ARCH 576 CLI
CLIMATE DESIGN (3 Credits)
Professor Dr. Ralph Hammann

Overview
The course introduces sustainable concepts for building enclosure design in various climate regions. We will first learn from examples of vernacular building and façade designs in hot-arid, hot-humid, and moderate climates and how these concepts may be used in creating modern buildings which use less energy, are more comfortable for users, provide a healthier environment, use extensive day lighting, and provide proper shading. The course will present the key metrics for determining wall enclosure and glazing efficiencies, such as R-/U-values, solar heat gain coefficients, emissivity, transmissivity, radiation and absorption and how they are calculated and applied. The seminar is organized into alternating lecture/discussion and case study sessions. There will be one field trip to Chicago at the beginning of the course.

Course Structure
The seminar consists of the following components:

a) Climate: What do we need to understand, How do we need to incorporate climate parameters. Why is this important. Understanding the Koeppen-Geiger Climate Classification, Introduction to the U.S. DOE Building Energy Codes Program and IEEC Climate Zones.


c) Advanced modern enclosure systems: Elements, functionality, strategies, materials and limitations. R-/U-values, vapor retarders, air infiltration barriers, glazing types, framing technology. Enclosure layer organization according to climate locations.

d) Tool Box:
(1) Introduction to thermal-hygric building enclosure analysis software WUFI Pro.
(2) Building enclosure analysis using FLIR thermal imaging.

Seminar requirements include one Final Exam (Multiple choice), one case study analysis and a WUFI® Pro Hygric and Thermal Simulation Exercise (Software available in Architecture Computer Lab).