

**New York City College of Technology – City University of New York**  
300 Jay Street, Brooklyn, New York 11201

## **Department of Architectural Technology**

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### **ARCH 2330 - 9606      BUILDING TECHNOLOGY III**

1 cl hrs, 6 lab hrs, 4 credits

**Course Description:** This course studies the development of building systems as they occur during the design development phase of architecture. Using case study research methods, students analyze factors, such as building assemblies and systems, codes and government regulations, human ergonomics, and sustainability, which affect building construction and use. Their solutions to these issues are integrated into their final building design solutions. The student creates a series of reports and a set of construction drawings using both analog methods (hand sketching and drawing) and digital tools including traditional CAD software and Building Information Modeling techniques.

**Course Context:** This is the third class in the required sequence of four building technology courses. As this course is under development it is subject to changes. Notice of changes will be provided to students.

**Prerequisites:** ARCH 1230: Building Technology II with a grade of C or higher or ARCH 1240 and ARCH1200 with a grade of C or higher.

**Pre- or co-requisites:** ARCH 2370: Environmental Systems for Architects

#### **Required Texts:**

- Class readings on relevant sections will be posted weekly on either Blackboard or the OpenLab website
- Allen, Edward and Joseph Iano. Fundamentals of Building Construction / Materials and Methods. John Wiley and Sons, 2008.
- Ching, Francis. Building Construction Illustrated. John Wiley and Sons, 2008.

#### **Recommended Text:**

- Ramsey, Charles George, Harold Reeve Sleeper, and Bruce Bassler. Architectural Graphic Standards: Student Edition (Ramsey/Sleeper Architectural Graphic Standards Series). John Wiley and Sons, 2008.
- James Vandezande, Eddy Krygiel, and Phil Read. Autodesk Revit Architecture 2013 Essentials: Publisher: Sybex; 1 edition (May 1, 2012)

**Attendance Policy:** No more than 10% absences are permitted during the semester. For the purposes of record, two lateness are considered as one absence. Exceeding this limit will expose the student to failing at the discretion of the instructor.

**Course Structure:** Lectures & lab work. Assignments include sketching, a series of reports, class presentation, , quizzes and set of design development level construction drawings. Digital tools learned in prior building technology courses are reinforced and enhanced.

#### **Grading:**

50%	Individual Computer Based Drawings	(Comprehensive Drawing Set)
15%	Case Studies, Presentations, Research	
15%	Studio Lab Assignments	
15%	Sketching assignments & redlines	
5%	Class Participation	

**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 citing 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.

### Learning Objectives (LO)

Upon successful completion of this course, the student will:

1. **Understand** the process and requirements of developing a design from a schematic concept into design development drawings. (Knowledge)
2. **Execute** work through a collaborative process (Gen Ed)
3. **Generate** clear and concise talking points to guide oral presentations of lab assignments. (Gen Ed)
4. **Understand** the advantages and limitations of BIM (building information modeling) as a tool for design development and project delivery. (Skill)
5. **Apply** knowledge of materials and methods of construction, including sustainable principles, to the development of details and assemblies. (Skill)
6. **Sketch** and **draft** details in orthographic and 3-D views in analogue and digital media. (Skill)
7. **Design** and **analyze** exterior wall system based on environmental performance.
8. **Apply** knowledge of professional construction drawing standards for page composition, title blocks, annotation, and schedules. (Skill)
9. **Develop** a professional quality coordinated, edited, and organized set of design development documents for a given building design using BIM and CAD. (Skill)

### Assessment

To evaluate the students' achievement of the learning objectives, the professor will do the following:

1. **Review** students' drawing and modeling work where students must exhibit their visual representation skills (2-D and 3-D). (LO: 6, 8, 9)
2. **Assess** the students' use of professional vocabulary during oral presentations. (LO:3)
3. **Review** the effectiveness of student team organization and their management of the project work by frequent meetings. (LO: 2)
4. **Inspect** student submissions for the efficient and effective use of BIM tools. (LO: 4)
5. **Confirm** the proper coordination of the students' submitted drawing sets. (LO: 9)
6. **Review** the quality and accuracy of the students' submitted analogue and digital models of construction assemblies (LO: 6, 7)
7. **Review** the effectiveness of the design and the accuracy of the analysis of the environmental performance of the submitted exterior wall system. (LO: 5, 7)
8. **Compare** the content and quality of final submission of the design development set to a specific professional standard. (LO 1, 8, 9)

**Term Project / Weekly Assignments:** Each student is responsible for turning in an assignment even if absent the day the assignment is given. It is the student's responsibility to have the email address or telephone number of another student in the class, or to speak with the instructor when absent. Late assignments will be downgraded 1/3 grade for each class date they are late. If the assignment deserves an **A-**, but was delivered two classes late, the student will receive a **B**. (**A- to B+ to B**)

**Course Requirements:** Students should expect to spend at least 10 hours per week outside of class time preparing assignments by hand and at the computer. The computer lab is open weekdays and on Saturdays and Sundays during the semester. Hours are posted after the first week of classes. Due to our revised curriculum and greater use of computer labs, open lab hours have been greatly reduced. Remember to plan accordingly and print all assignments the day before your class meets.

