

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: No more than 10% absences are permitted during the semester. For purposes of record, two late arrivals are considered as one absence. Exceeding this limit will expose the student to grade penalties at the discretion of the instructor due to lack of class participation and mastery of class material.

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.

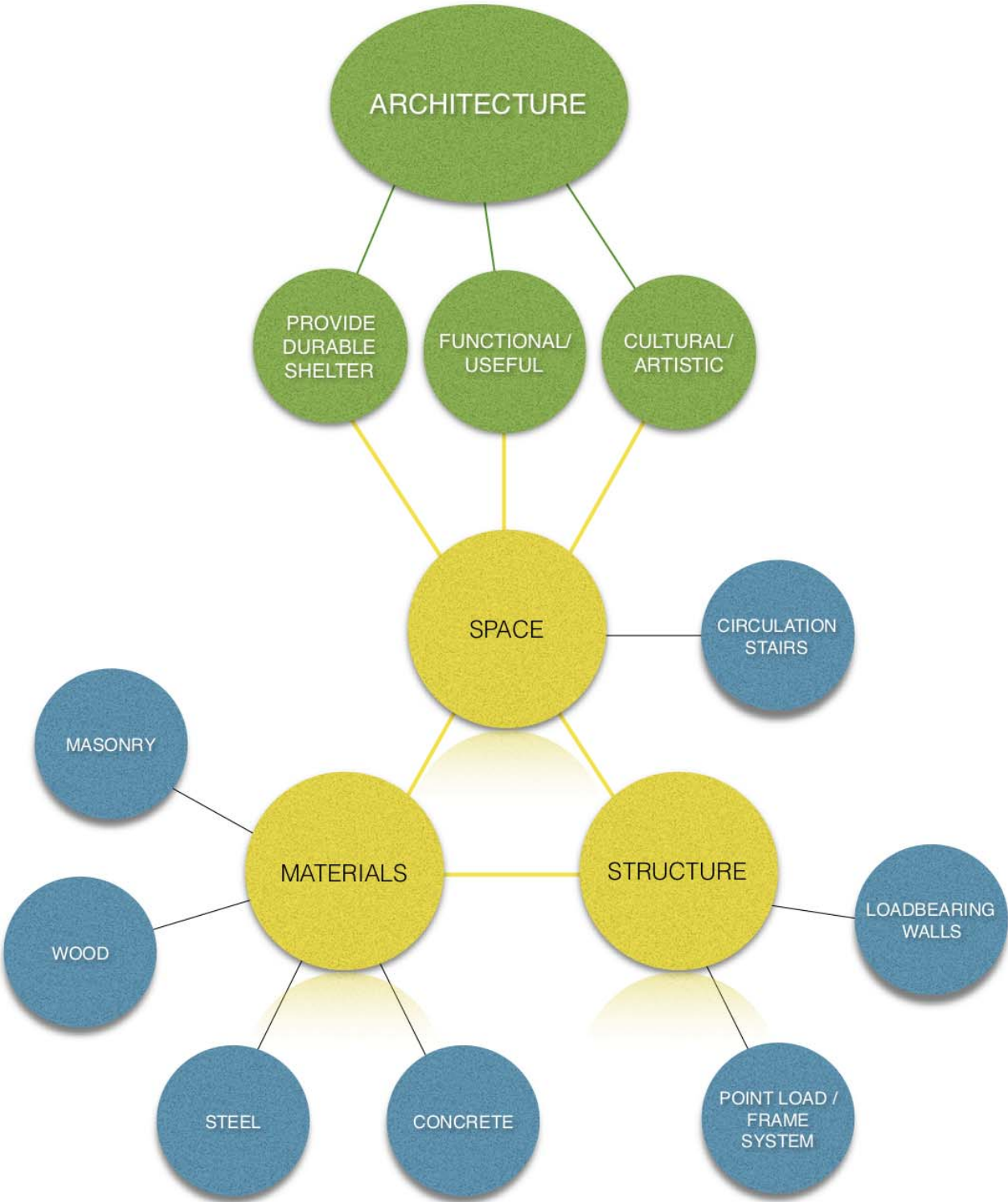
Course Structure: This course combines class discussions based on the readings, site investigations, and drawing labs. Students are required to maintain a combined notebook/sketchbook for all readings and site investigations. Students will learn to develop architectural drawings by hand as well as using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

Contact Info:

Professor:	Michael Loo, AIA
Email:	mloo@citytech.cuny.edu
Office Hours:	Tues 12:45pm-1:45pm, V-818, By Appointment Only

Grading:	20%	Module 1
	30%	Module 2
	42%	Module 3
	8%	Participation + Class Protocols

CONCEPT MAP FOR ARCH 1231 COURSE CONTENT



MODULE 1: 200 pts

Drawing Assignments:

Floor Plans **104**

Reading Notes: 64

Sketchbook Assignments: 32

MODULE 2: 300pts

Drawing Assignment:

2 Axons + Component Sections **172**

Reading Notes: 96

Sketchbook Assignments: 32

MODULE 3: 416pts

Drawing Assignments:

