a single PDF multipage file for each reading topic in required list.

Any submission not conforming to the above standards will NOT be accepted and must be resubmitted.

General Education Learning Outcomes / Assessment Methods	
Learning Outcomes	Assessment Methods
Upon successful completion of this course the student shall be able to:	To evaluate the students' achievement of the learning objectives, the professor will do the following:
1. Develop Knowledge from the range of architectural disciplinary concepts presented in the course.	<ul style="list-style-type: none"> • Review student notebooks, observe student participation in class discussions, and review student applications of disciplinary concepts in drawing assignments.
2. Use the texts assigned in the course as well as background knowledge from within the discipline in order to Draw Inferences from the material.	<ul style="list-style-type: none"> • Use a pre and post written exam to assess students' development and achievement over the course of the semester.
3. Apply Information from the reading within the discipline.	<ul style="list-style-type: none"> • Review student applications of disciplinary concepts in drawing assignments.

National Architectural Accrediting Board (NAAB) Students Performance Criteria (SPC) / Assessment Methods	
Learning Outcomes	Assessment Methods
Upon successful completion of this course the student shall be able to:	To evaluate the students' achievement of the learning objectives, the professor will do the following:
4. Understand the fundamentals of formal ordering systems and the capacity to inform two- and three-dimensional design.	4. Review student drawing assignments with implementation of the organizing grid.
5. Understand some of the basic principles used in the appropriate selection of interior and exterior construction materials, finishes, products, components, and assemblies based on their inherent performance, including environmental impact and reuse.	5. Review student notebooks and drawing assignments with application of material properties, rules of thumb, and performance analysis.

Course Specific Learning Outcomes / Assessment Methods	
Learning Outcomes	Assessment Methods
Upon successful completion of this course the student shall be able to:	To evaluate the students' achievement of the learning objectives, the professor will do the following:
6. Layout plan drawings by hand and with digital tools.	6. Review student plan assignments for accuracy and application of line weights and drawing conventions.
7. Understand and apply basic principles of structural characteristics of materials following rules of thumb.	7. Review student drawing assignments for accurate application of rules of thumb to sizing structural elements for a specific span.

Weekly Course Outline:

MODULE I	MEASURED SPACE (PLAN, SECTIONS (2), AXON) + READING #1 + SKETCHBOOK ASSIGNMENT	
CLASS 1	<i>Activity/Assessment:</i>	Intro, Reading Texts, Reading Drawings
CLASS 2	SITE VISIT: <i>Sketchbook:</i>	Measured Space Site Survey Measured Space Site Survey
CLASS 3	<i>Drawing Assignment:</i> Discussion: <i>Drawing Lab:</i> <i>Reading Notes:</i> <i>Additional Discussion:</i>	Measured Space Arch Drawing / Orthographic Projection Measured Space Plan Guideline Underlay* Stairs + Egress (Reading #1) Post Summary to OpenLab Note Taking + Reading
CLASS 4	<i>Drawing Assignment:</i> Discussion: <i>Reading Notes:</i> <i>Drawing Lab:</i>	Measured Space Stairs + Egress (Reading #1) Egress, Configurations, Code, Design Submit Notebooks for Prof. review Measured Space Plans w/Stairs
CLASS 5	<i>Drawing Assignment:</i> <i>Drawing Lab:</i>	Measured Space Measured Space Section Setup*
CLASS 6	<i>Drawing Assignment:</i> <i>Drawing Lab:</i>	Measured Space Measured Space Axon Setup*
CLASS 7	<i>Assignment Review:</i> <i>Drawing Lab:</i> <i>Reading Notes:</i>	Measured Space Assignment Feedback Submission Prep Demonstration Building Elements (Reading #2) Post Summary to OpenLab
SUBMISSION	MODULE 1 DUE DATE: CLASS 9	Measured Space Drawing Assignment <u>Reading #1 Notes + Sketchbook Assignment</u>

