“Mechanical Behavior of Materials”
Syllabus

MS 143A WQ2018  Mon/Wed 10:00-11:50 PM, Room: ENGR V, 2101

Instructor: Jaime Marian, Eng. V - 3121D, Phone: 6-9161

Office Hours: Wed 2:00-3:00 PM.

Teaching assistant: Jin Huang. Review sessions: Mondays 8:00-8:50 AM (Boelter 4283) and Thursdays 8:00-8:50 AM (Humanities Building A32)

Textbooks:

• M. Ashby, “Materials Selection in Mechanical Design” (Elsevier, 2011).

Prerequisites: MS104 or MAE101

Course Outline*:

Lecture 1: Introduction, Stresses and Strains .......................................................... (week 1)
Lecture 2: Elastic Behavior, Stiffness Design, Yielding, Elastic Property Design ........(weeks 1&2)
Lecture 3: Strength and Fracture of Fiber Composites ........................................ (week 2)
Lecture 4: Plasticity, Stress-Strain Response, Hardness ....................................... (week 3)
Lecture 5: Crystal Plasticity .............................................................................. (week 4)
Lecture 6: Dislocations .................................................................................... (week 5)
Midterm Exam (week 5)
Lecture 7: Strengthening Mechanisms in Crystals .............................................. (week 6)
Lecture 8: Creep, Creep Rupture, High-Temperature Behavior ......................... (week 7)
Lecture 9: Polymers: Structure and Deformation, Viscoelastic Behavior ..........(week 7)
Lecture 10: Fracture: Basics of Fracture Mechanics ......................................... (week 8)
Lecture 11: Fatigue ......................................................................................... (week 9)
Lecture 12: Environmental Effects .....................................................................(week 10)
Lecture 13: Failure Analysis .............................................................................(week 10)
Final Exam

*Subjected to change based on schedule
Grade Policy: Grades will be assigned on the basis of homework completion (30%), midterm exam score (30%) and final exam score (40%). The final grades will be assigned according to the following scale:

<table>
<thead>
<tr>
<th>Letter grade</th>
<th>% points</th>
<th>Letter grade</th>
<th>% points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>97.00-100.00</td>
<td>C+</td>
<td>77.00-79.99</td>
</tr>
<tr>
<td>A</td>
<td>93.00-96.99</td>
<td>C</td>
<td>73.00-77.99</td>
</tr>
<tr>
<td>A−</td>
<td>90.00-92.99</td>
<td>C−</td>
<td>70.00-72.99</td>
</tr>
<tr>
<td>B+</td>
<td>87.00-89.99</td>
<td>D+</td>
<td>67.00-69.99</td>
</tr>
<tr>
<td>B</td>
<td>83.00-86.99</td>
<td>D</td>
<td>60.00-66.99</td>
</tr>
<tr>
<td>B−</td>
<td>80.00-82.99</td>
<td>F−</td>
<td>&lt;60.00</td>
</tr>
</tbody>
</table>

Course Objectives: The course objectives are to understand the scientific principles behind the mechanical behavior and properties of materials, and to apply engineering principles to design structures using the appropriate materials.

University Attendance Policy: http://www.registrar.ucla.edu/soc/notices.htm: Attendance will not be enforced. However, students are expected to attend classes regularly and a student who incurs an excessive number of absences may see it reflected in their grade.

Important Dates:

- First day of class ......................... Monday, January 8, 2018
- Midterm exam ................ Mon, February 5, 2018 (during lecture time)
- Last day of class ......................... Wed, March 14, 2018
- Final exam ......................... Fri, March 23, 2018 (11:30am-2:30pm)