

ASEN 1022 - Spring 2023
Materials Science for Aerospace Engineers

Instructors:

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Teaching Assistants:

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Class Web Site: log on to <https://canvas.colorado.edu>

Homework Site: WileyPlus (In Canvas)

Discussion Board: In Canvas!

Class e-mail list: This is automatically done through Canvas.

Texts: W.D Callister, *Materials Science and Engineering an Introduction*, 10th edition. Pearson, MUST include WileyPlus access. Note that with WileyPlus you will get access to both the homework and the e-book. Purchase through CU bookstore or Wiley website.

Prerequisites: APPM 1350 or MATH 1300 (minimum grade C). Required co-requisite courses: COEN 1300 or ECEN 1310 or CSCI 1300 or CSCI 1310 or CSCI 1320 or ASEN 1320.

Course Objectives: Introduce the fundamental understanding of the relation between composition, structure, processing, and properties of materials. Topics include atomic bonding, perfect and imperfect crystal structures, thermal and mechanical behavior of materials, and failure mechanisms, and heat

treatment. This course will provide insight into the design and selection of materials for aerospace applications.

Major Course Topics:

1. Atomic bonding.
2. Perfect and imperfect crystalline structures.
3. Diffusion.
4. Phase diagrams.
5. Mechanical and thermal behavior.
6. Failure mechanisms.
7. Heat treatment.
8. Material processing techniques.
9. Design and selection of materials.

Grading Guideline:

Homework	16% (WileyPlus)
6 Quizzes	84% (14% each)
Total:	100%

- Please verify all your scores and grades on Canvas within 2 weeks after they are posted; requests to change a score need to be made within this period. All regrade requests should be submitted to Canvas folder as outlined in 'Important Notes' below.
- We reserve the right to make minor changes to this distribution of weights based on variations in assignments.

Quiz and Optional Final Exam Times and Locations:

1. Quiz 1: 2/10, 8:00 to 8:40 AM MT
2. Quiz 2: 2/24, 8:00 to 8:40 AM MT
3. Quiz 3: 3/10, 8:00 to 8:40 AM MT
4. Quiz 4: 3/22, 8:00 to 8:40 AM MT (NOTE THIS IS A WEDNESDAY!!!)
5. Quiz 5: 4/14, 8:00 to 8:40 AM MT
6. Quiz 6: 4/28, 8:00 to 8:40 AM MT
7. OPTIONAL Final Exam: Weds May 10th at 7:30 to 9:30 PM MT

Lecture:

Lectures are MWF at 8 AM to 8:50 AM in Math 100. We HIGHLY recommend attending lectures in person. All lectures will be recorded via classroom capture and posted to the Canvas website. Please utilize these recordings in the case of illness, interviews/conferences, or to go back and review material for quizzes. **There is no need to email us if you miss the lecture.**

Quiz Times and Policies

Instead of exams, students will take 6 quizzes every other Friday throughout the semester during the class period. **Students may use the final exam to make up or replace up to 3 quizzes for any reason.**

Students who have submitted official accommodations letters through the university accommodate portal will receive an email 1 week prior to the quiz with quiz locations and times. Accommodation letters must be received one week prior to the quiz or final exam for a student to receive them.

As the final exam can be utilized to replace or make up three quiz grades, there are no make-up quizzes or alternative quiz times in this course with the exception of religious obligations.

Final Exam

The final exam is optional: students are not required to take the final exam and the final exam will not be counted towards your grade on its own. The final exam will be used to replace up to 3 quiz grades. The final exam will consist of 6 questions, each one covering material from a different quiz. You will choose up to 3 questions to answer. If your score on a given final exam question is higher than your score for the corresponding quiz, your quiz score will be replaced with your score on that final exam question. If your score on a given final exam question is lower than your score for that quiz, your quiz score will remain unchanged.

The optional final exam will take place during the university-scheduled final exam time, which is: Wednesday May 10th from 7:30 to 9:30 PM MT

Office Hours: Students can ask questions about concepts, example problems given in the lecture videos, and homework assignments during office hours. Students are strongly encouraged to participate in office hours, even if they don't have specific questions about the material or the homework. Online Canvas discussion boards may also be used for any questions at any time and will be moderated by the instructional team. The office hour schedule and zoom link will be released on Canvas the second week of class.

