

ENGT 3415, 10452, Materials Science
Lecture on Mondays, 2PM-4:45PM
Laboratory on Wednesdays, 2PM-5PM

Spring 2023

Texas A&M University-Central Texas

COURSE DATES, MODALITY, AND LOCATION

Course Start Date: January 17, 2023

Course End Date: May 12, 2023

Lecture on Monday: Face-to-face in Warrior Hall room 306 (WH 306)

Laboratory on Wednesday: Face-to-face in Warrior Hall room 413 (WH 413)

Any supplemental materials required for this course will be made available online

If for any reason campus were to close for an extended period of time, the course will become 100% online.

INSTRUCTOR AND CONTACT INFORMATION

Lecture Instructor: Dr. Juan Alex Garcia

Office: Founders Hall 411 (FH 411)

Phone: 254-519-8752

Email: ja.garcia@tamuct.edu

Laboratory Instructor: Dr. Melissa Wunch

Office: Founders Hall, 411 (FH 411)

Phone: 254-519-8752

Email: melissa.wunch@tamuct.edu

Office Hours

By Appointment. E-mail when you would like to schedule an office hour time outside of class times.

Student-instructor interaction

All students are strongly encouraged to contact me via email to schedule office hours during the work week of M-F. Please make sure to schedule time if you are struggling or have any questions regarding lab reports at least 48h before the report is due. If you are unable to make it to an office hour appointment, then please email me with either screenshots of your work or write your question as detailed as possible and I will help. I will reply to student emails within 24-48h time frame unless received over the weekend then it will be on the following Monday.

Emergency Warning System for Texas A&M University-Central Texas

SAFEZONE. SafeZone provides a public safety application that gives you the ability to call for

help with the push of a button. It also provides Texas A&M University-Central Texas the ability to communicate emergency information quickly via push notifications, email, and text messages. All students automatically receive email and text messages via their myCT accounts.

Downloading SafeZone allows access to push notifications and enables you to connect directly for help through the app.

You can download SafeZone from the app store and use your myCT credentials to log in. If you would like more information, you can visit the [SafeZone](http://www.safezoneapp.com) website [www.safezoneapp.com].

To register SafeZone on your phone, please follow these 3 easy steps:

1. Download the SafeZone App from your phone store using the link below:
 - o [iPhone/iPad](https://apps.apple.com/app/safezone/id533054756): [https://apps.apple.com/app/safezone/id533054756]
 - o [Android Phone / Tablet](https://play.google.com/store/apps/details?id=com.criticalarc.safezoneapp)
[https://play.google.com/store/apps/details?id=com.criticalarc.safezoneapp]
2. Launch the app and enter your myCT email address (e.g. {name}@tamuct.edu)
3. Complete your profile and accept the terms of service

For updates on COVID information, please monitor the University [website](https://www.tamuct.edu/covid19/)
[https://www.tamuct.edu/covid19/]

COURSE INFORMATION

Course Overview and description

Study structure and properties of metallic and nonmetallic materials. This course will cover material microstructure; phase diagrams; thermal, optical, and electrical properties; testing and failure analysis; and corrosion.

Student Learning Outcomes (SLO)

- Describe different groups of materials, properties, and the types of atomic bonding present in different materials
- Classify and analyze crystalline structures and defects
- Explain mechanical behaviors and apply that knowledge to conduct mechanical behavior experiments and analyze the results
- Explain thermal behaviors of materials and apply that knowledge to conduct thermal behavior experiments and analyze the results
- Recite the fundamentals of phase diagrams and microstructure development
- Define structural, electronic, optical, and magnetic materials and apply that knowledge to perform materials selection for engineering design based on application requirements

Required Reading and Textbook(s)

For the lecture: Materials Science and Engineering: An Introduction, 10th Edition. Callister, Wiley Science

For the laboratory course student will be required to have the following safety equipment:

- Safety Goggles (Z87 certified recommended)
- Lab Coat (available from the TAMU-CT bookstore) or apron

Lab safety

There is a laboratory component to this class. **Safety is a priority.** Laboratory safety training will be conducted during the first laboratory session during the semester. A safety quiz will be required on Canvas. You will also have to acknowledge the training on a signed agreement form. Students who do not complete the training, safety quiz, and student agreement will not be allowed access to the lab and will not pass the course.