MODULE 2**CASE STUDY PLANS (2 FLOOR PLANS) + READINGS #2,3,4,5 + SKETCHBOOK ASSIGNMENTS (3)**

CLASS 8	SITE VISIT: <i>Discussion:</i> <i>Sketchbook:</i>	Case Study Building Site Building Elements (Reading #2) The Building, Space, Circulation, Stairs, Transparency Site Investigation Assignment
CLASS 9	<i>Drawing Assignment:</i> <i>Drawing Lab:</i> <i>Reading Notes:</i> <i>Additional Discussion:</i>	Case Study Floor Plans Case Study Plan Grid/Centerlines Underlay* Structural Components (Reading #3) Post Summary to OpenLab Note Taking + Reading
CLASS 10	SITE VISIT: <i>Discussion:</i> <i>Sketchbook:</i>	Structure Walk Structural Components (Reading #3) Forces, Columns, Beams, Spans, Trusses, Frames, Walls, Plates, Arches, Vaults, Domes, Joints, Connections Structural Components Sketches
CLASS 11	<i>Drawing Assignment:</i> <i>Drawing Lab:</i> <i>Reading Notes:</i>	Case Study Floor Plans Case Study Plan Guidelines/Geometry Structural Typologies (Reading #4) Post Summary to OpenLab
CLASS 12	<i>Drawing Assignment:</i> <i>Discussion:</i> <i>Drawing Lab:</i> <i>Reading Notes:</i>	Case Study Floor Plans Structural Typologies (Reading #4) Structural Units, Spans, Patterns Lateral Stability, Relation b/w Structure + Space Case Study Plan Development Materials + Properties (Reading #5) Post Summary to OpenLab
CLASS 13	SITE VISIT: <i>Discussion:</i> <i>Sketchbook:</i>	Materials Walk Materials + Properties (Reading #5) Stone, Brick, CMU, Wood, Concrete, Steel Materials + Properties Sketches
CLASS 14	<i>Drawing Assignment:</i> <i>Drawing Lab:</i>	Case Study Floor Plans Case Study Plan Development
CLASS 15	<i>Assignment Review:</i>	Case Study Floor Plans Feedback
SUBMISSION	MODULE 2 DUE DATE: CLASS 17	Case Study Floor Plans Assignment Readings #2,3,4,5 Notes <u>Sketchbook Assignments (3)</u>

MODULE 3**CASE STUDY STRUCTURAL STUDY (AXON + EXPLODED AXON + SECTIONS) + READINGS #6,7**

CLASS 16	<i>Drawing Assignment:</i> <i>Drawing Lab:</i> <i>Reading Notes:</i>	Case Study Structural Study Axon Grid + Guidelines* Material Modules (Reading #6) Post Summary to OpenLab
CLASS 17	<i>Drawing Assignment:</i> Discussion: <i>Drawing Lab:</i> <i>Reading Notes:</i>	Case Study Structural Study Material Modules (Reading #6) Brick/CMU Bonding, Wood Components, Steel Shapes, Concrete Beams Axon Development Spans + Rules of Thumb (Reading #7) Post Summary to OpenLab
CLASS 18	<i>Drawing Assignment:</i> Discussion: <i>Drawing Lab:</i>	Case Study Structural Study Spans + Rules of Thumb (Reading #7) Masonry Arches, Lintels, Wood Beams + Joists Steel Beams + Joists, Reinforced Concrete Beams Structural Overlay on Axon
CLASS 19	<i>Drawing Assignment:</i> <i>Drawing Lab:</i>	Case Study Structural Study Structural Calcs + Sections
CLASS 20	<i>Drawing Assignment:</i> <i>Drawing Lab:</i>	Case Study Structural Study Structural Exploded Axon
CLASS 21	<i>Assignment Review:</i>	Case Study Struct Study Feedback
SUBMISSION	MODULE 3 DUE DATE: CLASS 23	Case Study Struct Study Assignment <u>Readings #6,7 Notes</u>

MODULE 4 **CASE STUDY ENVELOP STUDY (PLAN ELEV SECT DETLS + AXON) + READINGS #8,9 + SKETCHBOOK ASSIGN**

CLASS 22	<i>Drawing Assignment:</i> <i>Drawing Lab:</i> <i>Reading Notes:</i>	Masonry Exterior Wall Details + Analysis Plan/Section/Elevation Detail Underlay Assemblies + Performance (Reading #8) Post Summary to OpenLab
CLASS 23	SITE VISIT: <i>Discussion:</i> <i>Sketchbook:</i> <i>Reading Notes:</i>	Assemblies + Performance Walk Assemblies + Performance (Reading #8) Building Envelop, Exterior Walls, Moisture Protection, Flashing, Thermal Protection Designing Exterior Walls Assemblies + Performance Sketches Masonry Envelope Assemblies (Read #9) Post Summary to OpenLab
CLASS 24	<i>Drawing Assignment:</i> <i>Discussion:</i> <i>Drawing Lab:</i>	Masonry Exterior Wall Details + Analysis Masonry Envelop Assemblies (Reading #9) Masonry Cavity Walls, Brick Coursing, Stone Lintels, CMU Coursing + Bond Beam, Rigid Foam Insulation, Batt Insulation, Vapor Barrier, Interior Furring, Plaster on Lath, Drywall Plan/Section/Elevation Detail
CLASS 25	<i>Drawing Assignment:</i> <i>Drawing Lab:</i>	Masonry Exterior Wall Details + Analysis Plan/Section/Elevation Details
CLASS 26	<i>Drawing Assignment:</i> <i>Drawing Lab:</i>	Masonry Exterior Wall Details + Analysis "Peel Away" Axon
CLASS 27	<i>Drawing Assignment:</i> <i>Drawing Lab:</i>	Masonry Exterior Wall Details + Analysis "Peel Away" Axon
CLASS 28	<i>Drawing Assignment:</i> <i>Drawing Lab:</i>	Masonry Exterior Wall Details + Analysis R-value Calc
CLASS 29	<i>Assignment Review:</i>	Masonry Ext Wall Dtls + Analysis Feedback
CLASS 30	<i>Activity/Assessments:</i>	Activity, Reading Texts, Reading Drawings
SUBMISSION	MODULE 4: DUE DATE: CLASS 30* *or on alt date required by Professor	Masonry Exterior Wall Details + Analysis <u>Readings #8,9 Notes + Sketchbook Assign.</u>

