

Materials

EMA 3010 Class Number 30154

Class Periods: T Period 2 (8:30 am - 9:20 am) and R Periods 2-3 (8:30 am – 10:25 am)

Location: CSE E121

Academic Term: Spring 2024

1. Instructor

Dr. Juan Claudio Nino

jnino@ufl.edu

(352) 846 3787

Office Hours: M, W 10:30-11:30 am or by appointment.

2. Teaching Assistants

Please contact through the Canvas website

- TBD, Office Hours: Tuesday and Thursday 4-5 pm in the Rhines Library

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 (or equivalent).

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 how to select materials for a given application.

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 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.	
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	

*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: **2023 6th Edition (Wiley), zyBooks edition with Wiley Plus Access**
- ISBN: **979-8-203-26676-7**

PLEASE NOTE: You need to acquire the zyBook version with access Wiley Plus 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 cheapest way to acquire the e-book is via UF ALL ACCESS. This includes a UF Negotiated rate.

Login at <https://www.bsd.ufl.edu/AllAccess> and Opt-In to gain access to your UF All Access course materials. 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.

9. Course Schedule

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

Week	Date	Topics	Chapter	Pre-Class Activity	In-Class Activity
1	Jan			Z - zyBooks	
	9	Introduction - Course Workflow - CANVAS - xyBooks - WILEY Plus	0	(due before class)	
	11	Types and Applications of Materials	1	Z0	GE = Group Exercise
	11	Atomic Structure and Interatomic Bonding	2		
2	16	Atomic Structure and Interatomic Bonding	2	Z1	
	18	Atomic Structure and Interatomic Bonding	2		GE1
	18	Structures of Metals and Ceramics	3		
3	23	Structures of Metals and Ceramics	3	Z2	
	25	Structures of Metals and Ceramics	3	Z3	GE2
	25	Structures of Metals and Ceramics	3		
4	30	Polymer Structures	4	Z4	
	Feb				
	1	Polymer Structures	4		GE3
5	1	Polymer Structures	4		
	6	Pre-Exam Review	1-4	Z5	
6	8	EXAM I (IN CLASS - CANVAS)	1-4		EXAM
7	13	Imperfections in Solids	5	Z6	
	15	Imperfections in Solids	5		GE4
	15	Imperfections in Solids	5		
8	20	Diffusion	6	Z7	
	22	Diffusion	6		GE5
	22	Diffusion	6		
9	27	EXAM II (IN CLASS - CANVAS)	5-6		EXAM
	29	Mechanical Properties	7	Z8	
	29	Mechanical Properties	7		GE6
10	Mar				
	5	Mechanical Properties	7		
	7	Deformation and Strengthening Mechanisms	8	Z9	
	7	Deformation and Strengthening Mechanisms	8		GE7
SPRING BREAK					
11	19	Deformation and Strengthening Mechanisms	8		
	21	Failure	9	Z10	
	21	Failure	9		GE8
12	26	EXAM III (IN CLASS - CANVAS)	7-9		EXAM
	28	Phase Diagrams	10	Z11	
	28	Phase Diagrams	10		
13	Apr				
	2	Phase Diagrams	10		GE9
	4	Phase Transformations	11	Z12	
14	4	Phase Transformations	11		GE10
	9	EXAM IV (IN CLASS - CANVAS)	10-11		EXAM
	11	Types and Applications of Materials	13	Z13	
15	11	Composites	15		GE11
	16	Composites	15	Z14	
	18	Economic, Environmental, and Societal Issues in MSE	20	Z15	
16	18	Economic, Environmental, and Societal Issues in MSE	20		GE12
	23	EXAM V (IN CLASS - CANVAS)	13, 15, 20		EXAM
17	May				
	2	MAKE UP DURING FINAL EXAM - 12:30 PM (IN CLASS CANVAS)	All Chapters		

10. 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>. Please check CANVAS frequently.

11. Course Format

This course uses a **team-based learning approach** that combines pre-class preparation materials (i.e., reading and homework assignments and watching pre-recorded lectures and short topical videos) with short mini-lectures and active learning exercises during class time. Completion and involvement in all these aspects of the course is critical to success.

