



**INSTRUCTOR** Jason Brown  
Hinman 358B  
jason.brown@gatech.edu

**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 ‘from scratch’ simple flows of energy and mass through facade elements
2. Solve simple multidimensional heat transfer problems using the finite difference technique
3. Conduct complex multidimensional and multimodal thermal analyses, one-dimensional mass transfer analyses as applied to facades, and interpret their results via use of prepackaged thermal analysis software such as THERM, WINDOW, and WUFI
4. 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.