

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

Department of Architectural Technology

Fall 2013

ARCH 2430 – 9632 BUILDING TECHNOLOGY IV

1 cl hrs, 4 lab hrs, 3 credits

Class times: Monday and Wednesday 6:00pm -8:05pm
Instructor: Daniel Friedman
E-Mail: DFriedman@CityTech.cuny.edu
Office Hours: by appointment

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 CAD software and BIM (Building Information Modeling) techniques.

Course Context: This is the fourth and final course in the required sequence of four building technology sequence. Since this course is under development (this is the second time the course is offered), it is subject to changes. These will be discussed with ample notice to students.

Prerequisites: ARCH 2330: Building Technology III with a grade of C or higher. Or, a student needs ARCH 2340 and ARCH1290 with a grade of C or higher.

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

Required Texts:

Class reader on Blackboard; relevant sections will be posted weekly.

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 2012. Edward Allen, Joseph Iano. The Architect's Studio Companion: Rules of Thumb for Preliminary Design, Wiley; 5 edition

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 and lab work. Assignments include a series of reports, class presentation, sketching, quizzes and set of construction drawings. Digital tools learned in prior building technology courses are reinforced.

Grading:

60%	Comprehensive Drawing Set (including midterm, progress and final submissions)
15%	Studio Lab Assignments (# 1-12)
10%	Research Projects (Concrete & Cladding)
10%	Sketching Assignments ((SK) & redlines (student 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 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.

Learning Objectives

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). (Los: 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 (Los: 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. (Los: 5, 7)
8. **Compare** the content and quality of final submission of the design development set to a specific professional standard. (Los 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.

Course Requirements: The student should spend at least 8 hours per week outside of class time preparing assignments by hand and at the computer. Computer lab hours are posted after the first week of classes. The lab is open on Saturdays and Sundays during the semester. Because of the new curriculum and greater use of computer labs, open lab hours have been greatly reduced. Remember to prepare accordingly.

Deadline note: unless otherwise instructed the due assignments must be posted to the class blackboard website by 10pm on the day before the class meets.

Example:

If an assignment is due for a Monday 6:00pm class it must actually be completed and posted up to blackboard by Sunday at 10:00pm.

File Naming and Protocols: All file names should include student's name (last then first), assignment number, assignment name, and date (year, month, day). The date used for naming your assignment should be the date the assignment is due. All work must be submitted using the same version of Revit or AutoCAD that is installed in the lab.

Example:

Wright_Frank_01Grid_120830.dwg

Only files named appropriately will be accepted. Any other format will be rejected and considered as not submitted.

At the end of the semester, you will be required to submit your work (final Revit model and drawing set PDF) for archiving. The file format will be different. Here the file format will include course number, course section, semester, professor's name, project name, drawing title, your name (last then first)

Examples:

ARCH2430_0000_semester_ProfessorsName_Project_xxTitle_Last_First.dwg

ARCH2430_9619_Fall_Smith_Project_03SitePlan_Trubin_Alex.dwg

We will discuss this requirement further towards the end of the semester.

Course Outline

Week	Class	Lecture	Lab	Assignment	
1					
	1	08/28	Introduction/ Title block/ Logo/ Project introduction	Title sheets - families /Image usage and linking	Assignment 1 due, Bring in 3 potential projects, Sketch SK-01 due
2		09/04	NO CLASS		
		09/06	NO CLASS		
3	2	09/09	Project selection/Structural system discussion	Structural System selection- student presentations, Start Concrete Research (R1)	
	3	09/11	Site: Site analysis/ Zoning Revit Massing model	Revit Massing Model	Assignment #2 due
4	4	09/16	Site: Site analysis/ Zoning Revit massing	Revit massing Model and Zoning calculations	
	5	09/18	Structure	Develop structural strategy/ Size column bays	Assignment #3 due: Concrete Research (R1) due
5	6	09/23	Present research/case studies (R1)	4D planning-phasing	
	7	09/25	structure - Develop framing systems and structural connections / 3D model	Adapt plans, Integrate structural systems and shear walls	DS 01- Progress set 1 due, SK-02 (Concrete Construction) due

