

## **Materials**

EMA 3010 Section 3012

**Class Periods:** M, W, F, Period 7, 1:55-2:45

**Location:** NEB 201

**Academic Term:** Spring 2020

### ***Instructor:***

G. Bahar Basim

[gbbasim@ufl.edu](mailto:gbbasim@ufl.edu)

352-846-3557

Office Hours: Monday 13:00-14:00  
Particle Science and Technology Building  
1180 Center Drive  
205 C

### ***Teaching Assistants:***

Please contact through the Canvas website

- Kory Burns  
[e-mail: KoryBurns@ufl.edu](mailto:KoryBurns@ufl.edu)  
Chandler Honaman  
[e-mail: ChandlerHonaman@ufl.edu](mailto:ChandlerHonaman@ufl.edu)

Office Hours:

TBD

Wiley Plus TA : TBD

### ***Course Description***

Conceptual perspective for origin of materials behavior and the interrelationships of structure/property /performance. Materials selection and use of familiar material (metals, ceramics, polymers, electronic materials and composites) in electronics and structural and other engineering applications.

### ***Course Pre-Requisites / Co-Requisites***

CHM 2045 General Chemistry (or equivalent)

### ***Course Objectives***

This is an introductory course, designed to provide the fundamental concepts of Materials Science and Engineering. Students will be able to describe structure, properties, and applications of metallic, ceramic, polymeric and composite materials and the significance of the electronic, thermal, magnetic and photonic properties in applications.

### ***Materials and Supply Fees***

WileyPlus online

### ***Professional Component (ABET):***

This course provides 3 credits towards engineering sciences.

**Relation to Program Outcomes (ABET):**

The table below is an example. Please consult with your department's ABET coordinator when filling this out.

Outcome	Coverage*
1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics.	High
2. An ability to apply both analysis and synthesis in the engineering design process, resulting in designs that meet desired needs.	
3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	
4. An ability to communicate effectively with a range of audiences	
5. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	
6. An ability to recognize the ongoing need for additional knowledge and locate, evaluate, integrate, and apply this knowledge appropriately.	
7. An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty	

\*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

**Required Textbooks and Software**

- Title : Fundamentals of Materials Science and Engineering: An Integrated Approach
- Author : William D. Callister and David G. Rethwisch
- Publication date and edition: Wiley 5<sup>th</sup> Edition
- ISBN number : 9781119035640

**Recommended Materials**

- Title : Understanding Materials Science
- Author : Rolf Hummel
- Publication date and edition : 1998, Springer 1<sup>st</sup> Edition
- ISBN number : 0387983031
  
- Title : Essentials of Modern Materials Science and Engineering
- Author : James Newell
- Publication date and edition : 2009, Wiley 1<sup>st</sup> Edition

**Tentative Course Schedule**

Week	Class dates	Topic	Chapter
1	January 6	Course Objectives, Syllabus, Wiley Introduction	0
	January 8	Introduction	1
	January 10	Atomic Structure and Interatomic Bonding	2
2	January 13	Atomic Structure and Interatomic Bonding	2

Week	Class dates	Topic	Chapter
	January 15	Structure of metals, ceramics	3
	January 17	Structure of metals, ceramics	3
<b>3</b>	<b>January 20</b>	<b>Martin Luther King, Jr.'s Birthday</b>	
	January 22	Structure of metals, ceramics	3
	January 24	Structure of metals, ceramics	3
<b>4</b>	January 27	Structure of metals, ceramics	3
	January 29	Structure of Polymers	4
	January 31	Structure of Polymers	4
<b>5</b>	February 3	Structure of Polymers	4
	February 5	Defects in Solids	5
	February 7	Defects in Solids	5
<b>6</b>	February 10	Defects in Solids	5
	February 12	Diffusion	6
	February 14	Review	1-5
<b>7</b>	February 17	Recitation <b>Midterm Exam I (Tentative)</b>	1-5
	February 19	Diffusion	6
	February 21	Diffusion	6
<b>8</b>	February 24	Mechanical Properties	7
	February 26	Mechanical Properties	7
	February 28	Mechanical Properties	7
<b>9</b>	<b>March 2</b>	<b>Spring Break</b>	
	<b>March 4</b>		
	<b>March 6</b>		
<b>10</b>	March 9	Deformation and strengthening mechanisms	8
	March 11	Deformation and strengthening mechanisms	8
	March 13	Deformation and strengthening mechanisms/Failure	8-9
<b>11</b>	March 16	Failure	9
	March 18	Failure	9
	March 20	Review	6-9

Week	Class dates	Topic	Chapter
12	March 23	Recitation <b>Midterm Exam II</b>	6-9
	March 25	Phase Diagrams	10
	March 27	Phase Diagrams	10
13	March 30	Phase Diagrams	10
	April 1	Phase Diagrams	10
	April 3	Phase transformations	11
14	April 6	Phase transformations	11
	April 8	Phase transformations	11
	April 10	Types and Applications of materials	13
15	April 13	Types and Applications of materials	13
	April 15	Composites	15
	April 17	Composites	15
16	April 20	Review /Recitation	10, 11, 13, 14
	April 22	Make Up Exams/ Review <b>Midterm Exam III</b>	10, 11, 13, 14

### Course Website

The course website is on the Canvas system <http://elearning.ufl.edu/https://ufl.instructure.com/>, where you can find the syllabus, lecture notes, homework problems, announcements, and your grades. Please check it frequently.

### Lectures and Attendance Policy

**Lectures** are critical to success in this MSE course.

**Attendance** is not required but highly encouraged since there will be In Class Exercises (ICE). Students are encouraged to ask questions and participate. The fundamental concepts will be repeated as required based on the ICE discussions and exam results as needed.