COURSE REQUIREMENTS

This course will consist of homework, exams, research critique project, and lab reports

Homework (25 weighted pts in total) will be assigned on a weekly basis throughout the semester. (SLO 1-6)

Laboratory Reports (10 weighted points in total) to be due on Canvas before the start of the next lab. There will be two formats for some of the reports, some will be done using an assigned handout and others will be full lab reports. (SLO 1-6)

Two **Laboratory Exams** (5 weighted points in total) will be administered during the semester through canvas. (SLO 1-6)

A **Project** (15 weighted pts in total) will be conducted during the semester. Students will select a peer reviewed article and submit it for approval by the instructor. Deliverables for the final project are a 5 page report evaluating the chosen article and an 8 minute in class presentation followed by a questions session. The project will be graded based on 100 pts then scaled. The final project can use any style guide (e.g. ACS) but must be formatted and referenced. (SLO 1-6)

Two **Midterm Exams** (15 weighted pts each) and a **Comprehensive Final Exam** (15 weighted pts) will be administered during the semester. (SLO 1-6)

Grading Criteria Rubric and Conversion

Activity	Points	% of Final Grade
Homework	25	25
Project	15	15
Laboratory Reports	10	10
Laboratory Exams	5	5
Midterm Exams	30	30
Final Exam	15	15

Course Grade Assignment Scale

Grade	Weighted Grade (%)
A	≥ 90.00
B	80.00 - 89.99
C	70.00 - 79.99
D	60.00 - 69.99
F	< 60.00

American Chemical Society (ACS) formatting will be used unless otherwise stated. Reports will be graded on their content, and writing skills.

Posting of Grades

Grade for both lecture and lab assignments/exams will be posted on Canvas Grade Book approximately 1 - 2 weeks after they are submitted. For physical assignments, grades will be recorded and the assignments may be returned before the grades are posted on Canvas. Late work may take longer to be posted on Canvas.

If the student wishes to appeal a grade, they must do so within 1 week of receiving the graded paper. Students should save all their work to ensure that no clerical errors are made in grade reporting.

Grading Policies

Late Work

Assignments will receive a 5% deduction for each day they are late (95% maximum for one day late, 90% max for two days late, etc.), but no submissions will be accepted greater than 7 calendar days late.

Late work without penalty will not be accepted without prior approval. You must plan your time well in order to turn things in on time. If there are extenuating circumstances, an individual extension may be granted after speaking with the instructor. Emergencies will be accommodated.

Scores for late projects will be determined using this formula:

$$\text{'Grade recorded'} = \text{'Grade earned'} \times \text{'Maximum percent based on days late'}$$

Exams

Exams will be administered either in-person in the classroom or through Canvas. Proctorio, a remote proctoring program integrated into Canvas, may be used during exams. Exams will be administered at a specific time or during a designated time period. Exam timing and instructions will be communicated during lecture and on canvas.

Missed Exams

If you cannot make an exam session/period, you must schedule an alternative time period beforehand. Extenuating circumstances will be considered after speaking with the

instructor. Emergencies will be accommodated. All exams must be taken within 1 week of the original exam period

Plagiarism

It is the responsibility of the student to understand plagiarism and avoid it completely. Contact me if you have any questions about what constitutes plagiarism. Any assignment deemed to be plagiarized by the instructor will receive a zero, even if the plagiarism is the result of a misunderstanding or ignorance. A second plagiarism offense will lead to a failing grade in the course.

Appeals

As stated above, if the student wishes to appeal a grade, they must do so within 1 week of receiving the graded paper. Students should save all their work to ensure that no clerical errors are made in grade reporting.

