

University of Alberta

Department of Chemical and Materials Engineering

MAT E 201

MATERIALS SCIENCE

Course Outline, September 2021

Time: MWF 11:00 – 11:50

Lecturer:

Camila Santander, MSc,
Sessional Professor

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Lead grader:

Mr. Jose Velasco
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Textbook

- *The Science and Engineering of Materials*, by Donald R. Askeland, and Wendelin J. Wright, 7th. Edition, ISBN-13: 978-0-495-29602-7, Thomson, 2015 (by Nelson a Division of Thomson Canada Limited). **OLDER EDITIONS ARE ALSO ACCEPTABLE.**
https://www.cengage.com/coursepages/University_MAT_E_201

Supplementary Texts

1. *Materials Science and Engineering: An Introduction*, 8th, by William D. Callister, Jr., David G. Rethwisch, 8th Edition, ISBN-13: 978-0-470-41997-7, John Wiley & Sons, 2010.
2. *Foundations of Materials Science and Engineering*: Fourth Edition, by William F. Smith, J. Hashemi, Mc Grow Hill, Higher Education, 2006.

Mark Distribution

Assignments*	Approximately weekly Tentative,	25%
Mid-term Exam	Friday, November 5 th , 2021	30%
Final Exam**:	TBA, December 2020	45%
Total		100%

- Assignments will be approximately on a weekly basis. Assignments should be submitted on PDF (LastName_FirstName_AssignmentNumber.pdf) by 3:00 PM on the day they are due. Any late assignments will be subject to a penalty of 20% for the first 24 hours and will not be accepted after 24 hours.
- Students who require accommodations in this course due to a disability affecting mobility, vision, hearing, learning, or mental or physical health are advised to discuss their needs with Student Accessibility Services, 780-492-3381 (phone), Fax: 780-248-1665, or web site www.ssds.ualberta.ca.

** The Final exam will be a 24 hour study case exam. The students will have 24 hours to solve a case study question exam which will require for the students to analyze, apply knowledge, reason and draw of conclusions. The topics that will be evaluated are composite, electronic, magnetic, photonic materials and applications.

*** Please note that ignorance does not absolve you of responsibility for committing academic offences. You are therefore expected to be familiar with the Code of Student Behavior in the University of Alberta Calendar:

“The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the *Code of Student Behavior* (online at www.ualberta.ca/secretariat/appeals.htm) and avoid any behavior which could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University” (GFC 29 SEP 2003)

"Recording is permitted only with the prior written consent of the professor or if recording is part of an approved accommodation plan."

Classroom Organization/Lecture Etiquette

Due to virtual setting, the lectures will be posted on the eClass portal as soon as the topic is, in its entirety, covered. The lecture will include several examples that will be solved during class, however, the solution of the examples won't be posted with the lecture.

I strongly encourage an interactive atmosphere during the class. If you have any question, please feel free to interrupt and ask. Just write the question on the eLive class chatroom and I'll be sure to answer it. If longer time is required I would gladly stay after class and explain. Also, you can always contact me via e-mail for any questions arising from the class, subject and assignments.

Outline

1.	Introduction	Chapter 1
2.	Structure of solids	Chapter 2
	• Atomic and Electronic Structure	
	• Bonding	
	• Periodic Table	
3	Atomic and Ionic Arrangements	Chapter 3
4.	Imperfections in the Atomic and Ionic Arrangements	Chapter 4
5.	Atom and Ion Movements in Materials	Chapter 5
6.	Solid Solutions and Phase Diagrams	Chapter 10
7.	Dispersion Strengthening and Eutectic Phase Diagrams	Chapter 11
8.	Ceramic Materials	Chapter 15
9.	Polymers	Chapter 16
10.	Composite Materials	Chapter 17
11.	Electronic Properties of Materials	Chapter 19
12.	Magnetic Properties of Materials	Chapter 20
13.	Photonic Properties of Materials	Chapter 21
14.	Applications	

The chapters listed in the second column are from the recommended text by D.R. Askeland. 7th Edition