Course Description:

This is a seminar on Super-Tall building typology. The class will follow an analytical approach by dissecting individual building components and their interrelationships to each other to build a comprehensive understanding of how Super-Tall Buildings behave.

From the early examples at the turn of the 20th Century in Chicago and New York onto today's global Super-Tall Towers, skyscrapers have been at the forefront of technological innovations in Architecture, Engineering and Construction Industries. It has led advancements in fields such as vertical transportation, structural systems, curtain-wall, wind tunnel engineering, environmental engineering, construction and fireproofing; and it has forced an ongoing discourse and evaluation of building codes.

What makes a Super-Tall building unique is its scale. However, scale cannot be read as an accumulation of numbers; a 100-story-tower is not a stack of 10-story-buildings added on top of each other. Even though, in its essence, a Super-Tall building can be seen as a multiplication of the site that it raises from, its behavior cannot be analyzed as an aggregation of its components. It presents complex, non-linear and dynamic behavior.

What are the building blocks of this unique typology? How do users circulate? How are such structures challenged by wind? What are the operational considerations and how are they maintained? How do we ensure the health, safety and welfare of occupants? How can we design and build smarter?

The exploration of the Super-Tall building typology will utilize New York City as a laboratory.

A case study will be provided to each student at the start of the semester, along with sample drawings and associated technical reports.
Students working in teams of two will be assigned one of the following categories:

- Vertical Transportation & Service
- Building Enclosure & Maintenance
- Building Systems: Structure & MEP
- Life Safety & Core Elements

The topics will be studied in various scales from overall building behavior to the details of building tectonics.

Throughout the semester, each team will develop a series of three-dimensional infographics that will visually represent the categorical fundamental building blocks of the Super-Tall.

Classes will incorporate presentations of the survey of assigned topics and the critique of their representations throughout the semester. New topic will be introduced for each category throughout the semester.

The course will also incorporate analysis of existing buildings as case studies, guest lecturers from experts on tall buildings and a field trip to a relevant building under construction.

**Enrollment and Prerequisites:**

Enrollment is limited to 12. Students must have completed AT4: Building Integration.
STUDENT WORK SAMPLES
2018 SPRING SEMESTER
DUNNAGE:
SUB-STRUCTURE TO SUPPORT COOLING TOWERS AND ALLOW PIPE CLEARANCE
5 COOLING TOWERS (4 ACTIVE, ONE NON-ACTIVE) FOR A TOTAL CAPACITY OF 7500 TONS

CONCRETE SLAB
REBARS
SHEAR STUDS
BEAM
EMBOSSMENTS
STEEL DECK

FOUNDATION WALL
OPENINGS
FRAMI PANELS
TIE-ROD SYSTEM
90 DEGREE CORNER
PLUMBING ACCESSORIES
ACUTE AND OBTUSE-ANGLED JOINING GANGS
POURING PLATFORMS
PRODUCED CONCRETE
CAISSON
UPLIFT
ROCK ANCHOR
STRIP FOOTING

DX UNIT
TENANT PROVIDED
2HR WALL
SHEER WALL
OPENINGS
SUPPLY
RETURN
CVR UNIT

ELECTRICAL
CLOSETS
LOCAL LOW ZONE (3-31)
EXPRESS HIGH ZONE (32-61)

GENERATOR PLANT
PLATE AND FRAME HEAT EXCHANGERS
SECONDARY CHILLER WATER PUMPS
IT MEET ME ROOM
HEAT EXCHANGERS
HEATING AND VENTILATING SYSTEM FOR 2+MER LOBBY
AIR HANDLING UNIT
LOWRISE TENANT OUTSIDE AIR

BELT TRUSS ON 62 AND 2 FLOOR
BELT TRUSS ON 62ND FLOOR
DUCT TRANSFER
SMOKE PURGES WITH EXHAUST ON 62ND FLOOR
DUCT TRANSFER OUTSIDE AIR

BETWEEN GSAPP SPRING 2019 - SUPER TALL - NICOLE DOSSO, FAIA
MEP & STRUCTURES
STUDENT NAME: QUY LE
LIFE SAFETY & CORE ELEMENTS
STUDENT NAME: SHUOSONG ZHANG

GSAPP SPRING 2019 - SUPER TALL - NICOLE DOSSO, FAIA
Protection of the Perimeter

Exterior Lite with Lowe Coating-AGC/Interpane Stopray 50T (Heat Strengthened)

Interior Lite-AGC/Interpane Planibel (tempered and fully heat soaked)

Cleaning Track

3 mm THK Painted Alum Panel

Floor Plate, Structure & MEP

Concrete was poured in after the anchorage screws were sealed to the floor slab.

Wind Test: The predicted peak exterior pressure should be 50-year return period.

System Requirement: Should be able to withstand loadings, deflections, shrinkage, creep, seismic and thermal.

Kemperol V210 System field membrane

Angled Kemperal V210 Resin Fill Typical

Ply Kemperol System Membrane Flashing-extent minimum 3" into Prepare and Primed Drain Bowl

Roof Drain-Stainer 1" Copper Pipe 4 1/4"x4 1/4" Aluminum Fin

5" Grille Centered over 4 1/4" HTG. Fin

Extruded Aluminum Pocket

Weighted Extruded Aluminum Hem Bar

2 1/2" Tube and Shade Assembly with Electro/1 Bracket (Motor Inside Tube)

Steel Erection

Metal Deck

Pour Concrete on Metal Deck

Concrete Shear Wall

Core Slab

Stair

Spray Fireproof Curtain Wall Install

GSAPP SPRING 2019 - SUPER TALL - NICOLE DOSSO, FAIA

STUDENT NAME: SHUO YANG