MTSE 3090
Materials Science and Engineering Laboratory I
Dept. of Materials Science & Engineering, Fall 2022

Credits and contact hours: 1 Credit. Friday (9:30am-12:20pm), Primary Lab Rooms E-138 (UG Lab 1), E-135A (UG Lab), E-145 (UG Lab 3), E-146, Discovery Park

Instructor’s or course coordinator’s name: Dr. Xiao Li, Office: E-119 Discovery Park, Xiao.Li@unt.edu

Text book, title, author, and year
No required textbook. The instructor will provide the laboratory manual.

Specific Course Information
  a. Brief description of the content of the course (catalog description)
     Laboratory designed to introduce students to some of the most common materials processing, testing, characterization methods. Topics will include polymer, glasses, and nanocomposites materials.
  b. Prerequisites or co-requisites
     MTSE 3000, 3001
  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, molding, casting)
     2. Students will learn how to characterize materials using the different techniques specific to each of the modules (e.g., optical microscopy, scanning electron microscopy (SEM)-energy dispersive spectroscopy (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
  b. 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): 5, 6, 7.
Brief list of topics to be covered
1. Introduction, safety training refresher/quiz safety testing completion (1 week)
2. Polymers – Thermoplastic and thermoset/Thermophysical, mechanical and tribological characterization (4 weeks)
3. Ceramics – Melting of oxide glasses/Structure and composition characterization (4 weeks)

Course Requirements: Mandatory attendance. Three safety trainings must be completed before coming to labs: Chemical Lab Safety (https://riskmanagement.unt.edu/chemical-lab-safety-training); Chemical Fume Hood Safety (https://riskmanagement.unt.edu/chemical-fume-hood-safety-training); Gas Cylinder Handling Safety (https://riskmanagement.unt.edu/compressed-gas-cylinder-training); Hazard Communication Training (https://riskmanagement.unt.edu/hcs-ghs-training). You must pass the quiz, print out that you passed it, and upload the certificate to the Canvas in order to start the lab modules.

Grading: Lab attendance/participation is required for each of the labs. Lab reports are due at the end of each session (dates will be announced by Instructor). Grading is based on lab attendance/participation and the reports as follows:

Lab attendance/participation: 10%, polymer materials: 30%, ceramics: 30%, nanocomposite materials: 30%

Academic Integrity: As is understood by the vast majority of students, our basic relationship is based on trust. Do not plagiarize lab reports (see pages 55-61 in Lab manual for examples and how to cite references).

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, References, and Acknowledgments. You must include appropriate visual figures from the experiments (including charts, graphs, and images) and captions. 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. Collaboration with your group members in preparing the reports is acceptable. However, in the main, the report should be primarily yours and blatant copying will result in failing grade. Submit your lab reports on Canvas. Late lab reports will not be accepted.

LAB I Schedule (will be adjusted according to lab situation)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Polymers (Room: E-146) TA: Akhila Joy</th>
<th>Ceramics (Room: E-135A/145) TA: Gregory Braun</th>
<th>Nanocomposites (Room: E-138/145) TA: Allan Kolek</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9/02</td>
<td>Introduction, lab overview, and chemical lab safety information (all students) (\rightarrow) THIS WILL BE B192</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>9/09</td>
<td>Group 1</td>
<td>Group 2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>9/16</td>
<td>Group 1</td>
<td>Group 2</td>
<td></td>
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</table>
The group assignment will be announced at first class on 9/02.

The TAs will assign a number to you during each lab in case contact tracing is necessary.

COVID-19 Impact on Attendance

While attendance is expected as outlined above, it is important for all of us to be mindful of the health and safety of everyone in our community, especially given concerns about COVID-19. Please contact me if you are unable to attend the lab because you are ill, or unable to attend lab due to a related issue regarding COVID-19. It is important that you communicate with me prior to being absent so I may make a decision about accommodating your request to be excused from lab.

If you are experiencing any symptoms of COVID-19 (https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html) please seek medical attention from the Student Health and Wellness Center (940-565-2333 or askSHWC@unt.edu) or your health care provider PRIOR to coming to campus. UNT also requires you to contact the UNT COVID Hotline at 844-366-5892 or COVID@unt.edu for guidance on actions to take due to symptoms, pending or positive test results, or potential exposure. While attendance is an important part of succeeding in this lab, your own health, and those of others in the community, is more important.

Statement on Campus Operations

“New mandatory measures to keep campus safe-An Official Notice from the President”

Face Coverings

UNT encourages everyone to wear a face covering when indoors, regardless of vaccination status, to protect yourself and others from COVID infection, as recommended by current CDC guidelines. Face covering guidelines could change based on community health conditions.