

Syllabus: EMA 3010 (Section 5823) – Materials – Fall 2017

COURSE DESCRIPTION: (3 Credit Hours)

- 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.

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.

PREREQUISITES: CHM 2045 General Chemistry

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

INSTRUCTOR: Dr. Jon Dobson

- Office location: **BMJ 293**
- E-mail address: **jdobson@ufl.edu**
- Office hours: **TBA or by appointment**
- Teaching Assistant: **Marcus Benjamin**
- Office location: **TBA**
- E-mail address: **anewjourney99@ufl.edu**
- Office hours: **TBA**

Meeting Times and Location: **T Period 4 (10:40 - 11:30 am) / Th Periods 4 & 5 (10:40 am - 12:35 pm) – Weil Hall 270**

TEXTBOOK (required)

- Title: *Fundamentals of Materials Science and Engineering: An Integrated Approach*
- Author: William D. Callister, Jr. and D.G. Rethwisch
- Year and edition: Fifth Edition (John Wiley & Sons, Inc.) / Electronic Version
- ISBN: 9781119175483 or ON-LINE ONLY ISBN: 9781119127604

ON THE WEB: This course will use Canvas/Sakai extensively as a *communication, homework and archival tool*. Students can access relevant course information via the entry link: <https://lss.at.ufl.edu/>.

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. Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>.

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

Homework: 10% / Quizzes: 10% / Three In-Class Exams: 30%/30%/20%

A = 95% - 100%; **A-** = 90% - 94%; **B+** = 87% - 89%; **B** = 83% - 86%; **B-** = 80% - 82%;

C+ = 77% - 79%; **C** = 73% - 76%; **C-** = 70% - 72%; **D+** = 67% - 69%; **D** = 63% - 66%;

D- = 60% - 62%; **E** < 60%

HOMEWORK: Homework exercises will be assigned throughout the course. Notification of homework assignments and due dates will be via classroom announcements and posting on Canvas.

PROVISIONAL COURSE OUTLINE: Below is the tentative schedule of topics, activities, reading assignments and exams.

Date	Lecture Topic	Notes
Tue 8/22	Introduction & course overview	
Thur 8/24	Material Properties / Atomic structure and chemical bonding	Ch 1 & 2
Tue 8/29	Atomic structure and chemical bonding	Ch 2
Thur 8/31	Crystalline Solids	Ch 3
Tue 9/5	Crystalline Solids	Ch 3
Thur 9/7	Imperfections in Solid	Ch 5
Tue 9/12	Microscopy	Ch 5
Thur 9/14	Diffusion	Ch 6
Tue 9/19	EXAM REVIEW	
Thur 9/21	EXAM 1	
Tue 9/26	Mechanical properties of materials	Ch 7
Thur 9/28	Mechanical properties of materials / Deformation & Strengthening	Ch 7 & 8
Tue 10/3	Failure	Ch 9
Thur 10/5	Phase Diagrams	Ch 10
Tue 10/10	Phase Transformations	Ch 11
Thur 10/12	Polymer Structure	Ch 4
Tue 10/17	Types and applications of materials: Metals	Ch 13
Thur 10/19	Types and applications of materials: Metals / Ceramics	Ch 13
Tue 10/24	Processing of materials: Polymers	Ch 14
Thur 10/26	Processing of materials: Metals	Ch 14
Tue 10/31	Processing of materials: Ceramics	Ch 14
Thur 11/2	Corrosion / Composites	Ch 15 & 16
Tue 11/7	EXAM REVIEW	
Thur 11/9	EXAM 2	
Tue 11/14	Thermal Properties / Optical Properties	Ch 17 & 19
Thur 11/16	Electrical Properties	Ch 12
Tue 11/21	Magnetic Properties	Ch 18
Thur 11/23	THANKSGIVING	
Tue 11/28	Magnetic Properties	Ch 18
Thur 11/30	Magnetic Properties / EXAM REVIEW	Ch 18
Tue 12/5	EXAM 3	
	NO FINAL EXAM	

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.

*Note that failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures.

See <http://www.dso.ufl.edu/sccr/procedures/honorcode.php>.

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:

- UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, <http://www.counseling.ufl.edu/cwc/Default.aspx>, counseling services and mental health services.
- Career Resource Center, Reitz Union, 392-1601, career and job search services.
- University Police Department 392-1111

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.

FEEDBACK – Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.