6	8	09/30	Structural analysis with Revit/ Adapt as necessary	Adapt structure based on analysis findings	
	9	10/02	Elevations, Assign Cladding Research project		Assignment #5 due, R2 Cladding Research draft due
7	10	10/07	Elevations, Cladding Research project		
	11	10/09	Shell roof design rhino to Revit		Assignment #6 due, R2 Cladding Research Final due

Week	Class	Lecture	Lab	Assignment	
mid. 8	10/15	R2 Cladding Research student presentations. Review Freeform roof designs			
	12	10/16	Elevations - Cladding systems and approaches/ Podium (curtain wall) (selected system)	draft and develop	DS 02- Midterm Progress set (2) due
9	13	10/21	Elevations- Energy analysis	Vasari/ Green Building Studio	
	14	10/23	Elevations - energy analysis / Pick materials for Exterior surfaces/ Adaptive façade components	diagram areas that may need more sun or shading	Assignment #8 due
10	15	10/28	Elevations - energy analysis		SK-03 Curtain wall details due
	16	10/30	Elevations - adapt Elevations to energy modeling /Develop shading strategies		R3- Research on Cladding Details due, Assignment #9 due
11	17	11/04	Research on Cladding Details presented		

	18	11/06	Redline drawings and clean up model		DS 03- 75% Progress set (3) due
12	19	11/11	Elevations - details - connections to structure	Critical section details developed and called out - Critical details located	SK-04 Façade details due
	20	11/13	Elevations - details - connections to structure		Assignment #10 due
13	21	11/18	Elevations - Physical Façade detail (1:1 to 1:4 scale)3-D model discussed and selected		
	22	11/20	Light Fixtures	Indoor lighting/ electrical analysis	Assignment #11 due SK-05: Connection Cladding to Structure due
14	23	11/25	Green Building Studio		Assignment #12 due
		11/27	NO CLASS		
15	24	12/02	Curtain wall- Parts and Assemblies		
	25	12/04	Mechanical shafts/ Building specific details	Detail development	
16	26	12/09	Project -Bldg Dept Notes/ Construction Notes/ Symbols/ Cover sheet	Drawing list (index) reviewed	
	27	12/11	Review		DS 04: Final Drawing Set due
17	28	12/16	Project -student presentations		
	29	12/18	Final Submission Due		

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:

Drawing submissions

DS 01 25% progress set
DS 02 50% progress set
DS 03 75% progress set
DS 04 100% Final drawing set

Sketch drawings

SK-01 site drawings
SK-02 concrete construction
SK-03 curtain wall details
SK-04 façade details
SK-05 connections cladding-structure

Extra credit

EC 01 Structural system poster**EC 02** fire rating diagram/ egress plan**EC 03** Façade research/application posters**EC 04** Adaptive components façade poster/model**EC 05** Additional physical three-dimensional models**Research Projects:****RP 01** Concrete research**RP 02** Cladding research**RP 03** Cladding details research**Weekly Assignments:****Assignment #1:** Team Logo/ Titleblock

Assignment #2: Zoning Analysis/ Massing**Assignment #3:** Zoning sheets**Assignment #4:** Concrete Framing Systems**Assignment #5:** Structural Analysis**Assignment #6:** Freeform Roof Design**Assignment #7:** Cladding Systems**Assignment #8:** Energy Analysis**Assignment #9:** Shading Strategies**Assignment #10:** Curtain wall Details**Assignment #11:** Indoor Lighting Analysis**Assignment #12:** Environmental Performance Studies

Submittal calendar: Use the chart above for dates for submittals (assignments, sketches, drawing sets and research) that will be due throughout the course of the semester. They are due the following class after they are listed. They are subject to change: