

Building Enclosure Systems:

Bioclimatic and Ecological Approaches to Tall Building Enclosure Design

ARCH 505

Credit: 3 semester hours

Instructor: Jong-Jin Kim 734-763-3518 (o) daylight@umich.edu

Time: Monday 8:30 - 11:30 am

Location: Room 3146 Art and Architecture Building (Old Wing, 3rd Floor)

Office Hour: Wednesday 11:30-12:30 pm @ Room 1205B (By Appointment)

DESCRIPTION

This course is to examine new environmentally sustainable methods of designing building enclosure systems. The revision of seven decade old practice of building enclosures as single-layer curtain walls is the ultimate goal of the course. Bioclimatic design and eco-diversity are the key course themes. New functions of building facades, windows and walls, will be introduced, and their performance criteria will be examined. Various methods of assembling multifunctional enclosure systems will be investigated to enhance the thermal and visual comfort in building perimeter zones and to improve the energy efficiency and resource self-sustainability of opaque and transparent building skins. In the process, recent advancements in high-performance glass technology, daylighting systems, and solar and wind energy production methods will be examined. As the final outcome of the course, each student will develop an innovative artistic sustainable building enclosure system for a building type of his/her choice.

The main topics of the course include:

- 1) Thermal, visual and energy performance of windows and walls,
- 2) Enclosures for self-sustaining buildings,
- 3) Design-driven enclosures,
- 4) Double skin enclosures,
- 5) Sun control, daylighting, natural ventilation and vegetated facade, and
- 6) Proposals for a multi-functional resource-producing enclosure system.

INSTRUCTIONAL METHODOLOGY

In-person classroom lectures will be given on a specific topic each week. Bi-weekly assignments and projects will be issued to develop innovative façade design schemes for tall buildings. Student-driven research on emerging building technologies and products that could be applied to new façade assemblies will be an important pedagogy of the course.