

**ENGT 3415, 10321, Materials Science
Spring 2020**

Texas A&M University-Central Texas

COURSE DATES, MODALITY, AND LOCATION

This course meets face-to-face from
January 13 – May 8

**For Lecture on T and Th from 2:30 – 3:45 pm in
Warriors Hall (WH) 314 and**

**For Lab on Th from 10 – 1 pm in
Warriors Hall (WH) 413**

with supplemental materials made available online through the A&M-Central Texas Canvas Learning Management System [<https://tamuct.instructure.com/>]

INSTRUCTOR AND CONTACT INFORMATION

Instructor: Dr. Taylor Harvey

Office: Heritage Hall 302L

Phone: 254-519-5414

Email: tharvey@tamuct.edu (prefer direct email)

Co-Instructor: Dr. Aida Torabi

Office: Founders Hall 408

Phone: 254-519-5775

Email: atorabi@tamuct.edu (prefer direct email)

Office Hours

Dr. Harvey

T 1:30 -2:30 pm

Available by appointment at other times. Really, just email me!

Dr. Torabi

Feel free to email anytime!

Student-instructor interaction

You are strongly encouraged and expected to communicate with the instructor! If you get stuck on a concept or homework problem, don't wait until office hours! Send me an email with a screenshot or photo of the problem you are having difficulty with and we can solve the problem sooner. I will reply to any email within 24 hours (but probably a lot sooner). If you need more help, send me an email and schedule a skype session (id: taylorbharvey). But make sure you are communicating with me!

WARRIOR SHIELD

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

Warrior Shield is an emergency notification service that gives Texas A&M University-Central Texas the ability to communicate health and safety emergency information quickly via email, text message, and social media. All students are automatically enrolled in Warrior Shield through their myCT email account.

Connect to Warrior Shield by [911Cellular](https://portal.publicsafetycloud.net/Account/Login) [https://portal.publicsafetycloud.net/Account/Login] to change where you receive your alerts or to opt out. By staying enrolled in Warrior Shield, university officials can quickly pass on safety-related information, regardless of your location.

COURSE INFORMATION

Course Overview and description

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

Student Learning Outcomes

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

Required Reading and Textbook(s)

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

Required Laboratory Equipment: Safety goggles and a temporary lab coat (available from the Bookstore)

COURSE REQUIREMENTS

The course will involve homework, exams, a literature review project, and laboratory reports.

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

Laboratory Reports (15 weighted pts in total) will be due each week on at the start of class on Tuesday for the previous week's lab. Two formats will be used for lab reports. Half the labs will

be reported on an assigned handout form. The other half of labs will be reported via lab reports. Lab reports will be graded on the following rubric. (SLO 1-6)

Laboratory Report Grading Rubric - 10 points total possible

Introduction (2 points)

Background (0.5 pt): Is context provided for the study?

Hypothesis (0.5 pt): Is the hypothesis stated clearly, and is it well-justified?

Predictions (0.5 pt): Are explicit predictions made that follow from the hypothesis?

Results (5 points)

Graphs, charts, tables (2 pt): Are all relevant figures included? Are figures and axes labeled appropriately? Do they only contain appropriate information? Are the tables redundant with the figures?

Description in text (1 pt): Does the text adequately describe the results of the study?

Statistics (1 pt): Are the appropriate statistics included for this study? (e.g., mean, standard deviation, test statistic, p-value)

Handout (1 pt): Is the lab handout (if applicable) attached and appropriately filled out.

Discussion (3 points)

Are the results related back to the hypothesis and predictions? (1 point)

Is the general significance of the study discussed? (0.5 pts)

Independent thought (0.5 points): Did the student contribute ideas besides those discussed in lab?

Potential Deductions

Grammar, Organization, and Mechanics (up to 2 point)

Conciseness (up to 1 point)

There will be no make-up labs for any reason. If a student misses a lab experiment for any reason, he will receive a zero for that experiment. However, the lowest lab experiment grade will be dropped as long as the lowest grade is not a result of violation of lab regulations.

Two **Laboratory Exams** (2.5 weighted pts each) will be given during the semester.

