



Course Title

Introduction to Materials Science and Engineering (0581-2111)

Lecturer

Prof. Oswaldo Diéguez (dieguez@tau.ac.il)

Semester

1/2025

Course requirements

This is a second-year undergraduate course designed for a materials science and engineering degree. It is expected that you have been exposed to beginning-level university courses in **physics, chemistry, and mathematics**. The courses that the Faculty of Engineering demands as **prerequisites** are **mandatory**.

Final grade components

Attendance: Attendance to class is not mandatory, but you get 5 points per lecture in which you are in class (no points for remote attendance), till a maximum of 100 points. It counts **5%** for your Final Grade if it is higher than your Exam Grade.

Homework: Your Homework Grade will be evaluated by averaging the results of submitting your homework sheets (the worst performance in those will be discarded). It counts **10%** for your Final Grade if it is higher than your Exam Grade.

Exam: **85%** to **100%** of the Final Grade, depending on your Attendance Grade and Homework Grade.

Course schedule

Module	Subject and Requirements (assignments, reading materials, tasks, etc.)
1	<i>Introduction</i>
2	<i>The Atom</i>
3	<i>Atomic Bonding</i>
4	<i>The Atomic Structure of Materials</i>
5	<i>Crystal Structures</i>
6	<i>Points, Directions, and Planes in Crystals</i>
7	<i>X-Ray Diffraction</i>
8	<i>Point Defects</i>
9	<i>Miscellaneous Imperfections</i>
10	<i>Microscopic Examination of Defects</i>



11	<i>Diffusion I</i>
12	<i>Diffusion II</i>
13	<i>Dislocations and Plastic Deformation</i>
14	<i>Mechanisms of Strengthening in Metals</i>
15	<i>Recovery, Recrystallization, and Grain Growth</i>
16	<i>Basics of Phase Diagrams</i>
17	<i>Binary Phase Diagrams</i>
18	<i>The Iron-Carbon System</i>
19	<i>Phase Transformations</i>
20	<i>Microstructure of Iron-Carbon Alloys</i>
21	REVIEW
22	REVIEW

Required course reading

There will be no required reading. The slides used in class will be available for download.

Optional course reading

This course covers topics presented in textbooks such as:

- *Materials Science and Engineering: An Introduction*, by William D. Callister, Jr. and David G. Rethwisch (Wiley, 2018).
- *The Science and Engineering of Materials*, by Donald R. Askeland and Wendelin J. Wright (Cengage, 2020).
- מבוא להנדסת חומרים, ד. אלון, ג. ברנדון, ש. נדיב, א. רוזן (מכלול, 1974)

Comments

This Course is taught in English.

The lecturer plans to **stream** and **record** each lecture.

All the material of this Course will be available in our Moodle page.