

Course Syllabus for ENGR 2300

Course Title: ENGR 2300: Materials Engineering

Prerequisite: MATH 1315; CHEM 1341

Besides Chemistry your mathematical skills are also important in this course.

Instructor: Dr. Jitendra S. Tate

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Required Text:

Callister, W.D. (7th Ed.). Materials Science and Engineering an Introduction. John Wiley & Sons,

ISBN: 0-471-73696-1.

Reference Book:

Smith, W.F. (2006). Principles of Materials Science and Engineering. McGraw-Hill, Inc., New York, NY 4th Ed.

Course Description:

Engineering 2300 deals with the science and engineering of materials. Materials, for our purposes, may be defined as all matter used to produce manufactured or common goods. The successful utilization of materials requires that they satisfy a set of properties. These properties can be classified into physical, mechanical, chemical, electrical, thermal, and optical. Properties are very intimately connected to the structure of materials. This structure, in turn, is dependent on prior processing and synthesis. Thus, the treatment of the structure and properties of engineering materials is the main objective of this course.

Course Objectives:

- Develop the knowledge of the language of materials science and engineering.
- Be able to define the structure of materials, including crystallography, microstructure, defects, and phase diagrams
- Be able to relate structure-property relationships and define the properties of materials including mechanical, thermal, electrical, magnetic, and optical.
- Understand the properties and applications of advanced materials including polymers, ceramics, and composites
- Be able to select proper material for given application with technical reasoning

Topics Covered:

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| • Introduction | • Phase Diagrams |
| • Atomic Structures and Interatomic Bonding | • Metal Alloys |
| • The Structure of Crystalline Solids | • Ceramics |
| • Imperfection in Solids | • Polymers |
| • Diffusion | • Composites |
| • Mechanical Behavior | • Electrical, Magnetic, and Optical Properties |
| • Thermal Behavior | |

Evaluation:

Homeworks/Unannounced Quizzes	-	10%
Mid-Term	-	30%
Group Project	-	30%
Final Exam	-	30 %
TOTAL		100%

Attendance (unexcused)

Reduction of 2% per day absence in final grade

Grading (Scale: 90-100 (A), 80-89.9 (B), 70-79.9 (C), 60-69.9 (D), 59.9 or less (F)):

Absences:

Absences are not recommended in general (**Reduction of 2% per day unexcused absence in final grade**). All departmental and University policies on academic integrity and absences apply and should be taken very seriously.

General Policies and Procedures:

- 1) NO food or drinks are permitted in the classroom.
- 2) NO smoking or tobacco use of any kind in the lab or classrooms per state law.
- 3) NO cell phone use during appointed class times.
- 4) Instructor DOESN'T accept late homework/assignment/project unless there exists legitimate excuses (illness, death in the family, etc.) and adequate documentation is furnished.
- 5) Instructor DOESN'T give make-up quiz or, test or, project or, homework unless there exists legitimate excuses (illness, death in the family, etc.) and adequate documentation is furnished.
- 6) Instructor DOESN'T curve grade under any circumstances.
- 7) Coming late and leaving early is totally unacceptable. You will be marked absent if you do so. If you have to leave early, talk to instructor before class begin.

TRACS

- 8) You must check your emails regularly and also need to visit 'TRACS' for important announcements, due dates, course documents, and assignments.
- 9) All important presentations will be uploaded on 'TRACS'. These presentations are copyrighted and are only for your convenience. These presentations should not be shared/e-mailed to any students/faculties/staff not related to this course outside or, at Texas State University - San Marcos.
- 10) It is the student's responsibility to obtain class notes, handout materials, if any, etc. when a scheduled lecture is missed. Most of the course material will be uploaded on TRACS.

Special Needs:

Students with special needs (as documented by the Office for Disability Services) should identify themselves to the instructor at the beginning of the semester so that provisions for accommodation can be made.