

MECE 3345 Materials Science

Course Introduction

Course Number: MECE3345

Course Name: Materials Science

Class Number: TBD

Class Time: TBD

Classroom: TBD

Instructor: Jae-Hyun Ryou

Office Location: ENG1 N220

Office Hours: TBD

Phone: 713-743-0858

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Teaching Assistant(s): TBD

TA Office Hours: TBD

Required Textbook: Course materials in ppt format posted in Canvas

Recommended Textbook: Materials Science and Engineering: An Introduction, 9th edition (or 8th edition), William D. Callister Jr. and David G. Rethwisch, John Wiley and Sons Publishers

Prerequisites: CHEM 1332 and 1112 (Chemistry); MECE 2334 (Thermodynamics)

Grading Policy:

Exams	80%
Participation/Attendance	10%
Homework assignments and take-home exam	10%

Detailed Course Information

Course Delivery Formats and Exams:

This course is taught in a face-to-face format in a classroom.

This course will have two mid-term exams and a final exam. The specified date and time will be announced during the course. Prior to the exam, descriptive information, such as the number and types of exam questions, available resources, and collaborations that are allowed and disallowed in the process of completing the exam, and procedures to follow, may be provided.

Detailed Grading Policy:

Mid-Term Exams (2)	50 (25+25) points
Final Exam	30 points
Take-Home Exam	4 points
Attendance (10 out of 12-13 Quizzes)	10 (1×10) points
Homework Assignments (3)	6 (2+2+2) points
Extra credit (Discussion and TA office hours)	0-2 points

Policy for Exams:

All students enrolled in this course must take the quizzes and exams.

Refer to “Course Schedule” for detailed information on the dates of the exams.

The exams will be closed book and closed course materials.

Equation sheet will be provided (This can be used for HW Assignments).

A calculator is needed.

There will be a sample exam to be posted before exam and this will serve as a good guide for real exams.

Any student who will be on travel due to work or interview at the time of a scheduled exam must contact the instructor as soon as possible for permission to take the exam at another time. For permission, proper justification such as copies of conference registration and travel documents, is required. In this case, only an early exam (no late exam) can be arranged with proper justification.

No excuse will be accepted for the absence of an exam without proper evidence/documents, e.g., physician’s letter, etc. For a student who submits “verifiable” documentation (doctor or hospital note, etc.), the missed exam can be substituted with an increased weightage of the other exam.

However, there will be no substitute for the final exam (Exam 3). If a student does not take the final exam, the student will not receive any credit for the final exam, unless the student contacts the instructor to pursue make-up of the final exam within 3 days from the date of the final exam.

Policy for Make-Up of Final Exam:

Final exam is mandatory. If an emergency arises and Exam 3 is missed, then, on a case-by-case basis, there will either be a make-up test or else an Incomplete ("I") grade will be assigned. The make-up test will be given in the oral exam. The "I" grade could mean that Exam 3 will need to be taken with the final test in the subsequent semester unless other special arrangements are made with the instructor.

Policy for Attendance and Quizzes:

Attendance is mandatory, as it is regarded as an obligation as well as a privilege.

Students are expected to attend every class.

It will be checked by "random" pop quiz.

No excuse will be accepted for the absence (no submission) of the quiz except the occasions defined in Excused Absence Policy (next section).

There will be 12-13 quizzes with 1 point each for the maximum credit of 10 points.

No attendance check for someone else is allowed. In case of a substitute attendance check, 0 credit for the entire attendance (10% of grade) will be given to all the students involved.

Excused Absence Policy:

Regular class attendance, participation, and engagement in coursework are important contributors to student success. Absences may be excused as provided in the University of Houston [Undergraduate Excused Absence Policy](#) and [Graduate Excused Absence Policy](#) for reasons including: medical illness of student or close relative, death of a close family member, legal or government proceeding that a student is obligated to attend, recognized professional and educational activities where the student is presenting, and University-sponsored activity or athletic competition. Under these policies, students with excused absences will be provided with an opportunity to make up any quiz, exam or other work that contributes to the course grade or a satisfactory alternative. Please read the full policy for details regarding reasons for excused absences, the approval process, and extended absences. Additional policies address absences related to [military service](#), [religious holy days](#), [pregnancy and related conditions](#), and [disability](#).

Policy for Homework Assignments:

Like other engineering courses, homework is ESSENTIAL to this course. It requires students to practice solving problems. This practice will allow students to find an appropriate path to a solution efficiently during the exams and other real engineering problems. Therefore, it is expected that there will a significant overlap between questions in homework assignments and exam questions.

Students are allowed to collaborate in finding solutions to homework problems.

Standard solutions will be provided to help the student check their answers.

Before the submission, the assignments should be self-graded based on the standard solution provided.

