Materials
EMA 3010  Sections 1935 and 1936

Class Periods:
Section 1935 - Tuesday Period 4 (10:40 am – 11:30 am), Thursday Period 4-5 (10:40 am – 12:35 pm)
Section 1936 - Tuesday Period 7 (1:55 pm – 2:45 pm), Thursday Period 7-8 (1:55 pm – 3:50 pm)

Location:
Section 1935 – Tuesday LIT 0201, Thursday MAT 0018
Section 1936 – Tuesday LIT 0121, Thursday LIT 0113

Academic Term:  Spring 2022

Instructor:
Aroba Saleem
aroba.saleem@ufl.edu
352-294-1789

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
Please contact through the Canvas website
• TBA

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 (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 how to select materials for a given application.

Materials and Supply Fees
N/A

Relation to Program Outcomes (ABET):

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Coverage*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics.</td>
<td>High</td>
</tr>
<tr>
<td>2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.</td>
<td></td>
</tr>
</tbody>
</table>

Materials, EMA 3010
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3. An ability to communicate effectively with a range of audiences

4. 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

5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

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**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 5th Edition
- **ISBN number**: 9781119035640

PLEASE NOTE: You need to acquire the e-book version with access to both Wiley Plus and Perusall as these online tools will be used for assessment as indicated in the evaluation of grades and will provide you with additional learning tools. **The simplest and affordable way to acquire the e-book is via UF ALL ACCESS.** Login at the following website and Opt-In to gain access to your UF All Access course materials - [https://www.bsd.ufl.edu/AllAccess](https://www.bsd.ufl.edu/AllAccess) – UF All Access will provide you with your required materials digitally at a reduced price, and the charge will be posted to your student account. This option will be available starting one week prior to the start of the semester and ends three weeks after the first day of class.

**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/](https://elearning.ufl.edu/) or [https://ufl.instructure.com](https://ufl.instructure.com). Within CANVAS the students can purchase and access the book as well as Perusall and Wiley Plus. Please check CANVAS frequently.

**Course Schedule**

This course is face to face, i.e. synchronous. Below is the intended/tentative schedule of classes and exams.

<table>
<thead>
<tr>
<th>W</th>
<th>Class dates</th>
<th>Topic</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>January 6</td>
<td>Course Objectives, Syllabus, Wiley Introduction</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>January 6</td>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>January 11</td>
<td>Atomic Structure and Interatomic Bonding</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>January 13</td>
<td>Atomic Structure and Interatomic Bonding</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>January 13</td>
<td>Atomic Structure and Interatomic Bonding</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>January 18</td>
<td>Structure of metals, ceramics</td>
<td>3</td>
</tr>
</tbody>
</table>
3 January 20 | Structure of metals, ceramics | 3  
January 20 | Structure of metals, ceramics | 3  
4 January 25 | Structure of metals, ceramics | 4  
January 27 | Structure of Polymers | 4  
January 27 | Structure of Polymers | 4  
5 February 1 | Structure of Polymers | 4  
February 3 | Review | 1-4  
**TBA** | **EXAM 1** | 1-4  
6 February 8 | Defects in Solids | 5  
February 10 | Defects in Solids | 5  
February 10 | Diffusion | 6  
7 February 15 | Diffusion | 6  
February 17 | Diffusion | 6  
February 17 | Review | 5-6  
**TBA** | **EXAM 2** | 5-6  
8 February 22 | Mechanical Properties | 7  
February 24 | Mechanical Properties | 7  
February 24 | Deformation and strengthening mechanisms | 8  
9 March 1 | Deformation and strengthening mechanisms | 8  
March 3 | Failure | 9  
March 3 | Failure | 9  
10 March 15 | Review Lecture | 7-9  
**TBA** | **EXAM 3** | 7-9  
March 17 | Phase Diagrams | 10  
March 17 | Phase Diagrams | 10  
11 March 22 | Phase Diagrams | 10  
March 24 | Phase Transformations | 11  
March 24 | Phase Transformations | 11  
12 March 29 | Phase Transformations | 11  
March 31 | Review Lecture | 10-11  
**TBA** | **EXAM 4** | 10-11  
13 April 5 | Types and Applications of Materials | 13  
April 7 | Types and Applications of Materials | 13  
April 7 | Composites | 15  
14 April 12 | Composites | 15  
April 14 | Economic, Environmental and Societal Issues in MSE | 20  
April 14 | Economic, Environmental and Societal Issues in MSE | 20  
15 April 19 | Review Lecture | 13, 15, 20  
**TBA** | **EXAM 5 (8 PM)** | 13, 15, 20  
NO FINAL EXAM

The instructor reserves the right to make changes to the syllabus as needed. Any changes will be clearly announced on CANVAS and in class.
Course Format
This course uses a **team-based learning approach** that uses pre-class preparation materials (including watching pre-recorded lectures and reading assignments) and live lectures. The class time will be dedicated to lectures and/or In-Class Exercises and Discussions. Your completion and involvement in all these aspects of the course is critical to success.

