

# ARCH 282

# STRUCTURAL PRINCIPLES

Thomas Ogorzalek  
Senior University Lecturer  
J. Robert and Barbara A. Hillier  
College of Architecture and Design  
New Jersey Institute of Technology



*Milwaukee Art Museum, Santiago Calatrava*



*WTC Transit Hub, Santiago Calatrava*



*Peace Bridge, Calgary Santiago Calatrava*

## COURSE SYLLABUS

Type of Course: 3 credit course for Interior Design students  
3 contact hours/week - Consists of lectures, workshops, and design projects  
Meets on Monday and Thursday 10:00am-11:20am - FMH 403

### Course Description

Introduction to fundamental principles and behavior of building structures for interior design students. Students will be exposed to a variety of structural systems, their material composition, and principles that underlie their design.

### Learning Objectives

The objectives of the course seek to provide students a basic understanding of structural behavior in withstanding gravity and lateral forces. In doing so students will develop the ability to document, assess and communicate structural systems utilized in contemporary architecture today.

### Format

Class will be comprised of lectures, discussions, model workshops, and design projects, meeting twice a week. Class lectures will provide basic information to be supplemented by readings and class discussions to review and clarify course content. Workshops and design projects will provide students an opportunity to explore structural behaviors first hand and demonstrate their understanding of the principles that are being discussed.

### Course Requirements

Class will meet twice a week: Monday and Thursday 10:00am-11:20am

All undergraduates are expected to attend all regularly scheduled classes. Unexcused absences may result in a grade reduction due to a lack of participation in class workshops and assignments. Three or more unexcused absences will require a meeting with the course instructor.

### Attendance and Tardiness Policy

#### 1) Excused Absences:

Are for medical and religious reasons or pre-approved for student-athletes only. An absence due to illness can be excused if the student has filed official documentation (licensed medical practitioner including NJIT Health Services) with the Office of the Dean of Students. The Office of the Dean of Students will, in turn, notify the instructor(s) that appropriate documentation has been received and confirmed, and detail what accommodation is warranted. These accommodations may range from identified dates for excused absences (normally for temporary illness) to extra time for projects and assignments (for ongoing medical issues).

Students who expect to miss classes or exams because of religious observance must submit to their instructors, by the end of the second week of classes, a written list of dates that will be missed. Students are expected to make up missed work. Faculty are expected to make reasonable attempts to accommodate students who are appropriately following this policy. For conflicts for student-athletes see Missed Class Policy at: [http://www.njithighlanders.com/documents/2014/8/7/2014\\_Book\\_08\\_7\\_14.pdf?tab=2014-15sahandboo](http://www.njithighlanders.com/documents/2014/8/7/2014_Book_08_7_14.pdf?tab=2014-15sahandboo)

## 2) Unexcused Absences:

All undergraduates are expected to attend all regularly scheduled classes. Unexcused absences may result in a grade reduction due to a lack of participation in class workshops and assignments. Three or more unexcused absences will require a meeting with the instructor, coordinator, and advisor.

The instructor is under no obligation to repeat any missed information or provide access to lecture notes or presentation materials to students who arrive late. It remains the responsibility of the student to learn the material presented. University Attendance Policy for Undergraduate Students can be found at: <https://catalog.njit.edu/undergraduate/academic-policies-procedures/>

## Course Evaluation and Grading Criteria (subject to change during semester)

NJIT Undergraduate grading scale:

A	4.0	Superior
B+	3.5	Excellent
B	3.0	Very Good
C+	2.5	Good
C	2.0	Acceptable
D	1.0	Minimum
F	0.0	Inadequate

An Incomplete is only granted in the event of a documented medical or family emergency, and must be approved by the instructor and administration.

NJIT has a policy of issuing 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 semester. At any point during the semester 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 semester.

Academic integrity and honesty are of paramount importance. Cheating and plagiarism will not be tolerated. The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students. All students are responsible for upholding the integrity of NJIT by reporting any violation of academic integrity to the Office of the Dean of Students. The identity of the student filing the report will remain anonymous. All students are expected to adhere to the University Code on Academic Integrity and to the Code of Student Conduct.

