

Eco-Responsive--Next Generation Facades

[Course] Arch 4050/6050- 6306, School of Architecture, UNC Charlotte Tuesdays 2:00-4:30 room 268

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[Premise] The exterior environment changes through the time and season. Yet, the primary problem of the envelopes is the static nature to respond to dynamic environment and not being able to utilize the skin's energy gain or loss. Eco Responsive Façade differs from conventional façades in a way that it is able to adjust its characteristics to and mediate between the changing environments, in order to increase user comfort while optimizing energy efficiency.

[Objectives] The design of an environmentally responsive building envelope must be based on integrated energy concepts, which enable an interaction between the envelope, the building and the environment. This course addresses general principles and framework that focuses on solar integrated building envelope systems. It will provide scientific and technological knowledge of an integrated nano solar skin façade in order to optimize the thermal and energy performance while balancing the daylighting and views. The goals of this course are: 1) In-depth knowledge about several façade related topics such as: facade principles, construction, and interactive materials 2) An understanding in the development process of a new innovative adaptive façade system, constructions and details. By the end of the semester, students will gain technical knowledge of sustainable façade systems that lead into testing the prototypes developed by them through the semester.

[Method] This will be a seminar-style class with considerable portion of time devoted to class discussion and presentation by students, model making and hands-on experience. Students work in a team to develop the design of an adaptive façade system, construction details, and performance analysis. The assignments and final project also address one or several issues related to the façade systems.

[Evaluation] Students will present their work to the class on several occasions during the semester. The final grades will be weighted through the following categories: Class attendance and participation 20%, Assignment presentations 30% Final Project 50%

[Texts] -- Hausladen, Gerhard et al (2008), Climate Skin: [Building-skin Concepts that Can Do More with Less Energy](#), Basel: Birkhauser
-- Knaack, Ulrich; Klein, Tillmann; Bilow, Marcel; Auer, Thomas. [Facades: Principles of Construction](#). Basel, Boston, Berlin: Brikhaeuser, 2007.

