# MASC 583/AME 588 – Materials Selection

Dr. Lessa Grunenfelder
Fall, 2018

**Lecture**
M/W 12:30-1:50 pm OHE 132

**Course description**
MASC 538 provides an introduction to the wide range of materials and processes available for engineering design and part fabrication. The focus of the course is a systematic selection methodology to narrow the available choices of material and process based on properties, performance, manufacturing considerations and economic and environmental factors. Material and process databases are introduced and utilized along with analytical strategies to aid selection.

**Contact information**
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Office hours: Monday 2:30-3:30 pm, or by appointment
Office hours with TA every week (time and location TBD)

**Learning Objectives**
Following completion of this course, students will be able to

- Name the material families and discuss property and processing commonalities among members of the same family
- Describe shaping, joining and finishing operations
- Utilize software (CES edupack) to locate information in material and process records, construct property charts, and determine material-process compatibility
- Given a materials design problem - evaluate the available options, apply constraints to narrow possible choices, utilize objectives to select a material and process, and justify the final selection with detailed documentation.
- Write a professionally formatted report detailing a selection process for a real-world application

**Course Content:**
The Desire2Learn system (https://courses.uscden.net/d2l/login) will be used for all course content including general announcements, course emails, homework, lecture videos, and important course documents and information. Be sure to check Desire2Learn and your USC email regularly. All assignments will be submitted through the Desire2Learn system.

**Text:**
There is one required textbook for the course

Materials Selection in Mechanical Design, 5th edition, Michael F. Ashby, 2017
ISBN: 9780081005996

For background and supplemental reading (not required), students are referred to the following texts, on hold at the USC library:

Introductory material

*Materials Science and Engineering*, W.D. Callister Jr

Supplemental text

*Engineering Design*, G.E. Dieter. L.C. Schmidt

**Software:**
The course will utilize a software package (CES EduPack) for homework assignments and a semester-long selection project. The software will be available through the Viterbi virtual desktop infrastructure (VDI). See the Desire2Learn course site for details.

**Assignments**

Web-based homework assignments will be posted periodically to assess familiarity with key concepts and software functionalities. Assignments will be submitted through Desire2Learn. Assignments will be posted on Wednesdays and are due the following Wednesday, prior to the start of class. Late assignments will be accepted up to 24 hours after the due date, with a 25% late penalty.

**Project Deliverables**
A course project will incorporate many of the key topics discussed throughout the semester. Details of the project will be covered in lecture and posted on the Desire2Learn site. Project deliverables will be assigned with specific due dates and times. Late project deliverables are penalized 25% if received after the specified time, and an additional 25% every 12 hours thereafter.

**Grade Breakdown**

| Grading | |
|---|---|
| **Homework** | 10% |
| **Project** | 35% |
| **Midterm** | 25% |
| **Final Exam** | 30% |

**Important Dates**

Midterm exam: Wednesday, October 3rd

Final exam: Friday, December 7th, 11:00-1:00

No class: Monday, September 3th (Labor Day), Wednesday, November 21st (Thanksgiving break)

### *Statement for Students with Disabilities*

*Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the instructor (or to the Coach) as early in the semester as possible. DSP is located in STU 301 and is open from 8:30 a.m. – 5:00 p.m., Monday through Friday, (213) 740-0776.*

### *Academic Integrity*

*USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others and to avoid using another's work as one's own. All students are expected to understand and abide by these principles.*

*Section 11.00 of SCampus, the USC Student Guidebook, which outlines behaviors that violate the USC Student Conduct Code, can be found here:*

*https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/*

*A list of recommended sanctions for a range of academic integrity violations are located in Appendix A of SCampus, which can be found here:*

*https://scampus.usc.edu/files/2009/08/appendix_a.pdf*

*Should there be any suspicion of academic dishonesty, students are referred to the Office of Student Judicial Affairs and Community Standards (SJACS) for further review. The SJACS review process can be found here:*

*http://www.usc.edu/student-affairs/SJACS/pages/students/academic_integrity.html*

*The SJACS website provides additional resources that you will find helpful in understanding what is meant by academic integrity, such as the following:*

*Academic Integrity: A Guide for Graduate Students*

*http://www.usc.edu/student-affairs/SJACS/forms/GradIntegrity.pdf*

*Academic Integrity Overview*

*http://www.usc.edu/student-affairs/SJACS/forms/AcademicIntegrityOverview.pdf*

### *Incompletes*

*An incomplete (IN) is given when work is not completed because of documented illness or some other emergency occurring after 80% of the course has been completed. Arrangements for the IN and its removal should be initiated by the student and agreed to by the instructor prior to the final exam. The University policy on IN is as follows (from the USC Catalogue):*

*Conditions for Removing a Grade of Incomplete: If an IN is assigned as the student's grade, the instructor will fill out the IN Completion form which will specify to the student and to the department the work remaining to be done, the procedures for its completion, the grade in the course to date, and the weight to be assigned to work remaining to be done when computing the final grade. A student may remove the IN by completing only the work not finished as a result of illness or emergency. Previously graded work may not be repeated for credit. It is not possible to remove an IN by re-registering for the course, even within the designated time.*

*Time Limit for Removal of an Incomplete: One calendar year is allowed to remove an IN. Individual academic units may have more stringent policies regarding these time limits. If the IN is not removed within the designated time limit, the course is considered "lapsed" and the grade is changed to an IX and it will be calculated into the grade point average as 0 points. Courses offered on a Credit/No Credit basis or taken on a Pass/No Pass basis for which a mark of IN is assigned will be lapsed with a mark of NC or NP and will not be calculated into the grade point average.*

***Standards of Appropriate Online Behavior***

*This course involves both in-person and online segments. The protocols defined by the USC Student Conduct Code will be upheld in online classes. Students are not allowed to post inappropriate material, spam to the class, use offensive language, or engage in online flaming. For more information, please visit http://www.usc.edu/student-affairs/SJACS*

***Emergencies and Course Continuity***

*In case of emergency, and if travel to campus is difficult, USC executive leadership will announce an electronic way for instructors to teach students in their residence halls or homes using a combination of 2SC, teleconferencing, and other technologies. Although this course uses the 2SC LMS for online support, an emergency site for the course is also available through 2SC (2SC.usc.edu). For additional information about maintaining classes in an emergency, please access: http://cst.usc.edu/emergency-preparedness/*

*In the Event of Technical Breakdowns: Students may submit assignments to the instructor via email by the posted due date. Remember to frequently back up your work, post assignments once completed, load files onto a power drive, and keep a hard copy of papers/projects.*

***Academic Accommodations***

*The University of Southern California is committed to full compliance with the Rehabilitation Act (Section 504) and the Americans with Disabilities Act (ADA). As part of the implementation of this law, the University will continue to provide reasonable accommodation for academically qualified candidates with disabilities so that they can participate fully in the University's educational programs and activities. Although USC is not required by law to change the "fundamental nature or essential curricular components of its programs in order to accommodate the needs of disabled candidates," the University will*

*provide reasonable academic accommodation. It is the specific responsibility of the University administration and all faculty serving in a teaching capacity to ensure the University's compliance with this policy.*

*Any candidate requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m. to 5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776. The email address is ability@usc.edu. The website for DSP has additional information regarding accommodations and requests (www.usc.edu/disability).*