Super-Tall

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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.

Class Syllabus: Refer to attached

week **1** - 01.18 **course introduction**

case study: anatomy of World Trade Center Tower 1

discussion topic: model development & core analysis

		VERTICAL TRANSPORTATION & SERVICE	BUILDING ENCLOSURE & MAINTENANCE	BUILDING SYSTEMS: STRUCTURE & MEP	LIFE SAFETY & CORE ELEMENTS
week **2** - 01.25	discussion topic	performance - *elevator report, size, group*	assembly - *building module, components, typical conditions*	structural system - *the deck, shear wall, typical framing*	building code fundamentals - *egress stair, photoluminscent*
week **3** - 02.01	discussion topic	elevator components - *hoist way, divider beams, rails*	interface - *edge of slab, embeds, smoke seal*	local fan room - *tenant loop, smoke control*	stair pressurization - *smoke control*
week **4** - 02.08		**guest lecture** - wind tunnel testing			
week **5** - 02.15	discussion topic	top and bottom - *pit, overrun, elevator machine room*	louvers - *intake and exhaust*	low and high rise mechanical plant - *belt truss and distribution*	fighting fire - *siamese, standpipe, domestic and fire reserve tank*
week **6** - 02.22	discussion topic	cab fit-out - *car operations, finishes, emergency access*	the crown - *coping, roofing and drainage*	top of the house - *cooling tower and dunnage*	emergency generator - *incoming service, operation, mtn.*
week **7** - 03.01		**mid review** with guest critics			
week **8** - 03.08		**spring break**			
week **9** - 03.15	discussion topic	service car - *type, size, hoistway*	building maintenance - *track, rig, platform, glass replacement*	providing power	lobby - *system distribution, sequencing and finishes*
week **10** - 03.22	discussion topic	service car - *pit, overun, elevator machine room*	building maintenance - *glass replacement*	information technology	toilet room - *plumbing and mechanical distribution*
week **11** - 03.29		**guest lecture** - exterior wall fabrication			
week **12** - 04.05	discussion topic	loading dock - *operational access*	interior perimeter - *convector, column enclosure, shading device*	foundations - *caissons, incoming services, underslab drainage*	security - *turnstiles, bollards, cameras*
week **13** - 04.12	discussion topic	hoist complex	glass installation	construction sequencing - *logistics, safeguard*	protection from the elements - *lightening and aviation*
week **14** - 04.19		**final review** with guest critics			

Note: Weekly discussion topic will be assignment. Each class will begin with review of students interpretation of topic via infographic.