Evaluated Outcomes: The Department of Aerospace Engineering Sciences has adopted a policy of assigning grades according to evaluated outcomes (Ox) in each course. Each assignment designed and graded to assess some combination of several or a few of the following outcomes:

- O1** Professional context and expectations (ethics, economics, etc.)
- O2** Historical perspective and vision
- O3** Multidisciplinary, system perspective
- O4** Written, oral, graphical communication ability
- O5** Knowledge of key scientific/engineering concepts
- O6** Ability to define and conduct experiments, use instrumentation
- O7** Ability to learn independently, find information
- O8** Ability to work in teams
- O9** Ability to design systems
- O10** Ability to formulate and solve problems
- O11** Ability to use and program computers

Important Notes:

1. Come to office hours! We would be delighted to work with you in person.

2. **Emails to your instructor should only be in the case of a family, medical, or personal emergency, or if you are struggling in the course and need advice.** All questions regarding homework, quizzes, or course policies **MUST** go to the Canvas discussion board or be asked in office hours. This allows for the instructional team to quickly respond to questions, and allows you to see other student questions.
3. If you are having a family, medical, or personal emergency, or are struggling in the course, please reach out to us via email. Note that emails will be responded to during business hours, i.e., Monday through Friday, 8:00 am – 5:00 pm. Please address the email to both Prof. Glusman and Prof. Wingate, and include ASEN1022 in the email subject line.
4. Changes may be made to the weekly course schedule based on occurring events that require different dispositions. We will give sufficient advance notice through announcements in class and posting on Canvas. Changes to this syllabus and assignments-table may be announced at any time during class periods. We will post the current syllabus and assignments-table on Canvas. Both are dated in the footnote.
5. Canvas will be used to send out announcements, to provide comments to you daily on class activities, and to provide general information about course assignments.
6. Why have homework and quizzes?
 - Homework assignments are to allow you to **PRACTICE** the important applications of current material. Remember, you cannot learn to juggle by watching someone juggle, you must attempt it yourself. The same is true with engineering, homework enforces the mental processes that help you to become proficient in a subject. Before beginning any homework assignment, you should read the text and work the examples in the text.
 - Quizzes allow us to assess your learning and determine if you will be prepared for the follow-on courses, industry positions, and/or graduate school.
7. Homework:
 - All homework questions must be submitted to the Canvas discussion forum under the appropriate homework assignment/question. **No homework questions should be emailed to the instructional team - all questions should be asked at office hours or posted to Canvas.** The instructional team will not respond to posts that are posted after 5 PM the day before the homework is due.
 - Collaboration is permitted on homework. However, we strongly recommend to first work on your own on the homework before comparing your results with your homework team members. You may discuss the means and methods for formulating and solving problems and even compare answers, but you are not free to copy someone's assignment. **Copying material from any resource (including solutions manuals) and submitting it as one's own is considered plagiarism and is an Honor Code violation. Remember, the less you think about the problems yourself, the less you actually learn, and the more difficult it will be to succeed on quizzes.**

- You are encouraged to answer questions that other students pose to Canvas, but you may only discuss the means and methods for formulating and solving problems. You cannot compare answers on Canvas, and you may not post your exact work or computer code.
- No late homework assignments will be accepted. You will have one week to complete a homework assignment. You will be allowed to drop the lowest homework score at the end of the semester.
- All homework must be submitted through WileyPlus.
- Homework solutions will be posted shortly after the submission deadline.

8. Quizzes:

- Makeup quizzes or alternative quiz times will not be granted for any reason with the exception of religious holidays. The final exam will be used for replacing up to 3 quiz grades per the policy stated above.
- Regrade requests must be submitted within 2 weeks of the grade posting to Canvas. Submit a single pdf document to the 'regrade request' folder on canvas with: the quiz problem with your original work, your hand-written CORRECT solution to the quiz problem in question, and a page stating the problem number, grading issue, and what you believe the correct grade should be. Note that regrade requests should only be submitted for errors in grading- there will be no points given for correcting your original work.

