SUS-8300A - Applied Resilience by Design

3 credits; 3 hours/week.

Monday 7:00 – 9:40pm, Spitzer School of Architecture Rm. 128.

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Course Description

Communities continue to experience “shocks” such as extreme weather events that suddenly affect critical systems, as well as “stressors” such as rising sea levels and aging infrastructure that gradually increase vulnerability over the long-term. Designers are being tapped to propose innovative solutions that respond to changing climactic conditions, and reduce the severity or longevity of disasters and disruptions in both the natural and built environment. These proposed solutions must also provide the necessary requirements to meet vital human needs while respecting natural systems limitations and complying with rigorous local, state or federal standards. This requires the collaboration of government, philanthropic organizations, academic institutions, and most importantly, local stakeholders to solve some of the most complex and intractable issues of our time.

This course will discuss the range of issues facing engineers, architects, scientists, and planners by exploring the seven Rebuild by Design (RBD) projects underway in the Sandy affected region. It will also analyze trends in resiliency through illustrative examples from the National Disaster Resilience Competition (NDRC), and the 100 Resilient Cities program.

Students will be asked to research existing project concepts not advanced through Rebuild by Design (RBD) and develop communication techniques to assist in the practical completion of the original designer’s vision. The course will culminate in the presentation of a group project designed to advance elements of the RBD projects and identify creative next steps.

Course Objectives

- Explore existing and emerging topics related to resiliency and adaptation.
- Identify the regional significance of projects occurring as part of Rebuild by Design, and discuss how this may impact larger national resiliency trends.
- Introduce the wide range of tools that can produce resiliency at different scales
- Develop methods to assess and communicate vulnerability, uncertainty, risk and value.
Topics Covered

1. Broad overview of resiliency issues affecting urban areas. Providing definitions, context (difference between shocks and stressors) and state of the industry
   a. Introduction of Rebuild By Design, the National Disaster Resilience Competition, 100 Resilient Cities, the Chief Resilience Officer

2. Rebuild by Design Projects (Case Study Selection) & RBD U exercise Introduction w/Amy Chester (Director RBD);

3. Rebuild by Design Process (in cooperation with 100 Resilient Cities) & the National Disaster Resilience Competition
   a. Review of non-funded RBD projects for final design (of 34)

4. Digital Modeling & Data Systems w/methods

5. Structural/Non-Structural Approaches to Resiliency

6. Organizations governing adaptation and federal programs. Cost Benefit Analysis

7. Regional Inequities/Policies & The National Flood Insurance Program (Reauthorization)
   a. Finance/Lending
   b. Insurance
   c. Bonding
   d. Innovation (Catastrophe Bonds)

8. Midterm Case Studies of 6 RBD Projects reviewed by Amy Chester

9. Social Forces and Human Behavior (Land Use and Development Patterns)
   a. Floodplain management, urban coastal design, land use, and development pressure.


11. Regulatory Standards (engineering; codes; standards; policies)

12. Project Restrictions (budget, timing, permitting)

13. Stakeholder engagement & communication techniques

14. Project Presentation (Critique by Laura Baird OMA, Alexis Landis SCAPE, others)
Selected Readings

Course materials will consist of readings excerpted from books, as well as scholarly articles, essays, policy reports, and short films/documentaries.

Breakdown of Deliverables

- Class participation and submission of weekly reading notes (20%);
- A mid-term writing assignment on an existing National Disaster Resilience Competition project or (preferably) RBD project (15%);
- A classroom presentation on the topic (15%);
- The main assignment is a group semester project carrying forward one of the 34 projects proposed as part of RBD to be submitted on the last day of class (30%);
- And an in-class presentation (20%) on the group project that includes the development of a physical communication tool or toolkit. (non – slide based; oriented as “community meeting”).