

Spring 2024

## Arch 224-002: Construction II Developments on Building Technology

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# Arch 224: Construction II

## Developments on Building Technology

Spring 2024: Monday and Wednesday 8:30 am – 9:50 AM

Delivery Method: In person - face to face.

Class Space: Weston Lecture Hall One

Credits: 3

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*... Well conceived construction not only is the prerequisite of every architectural work, but also, and this cannot be repeated enough, provides the modern creative architect with a number of positive ideas for creating new forms -in the fullest meaning of the word. Without the knowledge and experience of construction, the concept 'architect' is unthinkable.*

*-Otto Wagner*

This course will elaborate and expand on the fundamental principles underlying building construction introduced in **Construction I**. Emphasis will be given to the value these principles have in the design process, particularly as they verify the relationship between context, assembly, performance and intent.

The synthesis of decisions about site, program, codes, systems, materials and methods with the poetic and conceptual notions underlying the architectural expression is not a simple task. However, the study of building construction techniques without the reference of that ultimate intention would be significantly misrepresented.

With that in mind, the intention of this course is to actively engage you in discovering why the principles of construction here presented are fundamental and how they may contribute to your design process.

### Course Overview

Through a series of lectures, quizzes and assignments, this course will elaborate on the nature of construction systems and assemblies. We will discuss the elemental components that can influence the selection of structure, systems, assemblies, materials and methods.

The topics of this course are the following:

**Enclosure Systems:** Understanding the fundamental differences between enclosure systems, as well as, their relationship to the nature of the material with which they are made of, will be the focus of this presentation. By discussing the construction of each system we will explain their appropriateness to the building type each is used for.

**Concrete:** This is a man-made construction material which is the result of mixing specific ingredients in the proper proportions. The use of concrete as a building material has greatly increased in recent years to a point where all types of structures from simple bus shelters to multistory buildings are constructed from essentially this one material.

**Moisture/Thermal Protection:** Moisture protection and thermal comfort are essential requirements of any building. Nonetheless, the proper assembly of building components that offer adequate thermal and moisture protection is difficult to achieve and require its individual discussion. Particularly when assemblies include doors windows and glazing systems.

**Vertical Transportation:** This topic will review all the methods used to move people and materials vertically within a multi-storied structure. We will discuss the significance these components have in the organization and order within the building they are part of.

**Interior Materials and Finishes:** Finishing work refers to the methods, materials and treatments which provide a building its interior surfaces and appearances. Finishes are distinguished by the fact that they are all visible as an integral element of the complete structure.

## Course Requirements

The course will begin with an introduction including the review of requirements, expectations, materials and schedule for the semester.

A series of lectures and presentations about the topic at hand will be followed with a 10-question quiz. There will be four quizzes in total for the semester. **No mid-term or final exam is scheduled** for this course in an effort to work with the studio coordinators. However, there will be three project assignments during the semester as follows:

1<sup>st</sup> Project Assignment: Preparation of a Digital Model demonstrating the components of a multistory concrete structural system.

2<sup>nd</sup> Project Assignment: Preparation of a Digital Model demonstrating the proper assembly of an enclosure system (mid + high rise).

3<sup>rd</sup> Project Assignment: Digital Models of 3 thermal and/or moisture details of a building enclosure (mid + high rise).

## Learning Objectives

The National Architectural Accrediting Board accredits NJIT's architecture program. The NAAB has Program and Student Criteria that must be covered by any architectural curriculum to attain their approval. Arch 542G satisfies the following criteria:

**PC.7 Learning and Teaching Culture** – How the program fosters and ensures a positive and respectful environment that encourages optimism, respect, sharing, engagement, and innovation among its faculty, students, administration, and staff.

**SC.1 Health, safety, and Welfare in the Built Environment** – How the program ensures that students understand the impact of the built environment on human health, safety, and welfare at multiple scales, from buildings to cities.

**SC.4 Technical Knowledge** – How the program ensures that students understand the established and emerging systems, technologies, and assemblies of building construction, and the methods and criteria architects use to assess those technologies against the design, economics, and performance objectives of projects.

## Means of Evaluation

Each assignment will constitute a percentage of the overall course grade as follows:

Participation	6% course grade
(4) Quizzes	40% course grade (10% each)
1 <sup>st</sup> Project Assignment	18% course grade
2 <sup>nd</sup> Project Assignment	18% course grade
3 <sup>rd</sup> Project Assignment	18% course grade

## Office Hours

Office hours can be arranged with instructor.

## Class Policy

Attendance is required at all class meetings. Unexcused absences can result in the lowering of final grades or failure. Every three unexcused absences will automatically lower your grade by one note and will require a meeting with the instructor.

## ACADEMIC CONDUCT & HONESTY

Each student is responsible for reading and conducting themselves within the parameters of the *NJIT University Code on Academic Integrity*. Please refer to the NJIT website for the complete text of the policy. If you have questions of interpretation in this class please see your studio instructor for clarification. We welcome a discussion of our expectations.

