Integrating Design + Structure

ARCH 573 Course Catalog Description
Design studio investigations of buildings and systems focusing on structure, enclosure, technology and performance. Integration of building materials, components and systems and their impact on the design, construction, and sustainability of buildings. 6 credit hours. Prerequisite: Graduate standing in Architecture.

Studio Premise
This studio presents an interdisciplinary educational model in which the subjects of design and structures are linked together through the combining of two graduate-level courses: a design studio and an advanced structures class. The studio explores the potential for integrating structural design as a key conceptual component of an overall architectural design process, emphasizing both experimentation and analysis/verification.

This studio will focus on how two primary architectural elements—structure and skin—can work together to create unique experiences of space and light in a high-performance public building. Specifically, we will be designing long-span structural systems to shape space, integrated with custom enclosure systems that modulate natural light, in the creation of a new aquatic center on an urban site in the San Francisco Bay Area. The goal of this work is to develop design proposals that are both conceptually and technologically rigorous and which develop students’ abilities to integrate structural and design thinking.

Studio Project
Following initial research and analysis of site, program, and precedents, students in this studio will work on one semester-long design project: a new Aquatic Center sited in the San Francisco Bay Area. In order to enable a high level of depth and detail in the projects and to develop collaboration skills, students will work on this project in teams of two.

The Aquatic Center will be a 70,000 square-foot training and competition facility suitable for hosting the Swimming & Diving World Championships. The program includes one Olympic-sized swimming pool (25 x 50m), one diving pool (20 x 25m), and one short-course training pool (25 x 25m), as well as spectator amenities, administrative space, and support functions. The project will require structural spans in the range of 150 to 400 feet and will be designed using steel as the primary material. Another design objective will be to maximize the potential for natural lighting within the building while also addressing energy-saving priorities through advanced building-envelope design.
Images above and previous page: examples of student work in this studio from previous semesters by Pavel Gomez and Martin Grym, Laura Eckstein and Jienan Zhang, Casey Ozog and John Harmon, Caitlin Kelleher and Stephanie Denny, Cody Roth and Youngwook Park.

**Link with ARCH 556: Advanced Structural Planning**

This course is the latest of a series of studios offered in the School’s Performance Program Area each Spring semester which link a graduate design studio with an advanced technical course. In this case, the current studio will be taught jointly with ARCH 556: Advanced Structural Planning (4 credit hours), which is led by Prof. Marci S. Uihlein. Students enrolled in ARCH 556 will also enroll in this studio, and the same project will be used in both classes. The structural system designed for the studio project will be further developed and analyzed in ARCH 556, allowing the work in each of the two classes to productively inform and advance the other.

**Learning Objectives and Process**

The studio will emphasize mastery of technical principles in combination with more intangible qualities such as spatial experience and the creation of unique architectural character, while also integrating comprehensive design principles of accessibility, life safety, and sustainability. Through a process of questioning the status quo and projecting future possibilities, appropriate and inventive responses to climatic and site conditions will be sought.

The design process will be based on experimentation with structure, form, and enclosure, developed through iterative design proposals using large-scale, detailed physical and digital modeling techniques. Design teams will be expected to generate, document, and analyze multiple schemes with clear conceptual foundations before arriving at a final proposal for the project. This process will include regular desk critiques and informal in-class pin-ups, in addition to the formal midterm and final reviews. Final projects will be presented in multiple media: detailed plans and sections, digital 3D modeling, physical models at a range of scales, and diagrams and details of structure and enclosure systems. Students will also be submitting their final projects for a national student design competition, the 2015-2016 ACSA/AISC Steel Design Competition (Open Category). [https://www.acsa-arch.org/programs-events/competitions/2015-2016-steel-competition](https://www.acsa-arch.org/programs-events/competitions/2015-2016-steel-competition)

**Faculty Bios**

**Scott Murray**, Studio Instructor.
Scott is an Associate Professor in the School of Architecture and a licensed architect. His professional background includes working as a façade-design consultant with the firm of Heintges Associates in New York. He is the author of two books on building-envelope design. [http://www.arch.illinois.edu/faculty/scott-murray](http://www.arch.illinois.edu/faculty/scott-murray)

Marci is an Assistant Professor in the School of Architecture and a licensed professional engineer with a graduate degree in architecture. Her professional background includes working at Arup in their San Francisco and Los Angeles offices. She was recently awarded the Building Technology Educators’ Society (BTES) Emerging Faculty Award. [http://www.arch.illinois.edu/faculty/marci-s-uihlein-pe](http://www.arch.illinois.edu/faculty/marci-s-uihlein-pe)