Eco-Responsive - Next Generation Facades

Designing the Interaction Between Dynamic Façade and Environment

ARCH 4050/6050 – 6306 (3 Credits) – Thursday 9:30-12:15 Dr. Mona Azarbayjani, Email: mazarbay@uncc.du, Office 242

Premise: The exterior environment changes through 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.

Learning 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. The goals are:
1) In-depth knowledge about several façade related topics such as: (future) facade principles, façade construction and production, interactive façade materials
2) An understanding of and insight in the development process of adaptive façade constructions and details.
By the end of the semester, students will learn the technical and design knowledge of a sustainable eco responsive skin that will results in physical model of prototype.

Methodology: This will be a seminar-style class with a considerable portion of time devoted to class discussions, model making and hands-on experience. Students will work in a team to develop the design of an adaptive façade system, construction details, fabrications, and performance analysis. Lectures of the course are embedded within several themes: 1) Design adaptive façades, 2) Sustainability, climate and comfort 3) Production and assembly of adaptive façades, 4) Materials and next generation facades.

Outcome: Through this hands-on design course, student teams will accomplish the design scientific, technical, and policy solutions to sustainability challenges around the world.

Texts: Climate Skin by Gerhard Hausladen, Michael de Saldanha, Petra Liedl and Hermann Kaufmann (Feb 1, 2008). In Detail: Building Skins (In Detail (englisch))Oct 20, 2006 by Christian Schittich