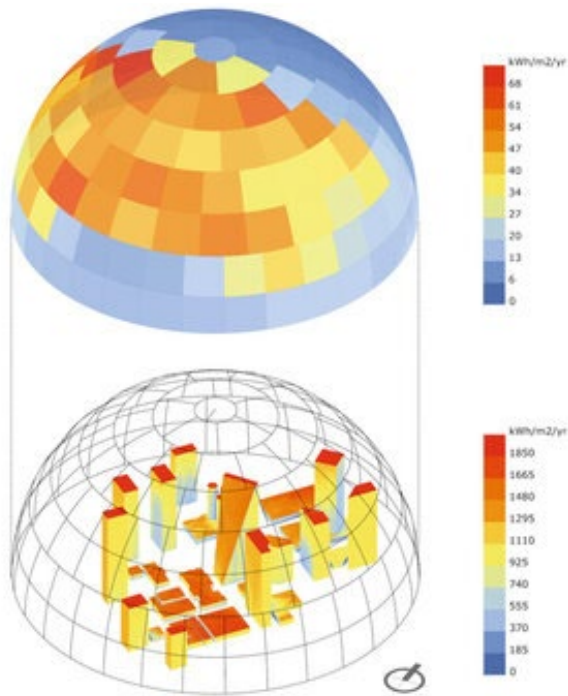




Carnegie Mellon University

School of Architecture
College of Fine Arts, CFA 201
Carnegie Mellon University
Pittsburgh, PA 15213



48-733: Environmental Performance Simulations (EPS)

Units: 9 or 12

Instructor: TBD

This course introduces fundamental knowledge in building physics in relation to a range of environmentally responsive building design principles and computational approaches for increased resiliency for human habitability with minimal reliance on mechanical systems. The course refreshes some of the fundamental building physics topics such as building thermodynamics (heat and mass transfer mechanisms), photometric quantification of light and luminous environment, human visual and thermal comfort (psychrometric and thermal modeling), and the principles of generating electricity from sunlight (photoelectric effect). Emphasis is given to understanding, analyzing, and simulating the natural thermodynamic principles and processes to get instant quantitative feedback for informed design explorations.

The course outlines a series of environmental design principles with emphasis on evidence-based design approaches and reviews of building case studies. Focus is also given to integration of multi-valent environmental design strategies into the early stages of performative architectures. EPS also introduces state-of-the-art architectural design and research oriented environmental performance simulation and visualization tools, and methods and techniques based on the algorithmic/parametric modeling ecosystem of Rhino-Grasshopper-Climate Studio programs. Computational introductions will be accompanied with pre-established workflows which are ready for future adaptation and extension by the students. These knowledgebase and skill sets are readily applicable to architectural research-oriented thesis studies and contemporary architectural practices in environmentally sustainable, high-performance, and user-centered design.