

Fall 2020

MTSE 301-003: Materials Science

Oktay Gokce

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Instructor: Dr. Oktay H Gokce
Office: TIER 456
Tel: 973 596-3571 E-mail: gokce@njit.edu

Class meeting schedule:

Section 001: *Monday – 11:00 AM – 12:20 PM, Thursday– 11:00 AM – 12:20 PM, Synchronous Online*

Section 003: *Monday – 2:30 PM – 3:50 PM, Thursday– 2:30 – 3:50 PM, Synchronous Online*

Office Hours: To be Announced

The course webpage is at Canvas: <https://canvas.njit.edu/> use your NJIT UCID and password to login.

Webex platform will be used for the synchronous online courses. Conference invitation messages for the class meetings will be sent to your NJIT email addresses.

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, Sixth Edition (or Fifth Edition)*, McGraw-Hill, Inc.

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

Exam 1 = 25% Exam 2 = 25% Final Exam = 30% Homework = 10% Lecture Quizzes = 10%

The conversion of numerical to letter grades is as follow:

> 80% A; >75% to 80% B+; >66 %to 75% B; >58%-66% C+; >50%-58% C; <50% D and F.

COURSE POLICIES

In order to insure consistency and fairness in application of the NJIT policy on withdrawals, student requests for withdrawals after the deadline (*end of the 10th week of classes*) will not be permitted unless extenuating circumstances are documented **through the Office of the Dean of Students**. The course instructor and the Dean of Students are the principal points of contact for students considering withdrawing from a course. When a student invokes extenuating circumstances for any reason (late withdrawal from a course, request for a make-up exam, request for an Incomplete grade) the student will be sent to the Dean of Students Office. The Dean of Students will be making the determination of whether extenuating circumstances exist or not and will be notifying the instructor accordingly. Instructors should never request or accept medical or other documents from students; such documents need to be submitted by the student to the Dean of Students.

Missed lecture quizzes : There are no make-ups for in-class activities. If you miss a lecture quiz, you will receive a grade of zero. Students who anticipate an absence from an lecture quiz should discuss their situation with their instructor PRIOR TO their absence.

HONOR CODE

"Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the

university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu”

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 imperfections 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.

COUNSELING AND ACADEMIC SUPPORT: The Center for Counseling and Psychological Services is **committed to assisting students experiencing high levels of personal challenge and stress.** If you need accommodations due to a disability, please contact Ms. Chantonette Lyles, Associate Director of Disability Support Services, Fenster Hall Room 260 to discuss your specific needs.

Date / Text Assignment / Homework

Week 1- Atomic Structure and Bonds

Chapt. 2 Sect. 2.1 – 2.4

Chapt. 2 Sect. 2.5 – 2.6

Week 2 - Crystal and Amorphous Structure in Materials

Chapt. 3 Sect. 3.1 – 3.6

Chapt. 3 Sect. 3.9 – 3.12

Week 3 - Solidification, Crystalline Imperfections, Diffusion in Solids

Chapt. 4 Sect. 4.1 – 4.5

Chapt. 5 Sect. 5.1 – 5.4

Week 4 - Mechanical Properties of Metals I

Chapt. 6 Sect.6.1 – 6.5

Chapt. 6 Sect. 6.6 – 6.10

Week 5 - Mechanical Properties of Metals II

Chapt. 7 Sect. 7.1 – 7.7

Week 6 - Phase Diagrams, Engineering Alloys

Chapt. 8 Sect. 8.1 – 8.10

EXAM 1

Week 7 - Engineering Alloys

Chapt. 9 Sect. 9.2 – 9.4, 8

Chapt. 9 Sect. 9.5 – 9.7, 9

Week 8 - Polymeric Materials

Chapt. 10 Sect. 10.1 – 10.4

Chapt. 10 Sect. 10.6, 10.10-10.12

Week 9 - Ceramics
Chapt. 11 Sect. 11.1 – 11.5
Chapt. 11 Sect. 11.6 – 11.11

EXAM 2

Week 10 - Composite Materials
Chapt. 12 Sect. 12.1 – 12.3
Chapt. 12 Sect. 12.10 – 12.11

Week 11 - Corrosion
Chapt. 13 Sect. 13.1 – 13.4
Chapt. 13 Sect. 13.4 – 13.7

Week 12 - Electrical Properties of Materials
Chapt. 14 Sect. 14.1 – 14.3
Chapt. 14 Sect. 14.4 - 14.6
Chapt. 14. Sect. 14.7 – 14.8

Week 13 - Optical Properties of Materials
Chapt. 15 Sect 15.1 – 15.4
Chapt. 15 Sect 15.5 – 15.7

Week 14 - Biological Materials and Biomaterials
Chapt. 17 Sect.17.1- 17.8 Reading only
Review for Final

Fall 2020 Academic Calendar

September	1	Tuesday	First Day of Classes
September	7	Monday	Labor Day
September	8	Tuesday	Monday Classes Meet
September	8	Tuesday	Last Day to Add/Drop a Class
September	8	Tuesday	Last Day for 100% Refund, Full or Partial Withdrawal
September	9	Wednesday	W Grades Posted for Course Withdrawals
September	14	Monday	Last Day for 90% Refund, Full or Partial Withdrawal - No Refund Partial Withdrawal after this date
September	28	Monday	Last Day for 50% Refund, Full Withdrawal
October	19	Monday	Last Day for 25% Refund, Full Withdrawal

November	9	Monday	Last Day to Withdraw
November	25	Wednesday	Friday Classes Meet
November	26	Thursday	Thanksgiving Recess Begins
November	29	Sunday	Thanksgiving Recess Ends
December	10	Thursday	Last Day of Classes
December	11	Friday	Reading Day 1
December	14	Monday	Reading Day 2
December	15	Tuesday	Final Exams Begin
December	21	Monday	Final Exams End
December	23	Wednesday	Final Grades Due