9. Grading:

- Minor adjustments may be made in the determination of final letter grades and with grade cut line.
- A course grade of C or better is required to fulfill the prerequisite for ASEN 4018

OFFICIAL UNIVERSITY SYLLABUS STATEMENTS:

CLASSROOM BEHAVIOR

Both students and faculty are responsible for maintaining an appropriate learning environment in all instructional settings, whether in person, remote or online. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. For more information, see the [classroom behavior](#) policy, the [Student Code of Conduct](#), and the [Office of Institutional Equity and Compliance](#).

REQUIREMENTS FOR COVID-19

As a matter of public health and safety, all members of the CU Boulder community and all visitors to campus must follow university, department and building requirements and all public health orders in place to reduce the risk of spreading infectious disease. CU Boulder currently requires COVID-19 vaccination and boosters for all faculty, staff and students. Students, faculty and staff must upload proof of vaccination and boosters or file for an exemption based on medical, ethical or moral grounds through the MyCUHealth portal.

The CU Boulder campus is currently mask-optional. However, if public health conditions change and masks are again required in classrooms, students who fail to adhere to masking requirements will be asked to leave class, and students who do not leave class when asked or who refuse to comply with these requirements will be referred to Student Conduct and Conflict Resolution. For more information, see the policy on classroom behavior and the Student Code of Conduct. If you require accommodation because a disability prevents you from fulfilling these safety measures, please follow the steps in the "Accommodation for Disabilities" statement on this syllabus.

If you feel ill and think you might have COVID-19, if you have tested positive for COVID-19, or if you are unvaccinated or partially vaccinated and have been in close contact with someone who has COVID-19, you should stay home and follow the further guidance of the Public Health Office (contacttracing@colorado.edu). If you are fully vaccinated and have been in close contact with someone who has COVID-19, you do not need to stay home; rather, you should self-monitor for symptoms and follow the further guidance of the Public Health Office (contacttracing@colorado.edu). {Faculty: insert your procedure here for students to alert you about absence due to illness or quarantine. Because of FERPA student privacy laws, do not require students to state the nature of their illness when alerting you. Do not require "doctor's notes" for classes missed due to illness; campus health services no longer provide "doctor's notes" or appointment verifications.}

ACCOMMODATION FOR DISABILITIES

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or dsinfo@colorado.edu for further assistance. If you have a temporary medical condition, see [Temporary Medical Conditions](#) on the Disability Services website.

PREFERRED STUDENT NAMES AND PRONOUNS

CU Boulder recognizes that students' legal information doesn't always align with how they identify. Students may update their preferred names and pronouns via the student portal; those preferred names and pronouns are listed on instructors' class rosters. In the absence of such updates, the name that appears on the class roster is the student's legal name.

HONOR CODE

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the [Honor Code](#). Violations of the Honor Code may include, but are not limited to: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to Student Conduct & Conflict Resolution (honor@colorado.edu; 303-492-5550). Students found responsible for violating the [Honor Code](#) will be assigned resolution outcomes from the Student Conduct & Conflict Resolution as well as be subject to academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found on the [Honor Code website](#).

SEXUAL MISCONDUCT, DISCRIMINATION, HARASSMENT AND/OR RELATED RETALIATION

CU Boulder is committed to fostering an inclusive and welcoming learning, working, and living environment. University policy prohibits sexual misconduct (harassment, exploitation, and assault), intimate partner violence

(dating or domestic violence), stalking, protected-class discrimination and harassment, and related retaliation by or against members of our community on- and off-campus. These behaviors harm individuals and our community. The Office of Institutional Equity and Compliance (OIEC) addresses these concerns, and individuals who believe they have been subjected to misconduct can contact OIEC at 303-492-2127 or email cureport@colorado.edu. Information about university policies, [reporting options](#), and support resources can be found on the [OIEC website](#).

Please know that faculty and graduate instructors have a responsibility to inform OIEC when they are made aware of any issues related to these policies regardless of when or where they occurred to ensure that individuals impacted receive information about their rights, support resources, and resolution options. To learn more about reporting and support options for a variety of concerns, visit [Don't Ignore It](#).

RELIGIOUS HOLIDAYS

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, please contact the instructors if you have a conflict with a quiz or the final exam because of religious obligations.

See the [campus policy regarding religious observances](#) for full details.