COURSE OUTLINE AND CALENDAR

Complete Course Calendar

ENGT 3415 Tentative Schedule				
Week	Dates	Lecture (Monday)	Reading	Lab (Wednesday)
1	1/16, 1/18	Martin Luther King Day	1,2	Meet for Lecture (Bonding and Structure)
2	1/23, 1/25	Crystal Structures	3	1
3	1/30, 2/1	Defects, Diffusion	4,5	2
4	2/6, 2/8	Mechanical Properties	6	3
5	2/13, 2/15	Mechanical Properties	6	4
6	2/20, 2/22	Strengthening, Failure	7,8	5
7	2/27, 3/1	Failure, Phases	8,9,10	6
8	3/6, 3/8	Exam 1	-	Lab Exam 1
9	3/13, 3/15	Spring Break	-	-
10	3/20, 3/22	Metal Alloys, Ceramics	11,12,13	7
11	3/27, 3/29	Polymers, Composites	14,15,16	8
12	4/3, 4/5	Electrical, Optical	18,21	9
13	4/10, 4/12	Magnetic, Thermal	20,19	10
14	4/17, 4/19	Corrosion, Nano	17	11
15	4/24, 4/26	Presentations, Review	-	12
16	5/1, 5/3	Exam 2	-	Lab Exam 2
17	5/8, 5/10	Final	-	-

Important University Dates

See the Academic Calendar: <https://www.tamuct.edu/registrar/academic-calendar.html>

TECHNOLOGY REQUIREMENTS AND SUPPORT

Computer access will be needed to complete homework and projects.

Technology Requirements

This course will use the A&M-Central Texas Instructure Canvas learning management system. **We strongly recommend the latest versions of Chrome or Firefox browsers. Canvas no longer**

supports any version of Internet Explorer.

Logon to A&M-Central Texas Canvas [<https://tamuct.instructure.com/>] or access Canvas through the TAMUCT Online link in myCT [<https://tamuct.onecampus.com/>]. You will log in through our Microsoft portal.

Username: Your MyCT email address. Password: Your MyCT password

Canvas Support

Use the Canvas Help link, located at the bottom of the left-hand menu, for issues with Canvas. You can select “Chat with Canvas Support,” submit a support request through “Report a Problem,” or call the Canvas support line: 1-844-757-0953.

For issues related to course content and requirements, contact your instructor.

Online Proctored Testing

A&M-Central Texas uses Proctorio for online identity verification and proctored testing. This service is provided at no direct cost to students. If the course requires identity verification or proctored testing, the technology requirements are: Any computer meeting the minimum computing requirements, plus web camera, speaker, and microphone (or headset). Proctorio also requires the Chrome web browser with their custom plug in.

Other Technology Support

For log-in problems, students should contact Help Desk Central, 24 hours a day, 7 days a week

Email: helpdesk@tamu.edu

Phone: (254) 519-5466

[Web Chat](http://hdc.tamu.edu): [<http://hdc.tamu.edu>]

Please let the support technician know you are an A&M-Central Texas student.

UNIVERSITY RESOURCES, PROCEDURES, AND GUIDELINES

Academic Accommodations

At Texas A&M University-Central Texas, we value an inclusive learning environment where every student has an equal chance to succeed and has the right to a barrier-free education. The Warrior Center for Student Success, Equity and Inclusion is responsible for ensuring that students with a disability receive equal access to the university’s programs, services and activities. If you believe you have a disability requiring reasonable accommodations, please contact the Office of Access and Inclusion, WH-212; or call (254) 501-5836. Any information you provide is private and confidential and will be treated as such.

For more information, please visit our [Access & Inclusion](#) Canvas page (log-in required) [<https://tamuct.instructure.com/courses/717>]

Academic Integrity

Texas A&M University-Central Texas values the integrity of the academic enterprise and strives for the highest standards of academic conduct. A&M-Central Texas expects its students, faculty,

and staff to support the adherence to high standards of personal and scholarly conduct to preserve the honor and integrity of the creative community. Any deviation by students from this expectation may result in a failing grade for the assignment and potentially a failing grade for the course. All academic misconduct concerns will be referred to the Office of Student Conduct. When in doubt on collaboration, citation, or any issue, please contact your instructor before taking a course of action.

