

Syllabus: EMA 3010 (Section 2963) – Materials – Spring 2014

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.

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. Chris Batich**

a. Office location: **MAE 317**

c. E-mail address: **cbati@ufl.edu**

d. Office hours: **TBA or by appointment**

6. Teaching Assistant: **TBA**

a. Office location: **TBA**

b. E-mail address: **TBA**

c. Office hours: **TBA**

7. Meeting Times and Location: **M-W-F Period 7 (1:55 - 2:45 pm) – NEB 0202**

8. Textbook Recommended

a. Title: ***Fundamentals of Materials Science and Engineering: An Integrated Approach***

b. Author: **William D. Callister, Jr. and D.G. Rethwisch**

c. Year and edition: **2008, Third Edition (John Wiley & Sons, Inc.)**

d. ISBN: **9780470343227** or ON-LINE ONLY ISBN: **9780470120149**

9. **On the Web:** This course will use Sakai extensively as a *communication, homework and archival tool*. Students can access relevant course information 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. 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 20% of the course points.

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

Four In-Class exams: 25% each

A = 90%-100%; **B+** = 85%-89%; **B** = 80%-84%; **C+** = 75%-79%; **C** = 70%-74%; **D+** = 65%-69%; **D** = 60%-64%; **E** < 60%.

12. **Homework:** Homework exercises will be assigned throughout the course. Notification of homework assignments will be via classroom announcements and posting on **Sakai**. Homework will not be collected or graded, but will be the basis for test questions.

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

WEEK OF	TOPICS	CHAPTER
1/6	<ul style="list-style-type: none"> • Introduction • Material Properties 	Ch 1 & 2
1/13	<ul style="list-style-type: none"> • Atomic Structure & Chemical Bonding • Crystalline Structure 	Ch 2 & 3
1/20	<p><i>*No class Jan 20: Martin Luther King day</i></p> <ul style="list-style-type: none"> • Crystalline Structure • Exam Review 	Ch 3
1/27	<p>EXAM 1 / Jan 27 / Ch 1, 2, 3</p> <ul style="list-style-type: none"> • Imperfection in Solids 	Ch 5
2/3	<ul style="list-style-type: none"> • Diffusion • Mechanical Properties 	Ch 6-7
2/10	<ul style="list-style-type: none"> • Mechanical Properties, Deformation & Strengthening • Failure 	Ch 7-8
2/17	<ul style="list-style-type: none"> • Polymer structure • Exam Review 	Ch 4
2/24	<p>EXAM 2 / FEB. 26 / Ch 4 - 8</p> <p>Failure and Phase Diagrams</p>	Ch 9 - 10
3/3	<p><i>*No class March 1-8 – Spring Break</i></p>	
3/10	<ul style="list-style-type: none"> • Phase Diagrams and Phase Transformations 	Ch 10-11
3/17	<ul style="list-style-type: none"> • Types and Applications of Materials <ul style="list-style-type: none"> • Processing 	Ch 13 & 14
3/24	<ul style="list-style-type: none"> • Processing of Materials (Metals, Ceramics, Polymers) 	Ch 14
3/31	<ul style="list-style-type: none"> • Composites • Corrosion • Exam Review 	Ch 15,16
4/7	<p>EXAM 3 / APRIL 7 / Ch 4, 13-16</p>	
4/14	<ul style="list-style-type: none"> • Electrical Properties • Magnetic Properties <ul style="list-style-type: none"> • Biomaterials 	Ch 12 & 18 Handout
4/21	<ul style="list-style-type: none"> • Biomaterials • Thermal and Optical Properties <p>Exam review</p>	Ch 18, 17, 19
4/23	<p>Exam 4 / APRIL 23 / Ch 12, 17-19</p>	

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.