

Virtual and Physical Design/Concepts + Structures

CONTEXT:

The project investigates experimental structural systems in the context of architectural tectonics. Students are expected to research a chosen structural approach, and apply this research into design and construction of a physical, full-size mock-up/model. Imaginative and innovative solutions are critical components and among the criteria used to determine the final grade.

Rather than employ a “hit or miss” or “guess and check” process, students will develop a number of digital models to simulate the behavior of the physical structure and study its possible formal expressions.

Students, working in groups, shall investigate no fewer than three structures. If an architectural precedent is minimal or not present, students may consider design examples from other disciplines such as fashion or industrial design.

Depending on the type of structure, different software applications may be more or less appropriate for documentation, analysis, design, and visualization. Structures may be investigated and designed according to the following groups:

- pneumatic structures; air-supported and/or air-inflated (Revit)
- space frame/geodesic dome/lattice/tensegrity structure
- tents/suspended structures (Maya, 3DS Max)
- kinetic structures/adaptive structures (Rhino/Grasshopper, 3DS Max, Maya)
- reactive and adaptive environments (open-ended and highly experimental, requiring good computer skills including basic programming) (Rhino/Grasshopper and more)

REQUIREMENTS:

- Document the process of building the physical mock-up with photography and a brief narrative.
- Document the explorative process, analysis, and project findings
- Provide all geometry 3D/model files in native file format for the application(s) used
- Provide visualization of virtual model in-situ
- Provide and document (using digital imagery, model photography, and digital models) digital explorations of at least 3 alternatives that parallel physical studies
- Document/analyze comparative features between the virtual and physical models – include a structural analysis and simulation of all tensile and compressive elements in digital model and test physical model to compare results with predictive principles

The use of animation and sequential imagery may be used to facilitate explorative discussion.

SCHEDULE:

This is a continuous project that will span two months, from mid-September to mid-November and will be executed in parallel with other course requirements and assignments. The project is worth 30% of the semester grade.