Pre-Class Preparation Materials

**Pre-Recorded Lectures** will help you prepare for the active learning activities and are a critical aspect of learning the content of this course. You are required to watch them using Perusall. Whether you watch and interact with the lectures will be evaluated and will be worth 15% of the grade.

**Reading assignments** will also help you prepare for the active learning activities and are another critical aspect of learning the course content. Your completion of the reading will be worth 15% of your grade and will be assessed using Perusall.

Active Learning Activities

**Attendance to Live Classes** is not required but highly encouraged since there will be discussion individual and group work on In Class Exercises. Students are encouraged to ask questions and participate. The fundamental concepts will be repeated as required.

**In Class Exercises (ICE)** will be given during the live classes. These exercises will be counted for credit and will be worth 20% of the grade.

Homework Problems

Homework is not required for this course. However, suggested homework problems will be provided via Canvas (WileyPlus) to help students prepare for the exams. These problems are not required and no credit will be provided.

Exams

There will be 5 exams throughout the semester. The exam content may change, and the dates are tentative and will be finalized after the add/drop period.

You have one week 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. Excused absences must be consistent with university policies in the undergraduate catalog [https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

Syllabus Changes

The instructor reserves the right to make changes to the syllabus as needed. Any changes will be clearly announced on Canvas.
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, assignments, exams, changes, etc. in a timely manner.

Evaluation of Grades

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Number of Assignments</th>
<th>Percentage of Final Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading (Perusall)</td>
<td>TBD</td>
<td>15%</td>
</tr>
<tr>
<td>Prerecorded lectures (Perusall)</td>
<td>TBD</td>
<td>15%</td>
</tr>
<tr>
<td>In-Class Exercises</td>
<td>TBD</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm Exams</td>
<td>5</td>
<td>50%</td>
</tr>
</tbody>
</table>

Grading Policy

<table>
<thead>
<tr>
<th>Percent</th>
<th>Grade</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>92.0 - 100</td>
<td>A</td>
<td>4.00</td>
</tr>
<tr>
<td>88.0 - 91.9</td>
<td>A-</td>
<td>3.67</td>
</tr>
<tr>
<td>84.0 - 87.9</td>
<td>B+</td>
<td>3.33</td>
</tr>
<tr>
<td>80.0 – 83.9</td>
<td>B</td>
<td>3.00</td>
</tr>
<tr>
<td>76.0 - 79.9</td>
<td>B-</td>
<td>2.67</td>
</tr>
<tr>
<td>72.0 – 75.9</td>
<td>C+</td>
<td>2.33</td>
</tr>
<tr>
<td>68.0 – 71.9</td>
<td>C</td>
<td>2.00</td>
</tr>
<tr>
<td>65.0 – 67.9</td>
<td>C-</td>
<td>1.67</td>
</tr>
<tr>
<td>62.0 – 64.9</td>
<td>D+</td>
<td>1.33</td>
</tr>
<tr>
<td>59.0 – 61.9</td>
<td>D</td>
<td>1.00</td>
</tr>
<tr>
<td>56.0 – 58.9</td>
<td>D-</td>
<td>0.67</td>
</tr>
<tr>
<td>0.00 – 55.9</td>
<td>E</td>
<td>0.00</td>
</tr>
</tbody>
</table>

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 who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, 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 Conduct Code (https://sccr.dso.ufl.edu/process/student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. 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
• Jennifer Nappo, Director of Human Resources, 352-392-0904, jpenacc@ufl.edu
• Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
• Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, 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

<table>
<thead>
<tr>
<th>U Matter, We Care:</th>
</tr>
</thead>
<tbody>
<tr>
<td>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 <a href="mailto:umatter@ufl.edu">umatter@ufl.edu</a> 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.</td>
</tr>
</tbody>
</table>

Counseling and Wellness Center: https://counseling.ufl.edu, 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
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/.

COVID-19
- You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email covid@shcc.ufl.edu) to be evaluated for testing and to receive further instructions about returning to campus.
- If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
- UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the UF Health Screen, Test & Protect website for more information.
- Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lssat.ufl.edu/help.shtml.


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/.

