New Jersey School of Architecture - Hillier College of Architecture and Design - NJIT



PCI Research Studio Living in Performance Spaces ARCH 463/464 Option Studio - Spring Semester, 2025 Gernot Riether

<u>Prerequisites:</u> (ARCH 396 or ARCH 364), (ARCH 304 or ARCH 329), (ARCH 314 or ARCH 327) and ARCH 324. <u>Meeting Times:</u> Monday and Thursday 12:00PM – 05:20PM <u>University Deadlines and Holidays:</u> <u>https://www.njit.edu/registrar/calendars</u> <u>Office Hours:</u> Open door policy (Weston 566) or by appointment in person or online: griether@njit.edu <u>Teaching Mode:</u> Face to face <u>Location:</u> 720-730 Weston Hall, if other you will be notified via email.



Projects by: Abdurahman Oudeh + Samantha Volpicella, Karly Savinon + Ella Martz, Kashish Dalal + Lucas Konradparisi, Pictures of High-Concrete Plant

Introduction:

Concrete is one of the world's oldest and most widely used building materials. Twice as much concrete is used globally in construction as all other materials combined. This studio will explore the advantages and challenges of precast concrete construction methods, focusing on innovative strategies for mass customization, efficient construction, and assembly processes. To achieve this, the studio will collaborate with the Precast Concrete Institute (PCI) and the Concrete Industry Management (CIM) Program at the School of Applied Engineering and Technology (SAET). Students will learn about current industry practices, identify key challenges, and develop speculative solutions that address the urgent need for climate action.

In response to the growing demand for housing in the New York Metropolitan area, developers are optimizing building envelopes within zoning constraints. Housing is increasingly designed as micro-units to provide affordable options for middle-class individuals and nomadic urban lifestyles, characteristic of cities like New York. This typology challenges traditional notions of home and belonging. In an era where digital connectivity prevails, individuals are paradoxically more isolated. The studio will design rituals that confront these social and spatial challenges, envisioning future spaces shaped by new evolving practices.

As living units become more compact, the demand for shared social spaces grows. Enhancing the quality of life in these dense urban environments requires going beyond the scale of individual apartments. It calls for the creation of spaces that foster engagement, build communities, and celebrate culture. This studio will seek to integrate housing with community-centered programs and spaces that create a sense of identity, are financially viable, and promote sustainability.

Course Learning Outcomes:

Architecture transforms the culture of today into the built environment of tomorrow. Architects strive to create spaces that are better, safer, more equitable, resilient, and sustainable. This commitment extends beyond design to embrace equity, diversity, and inclusion in the environments we shape, the policies we implement, the words we use, and the actions we take. At its core, design is a process of integration and synthesis, weaving together ideas, values, and innovation to build a better future.

Building on the analytical, critical, and conceptual thinking, as well as the fundamental design and presentation skills developed during the first three years of studio and integrating knowledge from core courses such as Building Construction, this studio challenges students to engage in architectural research to test and evaluate innovations in the field. Through their projects, students will gain an in-depth understanding of precast concrete as both a structural system and a building system. Students will be encouraged to experiment with innovative ideas, challenging themselves to enhance their design skills while thoughtfully addressing site conditions, programmatic and user needs, regulatory requirements, accessible design, life safety systems, and environmental impact.

Approaches to Leadership: Students will develop effective collaboration skills by working in teams and engaging with the precast concrete industry and diverse stakeholder groups. They will learn to question convention and challenge the status quo, respond constructively to feedback, and synthesize input to address complex problems responsibly and innovatively.

<u>NAAB</u>: 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. This course satisfies the following criteria as outlined in the <u>2020 NAAB Conditions for Accreditation</u>.

