EMA3013C Sections

Class Periods:

EMA3013C-M 1:55-4:55 (12498)
EMA3013C-W 1:55-4:55 (12521)
EMA3013C-F1:55-4:55 (127522)
Lecture M 11:45-12:35 PM (TBD)

Location: Rhines B06

Academic Term: Spring 2024

Instructor:

Nancy Ruzycki
nruzycki@mse.ufl.edu
352 846 2991
Office Hours: Tuesdays (12:30-1:30 PM) and Thursdays by appointment on Zoom

Teaching Assistants:

Please contact through the Canvas website
TBD

Course Description

General undergraduate materials laboratory. (WR)
2 Credits
Attributes: Satisfies 2000 Words of Writing Requirement

Course Pre-Requisites / Co-Requisites

Prerequisite: EMA 3080C.

Course Objectives

The Table below has the Module and Objectives for each of the Modules. This is subject to change

Module/Weeks	**Objectives**	**Main Activities/Labs**	**Professional Products**
SEM Training	Learn to be independent user of SEM	Three SEM Trainings	SEM Driver's license
Composite Design and Lay-up (3 weeks)	Rule of mixtures	Web Based Activity	Do-it poms
	Types of composites	Background reading, design of lay-up	Skills test
	Lay- up for tube and sheet	Mechanical testing	SOP writing for lay-up sheet and tube (500 words)

	Mechanical testing of composites	Data Analysis	Technical memo (1000 words) Student notebook
Failure Analysis (4 weeks)	Learn the elements of a case study for failure analysis, and apply it to actual cases. Learn to differentiate the modes of failure. Learn to differentiate different models/types of failure. Learn about the Weibull statistics and apply them to failure in ceramic materials. Learn about the Brittle to Ductile transition in materials, and test materials for presence of this transition. Conduct an independent case study on a material failure, and prepare a case study paper.	Failure Analysis and Product redesign	1. Case Study paper presentation (250 words) 2.Failure Analysis Report (1000 words)
Electronic Materials (2 weeks)	Gain background knowledge for electrical and optical properties of semiconductors and compound semiconductors for use as electronic materials.	Reading specifications sheets for LEDs Wiring circuit	Lab notebooks and data analysis of experiment LED Design paper(500 Words)

	Gain background knowledge of electron transport in semiconductor materials and basics of PN junction devices. Conduct experiments to determine cutoff voltage in LEDs and compare to manufacturer value, and to band gap of compound semiconductor used in the LED. Complete a technical report. Use materials screening and engineering design process to propose an LED design using a new combination of materials to produce a novel color.	Determining Cut Off Voltage on LEDs	Key Findings Report (250 words)
Ceramic Processing (4 weeks)	Gain knowledge of the structure property relationship for dielectric ceramics Conduct an experimental design for making a dielectric ceramic Understand and apply the processing steps of calcining, pressing and sintering of a ceramic dielectic pellet in order to produce a high dielectic material with a density of > 85 % of theoretical value.	1. Ceramic Design Proposal 2. Solid State Synthesis of Ceramics 3. Analysis of Dielectric Material	1. Oral group Proposal and Presentation 2. Final group presentation

	Prepare and test produced dielectric ceramics for dielectric constant		

Online Course Recording

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live for the lecture portion only.

Health and Wellness:

- *You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated. Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.*
- *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. 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*

- Links to an external site. *for more information.*

Materials and Supply Fees

See Course Listing for Materials and Supplies Fees

Professional Component (ABET):

State the contribution of the course to meeting the professional components of the ABET-accredited degree.

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 complex 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	Medium
3. an ability to communicate effectively with a range of audiences	High
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	Medium
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	Low
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	Medium
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.

Required Textbooks and Software

None

Recommended Materials

- Fundamentals of Materials Science and Engineering, an Integrated Approach.
- Callister
- 2015, 5E
- ISBN:9780471395515

Course Schedule/(see objectives for outcomes)

Weeks -1-3 Composite Processing

Weeks 5-8 Failure Analysis

Weeks 9-10 Electronic Materials

Weeks 11-15 Ceramic Design Challenge

Attendance Policy, Class Expectations, and Make-Up Policy

Laboratory Attendance is Required and there are no make ups for a missed lab. : Excused absences are allowed with prior notification and lab make-up conducted in advance. These policies are consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Links to an external site.) and require appropriate documentation. Medical Absences requires a doctors note.

Late work will not be accepted 30 days after the due date for any points towards the grade. Late work turned in up through the 30 day period will loose scaled points based on how late the document is turned in. Draft paper deadlines may not be turned in late to receive feedback on your work for the next draft. If you miss a draft deadline, you will need to submit the work for the next draft deadline. Student feedback for posters or presentations may not be turned in past the deadline, as feedback has to be aggregated to go back to the student groups for feedback. If you are unsure of the policies please speak directly with the course instructor.

Evaluation of Grades

Assignment	**Total Points**	**Percentage of Final Grade**

Laboratory Notebooks	50 each	15%
Skills Assessment	25 each	20%
Student Products	Varies	55%
Final Project		10%
Formative Assessments (pre-labs & Quizzes)	25 each	In with Skills assessments
		100%

Grading Policy

The following is given as an example only.