For more [information regarding the student conduct process](https://www.tamuct.edu/student-affairs/student-conduct.html),
[<https://www.tamuct.edu/student-affairs/student-conduct.html>].

If you know of potential honor violations by other students, you may [submit a referral](https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0),
[https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0].

Drop Policy

If you discover that you need to drop this class, you must complete the [Drop Request](#) Dynamic Form through Warrior Web.

[<https://federation.ngwebsolutions.com/sp/startSSO.ping?PartnerIdpld=https://eis-prod.ec.tamuct.edu:443/samlSSO&SpSessionAuthnAdapterId=tamuctDF&TargetResource=https%3a%2f%2fdynamicforms.ngwebsolutions.com%2fSubmit%2fStart%2f53b8369e-0502-4f36-be43-f02a4202f612>].

Faculty cannot drop students; this is always the responsibility of the student. The Registrar's Office will provide a deadline on the Academic Calendar for which the form must be completed. Once you submit the completed form to the Registrar's Office, you must go into Warrior Web and confirm that you are no longer enrolled. If you still show as enrolled, FOLLOW-UP with the Registrar's Office immediately. You are to attend class until the procedure is complete to avoid penalty for absence. Should you miss the drop deadline or fail to follow the procedure, you will receive an F in the course, which may affect your financial aid and/or VA educational benefits.

Important information for Pregnant and/or Parenting Students

Texas A&M University-Central Texas supports students who are pregnant, experiencing pregnancy-related conditions, and/or parenting. In accordance with requirements of Title IX and related guidance from US Department of Education's Office of Civil Rights, the Dean of Student Affairs' Office can assist students who are pregnant and/or parenting in seeking accommodations related to pregnancy and/or parenting. Students should seek out assistance as early in the pregnancy as possible. For more information, please visit [Student Affairs](https://www.tamuct.edu/student-affairs/pregnant-and-parenting-students.html) [<https://www.tamuct.edu/student-affairs/pregnant-and-parenting-students.html>]. Students may also contact the institution's Title IX Coordinator. If you would like to read more about these [requirements and guidelines](#) online, please visit the website [<http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf>].

Title IX of the Education Amendments Act of 1972 prohibits discrimination on the basis of sex and gender—including pregnancy, parenting, and all related conditions. A&M-Central Texas is able to provide flexible and individualized reasonable accommodation to pregnant and parenting students. All pregnant and parenting students should contact the Associate Dean in the Division of Student Affairs at (254) 501-5909 to seek out assistance. Students may also

contact the University's Title IX Coordinator.

Tutoring

Tutoring is available to all A&M-Central Texas students, both virtually and in-person. Student success coaching is available online upon request.

If you have a question, are interested in becoming a tutor, or in need of success coaching contact the Warrior Center for Student Success, Equity and Inclusion at (254) 501-5836, visit the Warrior Center at 212 Warrior Hall, or by emailing WarriorCenter@tamuct.edu.

To schedule tutoring sessions and view tutor availability, please visit [Tutor Matching Services](https://tutormatchingservice.com/TAMUCT) [https://tutormatchingservice.com/TAMUCT] or visit the Tutoring Center in 111 Warrior Hall.

Chat live with a remote tutor 24/7 for almost any subject from on your computer! Tutor.com is an online tutoring platform that enables A&M-Central Texas students to log in and receive online tutoring support at no additional cost. This tool provides tutoring in over 40 subject areas except writing support. Access Tutor.com through Canvas.

University Library & Archives

The University Library & Archives provides many services in support of research across campus and at a distance. We offer over 350 electronic databases containing approximately 631,525 eBooks and 75,149 journals, in addition to the 97,443 items in our print collection, which can be mailed to students who live more than 50 miles from campus. Research guides for each subject taught at A&M-Central Texas are available through our website to help students navigate these resources. On campus, the library offers technology including cameras, laptops, microphones, webcams, and digital sound recorders.

