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

Department of Architectural Technology Fall 2014

ARCH 2430 D619-LEC(28422) BUILDING TECHNOLOGY IV

1 cl hrs, 4 lab hrs, 3 credits

Class times:	Wednesday (V834B) and Friday (V812) 8:30 – 10:55 pm
Instructor:	Prof. Alexander Aptekar & Charlie Portelli
E-Mail:	AAptekar@CityTech.Cuny.Edu
Office:	V209
Office Hours:	Wednesday(V834B) & Friday(V812) 8:00 – 8:35am
	Monday(V834B) & Tuesdays(V834A) 7:30 – 8:00am and 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%	Research Assignments (Concrete & Cladding)
10%	Studio Lab Assignments (# 01-06)
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 Tuesday 2:30pm class it must actually be completed and posted up to blackboard by Monday 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 software (Revit or AutoCAD) that is installed in the lab.

Last name_First name_project number/project name_date(yymmdd)

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

Syllabus matrix

Week	Class	Lecture	Lab
1	1	Introduction/ Title block/ Logo/ Teambuilding/ Project introduction	Title sheets - families /Image usage and linking
	2	Project selection/Structural system discussion and selection	Analyzing requirements - structural system selection - student presntations
2	3	Site: Site analysis/ Zoning Revit massing	Revit massing Model
	4	Site: zoning Revit massing	draft levels - review zoning analysis - check if project complies
3	5	structure - Present research/case studiesDevelop structural strategy/ Size column bays / 4D planning-phasing	Develop(revise) structural grade
	6	structure - Develop framing systems and structural connections / 3D model	adapt plans as necessary - Integrate structural systems and sheer walls
4	7	Structural analysis with Revit/ Adapt as necessary	Select team members most successful structural solution
	8	Elevations - Cladding research/ Division of responsibility amongst team	
5	9	structure - Present/post team structural solutions	Present integrated Revit model - Post on openlab
	10	Explain required drawings - distribute drawing list Steets	Set up all the required sheets in Revit model
6	11	Shell roof design rhino to Revit (3 models one for each teammate; Gymnasium roof, lobby roofs, and grand staircase)	
	12	Elevations - Cladding systems and approaches/ Podium (curtain wall) compared and contrasted to residential tower (selected system)	Students present cladding research
7	13	Elevations - energy analysis/	
	14	Elevations - energy analysis / Pick materials for Exterior surfaces/ Adaptive façade components	diagram areas that may need more sun or shading
mid. **8**	15	Teams present progress set /	
	16	Elevations - energy analysis	Utilize massing model to develop energy analysis of project

9	17	Elevations - energy analysis	Revit families
	18	Elevations - adapt Elevations to energy modeling /Develop sunscreen strategies	
10	19	Elevations - adapt Elevations to energy modeling /Develop sunscreen strategies	
	20	Research on cladding details presented	
11	21	Project - progress evaluation/ redlining/ development of elevations	students will redline each other's set they will be graded for their redlining
	22	Elevations - details - connections to structure	Critical section details developed and called out - Critical details located
12	23	Lighting and water fixtures	
	24	Elevations - Physical Façade detail (1:1 to 1:4 scale)3-D model discussed and selected	
13	25	Green Building Studio	
	26	Elevations - detail sheets / Model development	Details reviewed/ detail page layout discussed
14	27	Elevations - details/ schedule/ labels & tags	Annotation
	28	building specific details	Detail development
15	29	3-D model presentedProject -Bldg Dept Notes/ Construction Notes/ Symbols/ Cover sheet	Drawing list (index) reviewed
	30	Project -student presentations	

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	**Research assignment**
Progress set 1 (structural skeleton)	**R1 Concrete research**
Midterm progress set 2	**R2 Cladding research**
Progress redline set 3	**R3 Cladding research Details**
Final drawing set 4	

Assignment list:	**Sketch assignments**
01 team logo/ title blocks*	**SK 1** Site
02 Potential Projects	**SK 2** concrete construction
03 Structural analysis	**SK 3** curtain wall details
04 Rhino form model	**SK 4** façade details
05 energy analysis *	
06 physical detail model	