



SYLLABUS

MENG 3114-101: Materials Science and Engineering (Required Course - Fall 2026)

COURSE INSTRUCTOR

Prof. Sheldon Wang, Ph.D., P.E., Fellow ASME (sheldon.wang@msutexas.edu)

LAB INSTRUCTOR

N/A

TEACHER ASSISTANT

COURSE & LAB SCHEDULE

<i>Days</i>	<i>Time</i>	<i>Location</i>
Monday	11:00 am – 11:50 am	MY 136
Tuesday		
Wednesday	11:00 am – 11:50 am	MY 136
Thursday		
Friday	11:00 am – 11:50 am	MY 136

**Lab sessions are indicated with an asterisk.*

OFFICE HOURS

<i>Days</i>	<i>Time</i>	<i>Location</i>
Tuesday	9:30 am – noon	MY 138
Thursday	9:30 am – 11:00 am	MY 138
Thursday	1:00 pm – 3:00 pm	MY 138

MSU CATALOG DESCRIPTION

Study of the physical and mechanical characteristics of materials, and the effects of chemical composition, mechanical treatment, and thermal or heat treatment upon material properties. Companion lab.

COURSE PRE-REQUISITES

MENG 2223 and CHEM 1143

REQUIRED TEXTBOOK

Materials Science and Engineering an Introduction by William D. Callister, 10th edition.

SUPPLEMENTAL MATERIAL

LIST OF TOPICS COVERED

• Materials Overview	• Mechanical Properties
• Microstructure and Imperfections	• Failure Mechanisms
• Optical, Thermal, and Electrical Properties	• Phase Diagram and Material Processing
• Diffusion, corrosion, and composites	• Ceramics and Polymers

Additional material may be covered as time permits.

SPECIFIC GOALS OF INSTRUCTION

Table 1: A detailed list of course objectives matched with the ABET outcomes (1-7).

COURSE OBJECTIVES	ABET OUTCOMES*						
	1	2	3	4	5	6	7
To develop an understanding of fundamental concepts of crystalline and non-crystalline structures, defects, diffusion, phases, solidification, solid state phase transformations and apply same to the major classes of materials: metals, ceramics, polymers, and composites. (assignments, exams)	X	X					
To understand why crystalline and non-crystalline structure of materials lead to widely different properties. (assignments, exams)	X						
To recognize that that one of the important characteristics of a material is how it responds to different stresses with respect to the temperature of the material. (assignments, exams)	X	X					
To realize that equilibrium phase diagrams are useful in understanding the development and preservation of non-equilibrium structures and their attendant properties. (assignments, exams)	X						
To design heat treatment phase transformations for some alloy that will yield the desired room-temperature mechanical properties. (assignments, exams)	X	X				X	
To make informed decisions involving materials selection and processing. (assignments, exams)	X	X	X			X	
To familiarize with the materials science and metallographic laboratory equipment. (assignments, exams)	X	X	X		X	X	

***Table 2:** Detailed descriptions of the ABET outcomes (1-7) listed in Table 1.

	ABET Student Outcome Description
1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2	an ability to apply engineering design to produce solutions that meets specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3	an ability to communicate effectively with a range of audiences.
4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

CONTRIBUTION OF COURSE TO PROFESSIONAL COMPONENT

This course contributes to the engineering science component of the Mechanical Engineering program.

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COURSE ORGANIZATION AND ASSESSMENT

Lecture Format

This course consists of a three 50-minutes sessions per week. The one hour class will be spent mostly explaining and discussing concepts, and solving relevant case problems. Lectures will not be used to communicate the entire textbook course content and thus, you will have to study a set of course paragraphs specified by the instructor on your own to further your understanding. Student participation in class discussions is highly encouraged and rewarded.

Exam

There will be two regular midterm exams plus one comprehensive final exam at the end of the semester. Each exam is based on the course materials developed between two consecutive exams. You are expected to take the exam on the scheduled date and time it is given. However, if for some acceptable reason you are not able to do so, then you must inform the instructor in advance in writing. The instructor will then decide whether you will be allowed to take a make-up exam, depending on the validity of your excuse.

Homework

Homework will be assigned from a set of chosen chapters. It will be turned in each week, unless specified by the instructor. Homework must be turned in on the due date, at the beginning of class. Each student is responsible for submitting his own individual personal homework copy written in his own words. No dual or group homework copy is accepted unless specified by the instructor.

