

Course Syllabus
EMA 4714 Materials Selection and Failure Analysis
Spring 2018

Catalog Description – Philosophy and practice of engineering selection of materials. Case studies in product liability and failure analysis; 3 credit hours.

Pre-requisite – EGM 2511, Engineering Mechanics – Statics; EGM 3520, Mechanics of Materials; STA 3032, Engineering Statistics [co-requisite].

Instructor – Dr. Matthew Zaluzec/Dr. Jack Mecholsky

- a. Office location: 100 D Rhines Hall
- b. Telephone: 352-846-3306 (office)
- c. E-mail address: jmech@mse.ufl.edu
- d. Class Web site: login to e-Learning at <https://lss.at.ufl.edu/>
- e. Office hours: M-2;7; or by appointment

Teaching Assistant – William Brewer

- a. Office location: Rhines Hall
- b. Telephone :
- c. E-mail address:
- d. Office hours: TBD

Meeting Times – Lecture: T-7; R- 6, 7

Class/laboratory schedule – Three 50 minute lecture periods per week.

Meeting Location – MCCA 1142

Material and Supply Fees - None.

Text: “Engineering Design – a Materials and Processing Approach”, 5th edition, by George E. Dieter and L.C. Schmidt, McGraw Hill, 2013 [ISBN = 978-0-07-339814-3], Materials Selection and Design ASM International [1997] and "Materials Selection in Mechanical Design", Pergamon Press [1993] by M.F. Ashby.

Course Objectives - This is a senior level capstone design course in Materials Science and Engineering. The specific objectives for the course are:

- describe, both conceptually and analytically, how system components work and to model function or performance using scientific and engineering principles learned as part of your undergraduate education.

- Participate in an integrated design activity using fundamentals of “systems engineering”, where performance and behavior have to be analyzed in light of consumer expectations and merchantability of the design
- to gain experience in the selection of materials and optimization of behavior by using a systematic methodology which combines materials properties with the engineering function of the process or product design.
- to defend materials selection effectively both orally and in written form.
- to select and use appropriate industrial literature and library resources in the solution of materials selection and failure analysis problems.

Contribution of course to meeting the professional component - This is a 3 credit course. It provides 3 credits towards design.

Relationship of course to program outcomes - This course addresses the following MSE Program outcomes (note: Numbers refer to the list of MSE Program outcomes):

Outcome (c) The student will have the ability to apply and integrate knowledge of structure, properties, processing, and performance to solve materials selection and design problems within realistic constraints.

Outcome (d) The student will have the ability to function on multi-disciplinary teams

Outcome (g) The student will have the ability to communicate effectively in written form.

Outcome (h1) The student will have understanding of the economic impact of engineering solutions.

Outcome (h2) The student will have understanding of the global, societal, and environmental impact of engineering solutions.

Attendance and Expectations - Attendance is not part of the course grade; however, all students are expected to attend class. The class is taught in an interactive lecture format, and includes discussion and practice problems. Cell phones should be turned off in class. Reading of newspapers, work on assignments for this or other classes, or other activities that are not part of the class are not allowed during class time.

Grading – Homework problem sets [6], 20%; Quizzes, 20%; 2 unit examinations, 30% ; Design project, 30%.

Grading Scale - A = 4.00 \geq 92, A- = 3.67 \geq 88, B+ = 3.33 \geq 84, B = 3.00 \geq 80, B- = 2.67 \geq 76, C+ = 2.33 \geq 72, C = 2.00 \geq 68, C- = 1.67 \geq 65, D+ = 1.33 \geq 62, D = 1.00 \geq 59, D- = 0.67 \geq 56, E = 0.00 < 56, Grades are not curved.

Make-up Exam Policy – There are usually no make-up quizzes – however, students are permitted to take the quiz or exam at an earlier time, time and place agreed on by student and instructor. Make-up exams are given only for reasons of illness and in accordance with University of Florida regulations.

Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

UF Counseling Services – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
- SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.
- Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

Software Use – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.