Course number and name: MTSE 1100: Discover How and Why Materials Matter

Credits and contact hours: 3 Credits. MWF 1:30-2:20pm

Final Exam: Dec 4, 2021 10:30-12:30

Instructor’s or course coordinator’s name: Dr. Rick Reidy

Text book, title, author, and year
Course handouts will be provided
  a. Other supplemental materials
     Flatland by Edwin Abbott

Specific Course Information
  a. Brief description of the content of the course (catalog description)
     Course serves as the heart of the MTSE first year experience. Topics include rationale for materials choices, composition and design of everyday items and how materials science and engineering drives innovation. Basic analysis and experimental design. A team-based hands-on project teaches the student to think critically and creatively by applying a range of analysis techniques borrowed from many engineering and science disciplines.
  b. Prerequisites or co-requisites
     none
  c. Indicate whether a required, elective, or selected elective course in the program
     Required

Specific goals for the course
  a. Specific outcomes of instruction

<table>
<thead>
<tr>
<th>Specific Course Learning Outcomes</th>
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<tbody>
<tr>
<td>1. Formulate an approach to a technical problem through hypothesis testing</td>
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<td>2. Write technical and descriptive analysis of technical and literary readings</td>
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<td>3. Students will learn to interpret, analyze, and present data</td>
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<td>4. Student will work in teams on a common project</td>
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This course addresses ABET Student Outcomes 2 and 6.

Course Requirements:
Attendance is expected for each class. This is a crucial part of your grade. Your group
will turn in work at least once a week. If you are present, please make sure your name is on the assignment. Do not ask your colleagues to include your name if you are not present—this would constitute an academic integrity violation. Each student is allowed two unexcused absences during the semester to fulfill their attendance requirement. However, missed work cannot be made up (exception noted below).

Grading:
Daily assignments and attendance 80%; group projects 20%.

Assignments are due by the end of class (unless noted by the instructor). There will be no makeup of daily assignments without a doctor's note or extreme circumstances (notify me before class). Any makeup work must be completed within one week. Allowances will be made for illnesses spanning several class days.

Brief list of topics to be covered

- Resources for success at UNT
- Read Flatland, discuss satirizing of Victorian England, how art and science parallel, issues of geometric point of view (dimensionally and scale)
- Limits of measurement based on dimension
- interpretation of data
- materials development in civilization, posit "what if" scenarios regarding materials development
- errors in experimentation
- posing a "good" experimental question
- analysis of materials issues in household items
- how size matters in materials
- what are the limits to materials development?

Time Outline of Course

<table>
<thead>
<tr>
<th>Week</th>
<th>Activities</th>
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<tbody>
<tr>
<td>Aug 23</td>
<td>Introduction, Flatland</td>
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<tr>
<td>Aug 30</td>
<td>atomic coordination, Flatland, thermodynamics</td>
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<tr>
<td></td>
<td>Flatland, group project, phase diagrams</td>
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<td>Sept 6</td>
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<td>Sept 13</td>
<td>crystal planes, Flatland, how the university works</td>
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<td>Sept 20</td>
<td>Diffusion and defects, one dimensional world, Flatland revolution, graphene, nanotubes</td>
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<td>Science vs Art, mechanical properties of materials,</td>
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<tr>
<td>Sept 27</td>
<td>Flatland</td>
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</tbody>
</table>
Oct 4  
making molds, porcelain, 4th dimension

Oct 11  
making materials, data analysis

Oct 18  
metallurgy, firing molds

Oct 25  
early ceramics, making slip and drying, protecting society

Nov 1  
oxidation of metals, combustion, making a clock

Nov 8  
electronic materials, how transistors work, nanoelectronics, drying and firing porcelain

Nov 15  
glasses, making of glasses

Nov 22  
porcelain repairs, glazing

Nov 29  
ethics, discussions of science in society

Dec 4  
Final

Additional Policies and Procedures:

Cell Phones: Please remember to turn off phones prior to class.

Academic Integrity: You are expected to adhere to the UNT Policy on Academic Integrity (Policy 06.003). Violations of which are cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. Such a violation could range from loss of points on an assignment to failing the class.

COVID-19
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 class, your own health, and those of others in the community, is more important.