

## Materials

EMA 3010 Class Number -13717, 13718

**Class Periods:** M,W,F – Period 3 (13717), Period 6 (13718)

**Location:** CSE E121 (13717), TUR L011 (13718)

**Academic Term:** Spring 2020

### 1. Instructor

Aroba Saleem

[aroba.saleem@ufl.edu](mailto:aroba.saleem@ufl.edu)

352-294-1789

Office Hours: 313 MAE, TBA

### 2. Teaching Assistants

Please contact through the Canvas website

- TBA

### 3. 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)

### 4. Course Pre-Requisites

CHM 2045 General Chemistry.

### 5. 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.

### 6. Professional Component (ABET)

This course provides 3 credits towards engineering sciences.

### 7. Relation to MSE Program Outcomes (ABET)

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.

### 8. Required Textbooks and Software

- Title: **Fundamentals of Materials Science and Engineering: An Integrated Approach**
- Author: **William D. Callister, Jr. and David G. Rethwisch**
- Year and edition: **2019 5<sup>th</sup> Edition (John Wiley & Sons, Inc.), e-book with Wiley Plus Access**
- ISBN: **1978-1-119-65905-1**

It is required that you purchase Wiley Plus access to this textbook. It is required because we will use Wiley Plus for the homework as well as to access the textbook. You will need to purchase and set up Wiley Plus; instructions can be found here:

[Setting up your Wiley Plus access](#)

## 9. Course Website

This course will use CANVAS extensively as a communication and archival tool. The students can access all relevant course information (course notes, homework, problem sets, solutions, announcements, grades, etc.) via the CANVAS entry link: <https://elearning.ufl.edu/>, or <https://ufl.instructure.com>. Within CANVAS the students can purchase the book and access to Wiley Plus to submit the homework. Please check CANVAS frequently.

## 10. Course Schedule

Below is the intended/tentative schedule of classes and exams.

W	Class dates	Topic	Chapter	Homework
1	Jan 6	Course Objectives, Syllabus, Wiley Introduction	0	
	Jan 8	Introduction	1	
2	Jan 10	Atomic Structure and Interatomic Bonding	2	
	Jan 13	Atomic Structure and Interatomic Bonding	2	
	Jan 15	Atomic Structure and Interatomic Bonding	2	
3	Jan 17	Structure of metals, ceramics	3	HW 1 Due (1/17)
	<b>Jan 20</b>	<b>Martin Luther King, Jr.'s Birthday</b>		
	Jan 22	Structure of metals, ceramics	3	
4	Jan 24	Structure of metals, ceramics	3	HW 2 Due (1/24)
	Jan 27	Structure of metals, ceramics	3	
5	Jan 29	Structure of Polymers	4	
	Jan 31	Structure of Polymers	4	HW 3 Due (1/31)
	Feb 3	Structure of Polymers	4	
6	Feb 5	Defects in Solids	5	
	Feb 7	Defects in Solids	5	HW 4 Due (2/7)
	Feb 10	Defects in Solids	5	
7	Feb 12	Review	1-5	HW 5 Due (2/12)
	Feb 13	<b>EXAM 1: February 13</b>		
	Feb 17	Diffusion	6	
8	Feb 19	Diffusion	6	
	Feb 21	Diffusion	6	
	Feb 24	Mechanical Properties	7	
9	Feb 26	Mechanical Properties	7	
	Feb 28	Mechanical Properties	7	HW 6 Due (2/28)
	<b>March 2</b>	<b>Spring Break</b>		
<b>March 4</b>				
<b>March 6</b>				
10	March 9	Deformation and strengthening mechanisms	8	
	March 11	Deformation and strengthening mechanisms	8	
	March 13	Deformation and strengthening mechanisms	8	HW 7 Due (3/13)
11	March 16	Failure	9	
	March 18	Failure	9	
	March 20	Failure	9	HW 8 Due (3/20)
12	March 23	Review	6-9	
	March 24	<b>EXAM 2: March 24</b>		HW 9 Due (3/24)
	March 25	Phase Diagrams	10	
	March 27	Phase Diagrams	10	
13	March 30	Phase Diagrams	10	

	April 1	Phase Diagrams	<b>10</b>	
	April 3	Phase transformations	<b>11</b>	HW 10 Due 4/3)
<b>14</b>	April 6	Phase transformations	<b>11</b>	
	April 8	Phase transformations	<b>11</b>	
	April 10	Types and Applications of Materials	<b>13</b>	HW11 Due (4/10)
<b>15</b>	April 13	Types and Applications of Materials	<b>13</b>	
	April 15	Composites	<b>15</b>	
	April 17	Composites	<b>15</b>	HW 12 Due (4/17)
<b>16</b>	April 20	Review	<b>10, 11, 13, 15</b>	
	April 21	<b>EXAM 3: April 21</b>		
		<b>NO FINAL EXAM</b>		

The instructor reserves the right to make changes to the syllabus as needed. Any changes will be clearly announced on CANVAS and in class.

### **11. Attendance Policy, Class Expectations, and Make-Up Policy**

Each class period will be used for course lectures and the working of example problems. Attendance will be a critical aspect of learning the material, as the lectures will not be recorded. However, attendance will not be taken. Attendance is strongly suggested since it is the best way to actively engage with the instructor while the topics are being covered and get any clarifying questions answered right when they arise. In addition, a number of in class exercises will be worked out in class, they will be graded, and they will help as preparation for the exams.

