



MTSE 3100
Materials Science and Engineering Laboratory II

Credits and contact hours

1 Credit. Friday (9:00am-11:50pm), Rooms B190 (classroom), E-138 (UG Lab 1), E-154 (UG Lab 2), E-145 (UG Lab 3), Discovery Park

Instructor's or course coordinator's name

Dr. Thomas Scharf, Office: E-117 Discovery Park, 940.891.6837, scharf@unt.edu

Text book, title, author, and year

No required textbook. The instructor will provide the laboratory manual modules and references.

Specific Course Information

a. Brief description of the content of the course (catalog description)

Sequel laboratory designed to continue to introduce students to some of the most common materials processing, testing and characterization methods. Topics include ceramic powder processing and sintering, polishing and heat treatment of metallic alloys, electronic material characterization, tensile testing, hardness testing, electrical resistivity, scanning electron microscopy, and x-ray diffraction.

b. Prerequisites or co-requisites

MTSE 3090

c. Indicate whether a required, elective, or selected elective course in the program

Required

Specific goals for the course

a. Specific outcomes of instruction

1. Students will learn how to conduct module-specific processing

- techniques (e.g., heat-treatments, sintering, polishing)
2. Students will learn how to characterize materials using the different techniques specific to each of the modules (e.g., optical microscopy, SEM/EDS, X-Ray Diffraction, Raman spectroscopy)
 3. Students will collect, analyze, and interpret data in teams and will share data with other teams assigned to other roles within each lab module.
 4. Students will learn materials structure-property relationships for each module
 5. Students will analyze and interpret data related to each of the modules and present the data in the form of original laboratory reports conforming to research and academic standards
 6. Students will learn to relate concepts learned in the lab modules involving modern engineering tools to solve practical engineering problems

- a. *Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes that are addressed by the course.*

This course addresses ABET Criterion 3 Student Outcome(s): a, b, d, g, k and Program Outcomes 1, 2, 4, 5, 6, 7, 11.

Brief list of topics to be covered

1. Introduction, safety training refresher/quiz safety testing completion (1 week)
2. Metallic alloys – Heat treatment-structure-property characterization (4 weeks)
3. Ceramics – Powder compact sintering-structure-property characterization (4 weeks)
4. Electronic Materials – Structure-property characterization (4 weeks)

Course Requirements: Mandatory attendance. Chemical Lab Safety and Laboratory Waste training and quiz testing must be completed at (www.riskmanagement.unt.edu/training). You must pass both quizzes, print out that you passed them, and turn into the instructor in order to take the labs.

Grading: Class participation is required for each of the labs. Lab reports are due at the end of each session (dates will be announced). Grading is based on class participation and the reports.

Class participation:10%, **electronic materials:**30%, **metallic alloys:**30%, **ceramic:**30%

Academic Integrity: As is understood by the vast majority of students, our basic relationship is based on trust. Do not plagiarize lab reports.

LAB Reports: The lab includes three modules. After the lab experiments are completed, the students are required to write project reports summarizing his or her work on their class lab. This report must be typed, single spaced, 12 point Symbol and/or Times New Roman fonts, and with 1-inch margins around. The report will follow the style of a standard laboratory report and must include the following sections: Title, Author and affiliation, Abstract, Introduction (of the method used and properties calculated), Results, Discussions (comparing the results with corresponding experimental values, or

theory), Conclusions, and References. You must include appropriate visual figures from the experiments/simulations (including charts, graphs, and images). All the legends and labels in the charts and graphs must be at least a 12-point font when scaled to fit to the report.

LAB II Schedule

Week	Date	Metallic Alloys (Room: E-154 Lab 2) TA: Zach Herl (ZacharyHerl@my.unt.edu)	Ceramics (Room: E-138 Lab 1) TA: Jingjing Gu (JingjingGu@my.unt.edu)	Electronic Materials (Room: E-145 Lab 3) TA: Urmila Rathod (UrmilabenRathod@my.unt.edu)
1	1/20	Introduction, safety training refresher & testing if non-complaint (Groups 1-3)		
2	1/27	Group 1	Group 2	Group 3
3	2/3	Group 1	Group 2	Group 3
4	2/10	Group 1	Group 2	Group 3
5	2/17	Group 1	Group 2	Group 3
6	2/24	Group 2	Group 3	Group 1
7	3/3	Group 2	Group 3	Group 1
8	3/10	Group 2	Group 3	Group 1
9	3/24	Group 2	Group 3	Group 1
10	3/31	Group 3	Group 1	Group 2
11	4/7	Group 3	Group 1	Group 2
12	4/14	Group 3	Group 1	Group 2
13	4/21	Group 3	Group 1	Group 2

Group 1: Callirgos, Jon Vincent; Espinoza, Eric; Gruszecki, Roman; Lide, Hunter; Ohl, Brandon; Rodriguez, Kenan; Simpson, Garrett; Valentin, Sheena

Group 2: Cunningham, Adam; Flannery, David; Hunt, Tyler; Macdonald, Neil; Oltman, Hunter; Sheehan, Kaylie; Taylor, Spencer; Williams, Sarah

Group 3: Eiland, William; Green, Whitley; Lanier, Jessica; Mello, Laura; Reeder, Jessica; Sheikh, Sofia; Thomas, Ty; Zellner, Sammy