A **Literature Review Project** (12.5 weighted pts total) will be conducted during the semester. Students will select a peer reviewed article and have it approved by the instructor. The final project deliverables will be 5 page report evaluating the article and an 8 minute in class presentation. The project will be graded up to 100 pts and then scaled to the 10 pt weight. Grading will be according to the rubric below. Reports for both projects can utilize any style guide, but must be formatted and referenced. (SLO 1-6)

Two **Midterm Exams** (12.5 weighted pts each) and a **Comprehensive Final Exam** (17.5 weighted pts) will be given during the semester. (SLO 1-6)

Literature Review Grading Rubric				
Category	Outstanding	Acceptable	Needs Improvement	Score
Introduction (10 pt)	Clearly presents key thesis of article. Strong overall critique of the article's thesis support. 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.	
Summary (20 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.	
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	
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 precisely express the intended meaning and support reader comprehension. Diagrams or analyses enhance and clarify presentation of ideas. Sentences are grammatical and free from spelling errors.	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 chosen with some minor exceptions. Diagrams are consistent with the text. Sentences are mostly grammatical and only a few spelling errors are present but they do not hinder the reader.	Report lacks an overall organization. Reader has to make considerable effort to understand the underlying logic and flow of ideas. Diagrams are absent or inconsistent with the text. Grammatical and spelling errors make it difficult for the reader to interpret the text in places.	
Presentation (30 pt)	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. 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.	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. Speakers are mostly audible and fluent on their topic, and require minimal referral to notes. Speakers respond to most questions accurately and appropriately.	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. 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.	

Grading Criteria Rubric and Conversion

Activity	Points	% of Final Grade
Homework	25	25
Literature Review Project	12.5	12.5
Laboratory Reports	15	15
Laboratory Exams	5	5
Midterm Exams	25	25
Final Exam	17.5	17.5

Course Grades will be assigned by the following scale based on weighted grade percentage

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

Posting of Grades

All turned in work will be graded within 2 weeks and results posted on Canvas.

Grading Policies

Late Work

Late work will not be excepted 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.

Missed exams

If you cannot make an exam session, you **must** schedule an alternative period beforehand. Missed exams should be taken before the scheduled time, but must be taken within a week of the actual exam.

Appeals

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.

Lab Safety

Students must comply with laboratory safety regulations. In particular, the student must wear safety goggles and apron while working in the laboratory. Each lab period, students found not wearing safety goggles over their eyes will be given one warning. Students found not wearing their safety goggles a second time during that lab period will be dismissed from lab immediately. The student will receive a zero for that lab period. Any zero grades for not wearing safety goggles will not be dropped. Students will not be permitted to wear shorts,

short skirts, short dresses, or sandals in the lab. All attire must come down to the ankles. Do not wear baggy clothing. Tank tops and halter tops are not permitted in lab. Shoulders and entire back must be covered. Only closed toe and closed heel shoes are allowed in the laboratory. The shoe must cover the entire foot.

No food or drink is permitted in the lab.

COURSE OUTLINE AND CALENDAR

Complete Course Calendar

A tentative schedule is shown below. Modifications to this schedule may be at the discretion of the instructor.

Week/Dates	Lecture Topics	Reading	Lab (Thursday)
1- Jan 14, 16	Bonding and Structure	1, 2	Intro
2- Jan 21, 23	Crystal Structures	3	Lab 1
3- Jan 28, 30	Defects	4	Lab 2
4- Feb 4, 6	Mech Properties	6	Lab 3
5- Feb 11, 13	Strengthening, Failure	7, 8	Lab 4
6- Feb 18, 20	Phases	9, 10	Lab 5
7- Feb 25, 27	Metal Alloys	11	Lab 6
8- Mar 3, 5	Ceramics, Exam 1	12, 13	Lab Exam 1
9- Mar 10, 12	Spring Break		No Lab
10- Mar 17, 19	Polymers	14, 15	Lab 7
11- Mar 24, 26	Mech Properties Revisited		Lab 8
12- Mar 31, 2	Electrical, Optical	18, 21	Lab 9
13- Apr 7, 9	Magnetic, Thermal	20, 19	Lab 10
14- Apr 14, 16	Corrosion	17	Lab 11
15- Apr 21, 23	Composites, Nano	16	Lab 12
16- Apr 28, 30	Exam 2, Review		Lab Exam 2
17- May 5, 7	Final		No Lab

The following dates there will not be a face-to-face lecture: April 21

Important University Dates

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

TECHNOLOGY REQUIREMENTS AND SUPPORT

Technology Requirements

Computer access will be needed to complete homework and projects. It is preferable that each student has a laptop, but not required. Use of a graphing calculator will be permissible on exams.

