ARCH 8803-JB
Facades Engineering

Spring 2017
3 credit hour seminar

When & Where
Tuesdays, 12:05pm – 2:55pm
Location: Van Leer C340

Instructor
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Overview
This course focuses on detailed thermal energy flows through facades and their implications for macroscopic building envelope characteristics and overall building performance goals such as energy use. Topics include the following:

I. Thermodynamics and heat transfer in general, but with an emphasis on:
   i. Multidimensional thermal conduction
   ii. Thermal convection and radiation at, within, and through facades
II. Basic graphical and numerical solution techniques for heat transfer
III. Mass transfer, i.e. moisture transport through facades and associated impacts
IV. Use of established thermal analysis software packages, e.g. THERM, WINDOW, and WUFI
V. Analysis of detailed facade design and its impact on macroscopic facade parameters and overall performance

At the completion of this course, you should be able to:

1. Understand basic thermal and mass transfer processes sufficiently to model flows of energy and mass through facade elements
2. Solve simple multidimensional heat transfer problems using the finite difference technique
3. Conduct multidimensional and multimodal thermal analyses, one-dimensional mass transfer analyses as applied to facades, and interpret their results via:
4. Use of prepackaged thermal analysis software such as THERM, WINDOW, and WUFI
5. Apply this knowledge and these techniques in the design of facades

Coursework will consist of readings, class exercises, and projects. Grading will be based on:

1. Participation in class, including presentations: 30%
2. Project submittals, both oral and hard copy: 60%

Readings
Handouts will be provided.

Prerequisites
None, but familiarity with basic calculus is helpful; previous courses involving physics are desirable, particularly ARCH 6242.