ARCH 6242
Building Physics Modeling

Fall 2017
3 credit hour seminar
School of Architecture

When & Where
T/Tr, 4:30 pm – 5:45 pm
Architecture West 260

Instructor
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Overview and Objectives
This course is a survey of basic thermo-fluid energy and mass flows in buildings (and building occupants!), the interrelations between these flows, and their implications for building performance goals such as occupant comfort and energy consumption. Objectives include the understanding and application of the following topics to buildings:

I. Thermodynamics
II. Heat transfer
III. Mass transfer
IV. Fluid flow
V. The physics of thermal comfort
VI. The combination of models of the above processes into a larger “system level” model

The ability to model a physical system, apply engineering judgment, and form a systems-level view are key outcomes of this course.

Procedures and Requirements
The approach will be to study each of these topics in isolation, and then to combine them as they are combined in buildings/building components (and people in the case of thermal comfort) to form a physics-based model of that building or building component. A typical class session will include a lecture or student presentation/lecture for half the period and group problem solving for the remainder; several classes will be devoted entirely to tutorials, project work sessions, or presentations and discussion. Students must come prepared to each class, in particular that the assigned readings have been done.

Coursework will consist of homework and project assignments, student presentations, and class exercises. Students will be graded based on class participation, technical understanding, and communication ability as revealed by homework/project assignment submittals and presentations.

Prerequisites
Familiarity with basic calculus is helpful; previous courses in physics are desirable.

Readings
Some lecture notes will be provided; two or three textbooks will be suggested but are not required for purchase; supplemental readings will be assigned. Part of this course will involve your finding materials for your own study.

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