All the homework assignments must be submitted through Canvas by 11:59 pm on the due date (Central Time Zone). Instructions for submitting homework are posted in Canvas under “Assignments”. Technology failures will not be accepted as a reason for late homework submissions – do not wait until the last minute to submit your homework. In case of late submission within a day after the due date, 50% credit will be given. For late submission after a day after the due date, 0% credit will be given.

Participation in TA Office Hours:

For the questions especially in homework assignments, I encourage you to use TA office hours.

1 point extra credit will be given for **active** participants in TA office hours.

Use of Discussions:

Use of Discussions in Canvas is strongly encouraged.

Participation in Discussions is considered to be part of the lecture.

1 point extra credit will be given for **active** participants.

Learning Objectives and Topics

Course Topics:

- Fundamentals of materials
 - Materials introduction (Chapter 1)
 - Atomic bonding (Chapter 2)
 - Crystal structures (Chapter 3)
 - Crystalline defects (Chapter 4)
 - Diffusion (Chapter 5)
 - Exam 1
- Structural properties of materials
 - Mechanical properties of metals (Chapter 6)
 - Dislocations and strengthening mechanisms (Chapter 7)
 - Material failure (Chapter 8)
 - Exam 2
- Microstructure and processing of materials
 - Phase diagrams (Chapter 9)
 - Phase transformations (Chapter 10)
 - Metal applications (Chapter 11)
 - Final exam (Comprehensive)
- Deteriorative properties of materials (Optional topic)
 - Corrosion (Chapter 17)

Learning Objectives:

The goal of the course is to provide the fundamental concepts in engineering materials, mainly for structural applications.

The objectives are to learn (1) the properties of engineering materials, (2) how microstructures dictate the properties, and (3) how processing conditions control the microstructures.

ABET Student Outcomes:

SO4. 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

SO7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Additional Information

Syllabus Changes:

Please note that the instructor may need to make modifications to the course syllabus and may do so at any time. Notice of such changes will be announced as quickly as possible through the Canvas announcement.

Copyright:

Materials in this course may be protected by copyright and should not be redistributed. Visit the [UH Library Copyright Resources](https://guides.lib.uh.edu/copyright) (guides.lib.uh.edu/copyright) for support resources regarding the basics of copyright, tools, fair use, and copyright law.

Emergency Preparedness Information:

Emergency Phone Numbers

713-743-3333 UH Police

911 Emergency Dispatch

Security Escort

The Security escort service is designed for the community members who have safety concerns and would like to have a Security Officer walk with them, for their safety, as they make their way across campus. Call **713-743-3333** to make arrangements.

FIRE

Evacuate

- > If the fire alarm is not sounding, activate the nearest alarm pull station.
- > Call **713-743-3333** or **911** to report the fire.
- > Notify and assist people in the immediate area.
- > As you leave, close all doors behind you to limit the movement of smoke or flames.
- > Do not re-enter the building until authorized to do so by emergency personnel.
- > Never assume an alarm is false.
- > Do not use elevators.
- > If unable to exit the building, go to nearest exit stairwell or safe area of refuge and call **713-743-3333** or **911** to report your location.
- > If trained, use a fire extinguisher if the fire is small and contained, and the room is not filled with smoke.

Two emergency exits are located:

1. Farish Hall - Northwest Stairwell (A stairs)
2. Farish Hall - Southeast Stairwell (C stairs)

Primary (Near) Meeting Area:

Green space between Farish Hall and McElhinney Hall.

Secondary (Far) Meeting Area:

Green space at Ezekiel W. Cullen water fountains.

UH Alert

UHALERT

In the event of a campus emergency, the University of Houston will activate the UH ALERT Emergency Notification System to provide critical information. UH ALERT utilizes the following methods to send UH ALERTS:

- > [UH ALERT Website](http://alerts.uh.edu) (alerts.uh.edu)
- > Email
- > Text Message
- > [Facebook Alerts](https://facebook.com/UHALert) (facebook.com/UHALert)
- > [Twitter Alerts](https://twitter.com/UHALert) (twitter.com/UHALert)
- > [UH Mobile App](http://uh.edu/go) (uh.edu/go)
- > Digital Signage
- > Outdoor Warning Siren

For more information visit the UH ALERT website.

Weather

Shelter-in-Place

- > Seek shelter indoors.
- > Check uh.edu/emergency for shelter-in-place directive for the UH campus.
- > If a Tornado Warning is issued, seek shelter indoors in an interior room away from windows, and on the lowest floor possible.

Active Shooter

Avoid, Deny, Defend

If an active shooter or violent person is in your vicinity, please attempt to take the following steps:

- > **AVOID:** If possible, exit the building immediately and call
- 713-743-3333** to reach UH Police, or dial **911**.
- > **DENY:** If you cannot exit, clear the hallway quickly, remain behind closed doors in a locked or barricaded room, if possible, and stay away from interior windows.
- > **DEFEND:** Do not attempt to confront or apprehend the shooter, unless it is a last resort.

See http://uh.edu/police/active_shooter.html for more information about "Avoid, Deny, Defend."