

CENG 1500: A first course on materials science and applications

Lectures: Monday 13:30 – 14:50
Friday 9:00 – 10:20

Location: LTD

Tutorials: Monday 18:00 – 18:50
Location: LTC

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Course description

This is an introductory course to give students a foundation knowledge on the science and engineering of materials. The course will apply the basics of physics and chemistry to the properties of materials. Students will learn how atomic and microscopic properties affect the macroscopic levels, how materials' structures can be engineered to achieve desired properties, and what unique tools are used to study materials properties.

Textbook

James F. Shackelford. Introduction of Materials Science for Engineers, 9th Ed.

Course objectives

As a result of this course, you will be able to

- Understand the basic building blocks of materials.
- Explain structural and property relationships.
- Evaluate materials for different applications.

Grade breakdown

- Homework (6) – 18 %
- Mid-terms (2) – 50 %
- Final (1) – 32 %

Teaching schedule

This schedule is tentative and subject to change at my discretion.

Week	Topic	
1	Atomic structure	
2	Bonding and Crystal structure	HW 1 assigned
3	Crystal structure	
4	Imperfections	HW 2 assigned
5	Diffusion	
6	Mechanical properties	HW 3 assigned
7	Dislocations and failure	MT 1
8	Phase diagrams	
9	Phase transformations	HW 4 assigned

10	Mid-term break	
11	Polymers	HW 5 assigned
12	Semiconductors	
13	Electrical properties	MT 2
14	Thermal properties	HW 6 assigned
15	Optical properties	

Homework

Homework are due via Canvas. No late submission is allowed unless prior arrangements are made with the instructor for valid excuses.

You are encouraged to work in a small group (no more than three students), yet you should clearly write down who you work with. You should indicate their full formal name under your name. You should still submit your individual homework that is written in your own words. Verbatim copying of other students' solutions or of external sources are NOT allowed.

Mid-terms

You are allowed to have a cheat sheet for the mid-terms. Your cheat sheet is limited to one side of 3"x5" index card which will be checked on the day of mid-term.

There will be no makeup exams. If you have a valid reason for missing the exam, you should talk to the instructor at the earliest possible.

Final

Final will be a comprehensive exam covering all the contents taught in the course. You are allowed to have a single two-sided cheat sheet of 3"x5" index card which will be checked on the day of the final.

Re-grading policy

If you would like to request a re-grade, you will need to perform the followings.

You will need to submit a written request to the instructor containing

- Name, student ID
- Assignment/exam in question, problem number in question
- A written description of the suspected mis-grading. You should clearly state the valid reasons for needing a re-grade.
- Your original assignment/exam

Simple fixes such as addition errors will be rectified immediately.

Upon your submission of re-grading request, instructor may reject or completely re-grade the entire question. This can result in lowering or increasing your grade. Results of the re-grading will be final.

Cheating and Plagiarism

Academic integrity and honesty are the key values at HKUST. All students should uphold the [Academic Honor Code](#).

The course has zero tolerance policy to cheating and plagiarism. Students caught cheating will receive a failing grade.