Syllabus for MSE112: Materials Selection and Performance

Spring 2011
Instructor: Lilian Davila

Designation:
Catalog Description: Design considerations in the use of materials; quality control; selecting materials to optimize multiple properties; materials failure; long-term materials properties; materials behavior under extreme conditions; corrosion; discussion of design and materials selection strategy; processing and process selection strategy; process economics; life-cycle thinking and eco-design; special topics.

Text Books and Other Required Materials:
• Cases studies provided by the instructor
• Various other selected readings throughout the semester.

Course Objectives/Student Learning Outcomes:

Course Goals:

* Learn key concepts and methods of the quantitative treatment of materials selection for engineering applications.
* Develop an understanding of the relationship between design parameters and materials properties rather than relying isolated concepts from crystallography, thermodynamics or similar.
* Gain understanding on how properties are influenced by processing, fabrication and service conditions and how to integrate materials selection in a range of modern engineering applications.
* Analyze contemporary case studies by reviewing several articles. Be able to communicate knowledge gained about materials selection and performance.
* Use a materials selection software tool, Cambridge Engineering Selector.

Learning Outcomes:

By the end of course through readings, homeworks, in-class discussions, interactions, software experience, project, presentations and exams students will demonstrate:

* An ability to apply fundamental knowledge about materials selection and performance.
* Knowledge of topics in design and materials selection that enable the comparison of similarities and differences among methods.
* An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.
* An ability to function effectively on a multi-disciplinary team.
* An ability to analyze contemporary studies to make connections and decisions based on their design and selection merit.
* An ability to understand the impact of engineering solutions in a global, economic, environmental and societal context.

Prerequisites by Topic:
ENGR 45; Good Academic Standing; Upper Division standing in engineering, or Consent of Instructor.

Course Policies:
1. Turn in completed assignments in class. No late work will be accepted. 2. No makeup exams will be given. Missed exams will be prorated, provided the absence was due to illness documented by a physician’s statement. 3. Unless you are instructed otherwise, you may discuss homework problems and term project topics with other students in the class, but submitted work must be your own. The UCM Code of Academic Conduct will be strictly enforced (see http://studentlife.ucmerced.edu under Student Judicial Affairs). 4. Students are expected to abide by the UC Merced Principles of Community (see http://studentaffairs.ucmerced.edu/principles-community)

Academic Dishonesty Statement:
a. Each student in this course is expected to abide by the University of California, Merced's Academic Honesty Policy. Any work submitted by a student in this course for academic credit will be the student's own work.
b. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give “consulting” help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e mail, an e mail attachment file, a diskette, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Policy can also be extended to include failure of the course and University disciplinary action.
c. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

Disability Statement: Accommodations for Students with Disabilities: The University of California Merced is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design and diversity. I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations.

Topics:
Design considerations in the use of materials; quality control; selecting materials to optimize multiple properties; materials failure; long-term materials properties; materials behavior under extreme conditions; corrosion; discussion of design and materials selection strategy; processing and process selection strategy; process economics; life-cycle thinking and eco-design; special topics.

Tu 1:00-2:50 PM and Fri 3:00-5:50 PM, S&E 158
Class/laboratory Schedule:
Midterm/Final Exam Schedule:
Midterm Exam: Fri March 18, 2011
Final Exam: Th May 12, 2011 (11:30 AM - 2:30 PM)
Course Calendar: See attached syllabus in pdf
Professional Component: Several topics discussed and activities performed (e.g. project planning) See calendar provided (pdf)
Assessment/Grading Policy:
Homework 10%
Quizzes 10%
Discussion 10%
Midterm 20%
Project 25%
Final 25%
Coordinator:
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Office Hours: Tuesday and Friday 4:00-5:00 pm, and by appointment