Research assistance from a librarian is also available 24 hours a day through our online chat service, and at the reference desk when the library is open. Research sessions can be scheduled for more comprehensive assistance, and may take place virtually through WebEx, Microsoft Teams or in-person at the library. [Schedule an appointment here](https://tamuct.libcal.com/appointments) [https://tamuct.libcal.com/appointments]. Assistance may cover many topics, including how to find articles in peer-reviewed journals, how to cite resources, and how to piece together research for written assignments.

Our 27,000-square-foot facility on the A&M-Central Texas main campus includes student lounges, private study rooms, group work spaces, computer labs, family areas suitable for all ages, and many other features. Services such as interlibrary loan, TexShare, binding, and laminating are available. The library frequently offers workshops, tours, readings, and other events. For more information, please visit our [Library website](https://tamuct.libguides.com/index) [https://tamuct.libguides.com/index]

University Writing Center

University Writing Center: Located in Warrior Hall 416, the University Writing Center (UWC) at Texas A&M University–Central Texas (A&M–Central Texas) is a free service open to all A&M–Central Texas students. The hours of operation are from 10:00 a.m.-5:00 p.m. Monday thru

Thursday in Warrior Hall 416 (with online tutoring available every hour as well) with satellite hours available online only Monday thru Thursday from 6:00-9:00 p.m. and Saturday 12:00-3:00 p.m.

Tutors are prepared to help writers of all levels and abilities at any stage of the writing process. While tutors will not write, edit, or grade papers, they will assist students in developing more effective composing practices. By providing a practice audience for students' ideas and writing, our tutors highlight the ways in which they read and interpret students' texts, offering guidance and support throughout the various stages of the writing process. In addition, students may work independently in the UWC by checking out a laptop that runs the Microsoft Office suite and connects to WIFI, or by consulting our resources on writing, including all of the relevant style guides. Whether you need help brainstorming ideas, organizing an essay, proofreading, understanding proper citation practices, or just want a quiet place to work, the UWC is here to help!

Students may arrange a one-to-one session with a trained and experienced writing tutor by making an appointment via [WCOOnline](https://tamuct.mywconline.com/) [https://tamuct.mywconline.com/]. In addition, you can email Dr. Bruce Bowles Jr. at bruce.bowles@tamuct.edu if you have any questions about the UWC, need any assistance with scheduling, or would like to schedule a recurring appointment with your favorite tutor.

OTHER POLICY STATEMENTS

A Note about Sexual Violence at A&M-Central Texas

Sexual violence is a serious safety, social justice, and public health issue. The university offers support for anyone struggling with these issues. University faculty are mandated reporters, so if someone discloses that they were sexually assaulted (or a victim of Domestic/Dating Violence or Stalking) while a student at TAMUCT, faculty members are required to inform the Title IX Office. If you want to discuss any of these issues confidentially, you can do so through Student Wellness and Counseling (254-501-5955) located on the second floor of Warrior Hall (207L).

Sexual violence can occur on our campus because predators often feel emboldened, and victims often feel silenced or shamed. It is incumbent on ALL of us to find ways to actively create environments that tell predators we don't agree with their behaviors and tell survivors we will support them. Your actions matter. Don't be a bystander; be an agent of change. For additional information on campus policy and resources visit the [Title IX webpage](https://www.tamuct.edu/compliance/titleix.html) [https://www.tamuct.edu/compliance/titleix.html].

Behavioral Intervention

Texas A&M University-Central Texas cares about the safety, health, and well-being of its students, faculty, staff, and community. If you are aware of individuals for whom you have a concern, please make a referral to the Behavioral Intervention Team. Referring your concern shows you care. You can complete the [referral](#) online

[https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=2].