**Deadline note:** Unless otherwise instructed assignments will be due and must be posted on Blackboard in advance of class meetings at least 12 hours prior to the class's official start time. If class begins 8:30 AM then assignment must be posted by 8:30 PM the night before.

If assignments require printing, you must print before the start of class. You will not be permitted to print during class and any assignment not ready at the start of class will be graded as late. Submission of PDF or original files will not excuse the lateness due to lack of printing. Late assignments are downgraded.

**File Naming and Protocols:** All file names should include student's name (last then first), assignment number, assignment name, and date. All work must be submitted using the same version of Revit or AutoCAD that is installed in the lab. If you have a newer version configure your "Save\_as" settings.

*Individual Assignment Examples:*

*Last\_First\_##\_AssignmentName\_MMDDYY.extension*

*Wright\_Frank\_01\_Grid\_092312.pdf or Wright\_Frank\_01\_Grid\_092312.rvt*

Only files named properly will be accepted. Other formats will be rejected and considered as not submitted.

*Group Assignment Examples:*

*GroupNumber\_##\_AssignmentName\_MMDDYY.extension*

*Group.01\_01\_Grid\_092312.pdf or Group.01\_01\_Grid\_092312.rvt*

*GroupMemberNames\_##\_AssignmentName\_MMDDYY.extension or*

*Wright.Sullivan.Meis.Corbuser\_01\_Grid\_092312.pdf or Group.01\_01\_Grid\_092312.rvt*

As the semester progresses you will be required to maintain and hand in a running archive of all your work, including sketches, group assignments, etc. This archive is the primary source used for grading. At the end of the semester you will submit a final archive. File name for the archive is to include course number, course section, semester, professor's name, project name, drawing title, your name (last then first) and due date.

Examples:

*ARCH2330\_Section#\_Semester\_ProfessorsName\_Lastname\_Firstname\_duedate.dwg*

*ARCH2330\_9619\_Fall12\_Prof.Smith\_Trubin\_Alex\_102212.dwg (due date = mmdyy)*

## Course Outline

Week	Class	Lecture	Lab
1	1	introduction: Site plan, massing, zoning analysis integration	oasisnyc - Zoning District, Use Group, FAR (Floor Area Ratio)
	2	Site plan, massing, zoning analysis integration, Isometric Grid Drafting	Zoning District, Use Group, FAR (Floor Area Ratio) zoning envelope, street wall height, setbacks, sky exposure plane
2	3	Typ. ADA Dimension standards & Notes, Restrooms	Bldg Dept Notes - Construction Notes - Symbols
	4	partition type drawings,	0,1,2,3 fire rating, <a href="http://www.usgdesignstudio.com/">http://www.usgdesignstudio.com/</a>
3	5	partition type drawings	sound attenuation
	6	add special condition partition types, Shaft walls, Wet walls	4' x 12' typ. floor to floor heights
4	7	Core, stairs	
	8	Core, elevator- stairs	
5	9	redlining & Deskcrits & Titleblock Creation	
	10	Introduction to Revit, Steel framing lecture	Levels and grids
6	11	Structural framing, schedules	grid and framing plan 3D structural - beam schedule
	12	concrete structural foundation systems	
7	13	Placement of shafts and cores	Revit cores in & slabs & mechanical shafts, foundation, Add Stais, Add Elevators
	14	Understand egress/ exits - Create circulation	
mid. 8	15	façade research	Group assignment
	16	Façade Windows, Wall Sections & Details	Drafting
9	17	Cover Sheet - schedule. Perspective views. Create all sheets as placeholders. Team discuss naming conventions, etc.	