Dean of Students: [www.njit.edu/doss](http://www.njit.edu/doss)

Code of Academic Integrity: <https://www.njit.edu/dos/academic-integrity>

Code of Student Conduct: <https://www.njit.edu/doss/policies/conductcode/index.php>

## Assignments

Course requirements will include in-class workshops, model assignments with accompanied documentation, mid-term and final exams. Each assignment will constitute a percentage of the overall grade as follows:

• Class readings, attendance and participation	<b>5%</b> of final grade
• In-class workshops and model assignments	<b>35%</b> of final grade
• Mid-term exam	<b>25%</b> of final grade
• Final project	<b>10%</b> of final grade
• Final exam	<b>25%</b> of final grade

## Course Reference Readings and Materials

A series of readings will accompany lectures and individual assignments. Readings can be found on CANVAS and in texts located at HCAD Library Permanent Reserve and on-line at the Barbara and Leonard Littman Architecture and Design Library ( <https://design.njit.edu/barbara-and-leonard-littman-architecture-and-design-library>).

Allen, Edward	<i>The Architect's Studio Companion: Rules of Thumb for Preliminary Design 4th Edition</i>
Iano, Joseph	John Wiley & Sons, Inc., New York 2002
Engel, I.	<i>Structural Principles</i>
	New Jersey: Prentice-Hall, Inc., 1984

## Weekly Schedule

This schedule is a generalization and subject to change, week to week. At this time Instruction is scheduled to be face-to-face, but if this changes the course format will be altered accordingly. All students should be prepared for on-line synchronous learning and have the following;

## Computer

Access to a computer with high speed internet connection, Webcam, microphone and audio, and Windows/Apple operating system is required. (Webcam and Windows/Apple operating system is required).

## Preliminary Schedule (subject to change)

Week	Day/Date	Remarks
<i>January</i>		
I	Thur. 1/18	Introduction - Expectations, Goals, and Methodology   Syllabus Review
II	Mon. 1/22	Lecture - Loads and Materials
	Thur. 1/25	Model Workshop: Tension + Compression
III	Mon. 1/29	Lecture: Forces   <b>Model 1 Documentation Due</b>
	Thur. 2/1	Model Workshop: Equilibrium
<i>February</i>		
IV	Mon. 2/5	Lecture: Structural System Types   <b>Model 2 Documentation Due</b>
	Thur. 2/8	Model Workshop: Framing
V	Mon. 2/12	Lecture: Structural System Elements   <b>Model 3 Documentation Due</b>
	Thur. 2/15	Model Workshop: Short Span
VI	Mon. 2/19	Model Workshop: Long Span
	Thur. 2/22	Mid-Term Review & Discussion   <b>Model 4 + 5 Documentation Due</b>
VII	Mon. 2/26	<b>Mid-Term Exam</b>
	Thur. 2/29	Lecture: Masonry
<i>March</i>		
VIII	Mon. 3/4	Lecture: Wood
	Thur. 3/7	Design Workshop: Wood Framing
IX	Mon. 3/11	<b>Spring Recess – no class</b>
	Thur. 3/14	<b>Spring Recess – no class</b>
X	Mon. 3/18	Lecture: Lightweight Steel   <b>Wood Framing Workshop Due</b>
	Thur. 3/21	Design Workshop: Lightweight Steel Framing
XI	Mon. 3/25	Lecture: Structural Steel   <b>Lightweight Steel Framing Workshop Due</b>
	Thur. 3/28	Design Workshop: Structural Steel Framing
<i>April</i>		
XII	Mon. 4/1	Lecture: Site-cast Concrete   <b>Structural Steel Framing Workshop Due</b>
	Thur. 4/4	<b>Last Day to Withdraw</b>
XIII	Mon. 4/8	Lecture: Pre-cast Concrete   <b>Final Project Issued</b>
	Thur. 4/11	<b>FIELD TRIP: Campus Walking Tour</b>
XIV	Mon. 4/15	Lecture: Fabric Structures   <b>Photo Journal Assignment Issued</b>
	Thur. 4/18	Final Project Design Workshop: Schematic Design (1/2 class)
XV	Mon. 4/22	Final Project Design Workshop: Schematic Design (1/2 class)
	Thur. 4/25	Final Project Design Workshop: Design Development (1/2 class)
	Fri. 4/26	Final Project Design Workshop: Design Development (1/2 class)
XVI	Mon. 4/29	<b>Photo Journal Assignment Due</b>
	Tue. 4/30	Lecture: Final Exam Review
<i>May</i>		
XVII	Fri. 5/3	Last Day of Classes   <b>Final Project Due at 11:59pm</b>
XVII	Fri. 5/3	Final Exams Week begin (Exam Day TBA)

## Contact Information:

Thomas Ogorzalek  
Senior University Lecturer  
Hillier College of Architecture and Design  
New Jersey Institute of Technology, Newark NJ 07102  
Email: thomas.ogorzalek@njit.edu  
Office: Weston 524

Office Hours: Thursday, 11:30 -12:30 pm by appointment.