# Sophomore Materials Lab

EMA3000L Sections
***Class Periods:***
EMA3000l-M  9:35-11:30  (12946-1D89)
EMA3000l-T  9:35-11:30  (12960-1D92)
EMA3000l-W  9:35-11:30  (12961-1D94)
EMA3000l-F  9:35-11:30  (27770-1D95)
***Location:***  Rhines B06
***Academic Term:***  Spring 2023

***Instructor:***
Nancy Ruzycki
nruzycki@mse.ufl.edu
352 846 2991
Office Hours:  Monday 12:30- 1:30 PM or Thursdays by ZOOM appointment.

***Teaching Assistants:***
Please contact through the Canvas website
- TBA

***Course Description***
Conceptual perspective of the origin of materials behavior and the interrelationships of the materials tetrahedron: structure/property/performance/processing. Conduct experiments on the materials tetrahedron.
**1 Credits**

***Course Pre-Requisites / Co-Requisites***
Corequisite: EMA 3010.

***Course Objectives***

Theme: Why can't we recycle everything?  This design class will explore recycling and materials recovery through the lens of materials science and engineering.

| Module/Weeks | Objectives | Main Activities/Labs | Professional Products |
|---|---|---|---|
| Safety<br>Personal Profile<br>Team Development  (week 1) | Learn basic lab safety practices<br>Learn to read and understand an MSDS<br>Learn to read and use a Standard Operating Procedure<br>Learn your personality type<br>Learn about effective teamwork<br>Learn about your personality type | 1. Actions and Reactions Lab Safety Training<br>2. MSDS reading and research<br>3. SOP FTIR of polymers<br>4. 16 Personalities<br>5. Teamwork activity<br>6. Teamwork type assessment | Safety Certificate<br><br>Professional Journal |
| Entrepreneurial Mindset (Week2) | Learn about attributes that exist in entrepreneurs.<br>Learn about myths on entrepreneurs which exist and can be debunked.<br>Learn about engineers as entrepreneurial leaders. | 1. Activity on Entrepreneurship<br>2.Activity on personal attributes.<br>3. Interview with entrepreneur | Professional Journal<br><br>Biosketch |

| | Learn about the life of an entrepreneur. | | |
|---|---|---|---|
| Engineering Design (Week 3) | Learn about parts and processes within engineering design. Learn about sustainable engineering. Learn about ways of thinking which support design (Design Thinking) | 1. Engineering Design on-line activity. 2. Sustainable design Activities 3. In class design activity 4. Design Activity | Professional Journal |
| Tools for Design and Sustainability (Week 4) | Learn about whole system mapping Learn about measuring sustainability Learn about greener materials, energy effectiveness and lightweighting. Learn how to involve stakeholders as positive forces in design work. | 1. Whole system mapping activity 2. Measuring Sustainability 3. Using Granta software to identify green materials. 4. Using Granta software to conduct sustainable design and lightweighting. 5. Interviews and Surveys with Stakeholders. . | Professional Journal |
| Project Tools/Entrepreneurship Practices  (week 5) | Learn about the Inventing Green Toolkit and the business canvas Learn about scrum boards and Gantt charts for process mapping. Learn how to communicate through the design process using project management websites. | 1. Design Activity with Business Canvas. 2. Design Activity with Scrum Boards. 3. Activities on ways of professional communication. | 1. Business Canvas 2. Scrum Board design 3. Gantt Chart design 4. Plecticia Mapping for design process Professional Journal |
| Introduction to solvable Problems (Week 3-5) | Learn about Life Cycle Analysis Using data to understand what is present and to make decisions. | Choosing a material to explore for recycling | 1. LCA of material 2. Background research 3. Analysis of materials 4. Problem brainstorming 5 Problem selection process. |
| Introduction to techniques to answer your questions about your material (week 6-8) | Introduction to standards Introduction to characterization methods Introduction to testing of degradability Introduction to materials recapture | ASTM and ISO standards FTIR, XRD, SEM, DSC, Hardness testing Water based testing, soil testing, heat and UV testing Disbanding, dissolution, desoldering, disassembly | 1. Standards related to the recycling of your material 2. Testing of samples using appropriate methods 3. testing the breakdown of materials 4. ways to take materials apart to recapture materials |
| Engineering Design Project (Weeks 8-15) | Identify areas for innovation and entrepreneurship within the solvable problem Work as a team to conduct research to design a solution | Develop a team for a solution development process. Conduct a design process to improve some aspect for the solution. | Creation of project management website Weekly key Learning meetings Weekly team reports Scrum Boards Professional Journal Business Canvas |

| | Learn to use stakeholders to keep design process focused.<br><br>Communicate progress for design work. | Consult with experts to refine and improve the design process.<br>Communicate the findings of the design project at every stage.<br>Identify areas for innovation and entrepreneurship within the design process. | Design Process map<br>Interim Pitch<br>Final Pitch |
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*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.

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**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 for more information.*

*Materials and Supply Fees*
See Course Catalogue 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 | Medium |
| 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 | Low |

| | |
|---|---|
| 3. an ability to communicate effectively with a range of audiences | Medium |
| 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 | High |
| 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 Matrix for outcomes and weeks)

### 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) and require appropriate documentation. Medical Absences requires a doctors note.

### Evaluation of Grades

| Assignment | Total Points | Percentage of Final Grade |
|---|---|---|
| Professional Journal | 50each | 15% |
| In Class Activities | 25 each | 10% |
| Project Deliverables | Varies | 60% |
| Project presentations | | 10% |
| Team work check-ins | 25 each | 5% |
| | | 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


**Writing Requirement.**
None


*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 feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu/evals. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/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
• 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*

**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 suppor***t*, 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.