

Syllabus 635:203
Introduction to Materials Science and Engineering
Fall 2014

1. **Course Number and Name:** 14:635:203 – Introduction to Materials Science and Engineering
2. **Credits and Contact Hours:** 3 credits, 45 contact hours
3. **Instructors' Names:** Prof. Laura Fabris
4. **Textbook, Title, Author, and Year (recommended):**

Materials Science and Engineering: An Introduction. W. D. Callister, D. G. Rethwisch. 9th Ed., John Wiley and Sons, New York (ISBN 978-0-470-41997-7)

- a. Supplemental materials: Handout material from instructor.

5. Specific Course Information:

a. Brief description of the content: This is an introductory course for second year students in the Department of Materials Science and Engineering that lays the foundations for the subsequent more advanced courses. The course requires the previous knowledge acquired in freshman calculus, chemistry, and physics.

- b. Prerequisites or co-requisites: Freshman chemistry, calculus, and physics.
- c. Required, elective, or selected elective? Required.

6. Specific Goals for the Course:

- a. Specific outcomes of instruction:

The student will gain a basic knowledge of metals, polymers, and ceramics, along with some aspects of nanomaterials. He or she will also learn the fundamental properties of materials, along with the fundamental aspects of phase diagrams and the concepts of degradation and failure. At the end of this course the student will be familiar with the basic notions required to attend the more advanced courses of the MSE curriculum.

- b. Student outcomes listed in Criterion 3, or other.

Outcomes	This Course, %
Function on multi-disciplinary teams	15
Professional ethics	5
Communicate effectively	15
Engineering solutions in global, economic environmental and society context	5
Modern techniques, skills, tools for practice	10
Structure, Properties, Processing, Performance	50

- 7. Brief List of Topics Covered:** Atoms, Bonding, Basic Chemistry.
Introduction to Crystal Chemistry.
Introduction to Metals.
Introduction to Ceramics.
Stress and Strain. Defects.
Phase Diagrams.
Introduction to Polymers.
Degradation and Failure.
Thermal Properties.
Magnetic Properties.
Electrical Properties and Electronic Materials.
Optical properties and Materials.
Introduction to Liquid Crystals.
Introduction to Nanomaterials.

8. Assessment and Grading:

The assessment will be based on the following:

1. Homework given on a bi-weekly basis (5%).
2. Group presentation on selected topics agreed with the instructor. The students will be divided in groups early in the semester and will be able to work on the project as soon as possible (10%).
3. Two midterms (20% each).
4. Final exam covering the entire program (40%).
5. Attendance (mandatory, 5%).

9. Code of Conduct:

All course material, including notes, labs, quizzes, tests, exams, etc. are Dr. Fabris' intellectual property, are provided for the sole purpose of educational instruction, and should not be shared with third parties. Should any type of infringement take place, all individuals suspected of being responsible will immediately be referred to the Office of Student Conduct for appropriate sanctioning.