18 Lab Building Layout

Create preliminary floor plan sketches by hand, Use sizes that match furniture layout/structural bays

<b>10</b>	19	Lab Building Layout	
	20	Furniture layout - Student presentations	Public areas: cafeteria, atrium, lobby Classes: classroom, computer lab, and lecture hall Offices: faculty, administration, conference room Laboratory: 1, 2 & 3 Bay types Gymnasium: basketball court, bleachers, changing room
<b>11</b>	21	Transfer sketches to model using proper wall types	Custom wall types matching partitions sheet
	22	lobby paving pattern - Atrium	Hatching tools
<b>12</b>	23	Selecting appropriate plan details	Plan details/Revit standards to CAD
	24	Detail development	Drafting
<b>13</b>	25	Doors/ tags/ rooms/tags	Placement and schedules
	26	RCP At two different Heights Gypsum compared to acoustical panels	One ceiling area must be at least two different levels
<b>14</b>	27	redlining & Desk Crits, roof plan required, (drainage plans & roof details optional)	Drafting
	28	Add Annotation & Dimension to all drawings	Annotation
<b>15</b>	29	redlining & Desk Crits	Drafting
	30	Final submission	

**Class and submittals list:** Following is a list of submittals (assignments, sketches, drawing sets and research) that will be due throughout the course of the semester. They are subject to change:

<b>Drawing submissions</b>	<b>Assignment list:</b>
<b>CAD Set</b>	01 Cover Sheet & Environs Plan
<b>progress set I</b>	02 Site Plan & Zoning Diagram
<b>progress set II</b>	03 ADA Diagrams
<b>final drawing set</b>	04 Partition Types
	05 Stair Core Studies
	06 Elevator Core & Service Entry Studies
<b>Research assignment</b>	07 Scavenger Hunt
<b>Presentation Research A</b>	08 framing plan
<b>Furniture plan Research</b>	09 elevations
	10 wall sections
	11 Cover & Drawings List & Perspective View
<b>Sketch assignments</b>	12 Lobby Plan, Additional Part Plans
<b>SK 1 site</b>	13 Plan Details
<b>SK 2 steel connection</b>	14 Door Schedule, Add to Part Plans or Separate Sheet
<b>SK 3 façades</b>	15 RCP Plan(s)
<b>SK 4 lobby</b>	16 Roof Plan Required, (Drainage & Details optional)

**Submittal calendar:** Following calendar outlining the dates for submittals (assignments, sketches, drawing sets and research) that will be due throughout the course of the semester. They are subject to change:

<b>Week</b>	<b>Classes</b>	<b>Assignment</b>	<b>Sheet, Sketch &amp; Assignment due</b>
<b>1</b>	1	Presentation Research A, <b>SK 1 site</b> , <b>01</b> Cover Sheet & Environs Plan	
	2	<b>02</b> Site Plan & Zoning Diagram	<b>SK 1 site</b>
<b>2</b>	3	<b>03</b> ADA Diagrams	01 Cover Sheet & Environs Plan
	4	<b>04</b> Partition Types	<b>02</b> Site Plan & Zoning Diagram, Presentation A.1
<b>3</b>	5		<b>03</b> ADA Diagrams, Presentation A.2
	6		<b>04</b> Partition Types, Presentation A.3
<b>4</b>	7	<b>05</b> Stair Core Studies	Presentation A.4
	8	<b>06</b> Elevator Core & Service Entry Studies	Presentation A.5, <b>04</b> Partition Types

5	9		<b>CAD Set ( w/05 &amp; 06)</b>
	10	<b>07</b> Scavenger Hun, <b>08</b> framing plan	
6	11		<b>07</b> Scavenger Hun, <b>SK2</b> steel connection
	12		<b>08</b> framing plan full 1/16 scale, 3 Part plans 1/8 scale, & column Schedule
7	13	<b>09</b> elevations	
	14		<b>progress set I</b>
mid. 8	15	<b>10</b> wall sections	<b>09</b> elevations, <b>SK 3</b> façades
	16		
9	17	<b>11</b> Cover & Drawings List	10 wall sections
	18	<b>12</b> Fire Protection Plan	<b>11</b> Cover Sheet & Drawings List & Perspective View
10	19		<b>12</b> Fire Protection Plan
	20	<b>SK4</b> lobby	<b>Furniture plan Research</b>
11	21	<b>12</b> Lobby Plan, Additional Part Plans	<b>progress set II (plans)</b>
	22		<b>SK4</b> lobby
12	23	<b>13</b> Plan Details	Lobby Plan, Additional Part Plans
	24		
13	25	<b>14</b> Door Schedule, Add to Part Plans or Separate Sheet	Plan Details
	26	<b>15</b> RCP Plan(s)	Door Schedule, Add to Part Plans or Separate Sheet
14	27	<b>16</b> Roof Plan	RCP Plan(s)
	28		Roof Plan Required, (Drainage & Details optional)
15	29		
	30		<b>final drawing set</b>