

Prof. David Cahill

1008 Materials Research Laboratory

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course homepage: <http://users.mrl.uiuc.edu/cahill/307/matse307.html>

office hours: Monday, Tues, Wednesday, 11:00–12:00, and by appointment.

instructor: John Bukowski, bukowski@illinois.edu

teaching assistants: David Baker, Robert Smith, Michael Chiang, Khoi Nguyen, Tian Li

SCHEDULE AND LOCATION: Lectures meet Monday and Tuesday 1–1:50 in 218 Ceramics Building for the first $\approx 1/3$ of the semester. After that, we will use this time as a “drop-in” session for discussion of labs and lab reports. Labs meet in the Kiln House, 2–4:50. Lab sections will meet the first week of class to divide the students into three groups and into teams of 2–3 students. The lab experiments will begin the week of August 31. The first three labs will run for 6 weeks and then we will pause for one week (the week of Oct. 12) so that the instructors can prepare the next set of labs. The labs will then run for another 6 weeks; the last week of lab is the week of November 30.

OBJECTIVES: Your goal as a student in this course should be to advance your understanding and skills in materials science, experimental methods, data acquisition and analysis, presentation of data, error analysis, and written communication.

PREREQUISITES: Credit or concurrent registration MSE 401 (Thermodynamics) and MSE 406 (Thermal-Mechanical Behavior).

NO EXAMS; NO QUIZZES; NO FINAL.

HOMEWORK: Problem sets drawn from the required text will be assigned the first few weeks of the semester. The problem sets will be due in class one week after they are assigned; problem set assignments will be posted at the course homepage. Solutions will be posted at the Compass site. A penalty of 10% per day (linear, not exponential decay) will be subtracted if problem sets are turned in late.

LABORATORY: You will work in groups of two (and sometimes three students); each student should keep their own laboratory notebook and each student will turn in their own report laboratory report. Each experiment will extend over 2 weeks. The final laboratory report will be due in the laboratory one week after the completion of each lab. The TAs will return the graded reports one week later. The first and fourth laboratory reports will require a re-write: after getting feedback from the TAs, you will submit a revised report one week after the TAs have returned the graded first-draft of your report. Grades will be determined by the clarity and completeness of the written descriptions (experimental approach, results, discussion, error analysis); the clarity and completeness of the figures (schematics of the experiment, raw data, analysis of data, summaries and comparisons of results, error analysis); and the depth and accuracy of your analysis. You are strongly

encouraged to use Origin or some other scientific software for preparing figures. (Creating a high-quality plot of data in a business application such as Excel can be challenging.) A penalty of 10% per day will be taken off for late lab reports.

GRADING: The following weighting factors will be used to determine your final grade:

six lab reports 96 %
problem sets 4 %

Grades will be assigned using the following scale:

A⁺=98-100%, A=93-97%, A⁻=90-92%

B⁺=88-90%, B=83-87%, B⁻=80-82%

C⁺=78-80%, C=73-77%, C⁻=70-72%

D⁺=68-70%, D=63-67%, D⁻=60-62%

E<60%

At my discretion, the minimum score to earn a certain letter grade may be lowered but it will not be raised.

TEXT: "An Introduction to Error Analysis" by J. Taylor (University Science Books, 1996). Additional reading will be posted at the Compass site including selected chapters from "Thermal Analysis of Materials" by R. Speyer and "Principles of Thermal Analysis and Calorimetry" by P. Haines.

SUPPLIES: You should bring with you to lab sessions a notebook, a USB memory stick for transferring data, and safety glasses.