

MSE 10 – Intrigue of Everyday Materials in a High-tech World

Instructor: Christopher Viney, Sarah Kurtz, Roberto Andresen, Beth Nowadnick, Jessica Wang

Email: Please refer to CatCourses information or come to office hours first, and use email as a last resort skurtz@ucmerced.edu

Office location: SE2 284

Office hours: TBD.

Class time: Mondays 11:30-12:20 pm

Class location: COB2 262

Lab time: Fridays 10:30-1:20 pm

Lab location: COB2 263 for Fridays

Materials: No textbook required. Assigned readings will be provided on CatCourses.

Prerequisites: None.

Catalog Course Description: Focuses on the special properties of everyday materials. Identifies a series of materials, provides a lecture on the special properties of each material, and asks students to complete an experiment studying each material's properties. Students will collect and evaluate data to distinguish between the behavior of different materials, and relate the resulting observations back to other materials in our world. Includes each week a 1-hour lecture and a laboratory experience.

Course Goals: Students will be introduced to materials science in ways that are relevant to each student's everyday life. Students will learn and demonstrate their ability to collect data, evaluate that data, draw conclusions from the data, and apply that knowledge to related materials.

Course Learning Outcomes: Students will learn:

1. About properties of materials around them including mechanical, thermal, optical, etc. (PLO 1)
2. What materials science is and how it is relevant to our everyday lives. (PLO 4,7)
3. To think critically about procedures and observations. (PLO 1-3,6,7)
4. To record observations and evaluate data, including analyzing uncertainty. (PLO 1,5,6)
5. To relate the results of the evaluation of the data to the conclusion of the experiment and communicate those results. (PLO 1,3,6)

Course Learning Outcomes 3-5 are designed to develop quantitative reasoning as expected for General Education. (Note: the course may also meet the Area A Approaches to Knowledge requirement for engineering).

Program Learning Outcomes (PLOs):

The Course Learning Outcomes will contribute to meeting the following PLOs:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;
3. an ability to communicate effectively with a range of audiences;
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Student Evaluation:

Students will be graded based on their completion of the experiment each week. There will also be weekly quizzes to test understanding of the previous week, a midterm and a final.

Detailed guidelines and due dates for the graded items will be provided as they are introduced during the semester. Please note that *lab reports* must always be completed to reflect each student's personal understanding of the work. Working together to better understand concepts is encouraged, but the results should never be copied.

Graded Items	Percentage of Final Grade
Quizzes	10%
Lab reports	55%
Midterm exam	15%
Final exam	20%

Class Guidelines and Useful Information:

1. **Attendance Policy:** Attendance is required in the course and will be recorded daily.
2. **Individual Work Policy:** Students are encouraged to work together so that they learn more, but the final work product must reflect the individual's personal understanding. Copying answers is never acceptable (either from another student or out of a book), but asking questions and explaining things to each other is highly encouraged. It is anticipated that some labs will be done with partners, in which case we anticipate that the data may be identical, but each student should present their independent evaluation of the data.
3. **Late Assignment Policy:** Assignments must be turned in at the indicated due date. Late assignments will be penalized depending on how late they are.

4. **Extensions:** On a case-by-case basis for emergencies and unusual circumstances, a penalty-free extension to turn in a graded item may be allowed. Dr. Kurtz has the sole authority to determine whether an extension will be granted and may require proof.
5. **Classroom Resources:** Laptops may only be used during class for note-taking purposes. The PowerPoint lectures will be posted on CatCourses after each class.
6. **Submitted Work:** All work will be submitted through CatCourses.

UC Merced policies and additional information

Catcourses includes a file

“AY2122-Resources_Policy.pdf”

under Resources and Policy that includes “Academic Honesty Policy”, “Accommodations for Students” and other useful information. This information will no longer be provided in the syllabus, but can always be accessed on CatCourses. Please familiarize yourself with this helpful information.

Course Schedule (subject to revision; any updates will be announced):

Week	Dates	Instructor	Topics
1	8/27	Kurtz/Viney	Introduction
2	8/30, 9/3	Kurtz	Melting/dissolving materials
3	9/10	Kurtz	Spreadsheet exercise
4	9/13, 9/17	Nowadnick	Hot materials (Materials and temperature)
5	9/20, 9/24	Andresen	Stiff materials
6	9/27, 10/1	Viney	Sticky materials
7	10/4, 10/8	Kurtz	Buoyant materials
8	10/11, 10/15	Kurtz	Review and midterm
9	10/18, 10/22	Wang	Colored materials
10	10/25, 10/29	Viney	Stretchy materials
11	11/1, 11/5	Kurtz	Illuminating materials.
12	11/8, 11/12	Viney	Absorbent materials
13	11/15, 11/19	Viney	Durable materials I
14	11/22	Viney	Careers in MSE
15	11/29, 12/3	Viney	Durable materials II
16	12/6, 12/10	Kurtz/Viney	Review/Wiggle room
17	12/17	Kurtz	Final exam – Take home

No class

- Monday, Sept 6
- Friday, Nov. 26

Format of lab report:

1. Objective or question being answered

2. Data

- All data need to have units of measure
- Use significant digits or other indication of uncertainty

3. Conclusions (answer to the question), including answers to some or all of the questions below

- What was the basis of the conclusion (show calculation or explain your logic)?
- What might change the conclusion?
- What would you do differently if you did the experiment again?
- What did you learn?
- How confident are you of your conclusions? (Why do you question your conclusions?)