Proper behavior in class is always important and leads to a relaxed and productive educational environment. Students are expected to arrive to class on time and be respectful to the instructor and to fellow students.

Students not presenting an exam, homework, quiz, or in class exercise, will receive a grade of zero (0) and there will be no make-up. Exceptions will only be entertained in cases of excused absences, which must comply with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation. 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.

### **12. Course Communication**

E-Learning will be the primary avenue for communication and course management. All announcements for the course will be made using the announcement system on the E-Learning site. Make sure and change your E-Learning settings so that you get notifications about announcements, assignment changes, etc. in a timely manner.

I prefer to be emailed directly at [aroba.saleem@ufl.edu](mailto:aroba.saleem@ufl.edu) instead of CANVAS mail but you can choose either.

### **13. Homework**

Homework problems for each module will be assigned, submitted, and graded using Wiley Plus through the E-Learning website. Two attempts are allowed for each question. Since you have roughly a week to work on the assigned homework, there is no late submission allowed. The availability to submit homework answers online is controlled automatically so please be sure to submit the homework before the deadline. Group discussions towards homework solving and teamwork are encouraged but all answers that are turned in should be the result of your own work. In addition, **you should keep records of the work leading to your answers throughout the semester**, as they will be randomly requested for grading clarification. If you have questions on grading in Wiley Plus, please contact TA (TBD).

### **14. In-Class Exercise Worksheets**

Students will work in pairs on some of the problems for a few minutes of class time. The purpose of this graded activity is to elicit questions from students on the topics covered and serve as preparation for the exams.

### **15. Exams**

You will be given three exams throughout the semester, the exam content may change but the dates will not. The exams will be given in the evening. There will be no final exam. Each exam is weighted equally and will be worth 25% of your final grade. You will be allowed one sheet of notes on a 8 1/2 by 11 sheet of paper (both sides) to bring to the exam. Make sure you write your name on it. It must be hand-written and not photocopied. **You must turn in your sheet with the exam for it to be graded.** Additional exam guidelines will be provided in class and posted in CANVAS a few days before the exam.

## 16. Evaluation of Grades

Assignment	Points	Percentage of Final Grade
Three Exams (25% each)	300	75%
Homework (drop lowest two)	40	10%
In-Class Exercises (drop lowest two)	40	10%
Quizzes (drop lowest two)	20	5%
<b>Grade based on a 400 total point 400 basis</b>		

## 17. Grading Policy

The final grade of the course will be calculated based on the total points scored as follows:

Points	≥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
Grade Points	4.0	3.67	3.33	3.0	2.67	2.33	2.0	1.67	1.33	1.0	0.67	0

For more information on UF grading policy, please visit: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

## 18. 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.

## 19. 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.ua.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.ua.ufl.edu/public-results/>.

## 20. 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.

## 21. Commitment to a Safe and Inclusive Learning Environment

The 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)

## 22. 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.

## 23. Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, see: <http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html>

## 24. 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>.

**UNIVERSITY OF FLORIDA**  
Student Honor Code (Abridged)

Preamble: In adopting this Honor Code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the University community. Students who enroll at the University commit to holding themselves and their peers to the high standard of honor required by the Honor Code. Any individual who becomes aware of a violation of the Honor Code is bound by honor to take corrective action. Student and faculty support are crucial to the success of the Honor Code. The quality of a University of Florida education is dependent upon the community acceptance and enforcement of the Honor Code.

The Honor Pledge: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty 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."***

**Violations of the Student Honor Code include (in part):**

(a) **Plagiarism**, in the form of quoting oral or written materials including but not limited to those found on the internet, whether published or unpublished, without proper attribution; or submitting a document or assignment which in whole or in part is identical or substantially identical to a document or assignment not authored by the student.

(b) **Unauthorized use of Materials or Resources ("Cheating")**. A student shall not use unauthorized materials or resources in an academic activity. Unauthorized materials or resources shall include:

1. Any paper or project authored by the student and presented by the student for the satisfaction of any academic requirement if the student previously submitted substantially the same paper or project to satisfy an academic requirement.
2. Any materials or resources prepared by another student and used without the other student's express consent or without proper attribution to the other student.
3. Any materials or resources that the faculty member has prohibited.
4. Use of a cheat sheet when not authorized to do so or use of any other resources or materials during an examination, quiz, or other academic activity without the express permission.

(c) **Prohibited Collaboration or Consultation**. A student shall not collaborate or consult with another person on any academic activity unless the student has the express authorization.

1. Prohibited collaboration or consultation shall include but is not limited to:
  - Collaborating when not authorized to do so on an examination, take-home test, writing project, assignment, or course work.

- Collaborating or consulting in any other academic or co-curricular activity after receiving notice that such conduct is prohibited.
  - Looking at another student's examination or quiz during the time an examination or quiz is given. Communication by any means during that time, including but not limited to communication through text messaging, telephone, e-mail, other writing or verbally, is prohibited unless expressly authorized.
2. It is the responsibility of the student to seek clarification on whether or not use of materials or collaboration or consultation with another person is authorized prior to engaging in any act of such use, collaboration or consultation.