MASC 583, Materials Selection
Units: 4.0
Spring 2023, Thursday, 6:00-9:20 pm

Location: SCT 1501K

Instructor: Michael Hahn
Office: TBD
Office Hours: By Appointment

Contact Info: hahnmt@usc.edu 310-350-3035

Teaching Assistant: TBD
Office: TBD
Office Hours: TBD
Contact Info: TBD
**Course Description**
“Materials selection in relationship to design and fabrication, economic considerations, methodology of selection, performance parameter; case studies.”
An overview of the materials and processes universes is provided. The course considers both traditional, empirical methods of materials selection as well as a more systematic approach.

**Learning Objectives**
The course will provide a background on how materials are selected, focusing on structural (load-bearing) applications but also considering physical properties, cost, and environmental considerations. Both empirical and systematic methods are discussed. The systematic method is enhanced with the use of the software available in the class.

**Recommended Preparation:** basic knowledge of materials science and mechanics of materials.

**Course Notes**
Copies of the lecture slides will be posted on Desire2Learn

**Technological Proficiency and Hardware/Software Required**
Lectures and other course information may be accessed through Desire2Learn
Software: CES Edupack 2019 (will be made available to class)

**Required Readings and Supplementary Materials**

**Description and Assessment of Assignments**
Homework is optional and will be corrected but not graded.
Grading Breakdown

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<tr>
<th>Assignment</th>
<th>Points</th>
<th>% of Grade</th>
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<tbody>
<tr>
<td>Midterm 1</td>
<td>100</td>
<td>20</td>
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<td>Midterm 2</td>
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<tr>
<td>Selection Project</td>
<td>100</td>
<td>30</td>
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<tr>
<td>Final</td>
<td>100</td>
<td>30</td>
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Assignment Submission Policy
Assignments may be handed in in person before or after class or submitted through DEN.

Additional Policies
Exams are open book, open notes. Calculators are permitted but no other electronic devices may be used.
Course Schedule: A Weekly Breakdown.

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<tbody>
<tr>
<td>Topics/Daily Activities</td>
<td>Introduction to Materials Selection</td>
<td>Overview of Processes</td>
<td>Material Properties</td>
<td>Materials Selection Methodologies</td>
<td>Multiple Constraints</td>
<td>Environmental and Energy Costs</td>
<td>First Exam, 6:00-7:15</td>
<td>Case Studies</td>
<td>Case Studies: Processes</td>
<td>SPRING BREAK, NO CLASS</td>
<td>Hybrid Materials and Composites</td>
<td>Second Exam, 6:00-7:15</td>
<td>Case Studies: Aerospace Metals</td>
<td>Industrial Design</td>
<td>Summary and Review</td>
<td>STUDY DAYS</td>
<td>FINAL EXAM, 6-8 PM, Thursday, May 4, Room TBD</td>
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<td>Readings and Homework</td>
<td>Ashby, Chapters 1 &amp; 3</td>
<td>Ashby, Chapter 6</td>
<td>Ashby, Chapter 2 &amp; 3</td>
<td>Ashby, Chapter 4</td>
<td>Ashby, Chapter 8</td>
<td>Ashby, Chapter 14</td>
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<td>Ashby, Chapter 5, 9</td>
<td>Ashby, Chapter 11</td>
<td>Ashby, Chapter 13</td>
<td>Ashby, Chapter 12</td>
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<td>Ashby, Chapter 16</td>
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<td>Deliverable/ Due Dates</td>
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Statement on Academic Conduct and Support Systems

Academic Conduct
Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Section 11, Behavior Violating University Standards https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions. Other forms of academic dishonesty are equally unacceptable. See additional
information in SCampus and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity http://equity.usc.edu or to the Department of Public Safety http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men http://www.usc.edu/student-affairs/cwm/ provides 24/7 confidential support, and the sexual assault resource center webpage http://sarc.usc.edu describes reporting options and other resources.

Support Systems
A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, USC Emergency Information http://emergency.usc.edu will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.