Department of Architectural Technology Fall 2019

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:	Jason A. Montgomery, NCARB LEED AP
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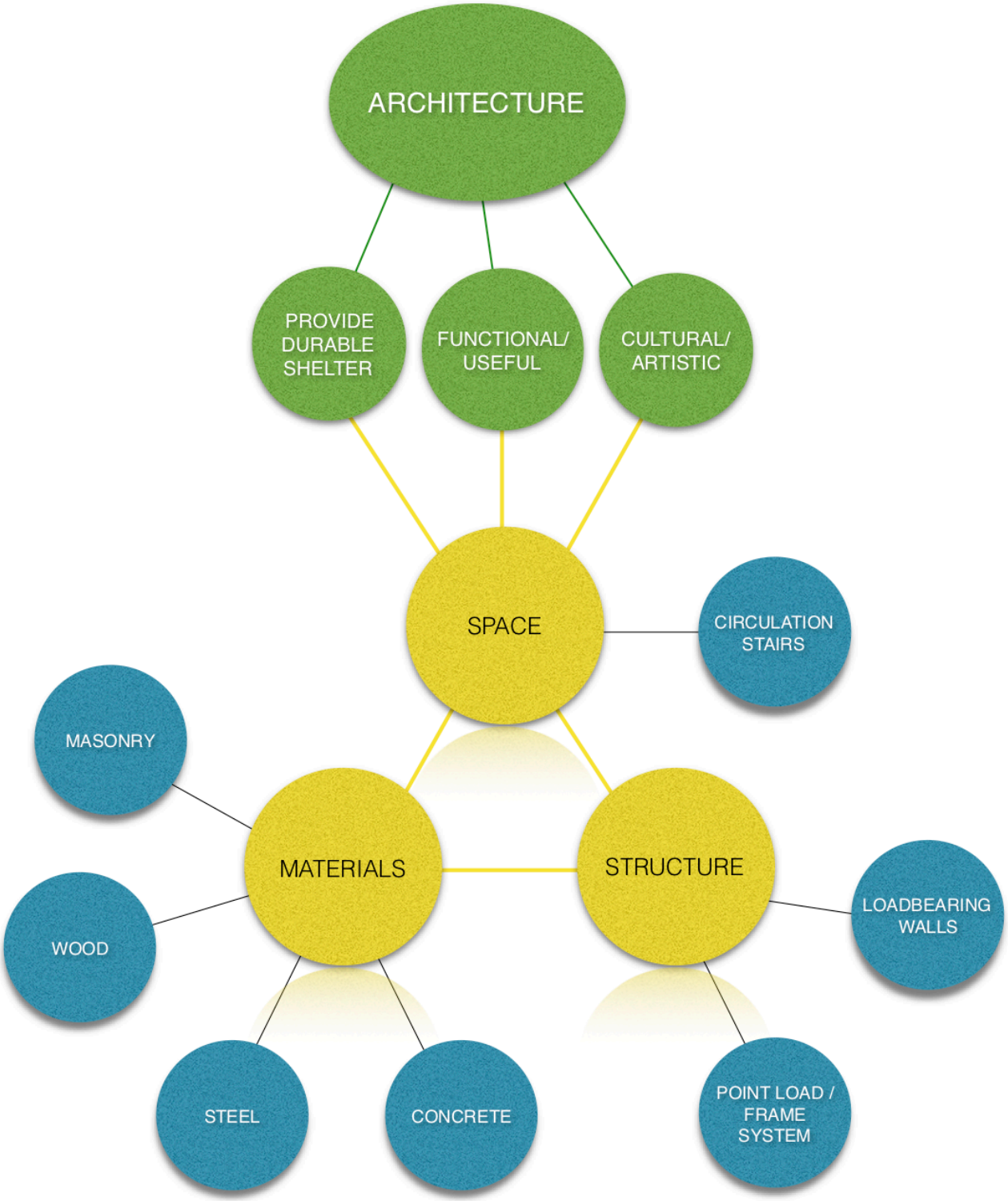
Grading:
- 20% Module 1
- 30% Module 2
- 42% Module 3
- 8% Participation + Class Protocols

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_Montgomery_Module1_firstfloorplan_20190925.pdf

Organa_Lea_ARCH1231_201902_Montgomery_Module3_reading6_masonry wall const_20191126.pd

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.	• **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.	• 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.	• **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**

