

MTSE 301 – 002

SPRING 2017

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Classes meet: Monday – 2:30 – 3:55 PM, Thursday– 1:00 – 2:30 PM, FMH 313

PREREQUISITE: Phys 111 and Phys 121, Chem 125 and Chem 126, Math 111 and Math 112 or equivalent.

TEXTBOOK: “FOUNDATIONS OF MATERIAL SCIENCE AND ENGINEERING”

William F. Smith, Javad Hashemi, Fifth Edition

McGraw-Hill, Inc.

Office Hours -Monday: 10:00 –11:25 am Wednesday: 1:00 – 2:30 pm

YOUR FINAL LETTER GRADE in MTSE 301 will be based on a composite score for term’s work that includes the exam scores, the final exam score, lecture quizzes scores and the homework scores. Here are the approximate weights to be used for calculating the composite score:

Exam 1 = 25% Exam 2 = 20% Final Exam = 35% Homework = 10% Lecture Quizzes = 10%

The cutoff percentages for various letter grades will be in the range of 80% for A, 75 % for B+, 68% for B, 60% for C+, 52% for C, 48% for D and F below 48 %. **Final grades are not negotiable: A score of 84.999% is a B+, not an A.**

HONOR CODE STATEMENT: As a student at New Jersey Institute of Technology, you are obliged to comply with the provisions of the NJIT Academic Honor Code. Any violations of NJIT Honor Code will be brought to the attention of the Dean of Students.

LEARNING OUTCOMES

For this course you can expect to be assessed on the following learning outcomes:

1. Comprehend the interrelations among structure, properties and performance of engineering materials.
2. Apply the principles of crystallography to understand the structure of materials.
3. Understand the effect of solid state imperfection on diffusion and mechanical properties of materials.
4. Analyze phase diagrams of binary alloy systems.
5. Understand the mechanical, electrical and optical properties of metals, semiconductors, ceramics and polymers
6. Apply the equations governing different processes in solid materials. Calculate unknown quantities based on physical relationships, boundary conditions, and known quantities.

IMPORTANT DATES

SPRING RECESS – MARCH 12-19

MAY 2 - FOLLOWS FRIDAY SCHEDULE

READING DAY 1 - MAY 3

READING DAY 2 – MAY 4

FINAL EXAM PERIOD – MAY 5 -11

<u>Date</u>	<u>Text Assignment</u>	<u>Homework</u>
<i>Atomic Structure and Bonds</i>		
01/19	Chapt. 2 Sect. 2.1 – 2.4	2.17, 2.26, 2.27, 2.75, 2.83, 2.85, 2.86
01/23	Chapt. 2 Sect. 2.5 – 2.6	
<i>Crystal and Amorphous Structure in Materials</i>		
01/26	Chapt. 3 Sect. 3.1 – 3.6	3.22, 3.30, 3.35, 3.50, 3.53, 3.64, 3.72,
01/30	Chapt. 3 Sect. 3.9 – 3.12	3.76
<i>Solidification, Crystalline Imperfections, Diffusion in Solids</i>		
02/02	Chapt. 4 Sect. 4.1 – 4.5	4.6, 4.23, 4.27, 4.33, 4.42, 4.51
02/06	Chapt. 5 Sect. 5.1 – 5.4	5.10, 5.12, 5.17, 5.24, 5.30, 5.42
<i>Mechanical Properties of Metals I</i>		
02/09	Chapt. 6 Sect. 6.1 – 6.5	6.13, 6.17, 6.21, 6.24, 6.25, 6.30, 6.44
02/13	Chapt. 6 Sect. 6.6 – 6.10	6.49, 6.57, 6.58, 6.62, 6.77
<i>Mechanical Properties of Metals II,</i>		
02/16	Chapt. 7 Sect. 7.1 – 7.3	7.13, 7.17, 7.19, 7.20, 7.24, 7.29, 7.35
02/20	Chapt. 7 Sect. 7.4 – 7.7	7.38, 7.47
<i>Phase Diagrams, Engineering Alloys</i>		
02/23	Chapt. 8 Sect. 8.1 – 8.10	8.8, 8.10, 8.21, 8.22, 8.24, 8.25, 8.45, 8.53

FEBRUARY 27

EXAM 1

<i>Engineering Alloys</i>		
03/02	Chapt. 9 Sect. 9.2 – 9.4, 8	9.6, 9.21, 9.24, 9.32, 9.39, 9.42, 9.61, 9.64
03/06	Chapt. 9 Sect. 9.5 – 9.7, 9	9.66, 9.68, 9.109
<i>Polymeric Materials</i>		
03/09	Chapt. 10 Sect. 10.1 – 10.4	10.9, 10.13, 10.22, 10.59, 10.60, 10.62, 10.64
03/20	Chapt. 10 Sect. 10.6, 10.10-10.12	10.83, 10.87, 10.135, 10.138 10.200
<i>Ceramics</i>		
03/23	Chapt. 11 Sect. 11.1 – 11.5	11.7, 11.10, 11.15, 11.28, 11.29, 11.67, 11.72
03/27	Chapt. 11 Sect. 11.6 – 11.11	11.74, 11.80, 11.86, 11.89, 11.112

MARCH 30

EXAM 2

<i>Composite Materials</i>		
04/03	Chapt. 12 Sect. 12.1 – 12.3	12.8, 12.36, 12.38, 12.41, 12.44, 12.79
04/06	Chapt. 12 Sect. 12.10 – 12.11	12.85, 12.86, 12.88, 12.105
<i>Corrosion</i>		
04/10	Chapt. 13 Sect. 13.1 – 13.4	13.21, 13.39, 13.41, 13.42, 13.49, 13.54
04/13	Chapt. 13 Sect. 13.4 – 13.7	13.61, 13.79, 13.81
<i>Electrical Properties of Materials</i>		
04/17	Chapt. 14 Sect. 14.1 – 14.3	14.7, 14.9, 14.14, 14.20, 14.23, 14.40, 14.46, 14.47
04/20	Chapt. 14 Sect. 14.4, 7, 8	14.48, 14.71, 14.73, 14.75, 14.81, 14.91, 14.96

<u>Date</u>	<u>Text Assignment</u>	<u>Homework</u>
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	<i>Optical Properties of Materials</i>	
04/24	Chapt. 15 Sect 15.1 – 15.4	15.3 15.10, 15.13, 15.14, 15.19, 15.38,
04/27	Chapt. 15 Sect 15.5 – 15.7	15.40, 15.43, 15.47, 15.49, 15.54
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	<i>Biological Materials and Biomaterials</i>	
05/01	Chapt. 17 Sect.17.1- 17.8	Reading only Review for Final
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