Anonymous referrals are accepted. Please see the [Behavioral Intervention Team](https://www.tamuct.edu/bit) website for more information [https://www.tamuct.edu/bit]. If a person's behavior poses an imminent threat to you or another, contact 911 or A&M-Central Texas University Police at 254-501-5805.

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Primary Research Article Critique - Grading Rubric				
Category	Outstanding	Acceptable	Needs Improvement	Score
Introduction (5 pt)	Clearly presents key thesis of article. Strong overall critique of the article's thesis support including internal and external considerations. States clearly value of reading article.	Key thesis of article presented. Mediocre overall critique of the article's thesis support. Value of reading the article stated.	Key thesis of article poorly presented. Weak summary critique of the article thesis support. Does not state if reading article is of value.	
	Comments:			
Summary (10 pt)	Clearly describes thesis, argument and conclusions of text. Shows good understanding of relevant main points and avoids extraneous detail.	Describes some elements of thesis and argument, but misses or misunderstands some parts of the text	Misses or misunderstands major parts of text. Lacks basic understanding of the issues.	
	Comments:			
Internal Critique (20 pt)	Perceptively describes and evaluates the kinds of evidence used to support the claims in the text. Thoughtful evaluation of strengths and weaknesses of text.	Describes most of the evidence used, and shows some ability to evaluate usefulness and relevance of evidence.	Describes some of the evidence used, but is not able to evaluate relevance and usefulness. Mostly ignores evaluation and focuses on summary	
	Comments:			
External Critique (20 pt)	In depth discussion of real-world context of article including utility of novel properties, scalability, and impact.	Discussion of the real-world context of article and novel properties but missing some key issues.	Discussion of the novel properties poorly addresses or misses key real-world issues.	
	Comments:			
Organization and Mechanics (20 pt)	Report is well organized and clearly written. The underlying logic is clearly articulated and easy to follow. Words are chosen that	Report is organized and clearly written for the most part. In some areas the logic or flow of ideas is difficult to follow. Words are well	Report lacks an overall organization. Reader has to make considerable effort to understand the underlying logic and flow of ideas. Diagrams are	

<p>Organization and Mechanics cont.</p>	<p>precisely express the intended meaning and support reader comprehension. Sentences are grammatical and free from spelling errors. Style guide for references included as an appendix.</p>	<p>chosen with some minor exceptions. Sentences are mostly grammatical and only a few spelling errors are present but they do not hinder the reader.</p>	<p>absent or inconsistent with the text. Grammatical and spelling errors make it difficult for the reader to interpret the text in places.</p>	
<p>Comments:</p>				
<p>Figures (5 pt)</p>	<p>At least two original or modified figures are used. Figures, tables, and diagrams enhance and clarify presentation of ideas.</p>	<p>At least two original or modified figures are used. Figures, tables, and diagrams help clarify presentation of ideas, but could be improved.</p>	<p>Less than two figures used. Figures are replicas from the article or other sources.</p>	
<p>Comments:</p>				
<p>Presentation (20 pt)</p>	<p>Slides are error-free and logically present the main components of the process and recommendations. Material is readable and the graphics highlight and support the main ideas.</p> <p>Speakers are audible and fluent on their topic, and do not rely on notes to present or respond. Speakers respond accurately and appropriately to audience questions and comments.</p>	<p>Slides are error-free and logically present the main components of the process and recommendations. Material is mostly readable and graphics reiterate the main ideas.</p> <p>Speakers are mostly audible and fluent on their topic, and require minimal referral to notes. Speakers respond to most questions accurately and appropriately.</p>	<p>Slides contain errors and lack a logical progression. Major aspects of the analysis or recommendations are absent. Diagrams or graphics are absent or confuse the audience.</p> <p>Speakers are often inaudible or hesitant, often speaking in incomplete sentences. Speakers rely heavily on notes. Speakers have difficulty responding clearly and accurately to audience questions.</p>	
<p>Comments:</p>				
<p>Overall (100 pt)</p>	<p>Comments:</p>			