- **PC 5** Research & Innovation How the program prepares students to engage and participate in architectural research to test and evaluate innovations in the field.
- **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 and Grading Standards:

Grading Scale:

Assignment 1: Micro Unit / Facade / Site (10%) Assignment 2: Mold / Assembly / References (10%) Assignment 3: Geometry / Material / Fabrication (10%) Assignment 4: Schematic Design (10%) Assignment 5: Design of Prototype and Piece Ticket (10%) Assignment 6: Midterm Review (10%) Assignment 7: Production Prototype (10%) Assignment 8: Project Presentation (10%) Assignment 9: Prototype presentation (10%) Assignment 10: Final Review (10%)

All parts of the research and project will be evaluated; however, the purpose of the educational experience is to develop personal professional motivation and not to encourage the idea that work is created solely for the purpose of external reward. The benefit that will accrue from this approach is that it will reinforce a "risk free" environment, TAKE A CHANCE, creative thinking will be rewarded (and is required). Mid-semester reviews will occur to help us each understand both your strengths and weaknesses in time to assure a successful educational experience.

The student who exhibits evidence of intellectual curiosity and growth by expanding the limits of the problem; by utilizing creativity and innovation in the interpretation of the problem; by being willing to experiment; by trying to go where "no person has gone before" is above average or excellent and will be rewarded at a level commensurate with that effort. At this time in your professional career as a student, (we are all students all our lives) intensity, effort, intellectual inquiry, professionalism, open-mindedness and a positive cooperative spirit are the most important virtues you can cultivate.

Grade Definition:

Grades are defined under <u>Graduate Grading Legend</u>. In addition to the NJIT's grading standard students at the HCAD must have a yearly 2.0 minimum studio GPA to proceed to the next studio year. Students who wish to pursue graduate studies in architecture or related fields should have a grade point averages of "B" or above as well as a compelling portfolio.

Absences:

To develop your project, you have to respond to feedback every class. Every absence may therefore negatively impact the development of your studio project. You can file a <u>Request for excused absence</u>. Once the absence has been verified, the DOS will communicate with the instructor. Nonetheless, the DOS only verifies documentation, and it remains the instructor's discretion to provide any accommodation and the student's responsibility to follow up with the instructor. Accepted reasons for absence include bereavement, medical concerns, military activity, legal obligations, university-sponsored events or <u>Religious Observances</u>.

Schedule:

Week 1 TR 01/23

Assignment 1 Introduction

Week 2

MO 01/27 (last day add/drop) Assignment 2 Introduction (Lecture Series) + Review Assignment 1 TR 01/30 Review Assignment 1, 2 + Site Visit

Week 3

MO 02/03 Assignment 3 Introduction + Review Assignment 1, 2 TH 02/06 Review Assignment 1, 2, 3

Week 4

MO 02/10 Presentation 1, 2, 3 + Assignment 4 Introduction TR 02/13 Review Assignment 4

Week 5

MO 02/17 Introduction Assignment 5 TR 02/20 Review Assignment 5 + Introduction Assignment 6

Week 6

MO 02/24 Review Review Assignment 5,6 TR 02/27 Review Assignment 5 (Industry Review)

Week 7

MO 03/03 Review Assignment 5,6 TH 03/06 **Final Review Assignment 5 (Industry submission)** + Introduction Assignment 7

Week 8

MO 03/10 Review Assignment 6,7 TH 03/13 **Midterm Review (Storefront)**

Week 9 MO 03/17, TH 03/20 (Spring Break)

Week 10

MO 03/24 Introduction Assignment 8 + Prototype Production TR 03/27 Prototype Production

Week 11

MO 03/31 Prototype Production, Preparation for Trip 1, 2 + Introduction Assignment 9 TR 04/03 (wellness day)

Week 12

MO 04/07 **Trip 1: Casting of prototype (leaving at 9:00AM)** TR 04/10 Review Assignment 8, 9 +. Introduction Assignment 10

Week 13

MO 04/14 **Trip 2: View prototypes, plant tour and feedback session leaving at 10:00** TR 04/17 Review Assignment 10

Week 14

MO 04/21 Review Assignment 10 TR 04/24 Review Assignment 10

Week 15

MO 04/28 Review Assignment 10 TR 05/01 **Pre-Final Review**

TU 05/06 Final Review (Storefront)