2 Building Sections/Elev **284**

Reading Notes: 116

Sketchbook Assignments: 32

CLASS PARTICIPATION 84 pts

Discussions 52

Assessment Exercises: 32

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

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_02_Lastname_Firstname

Sub Folders: 2019_02_Module 1_Lastname
2019_02_Module 2_Lastname
2019_02_Module 3_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_201902_ProfessorLastName_Module#_assignment title_YYYYMMDD.pdf

For example:

Skywalker_Luke_ARCH1231_201902_Loo_Module1_firstfloorplan_20190925.pdf

Organa_Lea_ARCH1231_201902_Loo_Module3_reading6_masonry wall const_20191126.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 CASE STUDY PLANS

8/27 Tues	CLASS 1	<i>Activity/Assessment:</i> <i>Review:</i> Homework:	Reading Texts, Reading Drawings Course Concept Map Post Concept Map Reflection on OpenLab
8/29 Thurs	CLASS 2	<i>Seminar:</i> <i>Reflection:</i> <i>Activity:</i> <i>Homework:</i>	Learning by Reading: Reading #1 Post Learning by Text Reflection Reading #1: Building Elements + Materials Post Reflection Reading #1 Reading #2: Egress + Stairs Concept Map
9/3 Tues	CLASS 3	<i>Seminar:</i> <i>Activity:</i> <i>Homework:</i>	Learning by Reading: Reading #2 Review Concept Map + Note Structure Post Reflection Reading #2 + Stair Sketches
9/5 Thur	NO CLASS		
9/10 Tues	CLASS 4	<i>Discussion/Activity:</i> <i>Reflection:</i> <i>Homework:</i>	Reading Drawings Post Reading Drawings Reflection Scan, organize, submit Reading Notes #1,2
9/12 Thurs	CLASS 5	SITE VISIT: <i>Activity:</i>	Case Study Site Sketchbook Analysis: Geometry, Grid
9/17 Tues	CLASS 6	<i>Drawing Lab:</i> <i>Activity:</i> <i>Homework:</i>	Case Study Floor Plans Geometry and Grid Complete Geometry and Grid
9/19 Thurs	CLASS 7	<i>Drawing Lab:</i> <i>Activity:</i> <i>Homework:</i>	Case Study Floor Plans Plan 1 Elaboration Continue Plan 1 Elaboration
9/24 Tues	CLASS 8	<i>Drawing Lab:</i> <i>Activity:</i> <i>Homework:</i>	Case Study Floor Plans Complete Plan 1, Overlay Plan 2 Plan 2 Elaboration
9/26 Thurs	CLASS 9	<i>Drawing Lab:</i> <i>Activity:</i> <i>Homework:</i>	Case Study Floor Plans Plan 2 Elaboration Complete Plan 2
10/1 Tues	NO CLASS		
10/3 Thurs	CLASS 10	<i>Drawing Review:</i> <i>Homework:</i>	Case Study Floor Plans Edit Plans, Scan, Organize Submit Class 12 Including Stair + Site Sketch Assignments

MODULE 2 CASE STUDY STRUCTURAL STUDY

10/8 Tues 10/10 Thurs	NO CLASS CLASS 11	<i>Seminar:</i> <i>Homework:</i>	Learning by Reading: Reading #3 Post Reflection Reading #3 Forces Elements Reading #4 Structural Units + Systems Concept Map
10/15 Tues	CLASS 12	SITE VISIT: <i>Pre-Activity:</i> <i>Homework:</i>	Structural Walk #1 Review Concept Map + Note Structure Post Reflection Reading #4, Struct. Walk #1
10/17 Thurs	CLASS 13	SITE VISIT: <i>Reflection:</i> <i>Homework:</i>	Structural Walk #2 Post Struct Walk #2 Reflection Scan, organize, submit Reading Notes #3,4
10/22 Tues	CLASS 14	<i>Drawing Lab:</i> <i>Activity:</i> <i>Homework:</i>	Case Study Structural Study System Axon Geometry and Grid Complete System Axon Geometry and Grid
10/24 Thurs	CLASS 15	<i>Drawing Lab:</i> <i>Activity:</i> <i>Homework:</i>	Case Study Structural Study System Calcs + Design, Element Sections Complete Element Sections w/ Dimensions
10/29 Tues	CLASS 16	<i>Drawing Lab:</i> <i>Activity:</i> <i>Homework:</i>	Case Study Structural Study Exploded Axon Set Up Continue System Axon + Exploded Axon
10/31 Thurs	CLASS 17	<i>Drawing Lab:</i> <i>Activity:</i> <i>Homework:</i>	Case Study Structural Study Continue System Axon + Exploded Axon Complete System Axon + Exploded Axon
11/5 Tues	CLASS 18	<i>Drawing Review:</i> <i>Homework:</i>	Case Study Structural Study Edit Plans, Scan, Organize Submit Class 20

