

EMA 3010 – Materials – Fall 2013
Section 3001

1. **Course Description:** Conceptual perspective for origin of materials behavior, including structure, property, performance interrelationships. Materials selection and use of familiar materials, including metals, ceramics, polymers, electronic materials, and composites in electronics, structural and other engineering applications. (3 Credit Hours)

2. **Course Objectives:** To present the fundamental concepts in materials science and engineering. To describe the structure, properties, and applications of metallic, ceramic, polymeric and composite materials. To generalize structure-property-performance interrelationships in materials.

Anticipated Outcomes:

- Ability to apply knowledge of mathematics, science and engineering to materials systems.
- Ability to identify, formulate, and solve engineering problems.
- Understanding of the global, societal, and environmental impact of engineering solutions, including safety of the environment, the global economy, and intellectual property.

3. **Prerequisites:** CHM 2045 General Chemistry

4. **Contribution of course to meeting the professional component:** This course provides 3 credits towards engineering sciences.

5. Instructor: **Dr. Jennifer Andrew**

- a. Office location: **162 Rhines Hall**
- b. Telephone: **352.846.3345**
- c. E-mail address: **jandrew@mse.ufl.edu**
- d. Office hours: **T 1:00 – 3:00 pm**
- e. Website: **<https://lss.at.ufl.edu/>**

6. Teaching Assistant: **Stefan Kelly**

- a. Office hours location: **MAE 239**
- b. Telephone: **TBA**
- c. E-mail address: **stefan.kelly@ufl.edu**
- d. Office hours: **M 2:00 – 3:00 pm and R 1:00 – 3:00 pm**

7. Meeting Times and Location: **T Periods 4 & 5, 10:40 – 11:30 am & 11:45 am – 12:35 pm WM (Williamson Hall) 100**

R Period 4, 10:40 – 11:30 am WM (Williamson Hall) 100

8. Textbook Required

- a. Title: ***Fundamentals of Materials Science and Engineering: An Integrated Approach***
- b. Author: **William D. Callister, Jr. and D.G. Rethwisch**
- c. Edition: **Fourth Edition (John Wiley & Sons, Inc.)**
- d. ISBN: **978-1-118-06160-2**

9. On the Web: This course will use Sakai extensively as a communication and archival tool. The students can access all relevant course information (course notes, homework and exam solutions, announcements, grades, etc.) via the Sakai entry link: **<https://lss.at.ufl.edu/>**.

10. Conduct, Attendance and Expectations: Proper behavior in class is always important and leads to a relaxed and productive educational environment. Thus, eating, drinking, texting, reading of newspapers, working on homework for this or other courses, or other activities that are not part of the class are not allowed. Students who do not comply with these requirements or who behave disorderly or disrespectfully may be asked to leave the classroom. Leaving your cell phone on, leaving early or arriving late can be VERY distracting. All electronic devices (PDAs, cell-phones, etc.) should be turned off or in silent mode. If your cell phone rings during class it will be confiscated for the remainder of the class period. While not directly enforced, attendance is strongly suggested since significant amount of participative as well as individual and collaborative work will be performed during the class sessions and will be worth as much as 25% of the course points.

11. **Grading and Grading Scale:** Your final grade will be allocated based on the following distribution:

Homework: 25%
 Three In-Class exams: 25% each

Percentage	≥ 92	≥ 88	≥ 84	≥ 80	≥ 76	≥ 72	≥ 68	≥ 65	≥ 62	≥59	≥ 56	<56
Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E

Exams. You will be given 3 exams throughout the semester, the exam content may change but the dates will not. **There will be no final exam.** Each exam is weighted equally and will be worth 25% of your final grade. Requests for re-grading must be made in writing and within one week after an assignment has been returned. **Make-up exams** will be provided only with the *prior approval of the instructor or excused absence*. In general, acceptable reasons for excused absence include illness, serious family emergencies, special curricular requirements, military obligation, court-imposed legal obligations, religious holidays and participation in official university activities such as music performances, athletic competition or debate.

Calculators. Only scientific and non-graphing calculators will be permitted during exams. The permitted calculators are NCEES (National Council of Examiners for Engineering and Surveying) approved, and include the following:

- Hewlett Packard- HP 33s and HP 35s
- Casio – fx-115 ES, fx-115 MS, fx-115 MS Plus, fx-115 MS SR
- Texas Instruments – TI-30Xa, TI-30Xa SOLAR, TI-30Xa SE, TI-30XS Multiview, TI-30X IIB, TI-30X IIS, TI-36X II, and TI-36X SOLAR, TI 36X Pro
- **If you are unsure about your calculator, it is your responsibility to check with the instructor for approval. Calculators will not be provided if you forget or bring the wrong calculator.**

Homework. Homework problems from the back of each chapter will be assigned, together with due dates, through e-Learning. These homework questions are *essential* to your study and some exam questions will be adapted from them. Homework will be posted, submitted, and graded through the Sakai web site. No late homework assignments will be accepted. You will be allowed at least 1 re-submission attempt for each homework, but this must be done before the homework due date/time. Start your HW assignments early to allow time for resubmission.

12. **Course Outline:** Below is the tentative schedule of topics, activities, reading assignments, exams, and homework.

Week of	Topic	Reading Assignments
Aug. 19	Introduction	Ch. 1
Aug. 26	Atomic Structure & Chemical Bonding, Crystalline Structure of Metals	Ch. 2-3
Sep. 2	Crystalline Structure (Metals & Ceramics)	Ch. 3
Sep. 9	Crystalline Structure of Polymers	Ch. 4
Sep. 16	Imperfections in Materials	Ch. 5
EXAM 1	Tues. September 24 (Chapters 1-5)	
Sep. 23	Diffusion	Ch. 6
Sep. 30	Mechanical Properties of Materials, Composites	Ch. 7, 15
Oct. 7	Composites, Deformation & Strengthening Mechanisms	Ch. 15, 8
Oct. 14	Failure	Ch. 9
Oct. 21	Phase Diagrams (Rules)	Ch. 10
EXAM 2	Tues. October 29 (Chapters 6-9, 15)	
Oct. 28	Phase Diagrams (Metals & Ceramics)	Ch. 10
Nov. 4	Phase Transformations	Ch. 11
Nov. 11	Processing of Materials (Metals, Ceramics, Polymers)	Ch. 14
Nov. 18	Types and Applications of Materials	Ch. 13
	Electronic Properties, Magnetic Properties	Ch. 12, 18
Nov. 25	Thermal Properties, Optical Properties	Ch. 17, 19
<i>(Nov. 28)</i>	<i>Thanksgiving Day (No Class)</i>	
EXAM 3	Tues. December 2 (Chapters 10-14, 17-19)	
NO FINAL EXAM		

14. **Honesty Policy** – All students admitted to the University of Florida have signed a statement of academic honesty committing them 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.

15. **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.

16. **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.

17. **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.