Readings and Resources:

Housing:

- A+T Online Library: https://aplust-net.libdb.njit.edu:8443/area-privada/biblioteca-digital/#

Regulatory Requirements, Accessible Design and Life Safety Systems:

- The Architectural Studio Companion, Edward Allen & Joseph Iano
- Architectural Graphic Standards, Keith Hedges
- Building Codes Illustrated, Francis Ching
- 2018 International Building Code, https://codes.iccsafe.org/
- Building Structures Illustrated, Francis Ching
- Structural Design of Buildings, Paul Smith

Concrete construction:

- Concrete by Koren, Leonard, Hall, William.
- Best of Detail: Beton = concrete, Christian Schittich
- Modern concrete construction manual: structural design, material properties, sustainability, Martin
- Concrete design by Roth, Manuela.
- Concrete: design construction examples, Peck, Martin
- Solid states: concrete in transition by Bell, Michael, 1960-; Buckley, Craig

Building Envelope Systems & Assembly:

- Facade Construction Manual: 2nd Edition, Thomas Herzog, Roland Krippner, and Werner Lang
- Building construction Illustrated, Francis The Architectural Detail, Edward Ford
- Studies in Tectonic Culture, Kenneth Frampton
- Constructing architecture: materials, processes, structures: a handbook, Andrea Deplazes

General Readings:

- The Language of Architecture, Andrea Simitch and Val Warke
- Rethinking Architecture: A Reader of Cultural Theory, Neil Leach
- Architectural Drawing, David Dernie
- Architecture, Form, Space and Order, Francis Ching
- The Function of Form, Farshid Moussavi and Daniel Lopez

Academic Integrity:

Upholding <u>academic integrity</u> is a commitment to the pillars of honesty, trust, fairness, respect, responsibility and courage.

Learning and Teaching Culture Policy:

In addition to the overarching values and ethics of the university, the New Jersey School of Architecture is dedicated to optimism, diversity and solidarity, professional conduct, constructive evaluation and instruction, collaborative community, health and wellbeing, time management and school-life-work balance, respectful stewardship and space management, and well-rounded enrichment. The pedagogy of architecture and design is as complex as it is rewarding, and as dynamically evolving as the people who learn and teach it. This understanding resides at the core of the NJSOA Learning and Teaching Culture Policy.

Canvas and Kepler:

Students must upload copies of their assignments to the new KEPLER 5 system found under the KEPLER tab in CANVAS "Modules". CANVAS assignments folders are automatically ported to KEPLER, although students will need to initiate a separate KEPLER upload. The new KEPLER has an improved interface for easier batch uploading. Any file, regardless of file size, or type can be uploaded, although .pdfs and jpegs are recommended to ensure viewability. KEPLER no longer has individual student folders. Rather, student work is now available for review in either "List View" organized by student or "Gallery View" with thumbnails of all work in an assignment folder viewable at once.

Academic Integrity:

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 link and to the <u>Code of Student</u>. Conduct. HCAD librarian Maya Gervits has assembled excellent resources for a students use on using images, citing, and plagiarism link.

Students with Disabilities:

<u>OARS</u> will notify professors via email regarding students with approved accommodations enrolled in their classes. Student Accommodations will have to be signed and dated by each professor and returned to Chantonette Lyles (Chantonette.Lyles@njit.edu)

Wellbeing:

Taking care of yourself is as important as your other responsibilities to your classes, work, family, and anything else that is part of your life. If you are struggling, please reach out to your instructor. Other resources: <u>Center for Counseling & Psychological Services</u> (C-CAPS). Students can make an appointment with C-CAPS by emailing <u>counseling@njit.edu</u> or calling (973) 596-3414. As NJIT student you have access to free, school-sponsored mental health support through our partnership with Mantra Health. Log in to the <u>Mantra Care Hub</u> using their <u>@njit.edu</u> email or download the Mantra Health app to get started.