### Homework, due as shown in WileyPlus Assignments

Homework exercises from the end of chapters will be assigned. These homework questions are essential to your study and some exam questions will be adapted from them. There will be 11 homework assignments throughout the semester, and the lowest 2 will be dropped from the final score. Each homework assignment is weighted equally, and the homework will account for **15%** of your grade. Homework will be posted, submitted, and graded through the Canvas/WileyPLUS web site via e-learning. **No late homework assignments will be accepted.** You will be allowed 1 re-submission attempts for each homework, but this must be done before the homework due date/time. Please see the TAs during office hours to discuss homework problems.

Tentative dates for HW assignments;

HW #	1	2	3	4	5	6	7	8	9	10	11	12
Date Due	1/17	1/24	1/31	2/7	2/14	2/28	3/13	3/20	3/27	4/3	4/10	4/17

## Exams

There will be 3 Midterm exams throughout the semester. The exam content may change and the dates are tentative and will be finalized after the add/drop period. All EMA3010 students will be given the same Midterm exams together. The time and location of the exams will be announced.

Each exam is weighted equally, and each exam will be worth **25%** of your final grade. Review sessions will be given prior to each exam. The tentative exam dates are as follows;

Midterm Exam 1 : Monday, February 17, 2020  
Midterm Exam 2 : Monday, March 23, 2020  
Midterm Exam 3 : Wednesday, April 22, 2020

### Chapters on each exam:

- Exam 1: Atomic structure and bonding (Ch 2), Structure of metals, ceramics (Ch 3), Structure of polymers (Ch 4), Defects in solids (Ch 5)
- Exam 2: Diffusion (Ch 6), Mechanical properties (Ch 7), Deformation and Strengthening Mechanisms (Ch 8), Failure (Ch 9)
- Exam 3: Phase diagrams (Ch 10), Phase transformations (11), Types and Applications of Materials (Ch 13), Composites (Chapter 15)

You have two weeks after the test results are posted to resolve any questions about scores and grades. No changes to your exam grade will be made after that time.

### **Exam Conflicts with other course exams**

The official UF policy on exam conflict resolution states that when two exams conflict, the course with the higher number will take priority. There will be no exceptions to this rule.

### **Make-up exams**

Students who do not take an exam will receive a grade of 0. There will be a make-up for a missed exam.

Excused absences must be consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

All the Make up exams will be scheduled by the course instructors.

### **Bonus points**

There may be some bonus point activities that will be assigned during the class hours. Bonus points may also be added to the midterm exams.

### **In Class Exercises (ICE)**

There will be multiple “in class” exercises during the class hours. Students will be allowed to work in small groups or work individually depending on the type of given assignment. ICEs are 5% of your grade and may be graded or assigned as bonus points as an indicator of class participation.

## Rules for the Midterm Exams

- All cell phones must be turned off and they cannot be used in place of a calculator.
- 1 letter size (8.5 by 11 inches) paper (both sides) can be used for your notes for the exams that has to be handwritten. No photocopies or print outs are allowed. Remember to write your names on the sheets. **You must turn in your sheet with the exam for it to be graded.** If you do not use one, it has to be noted on your exam paper by the instructors.
- You are responsible to know all the functions of your calculators
- Show all your work as needed
- Any suspicious activity during exam will result in marking of your exam paper to be evaluated accordingly.

## Behavior in class

- No behavior that can distract the other students in class will be allowed.
- Jean-Jacques Rousseau Principle “Ones freedom ends where the others freedom starts.”
- Destructive behavior will result in your dismissal from the class.

## Record keeping

All materials from this class that students will be saved for a year and will be shredded afterwards.

## Syllabus Changes

I reserve the right to make changes in the syllabus as needed. Any changes will be clearly announced on canvas and in class.

## Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework Sets (10)	10 each	15%
Quizzes (8)	10 each	5%
ICE (TBD)	10 each	5%
Midterm Exam I	100	25%
Midterm Exam II	100	25%
Midterm Exam III	100	25%
		100%

## Grading Policy

The following is given as an example only.

Percent	Grade	Grade Points
92 -100	A	4.00
88 - 92	A-	3.67
84 - 88	B+	3.33
80 - 84	B	3.00
76 - 80	B-	2.67
72 - 76	C+	2.33
68 - 72	C	2.00
65 - 68	C-	1.67
62- 65	D+	1.33
59 - 62	D	1.00
56 - 59	D-	0.67
0 - 56	E	0.00

More information on UF grading policy may be found at:  
<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

### ***Students Requiring Accommodations***

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

### ***Course Evaluation***

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. [Summaries](#) of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

### ***University Honesty Policy***

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### ***Commitment to a Safe and Inclusive Learning Environment***

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, [rbielling@eng.ufl.edu](mailto:rbielling@eng.ufl.edu)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu)

### ***Software Use***

All faculty, staff, and students 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.

### ***Student Privacy***

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

### ***Campus Resources:***

## Health and Wellness

### **U Matter, We Care:**

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

### **Sexual Discrimination, Harassment, Assault, or Violence**

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto:title-ix@ufl.edu)

### **Sexual Assault Recovery Services (SARS)**

Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

## Academic Resources

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu).  
<https://lss.at.ufl.edu/help.shtml>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

**Library Support**, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.  
<https://teachingcenter.ufl.edu/>.

**Writing Studio, 302 Tigert Hall**, 846-1138. Help brainstorming, formatting, and writing papers.  
<https://writing.ufl.edu/writing-studio/>.

**Student Complaints Campus:** [https://www.dso.ufl.edu/documents/UF\\_Complaints\\_policy.pdf](https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf).

**On-Line Students Complaints:** <http://www.distance.ufl.edu/student-complaint-process>.