CLASS 1	*Activity/Assessment:*	Reading Texts, Reading Drawings
	Review:	Course Concept Map
	Homework:	Post Concept Map Reflection on OpenLab
CLASS 2	*Seminar:*	Learning by Reading: Reading #1
	Reflection:	Post Learning by Text Reflection
	Activity:	Reading #1: Building Elements + Materials
	Homework:	Post Reflection Reading #1
		Reading #2: Egress + Stairs Concept Map
CLASS 3	*Seminar:*	Learning by Reading: Reading #2
	Activity:	Review Concept Map + Note Structure
	Homework:	Post Reflection Reading #2 + Stair Sketches
CLASS 4	*Discussion/Activity:*	Reading Drawings
	Reflection:	Post Reading Drawings Reflection
	Homework:	Scan, organize, submit Reading Notes #1,2
CLASS 5	*SITE VISIT:*	**Case Study Site**
	Activity:	Sketchbook Analysis: Geometry, Grid
CLASS 6	*Drawing Lab:*	Case Study Floor Plans
	Activity:	Geometry and Grid
	Homework:	Complete Geometry and Grid
CLASS 7	*Drawing Lab:*	Case Study Floor Plans
	Activity:	Plan 1 Elaboration
	Homework:	Continue Plan 1 Elaboration
CLASS 8	*Drawing Lab:*	Case Study Floor Plans
	Activity:	Complete Plan 1, Overlay Plan 2
	Homework:	Plan 2 Elaboration
CLASS 9	*Drawing Lab:*	Case Study Floor Plans
	Activity:	Plan 2 Elaboration
	Homework:	Complete Plan 2
CLASS 10	*Drawing Review:*	Case Study Floor Plans
	Homework:	Edit Plans, Scan, Organize Submit Class 12
		Including Stair + Site Sketch Assignments

MODULE 2 **CASE STUDY STRUCTURAL STUDY**

CLASS 11	*Seminar:* *Homework:*	Learning by Reading: Reading #3 Post Reflection Reading #3 Forces Elements Reading #4 Structural Units + Systems Concept Map
CLASS 12	*SITE VISIT:* *Pre-Activity:* *Homework:*	**Structural Walk #1** Review Concept Map + Note Structure Post Reflection Reading #4, Struct. Walk #1
CLASS 13	*SITE VISIT:* *Reflection:* *Homework:*	**Structural Walk #2** Post Struct Walk #2 Reflection Scan, organize, submit Reading Notes #3,4
CLASS 14	*Drawing Lab:* *Activity:* *Homework:*	Case Study Structural Study System Axon Geometry and Grid Complete System Axon Geometry and Grid
CLASS 15	*Drawing Lab:* *Activity:* *Homework:*	Case Study Structural Study System Calcs + Design, Element Sections Complete Element Sections w/ Dimensions
CLASS 16	*Drawing Lab:* *Activity:* *Homework:*	Case Study Structural Study Exploded Axon Set Up Continue System Axon + Exploded Axon
CLASS 17	*Drawing Lab:* *Activity:* *Homework:*	Case Study Structural Study Continue System Axon + Exploded Axon Complete System Axon + Exploded Axon
CLASS 18	*Drawing Review:* *Homework:*	Case Study Structural Study Edit Plans, Scan, Organize Submit Class 20

MODULE 3 **CASE STUDY SECTION/ELEV STUDY**

CLASS 19	*Seminar:*	Learning by Reading: Reading #5
	Homework:	Post Reflection Reading #5 Brick Masonry Reading #6 Masonry Wall Construction Concept Map
CLASS 20	*SITE VISIT:*	**Masonry Walk**
	Pre-Activity:	Review Concept Map + Note Structure
	Homework:	Post Reflection Reading #6, Masonry Walk
	Homework:	**Case Study Exterior Site Sketches**
CLASS 21	*Discussion/Activity:*	Reading Drawings #2
	Reflection:	Post Reading Drawings #2 Reflection
	Homework:	Scan, organize, submit Reading Notes #5,6 **+** Sketchbook Assignment Masonry Walk
CLASS 22	*Drawing Lab:*	Case Study Building Sections/Elev
	Activity:	Section Setup w/ Grid + Reference Lines
	Homework:	Complete Section Setup Section/Elev 1
CLASS 23	*Drawing Lab:*	Case Study Building Sections/Elev
	Activity:	Section Setup w/ Grid + Reference Lines
	Homework:	Complete Section Setup Section/Elev 2
CLASS 24	*Drawing Lab:*	Case Study Building Sections/Elev
	Activity:	Poche Layer Development
	Homework:	Continue Poche Layer
CLASS 25	*Drawing Lab:*	Case Study Building Sections/Elev
	Activity:	Poche Layer Development
	Homework:	Complete Poche Layer
CLASS 26	*Drawing Lab:*	Case Study Building Sections/Elev
	Activity:	Interior/Exterior Elevation Development
	Homework:	Continue Interior/Exterior Elevation Dev.
CLASS 27	*Drawing Lab:*	Case Study Building Sections/Elev
	Activity:	Interior/Exterior Development
	Homework:	Complete Interior/Exterior Elevation Dev.
CLASS 28	*Drawing Review:*	Case Study Building Sections/Elev
	Homework:	Edit Plans, Scan, Organize Submit Class 30
CLASS 29	*Activity/Assessments:*	Assessment Reading Texts + Drawings
CLASS 30	*Activity/Assessments:*	Pin Up Review, Reflection, Next Steps

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: *Building Construction Illustrated*

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: *Building Construction Illustrated*

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: *Building Construction Illustrated*

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 *Building Construction Illustrated*

Concrete:	
Reinforced Concrete	4.04-4.07
Precast Concrete	4.11-4.13
Concrete Columns	5.04-5.05
Steel:	
Steel Framing, Beams	4.14-4.18
Steel Decking	4.22
Steel Columns, Framing	5.35-5.38
Wood:	
Wood Horizontal Struct	4.26-4.40
Wood Columns + Framing	5.47-5.49
Masonry:	
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