Department of Mechanical Engineering
Phone: +1.903.566.7003
Fax: +1.903.566.7148
Uttyler.edu/engineering

# MENG 3319 – Materials Science and Manufacturing
## Course Syllabus

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| **Semester / Year** | Fall 2023 |
| **Catalog Description** | Introduction to materials science including the structure of metals and polymers, the testing of mechanical properties of materials, the relationship between material properties, structure and processing techniques, and the capabilities and limitations of modern manufacturing methods. Two one-hour lectures and one three-hour lab per week. |
| **Prerequisites** | C or better in CHEM 1311 and CHEM 1111 or equivalent, MENG 1301 or completion of a Computer Aided Drafting course |
| **Section Number** | 030, 030L, 031L |
| **Instructor Name** | Dr. Hussain Rizvi |
| **Contact Information** | Email: hrizvi@uttyler.edu Office: HEC A220 |
| **Class Type / Instruction Mode / Location** | Face-to-face<br>030: HEC A218<br>030L: HEC B223<br>031L: HEC B223 |
| **Class Time** | 030: MoWe10:10 AM –11:05 AM<br>030L: We 2:00 PM –4:45 PM<br>031L: Fr 8:00 AM – 10:45 PM |
| **Office Hours** | Mo and We 8:30 –10:00 am, or by appointment |
| **No. of Credits** | 3 credits |
| **Required Textbook** | Materials Science and Engineering: An Introduction, William D. Callister and David G. Rethwisch, 10th Edition, 2018, ISBN# 9781119405498 |
| **Optional References** | Class Handout |
| **Additional Rules and Requirements** | N/A |
| **Evaluation Method** | Quizzes: 5%<br>Homework: 20%<br>Exams: 30%<br>Lab Reports: 20%<br>Final Exam: 25% |
| **Grading Policy / Scale** | Letter grades, scale:<br>A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60 |

<table>
<tr><td>Important Events / Dates</td><td>09/01/2023 (Fr): Census date<br>09/20/2023 (We): 1st midterm date<br>10/25/2023 (We): 2nd midterm date<br>10/30/2023 (Mo): Last day to withdraw from one or more classes<br>12/06/2023 (We): (Tentative) Final</td></tr>
<tr><td>Attendance / Makeup policy / other rules</td><td>1.Lecture attendance will be checked using Canvas quiz function.<br>2.Lab attendance is mandatory.<br>3.No make-up exam(s).<br>4.All assignments MUST be submitted to Canvas for grading.<br>5.Student with SAR status should contact the UT Tyler Office of Student Accessibility and Resources for exam arrangements.</td></tr>
<tr><td>Course Learning Objectives / ABET & PEOs Relation</td><td>By the end of this course, students will be able to:<br>1.Explain atomic structure, crystal structures, and types of defects in metals.<br>2.Describe common processing techniques through strain hardening, diffusion, and solution hardening of metal alloys.<br>3.Describe common structures, properties, processing methods, and applications of polymer and ceramics.<br>4.Perform mechanical testing and metallographic procedures to report material properties and microstructures of various metal alloys in laboratory reports.</td></tr>
<tr><td>Tentative Topics / Course Plans</td><td>
<table>
<tr><th>Week (Date)</th><th>Topic</th><th></th></tr>
<tr><td>1 (8/21, 8/23)</td><td>(Mo) Syllabus</td><td>(Wed) Ch1: Introduction</td></tr>
<tr><td>2 (8/28, 8/30)</td><td>(Mo) Ch2: Atomic Structure</td><td>(Wed) Ch2: Interatomic Bonding</td></tr>
<tr><td>3 (9/4, 9/6)</td><td>(Mo) Labor Day Holiday</td><td>(Wed) Ch3: Unit Cells</td></tr>
<tr><td>4 (9/11, 9/13)</td><td>(Mo) Ch3: Crystal Systems</td><td>(Wed) Ch4: Imperfections</td></tr>
<tr><td>5 (9/18, 9/20)</td><td>(Mo) Ch5: Diffusion</td><td>(Wed) 1st Midterm</td></tr>
<tr><td>6 (9/25, 9/27)</td><td>(Mo) Ch6: Mechanical Properties</td><td>(Wed) Ch6: Mechanical Properties</td></tr>
<tr><td>7 (10/2, 10/4)</td><td>(Mo) Ch7: Dislocation</td><td>(Wed) Ch7: Strengthening</td></tr>
<tr><td>8 (10/9, 10/11)</td><td>(Mo) Ch8: Failure</td><td>(Wed) Ch9: Phase Diagram</td></tr>
<tr><td>9 (10/16, 10/18)</td><td>(Mo) Ch9: Phase Diagram</td><td>(Wed) Ch10: Phase Transformation</td></tr>
<tr><td>10 (10/23, 10/25)</td><td>(Mo) Review</td><td>(Wed) 2nd Midterm</td></tr>
<tr><td>11 (10/30, 11/1)</td><td>(Mo) Ch11: Forming/Casting</td><td>(Wed) Ch11: Heat Treatment</td></tr>
<tr><td>12 (11/6, 11/8)</td><td>(Mo) Ch12: Ceramics</td><td>(Wed) Ch13: Ceramic Processing</td></tr>
<tr><td>13 (11/13, 11/15)</td><td>(Mo) Ch14: Polymers</td><td>(Wed) Ch15: Polymer Processing</td></tr>
<tr><td>14 (11/20, 11/22)</td><td>Thanksgiving – No Class</td><td></td></tr>
<tr><td>15 (11/27, 11/29)</td><td>(Mo) Biomaterials</td><td>(Wed) Review</td></tr>
<tr><td>16 (12/4, 12/6)</td><td colspan="2">Final (tentative upon UT Tyler’s final exam announcement)</td></tr>
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(Dr. Rizvi reserve the right to change schedule in course plan)
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<tr><td>University Policies</td><td>https://www.uttyler.edu/academic-affairs/files/syllabus_information_2021.pdf</td></tr>
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