***“Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:***

***<http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>***

## Evaluation and Grading Criteria

NJIT undergraduate grading scale:

A	Superior
B+	Excellent
B	Very Good
C+	Good
C	Acceptable
D	Minimum
F	Failing

Incompletes are only granted in the event of a documented and notified medical or family emergency, and must be approved by the instructor.

NJIT has a policy of mid-term warnings for students who are not performing at a satisfactory level. Any student issued a warning will be required to have a conference with the instructor to evaluate satisfactory completion of the work for the remainder of the course. At any point during the course, students can arrange to meet with the instructor to inquire how their performance of the assignments is progressing and how they may improve. Final grades will be discussed in person at the end of the course.

## Course References

*Required Texts:*

*Building Construction Illustrated*, 4<sup>th</sup> or later Edition. Francis D.K. Ching John Wiley & Sons, Inc. New York.

*Suggested text:*

The Architect's Studio Companion: Rules of Thumb for Preliminary Design. 4<sup>th</sup> Edition. Edward Allen and Joseph Iano, John Wiley & Sons, Inc. New York 2007.

*Architectural Graphic Standards*, 10<sup>th</sup> Edition. John Wiley & Sons

*Building Codes Illustrated*, Francis D.K.Ching and Steven R. Winkel. John Wiley & Sons, Inc. New York

*Why Buildings Stand Up – The Strength of Architecture.* Mario Salvadori WW Norton & Co.

*Why Buildings Fall Down – How Structures Fail.* Matthys Levy & Mario Salvadori WW Norton & Co.

*Details of Modern Architecture.* Edward Ford MIT Press.

*Details of Modern Architecture – Volume 2: 1928 to 1988.* Edward Ford MI

## Schedule

Week	Day/Date	Remarks
<b>January</b>		
I	Mon. 1/15	<b>MLK Jr. Day – No Classes</b>
	Tues. 1/16	First day of Spring classes.
	Wed. 1/17	Introduction/Syllabus review. Building Enclosure Systems.
II	Mon. 1/22	Concrete: Introduction. <b>P1 Concrete Building Systems Assignment issued.</b> Last day to add/drop a class. Last day for 100% refund. Full or partial withdrawal. 1/23 W Grades posted for course withdrawals.
	Wed. 1/24	Concrete: Material Properties.
III	Mon. 1/29	Concrete: Design Mix, Form/ties, reinforcement. Last Day for a 90% Refund based on Partial Withdrawal
	Wed. 1/31	Concrete: Testing & curing. Finishes.
<b>February</b>		
IV	Mon. 2/5	P1 review / <b>Quiz 1: Concrete</b>
	Wed. 2/7	<b>P1 Concrete Building Systems Due.</b>
V	Mon. 2/12	Moisture/Thermal Protection introduction/ <b>P2 Enclosure Assignment issued.</b> Last Day for a 50% Refund based on total Withdrawal
	Wed. 2/14	Moisture/Thermal Protection from below.
VI	Mon. 2/19	Moisture/Thermal Protection from above
	Wed. 2/21	Moisture/Thermal Protection: Flashing, insulation, control/expansion joints.
VII	Mon. 2/26	P2 Assignment review / <b>Quiz 2: T/M Protection.</b>
	Wed. 2/28	<b>P2 Enclosure Assignments due.</b> <b>Mid Term Warnings</b>
<b>March</b>		
VIII	Mon. 3/4	Vertical Transportation: Introduction. <b>P3 Thermal/Moisture Protection Assignments Issued.</b> <b>Mid Term Warnings Issued</b> Last Day for a 25% Refund based on total Withdrawal
	Wed. 3/6	Vertical Transportation: Basic Systems.
IX	Mon. 3/11	<b>Spring Recess – no class.</b>
	Wed. 3/13	<b>Spring Recess – no class</b>

X	Mon. 3/18	Vertical Transportation: Mechanical systems: Elevators
	Wed. 3/20	Vertical Transportation: Mechanical systems: Escalators
XI	Mon. 3/25	Vertical Transportation: Other Mechanical Systems. P3 Assignment Review
	Wed. 3/27	<b>P3 Thermal/Moisture Protection Assignments due. Mid Term Warning</b>
		3/29 Friday: Good Friday – No Classes.
<b>April</b>		
XII	Mon. 4/1	<b>Quiz 3: VT</b> Last Day to Withdraw from a Course(s).
	Wed. 4/3	Plaster/ Gypsum Board
XIII	Mon. 4/8	Tile
	Wed. 4/10	Flooring
XIV	Mon. 4/15	Paint
	Wed. 4/17	Acoustical Systems / Materials
XV	Mon. 4/22	3D Printed Concrete
	Wed. 4/24	Presentation: Case Study <b>Quiz 4: Finishes</b>
<b>May</b>	Sun. 4/28	Upload to Kepler due.
XVI	Mon. 4/29	<b>Exit Interviews.</b> Last day of Class.
	Tue. 4/30	<b>Friday Schedule</b> Last day of Classes.
	Sat. 5/11	Grades are due in the Registrar's Office