IE 309
Manufacturing Processes I
Summer 2021

Lecture Time and Location:
Mon. 08:40-11:30
Thu. 08:40-10:30
Fri. 08:40-10:30

Zoom Link → https://sabanciuniv.zoom.us/j/7933111536

Recitation Time and Location
Thu. 17.40-19.30
Fri. 10:40-12:30

Instructor: L. Taner Tunc, Ph.D.  Office: FENS 1077  e-mail: ttunc [at] sabanciuniv.edu
Office hours:  TBD

Teaching Assistants/Office Hours (contact your TA for location or appointment):
Esra Yüksel  (esrayuksel [at] sabanciuniv.edu)  - TBA

Course Book:

Supplementary References:
- Introduction to Manufacturing Processes by J.A. Schey, McGraw-Hill,
- Manufacturing Processes and Systems by P. Oswald, J. Munoz, John Wiley and Sons.

Catalog Description:
Overview of modern manufacturing technology; introduction to manufacturing processes, inspection methods and quality; materials and their manufacturing characteristics; description of various conventional and nonconventional applications in industry: casting, metal forming, forging, extrusion, rolling, joining and welding, EDM, ECM, laser machining, abrasive flow processes; machining processes: turning, milling, drilling, broaching etc., abrasive machining processes.

Objective of the course:
At the conclusion of this course, you should be able to:
- Explain the relation between manufacturing processes and material properties.
- Explain the need for manufacturing processes.
- Analyze economics of manufacturing processes.
- Describe, select and analyze different manufacturing processes and their equipment.
- Analyze characteristics of different processes in terms of quality, cost, lead time, volume.
- Identify and select manufacturing processes and their parameters for a given industrial part/design.
- Identify various rapid product development methodologies in producing mass-customized prototypes/parts.
• Work effectively in a team to analyze a product to identify and explain production stages and manufacturing processes.

Policies and Procedures:

• **Homepage:** [https://sucourse.sabanciuniv.edu/](https://sucourse.sabanciuniv.edu/). The outline of lecture notes, assignments, projects, and other course material will be posted at the SUCourse site.

• **Exams:** There will be midterm exams (progressive) during the semester. The exam dates are as follows: **Midterm I:** Week 3, **Midterm II:** Week 5, **Midterm III:** Week 7. **Dates and times will be announced soon.** There will be a comprehensive final exam during the final exam week. **The questions in the exams will not be same with the solved example questions.**

• **Assignments:** Homework assignments will be assigned regularly. However they will NOT BE GRADED.

• **Tentative Grade Distribution for the course is as follows:**
  
<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes (1 x 5)</td>
<td>10%</td>
</tr>
<tr>
<td>Attendance</td>
<td></td>
</tr>
<tr>
<td>Lecture</td>
<td>5%</td>
</tr>
<tr>
<td>Recitation</td>
<td>5%</td>
</tr>
<tr>
<td>Midterm Exams</td>
<td>17.5% x 2</td>
</tr>
<tr>
<td>Project</td>
<td>15%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
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# Tentative Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Introduction, - Fundamentals of Mechanical Behavior of Materials</td>
<td>Syllabus/Chp 1</td>
</tr>
<tr>
<td>1.2</td>
<td>Casting processes and equipment - Fundamentals of Metal Casting</td>
<td>Chp. 10</td>
</tr>
<tr>
<td>2.1</td>
<td>Casting processes and equipment - Types of casting - Design considerations</td>
<td>Chp. 11/12</td>
</tr>
<tr>
<td>2.2</td>
<td>Bulk deformation processes - Forging and types of forging - Rolling and type of rolling</td>
<td>Chp. 13/14</td>
</tr>
<tr>
<td>3.1</td>
<td>Bulk deformation processes - Extrusion - Hot extrusion, cold extrusion - Drawing</td>
<td>Chp. 15</td>
</tr>
<tr>
<td>3.2</td>
<td>Sheet Metal forming processes - Shearing, Formability tests</td>
<td>Chp. 16</td>
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<tr>
<td></td>
<td><strong>MIDTERM 1</strong></td>
<td><strong>MIDTERM 1</strong></td>
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<td>4.1</td>
<td>Sheet Metal forming processes - Bending, Deep Drawing</td>
<td>Chp. 16</td>
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<td>4.2</td>
<td>Material Removal processes - Introduction - Turning, Drilling</td>
<td>Chp. 21</td>
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<td>5.1</td>
<td>Material Removal processes - Milling, Broaching</td>
<td>Chp. 23</td>
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<td><strong>MIDTERM 2</strong></td>
<td><strong>MIDTERM 2</strong></td>
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<tr>
<td>6.1</td>
<td>Advanced Machining Processes</td>
<td>Chp 27</td>
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<tr>
<td>6.2</td>
<td>Processes for plastics</td>
<td>Chp 19</td>
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<td>7.1</td>
<td>Polymer processing, rapid prototyping, metal powders</td>
<td>Chp 20</td>
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<tr>
<td>7.2</td>
<td>Fabrication of microelectronic and micromechanical microelectromechanical devices; nano-manufacturing</td>
<td>Chp 29</td>
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<tr>
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<td><strong>MIDTERM 3</strong></td>
<td><strong>MIDTERM 3</strong></td>
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