Learning Activities:

Course format will include a combination of any of the following activities:

- **Site Visits / High Impact Learning Practices:**
Site trips will look to visit existing buildings and construction sites, tour newly constructed buildings and urban spaces or visit institutions, including but not limited to museums, churches, or other colleges with discussions led by either the instructor or on-site experts in the field or the subject.
- **Discussions:**
Discussions will be led by a qualified instructor and if warranted invited guest lecturers or experts in the field or subject.
- **Activities:**
Students will participate in activities that provide them with the opportunity to apply what is learned in a given subject.
- **Research Activities:**
Students will be given directed readings and be required to correlate their readings with the lab exercises. Supplemental research will be encouraged to promote a greater analytical and critical understanding.
- **Presentations:**
Students will participate in written, oral and graphic presentation of course subjects and issues identified through their reading, writing, and lab work.

Class Submittals List: Following is a list of submittals that will be due throughout the course of the semester. They are subject to change:

Drawing Assignments:

Measured Space Assignment:

Plan
Sections (2)
Axon

Case Study Floor Plans Assignment:

Floor Plans (2)

Case Study Axon + Structural Study

Structural Study Axon
Exploded Axon
Component Sections
Calcs

Masonry Exterior Wall Details + Analysis

Plan Detail
Elevation Detail
Wall Section
Peel Away Axon
R-Value Analysis Diagram

Note: Grades for Incomplete Assignment Submissions will be pro-rated per % of missing drawings

Sketchbook Assignments:

Measured Space Site Survey
Case Study Site Investigation
Structural Components Walk
Materials + Properties Walk
Assemblies + Performance Walk

Notebook Assignments:

Reading Notes and Sketches for Readings #1-9 covering **all sections and subtopics** of each reading.

READINGS:

#1 Stairs + Egress:	<i>Building Construction Illustrated</i>	Egress	A.10-A.11
		Stair Design	9.03
		Stair Requirements	9.04-9.05
		Configurations	9.06-9.07
#2 Building Elements:	<i>Building Construction Illustrated</i>	Building Elements	2.02-2.03
#3 Structural Components + Forces:	<i>Building Construction Illustrated</i>	Forces	2.11-2.12
		Columns	2.13
		Beams Spans Trusses	2.14-2.16
		Frames Walls Plates	2.17-2.18
		Arches Vaults Domes	2.25-2.26
		Joints Connections	2.30
#4 Structural Typologies:	<i>Building Construction Illustrated</i>	Structural Units	2.19
		Structural Spans	2.20
		Structural Patterns	2.21
		Lateral Stability	2.22-2.23
#5 Materials + Properties:	<i>Building Construction Illustrated</i>	Stone	12.10
		Brick/CMU	12.06-12.07
		Wood	12.11-12.12
		Steel	12.08
		Concrete + Reinforcement	12.04-12.05
#6 Material Modules:	<i>Building Construction Illustrated</i>	Brick/CMU Bonding	5.26-5.27
		Wood Components	12.13-12.14
		Steel Shapes	4.16, 5.37
		Reinforced Concrete	4.04, 5.04-5.05
		Precast Concrete Floor Systems	4.11-4.12
		<i>Fundamentals of Building Construction</i>	Brick Masonry
	#7 Material Spans + Rules of Thumb:	<i>Building Construction Illustrated</i>	Masonry Arches + Lintels
Wood Beams + Joists			4.26-4.27, 4.35
Wood Subfloor, Decking			4.32, 4.40
Wood Plank and Beam			4.38-4.39
Steel Beams			4.16-4.18
Steel Open-Web Joists			4.19-4.21
Metal Decking			4.22
Reinforced Concrete Beams			4.04

#8 Assemblies + Performance:

Building Construction Illustrated

Building Envelop	7.02
Walls: Moisture + Flashing	7.22, 7.28-7.29
Thermal Protection	7.39-7.47

Fundamentals of Building Construction

Designing Exterior Wall Systems	Chapter 19
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#9 Masonry Envelop Assemblies:

Building Construction Illustrated

CMU + Brick	5.23-5.25
Stone	5.33-5.34
Windows	8.22-8.23, 8.27

Fundamentals of Building Construction

Masonry Wall Construction	Chapter 10
Windows and Doors	Chapter 18

SUPPLIES:

- sketchbook
- architect's scale
- adjustable triangle
- lead holder (various leads weights, 4H, 2H, B, 2B)
- lead pointer
- pencils
- eraser
- trace paper
- erasing shield
- tape