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

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

Links to an external site.

Writing Requirement. Each Topic listed above will have a student product which will be graded as a formal assessment. There will be a rubric for each product. Student products may include, but are not limited to; lab reports, posters, abstracts, research proposals, users manuals, program codes, technical letters, oral presentations.

The writing assignments/student products for this course are designed to meet the minimum requirements of the University Writing Requirement credit of **2,000 words**. To satisfy this requirement, every assignment's word count must be fulfilled (see Table below). Due dates are subject to change based on class progression and exams in other classes.

These Due dates are subject to change

Assignment	Draft Due Date	Draft Revision Due Date	**Final Due Date**
Composite Technical Memo (1000 words)	Jan 26, 2024	Feb 2, 2024	**Feb 9, 2024**
Case Study paper presentation (250 words)			**Week of Feb 5**
Failure Analysis Report (1000 words)	Feb 12, 2024	Feb 21, 2024	**March 11, 2024**
STAR report (500 Words)			**March 22, 2024**
LED Design paper(500 Words)			**March 25, 2024**
Key Findings Report (250 words)			**April 1, 2024**
Ceramic Project Research Proposal			**April 5, 2024**

The instructor will evaluate and provide feedback on the student's written assignment in accordance with both the UF writing rubric and the course content rubric for that particular assignment, including, but not limited to, grammar, punctuation, usage of standard written English, clarity, coherence, and organization. Students who do not meet minimum requirements for the written assignment will have 1 week from the return of the assignment to make changes, meet the rubric requirements and hand the assignment back in for regarding. Students will receive some loss of points for the re-grade. All feedback on writing assignments will be provided prior to the last class meeting.

Resources for Writing include:

Recommended Writing Manual: Alley, Michael "The Craft of Scientific Writing", 3rd Edition, Springer ISBN-10 0387947663

University's Writing Studio (www.writing.ufl.edu

Links to an external site.)

Recommended style manual is: IEEE Editorial Style Manual.

http://www.ieee.org/conferences_events/conferences/publishing/style_references_manual.pdf

Links to an external site.

All written assignments must be turned in early to receive feedback on the draft version. These dates will appear on the course website and will be approximately 1 week before main assignment due date. All writing assignments will be turned in through the class web portal and will be subjected to anti-plagiarism detection. Students found to have plagiarized will be subject to university policies.

Below is the UF writing rubric which will be used to judge mechanics and flow of the written student product. Each student product will also carry a content based rubric. The student products carry two grades, one for the writing mechanics, and one for the content mechanics. Students must satisfactorily meet both rubrics for a passing assignment.

	SATISFACTORY (Y)	**UNSATISFACTORY (N)**
CONTENT	Papers exhibit at least some evidence of ideas that respond to the topic with complexity, critically evaluating and synthesizing sources, and provide at least an adequate discussion with basic understanding of sources.	Papers either include a central idea(s) that is unclear or off- topic or provide only minimal or inadequate discussion of ideas. Papers may also lack sufficient or appropriate sources.
ORGANIZATION AND COHERENCE	Documents and paragraphs exhibit at least some identifiable structure for topics, including a clear thesis statement but may require readers to work to follow progression of ideas.	Documents and paragraphs lack clearly identifiable organization, may lack any coherent sense of logic in associating and organizing ideas, and may also lack transitions and coherence to guide the reader.
ARGUMENT AND SUPPORT	Documents use persuasive and confident presentation of ideas, strongly supported with evidence. At the weak end of the Satisfactory range, documents may provide only generalized discussion of ideas or may provide adequate discussion but rely on weak support for arguments.	Documents make only weak generalizations, providing little or no support, as in summaries or narratives that fail to provide critical analysis.
STYLE	Documents use a writing style with word choice appropriate to the context, genre, and discipline. Sentences should display complexity and logical sentence structure. At a minimum, documents will display a	Documents rely on word usage that is inappropriate for the context, genre, or discipline. Sentences may be overly long or short with awkward construction.

	less precise use of vocabulary and an uneven use of sentence structure or a writing style that occasionally veers away from word choice or tone appropriate to the context, genre, and discipline.	Documents may also use words incorrectly.
MECHANICS	Papers will feature correct or error-free presentation of ideas. At the weak end of the Satisfactory range, papers may contain some spelling, punctuation, or grammatical errors that remain unobtrusive so they do not muddy the paper's argument or points.	Papers contain so many mechanical or grammatical errors that they impede the reader's understanding or severely undermine the writer's credibility.

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/

Links to an external site.. 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/

Links to an external site.. 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/ Links to an external site.. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/

Links to an external site..

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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/

Links to an external site.) 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
- 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

Links to an external site.

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

Links to an external site., 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**

Links to an external site., 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/

Links to an external site..

Academic Resources

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

Links to an external site..

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

Links to an external site..

Library Support, http://cms.uflib.ufl.edu/ask

Links to an external site.. 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/

Links to an external site..

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

Links to an external site..

Student Complaints Campus*:* https://care.dso.ufl.edu

Links to an external site..

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

Links to an external site..