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.

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

Drop Policy

If you discover that you need to drop this class, you must complete a [Drop Request Form](https://www.tamuct.edu/registrar/docs/Drop_Request_Form.pdf) [https://www.tamuct.edu/registrar/docs/Drop_Request_Form.pdf].

Professors 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, signed and returned. Once you return the signed 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.

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. Academic integrity is defined as a commitment to honesty, trust, fairness, respect, and responsibility. Any deviation by students from this expectation may result in a failing grade for the assignment and potentially a failing grade for the course. Academic misconduct is any act that improperly affects a true and honest

evaluation of a student's academic performance and includes, but is not limited to, working with others in an unauthorized manner, cheating on an examination or other academic work, plagiarism and improper citation of sources, using another student's work, collusion, and the abuse of resource materials. All academic misconduct concerns will be referred to the university's Office of Student Conduct. Ignorance of the university's standards and expectations is never an excuse to act with a lack of integrity. 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 report](https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0),
[https://cm.maxient.com/reportingform.php?TAMUCentralTexas&layout_id=0].

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 Office of Access 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](https://tamuct.instructure.com/courses/717) Canvas page (log-in required)
[https://tamuct.instructure.com/courses/717]

Important information for Pregnant and/or Parenting Students

Texas A&M University-Central Texas supports students who are pregnant 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/index.html) [https://www.tamuct.edu/student-affairs/index.html]. Students may also contact the institution's Title IX Coordinator. If you would like to read more about these [requirements and guidelines](http://www2.ed.gov/about/offices/list/ocr/docs/pregnancy.pdf) 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 on-campus and online. Subjects tutored on campus include Accounting, Advanced Math, Biology, Finance, Statistics, Mathematics, and Study Skills. Tutors are available at the Tutoring Center in Warrior Hall, Suite 111. Tutor.com tutoring **will not offer writing support** beginning August 1, 2019, but will continue to offer other tutoring support.

If you have a question regarding tutor schedules, need to schedule a tutoring session, are interested in becoming a tutor, or have any other question, contact Academic Support Programs at (254) 501-5836, visit the Office of Student Success at 212F Warrior Hall, or by emailing studentsuccess@tamuct.edu .

Chat live with a 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. Access Tutor.com through Canvas.

University Writing Center

Located in Warrior Hall 416, the University Writing Center (UWC) at Texas A&M University–Central Texas (TAMUCT) is a free workspace open to all TAMUCT students from 10:00 a.m.-5:00 p.m. Monday thru Thursday with satellite hours in the University Library Monday thru Thursday from 6:00-9:00 p.m. This semester, the UWC is also offering online only hours from 12:00-3:00 p.m. on Saturdays.

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 visiting the UWC during normal operating hours (both half-hour and hour sessions are available) or by making an appointment via [WOnline](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 and/or need any assistance with scheduling.

University Library

The University Library provides many services in support of research across campus and at a

distance. We offer over 200 electronic databases containing approximately 250,000 eBooks and 82,000 journals, in addition to the 85,000 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 on Skype or in-person at the library. 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](http://tamuct.libguides.com/index) [http://tamuct.libguides.com/index].

OPTIONAL 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 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/departments/compliance/titleix.php) [https://www.tamuct.edu/departments/compliance/titleix.php].

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, who are exhibiting concerning behaviors, or individuals causing a significant disruption to our community, 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/student-affairs/bat.html) website for more information [<https://www.tamuct.edu/student-affairs/bat.html>]. If a person's behavior poses an imminent threat to you or another, contact 911 or A&M-Central Texas University Police at 254-501-5800.

OTHER POLICIES

Copyright Notice

Students should assume that all course material is copyrighted by the respective author(s). Reproduction of course material is prohibited without consent by the author and/or course instructor. Violation of copyright is against the law and Texas A&M University-Central Texas' Code of Academic Honesty. All alleged violations will be reported to the Office of Student Conduct.

Copyright. 2019 by Taylor Harvey at Texas A&M University-Central Texas, College of Arts and Sciences; 1001 Leadership Place, Killeen, TX 76549; 254-510-5414; tharvey@tamuct.edu

Copyright. 2019 by Aida Torabi at Texas A&M University-Central Texas, College of Arts and Sciences; 1001 Leadership Place, Killeen, TX 76549; atorabi@tamuct.edu