

MSE 1111: Introduction to Materials Science and Engineering

Credit hours and contact hours: 0-0-3-1

Instructor: Rosario Gerhardt

Textbook: Mark Miodownik, *Stuff Matters: Exploring the Marvelous Materials That Shape Our Man-Made World*, Mariner Books, 2014.

Specific course information

Catalog description: A general introduction to the field of Materials Science and Engineering and the MSE curriculum at Georgia Tech.

Prerequisites: None

Course: Required

Specific goals for the course

Outcomes of instruction:

1. Describe basic materials types and relate their significance in everyday use.
2. Describe and apply correct ethics and professionalism in science and engineering.
3. Describe and implement safe practice in laboratories.
4. Be able to work as part of a team to write a technical report about a material issue.

Student Outcomes:

- (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 for 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.

Topics covered:

1. Materials major and options
2. CES EduPack Software

3. Technical Communications
4. Research Ethics
5. Laboratory Safety
6. Materials Entrepreneurship
7. 3D printing lab
8. Measurements lab
9. Basics of Engineering Design
10. Metals processing and applications
11. Glass and ceramic materials
12. Polymer properties and applications
13. Bio-enabled/biomimetic materials
14. Carbon fiber and paper fabrication and applications
15. Magnetic materials and applications

Correlation between Outcomes of Instruction and Student Outcomes:

Outcomes of Instruction	Student Outcomes						
	1	2	3	4	5	6	7
1. Describe basic materials types and relate their significance in everyday use.				X			
2. Describe and apply correct ethics and professionalism in science and engineering.				X			
3. Describe and implement safe practice in laboratories.		X					
4. Be able to work as part of a team to write a technical report about a material issue.			X		X		

School of Materials Science and Engineering Student Outcomes:

- (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 for 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.