12. Pre-Class Preparation Materials

- a) **Reading assignments** will be your first exposure to the course topics, will engage you in social learning, and will be a key pre-class activity helping you prepare for both the pre-recorded lectures and the in-class active learning activities. Your completion of the reading and interaction will be worth 12% of the course grade and will be assessed using zyBooks.
- b) **Pre-Recorded Videos and 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. Whether you watch and interact with the lectures will be evaluated and will be worth 5% of the grade.

Beyond their grade value, your completion and involvement in this component is critical to success. Details on digital platform use, social learning interaction and assessment will be covered in the first class session.

13. Active Learning Activities

- a) **Attendance to Live Classes** is mandatory and attendance will be taken just before class starts. This is because discussion as well as individual and group work on exercises occur during class time. An evidence of your involvement and engagement in the course is showing up to class in time. Students are encouraged to ask questions and participate to get the most out of their classroom experience.
- b) **Group Exercises (GE)** will be given during class. These exercises will be performed in groups during class time and counted for credit. In total, GEs will be worth 18% of the grade. As such, attendance is essential to receive credit for this component.

14. Homework Problems

Homework is voluntary and will not be graded. However, suggested homework problems will be provided via Wiley Plus to help students prepare for the exams.

15. Exams

- a) There will be 5 exams presented in class throughout the semester. Your lowest exam grade will be dropped. Each exam is weighted equally, and each exam will be worth 15% of your final grade. Exams will be presented in class on CANVAS using Respondus LockDown Browser. VERY IMPORTANT, because the exams will be presented in class, it is essential that you have a working laptop with LockDown Browser installed and with sufficient battery capacity to run for at least 90 minutes without needing to be charged or be plugged in.
- b) 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.
- c) **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.
- d) **Make-up exams**. Students who do not take an exam will receive a grade of 0. Excused absences require appropriate documentation to warrant a make-up exam and must be consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>). In principle, the allocated final exam time will be used for make-up exams as needed.

16. Syllabus Changes

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

17. In-Class Expectations and General Make-Up Policy

- a) **Proper behavior** in class is always important and leads to a relaxed and productive educational environment. Students are expected to enter the classroom 5 minutes before class time to check in and to be respectful to the instructor and to fellow students at all times. Students who do not comply with these requirements, or who behave disorderly or disrespectfully, will be asked to leave the classroom.
- b) Students not presenting an exam, or participating in pre-class and in-class activities will receive a grade of zero (0) and there will be no make-up. Similar to the case for exams described in 15.e, 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.

18. 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.

If you are sending e-mails to the instructor, please use CANVAS mail and be sure to include a meaningful subject phrase, and please begin your e-mail with a salutation. [I know that personal e-mails and texts are often sent without even a name to address the recipient at the opening of the communication, but professionally that is unacceptable]. Close your e-mails by typing your name. Check your e-mail for grammar and spelling. Be concise. All of these guidelines are to promote professionalism.

19. Evaluation of Grades

Assignment	Number	Total Points Needed / Possible	Percentage of Final Grade
Reading (zyBooks, 1 point each)	15 (Drop 3)	12 / 15	12%
Pre-Recorded Videos (1 point each)	8 (Drop 3)	5 / 8	5%
Attendance	X – TBD	5 / 5	5%
Group Exercises (In class 2 points each)	12 (Drop 3)	18 / 24	18%
Exams (In class/Respondus 15 points)	5 (Drop 1)	60 / 75	60%
		100 / 127	100%
In essence, the course has 27% extra credit built-in. Therefore, there is plenty of opportunity to ace the course. Regardless of the total points possible, the grade will be solely determined by total points after the allowed drops, rounded to an integer and compared to 100 points scale and shown in the table below.			

20. 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>

21. Students Requiring Accommodations

Students with disabilities 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.

22. 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/>.

23. In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor. A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session. Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

24. 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.

25. Commitment to a Safe and Inclusive Learning Environment

The College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University’s core values, including the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information, and veteran status.

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
- Human Resources, 352-392-0904, student-support-hr@eng.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

26. 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.

27. Student Privacy

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

28. 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 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

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. <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.

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.