Course Grade

The final grade for the course will be based on the scores earned in the two mandatory exams, the comprehensive final exam, the average score earned in the quizzes, and the average score earned in the homework. Each one of the two exams contributes 15%, the comprehensive final exam contributes 30%, homework contributes 30%, and participation, neatness, attitude, and class attendance contributes 10%, for a total of 100%. Please refer to Student Resources https://msutexas.edu/academics/scienceandmath/student_resources.php for Academic Appeals and other supports.

General Guidelines

Plan on spending at least six hours outside of class to study the material and to work on homework assignments. Do not wait until the last day to start working on your assignment, or prepare for the exam. Read the course material before coming to class. Utilize the office hours throughout the semester to seek explanations from the instructor. Use engineering paper for all homework assignments and exams. Use a systematic approach to solve problems. If a problem involves drawing a graph, use Excel, Matlab, or any other graphic software tool to draw the graph. In engineering, neatness is a must, not a luxury. Be advised that you will be penalized for lack of neatness. You are strongly encouraged to study in group. You must choose different partner for the lab experiments.

General Education Statement

Students in this course must demonstrate their competency in oral and written communication through written homework assignments, lab reports, quizzes, and exams.

Disclaimer Statement

Information contained in this syllabus, other than grading, late assignments, makeup work, and attendance policies, may be subject to change with advance notice, as deemed appropriate by the instructor.

Conflict Resolution

- a. The student should contact the instructor face to face or via e-mail if there is an issue with the course or the instructor. The faculty and the student will discuss this face to face or via email. Hopefully a resolution is reached on the issue.
- b. The student should notify the faculty via email again if the issue still did not get resolved after the first encounter or communication.
- c. The student can then contact the Chair of the McCoy School of Engineering, Dr. Desai, face to face or via email, (raj.desai@msutexas.edu), and discuss this issue. Dr. Desai will discuss the issue at hand with the faculty member. Dr. Desai will discuss the result of this discussion with the student. Hopefully a resolution is reached on the issue after this.
- d. The student should notify the Chair via email if the issue still did not get resolved.
- e. The Chair will contact the Dean and try to resolve the conflict. In case the conflict deals with the student grade, she will forward the case to the Grade Appeals Committee if necessary.

COVID-19 Safety and Prevention Strategies <https://msutexas.edu/coronavirus/index.php>

Student Handbook

Refer to: [Student Handbook](#)

Academic Misconduct Policy & Procedures

Scholastic dishonesty will not be tolerated and will be prosecuted to the fullest extent. You are expected to have read and understood the current issue of the student handbook regarding student responsibilities & rights, and the intellectual property policy information about procedures and what constitutes acceptable on-campus behavior. Any form of plagiarism will not be accepted, and will be heavily reprimanded. Academic Dishonesty: Cheating, collusion, and plagiarism (the act of using source material of other persons, either published or unpublished, without following the accepted techniques of crediting, or the submission for credit of work not the individual's to whom credit is given). Additional guidelines on procedures in these matters may be found in the Office of Student Conduct. [Office of Student Conduct](#)

Moffett Library

Moffett Library provides resources and services to support student's studies and assignments, including books, peer-reviewed journals, databases, and multimedia materials accessible both on campus and remotely. The library offers media equipment checkout, reservable study rooms, and research assistance from librarians to help students effectively find, evaluate, and use information. Get started on this [Moffett Library webpage](#) to explore these resources and learn how to best utilize the library.

Desire-to-Learn (D2L)

Extensive use of the MSU D2L program is a part of this course. Each student is expected to be familiar with this program as it provides a primary source of communication regarding assignments, examination materials, and general course information. You can log into [D2L](#) through the MSU Homepage. If you experience difficulties, please contact the technicians listed for the program or contact your instructor.

Attendance

Students are expected to attend all meetings of the classes in which they are enrolled. Although in general students are graded on intellectual effort and performance rather than attendance, absences may lower the student's grade where class attendance and class participation are deemed essential by the faculty member. In those classes where attendance is considered as part of the grade, the instructor should so inform students of the specifics in writing at the beginning of the semester in a syllabus or separate attendance policy statement. An instructor who has an attendance policy must keep records on a daily basis. The instructor must give the student a verbal or written warning prior to being dropped from the class. Instructor's records will stand as evidence of absences. A student with excessive absences may be dropped from a course by the instructor. Any individual faculty member or college has the authority to establish an attendance policy, providing the policy is in accordance with the General University Policies.