MODULE 3 CASE STUDY SECTION/ELEV STUDY

11/7 Thurs	CLASS 19	<i>Seminar: Homework:</i>	Learning by Reading: Reading #5 Post Reflection Reading #5 Brick Masonry Reading #6 Masonry Wall Construction Concept Map
11/12 Tues	CLASS 20	SITE VISIT: <i>Pre-Activity: Homework: Homework:</i>	Masonry Walk Review Concept Map + Note Structure Post Reflection Reading #6, Masonry Walk Case Study Exterior Site Sketches
11/14 Thurs	CLASS 21	<i>Discussion/Activity: Reflection: Homework:</i>	Reading Drawings #2 Post Reading Drawings #2 Reflection Scan, organize, submit Reading Notes #5,6 + Sketchbook Assignment Masonry Walk
11/19 Tues	CLASS 22	<i>Drawing Lab: Activity: Homework:</i>	Case Study Building Sections/Elev Section Setup w/ Grid + Reference Lines Complete Section Setup Section/Elev 1
11/21 Thurs	CLASS 23	<i>Drawing Lab: Activity: Homework:</i>	Case Study Building Sections/Elev Section Setup w/ Grid + Reference Lines Complete Section Setup Section/Elev 2
11/26 Tues	CLASS 24	<i>Drawing Lab: Activity: Homework:</i>	Case Study Building Sections/Elev Poche Layer Development Continue Poche Layer
11/28 Thurs	NO CLASS		
12/3 Tues	CLASS 25	<i>Drawing Lab: Activity: Homework:</i>	Case Study Building Sections/Elev Poche Layer Development Complete Poche Layer
12/5 Thurs	CLASS 26	<i>Drawing Lab: Activity: Homework:</i>	Case Study Building Sections/Elev Interior/Exterior Elevation Development Continue Interior/Exterior Elevation Dev.
12/10 Tues	CLASS 27	<i>Drawing Lab: Activity: Homework:</i>	Case Study Building Sections/Elev Interior/Exterior Development Complete Interior/Exterior Elevation Dev.
12/12 Thurs	CLASS 28	<i>Drawing Review: Homework:</i>	Case Study Building Sections/Elev Edit Plans, Scan, Organize Submit Class 30
12/17 Tues	CLASS 29	<i>Activity/Assessments:</i>	Assessment Reading Texts + Drawings Pin Up Review
12/19 Thurs	CLASS 30	<i>Activity/Assessments:</i>	Reflection, Special Activity

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:

Case Study Floor Plans Assignment:

Floor Plans (2)

Case Study Axon + Structural Study

Structural Study Axon

Exploded Axon

Component Sections

Calcs

Loadbearing Masonry Building Section/Elev

Building Sections(2) with major interior elements indicated

Partial Exterior Elevation (1) showing relationship to section

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

Sketchbook Assignments:

Case Study Site Investigations (2)

Stair Sketch Documentation

Structural Walks (2)

Masonry Walk

Notebook Assignments:

Reading Notes and Sketches for Readings #1-6 covering **all sections and subtopics** listed in the reading list below.

READINGS:

#1 Building Elements + Materials:	<i>Building Construction Illustrated</i>	
	Building Elements	2.02-2.03
	Stone	12.10
	Brick/CMU	12.06-12.07
	Wood	12.11-12.14
	Steel	12.08
	Concrete + Reinforcement	12.04-12.05
#2 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
#3 Structural Forces, Components, Types:	<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
	Structural Units	2.19
	Structural Spans	2.20
	Structural Patterns	2.21
	Lateral Stability	2.22-2.23
	Floor Systems	4.02-4.03
	Wall Systems	5.02-5.03
	#4 Structural Systems	<i>Building Construction Illustrated</i>
<i>Concrete:</i>		
Reinforced Concrete		4.04-4.07
Precast Concrete		4.11-4.13
Concrete Columns		5.04-5.05
<i>Steel:</i>		
Steel Framing, Beams		4.14-4.18
Steel Decking		4.22
Steel Columns, Framing		5.35-5.38
<i>Wood:</i>		
Wood Horizontal Struct		4.26-4.40
Wood Columns + Framing		5.47-5.49
<i>Masonry:</i>		
Masonry Walls		5.14-5.21
Masonry Wall Sections		5.23-5.25
Masonry Bonding		5.26-5.27
Stone Masonry	5.33-5.34	

#5 Brick and Concrete Masonry

Fundamentals of Building Construction

Brick Masonry Chapter 8

- Intro
- History
- Mortar
- Sustainability
- Brick Masonry/Forming
- Firing Bricks
- Brick Sizes
- Brick Classification
- Choosing Bricks
- Laying Bricks
- Spanning Openings
- Masonry Walls

Concrete Masonry Chapter 9

- Manufacture
- Laying Concrete Masonry

#6 Masonry Wall Construction

Fundamentals of Building Construction

Masonry Wall Construction Chapter 10

Types:

- Composite Masonry Walls
- Masonry Cavity Walls
- Masonry Loadbearing Walls

Spanning Systems:

- Ordinary Joist
- Heavy Timber
- Steel and Concrete Decks

Detailing:

- Cavity Drainage and Flashings
- Thermal Insulation