Online Computer Requirements

Taking an online class requires you to have access to a computer (with Internet access) to complete and upload your assignments. It is your responsibility to have (or have access to) a working computer in this class. ****Assignments and tests are due by the due date, and personal computer technical difficulties will not be considered reason for the instructor to allow students extra time to submit assignments, tests, or discussion postings.*** Computers are available on campus in various areas of the buildings as well as the Academic Success Center. ****Your computer being down is not an excuse for missing a deadline!!*** There are many places to access your class! Our online classes can be accessed from any computer in the world which is connected to the internet. Contact your instructor immediately upon having computer trouble. If you have technical difficulties in the course, there is also a student helpdesk available to you. The college cannot work directly on student computers due to both liability and resource limitations; however, they are able to help you get connected to our online services. For help, log into [D2L](#).

Recording Classes

****Recording classes is generally prohibited without the professor's explicit permission.*** Such recordings, when permitted, are for personal use only and may not be uploaded to the internet or otherwise shared, transmitted, or published without the professor's prior consent. Some faculty may not permit recordings of their classes. When it is feasible and appropriate, students may record classes to accommodate disabilities under the Americans With Disabilities Act, with prior approval of Disability Support Services. Such recordings may not be uploaded to the internet or otherwise shared, transmitted, or published.

Change of Schedule

A student dropping a course (but not withdrawing from the University) within the first 12 class days of a regular semester or the first four class days of a summer semester is eligible for a 100% refund of applicable tuition and fees. Dates are published in the Schedule of Classes each semester.

Refund and Repayment Policy

A student who withdraws or is administratively withdrawn from Midwestern State University (MSU) may be eligible to receive a refund for all or a portion of the tuition, fees and room/board charges that were paid to MSU for the semester. HOWEVER, if the student received financial aid (federal/state/institutional grants, loans and/or scholarships), all or a portion of the refund may be returned to the financial aid programs. As described below, two formulas (federal and state) exist in determining the amount of the refund. (Examples of each refund calculation will be made available upon request).

Services for Students with Disabilities

In accordance with Section 504 of the Federal Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, Midwestern State University endeavors to make reasonable accommodations to ensure equal opportunity for qualified persons with disabilities to participate in all educational, social, and recreational programs and activities. After notification of acceptance, students requiring accommodations should make application for such assistance through Disability Support Services, located in the Student Wellness Center, (940) 397-4140. Current documentation of a disability will be required in order to provide appropriate services, and each request will be individually reviewed. For more details, please go to [Disability Support Services](#).

Emergency Aid Resources for Basic Needs

Unexpected life circumstances can affect anyone. If you are experiencing challenges meeting basic needs—such as housing, utilities, food, transportation, healthcare, technology, textbooks or other life necessities, resources may be available to help. Visit the [Student Emergency Support and Resources webpage](#) to learn more, and explore emergency support opportunities through MSU and how to access them. For additional information, please contact the Office of Student Affairs: Clark Student Center #108, (940) 397-7500, student.affairs@mstutexas.edu.

College Policies

Campus Carry Rules/Policies

Refer to: [Campus Carry Rules and Policies](#)

Smoking/Tobacco Policy

College policy strictly prohibits the use of tobacco products in any building owned or operated by WATC. Adult students may smoke only in the outside designated-smoking areas at each location.

Alcohol and Drug Policy

To comply with the Drug Free Schools and Communities Act of 1989 and subsequent amendments, students and employees of Midwestern State are informed that strictly enforced policies are in place which prohibits the unlawful possession, use or distribution of any illicit drugs, including alcohol, on university property or as part of any university-sponsored activity. Students and employees are also subject to all applicable legal sanctions under local, state and federal law for any offenses involving illicit drugs on University property or at University-sponsored activities.

Campus Carry

Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes has prohibited. The new Constitutional Carry law does not change this process. Concealed carry still requires a License to Carry permit, and openly carrying handguns is not allowed on college campuses. For more information, visit [Campus Carry](#).

Active Shooter

The safety and security of our campus is the responsibility of everyone in our community. Each of us has an obligation to be prepared to appropriately respond to threats to our campus, such as an active aggressor. Please review the information provided by MSU Police Department regarding the options and strategies we can all use to stay safe during difficult situations. For more information, visit [MSUReady – Active Shooter](#). Students are encouraged to watch the video entitled “Run. Hide. Fight.” which may be electronically accessed via the University police department’s webpage: ["Run. Hide. Fight."](#)

Grade Appeal Process

Update as needed. Students who wish to appeal a grade should consult the Midwestern State University [MSU Catalog](#)

***Notice:** Changes in the course syllabus, procedure, assignments, and schedule may be made at the discretion of the instructor.

Prepared by Dr. Sheldon Wang, July 2026.