Materials Laboratory 1

EMA3080C Sections 04G8, 2329, 2694, 8811,9922, 9933
Class Periods: Labs: Section 04G8 – M 7-9, 2329 M 3-5, 2694 W 3-5, 9922 W 7-9, 8811 F 3-5, 9933 F 7-9
Lecture: Tuesday 6, TBD times
Location: B06 Labs, Lecture via ZOOM links
Academic Term: Fall 2020

Instructor:
Nancy Ruzycki
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MAE 317 C
Office Hours: TBD – Via ZOOM

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
Please contact through the Canvas website
- TBD

Course Description
First part of the general undergraduate materials laboratory. (WR)

Course Pre-Requisites / Co-Requisites
Prerequisite: EMA 3010 and EMA 3800.
Attributes: Satisfies 4000 Words of Writing Requirement

Course Objectives
See Course Outline Below

Materials and Supply Fees
See OneUF for listing of materials and supply fees for the course

Professional Component (ABET):
This course contributes components towards 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	
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	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	Medium

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

- No required text book, Course Materials Developed by Instructor
- Software: Matlab, Minitab, SolidWorks, Jupyter Notebook/Lab, ThermoCalc, Granta CES, ImageJ. All software available through UF Apps, Department or Freeware.

Recommended Materials

- Materials Science and Engineering: An Introduction, 10th Edition (or text used in 3010 course)
- Calister & Rethwisch
- January 2018, 10th Ed
- 978-1-119-40549-8

Course Outline:

There may be changes/substitutions to the laboratories listed below, depending upon available equipment, and student progress.

Students are expected to dress properly for laboratory class. Closed toed shoes are required for class. Pants are preferred. There is no food or drink of any kind in the laboratory. You are expected to follow all laboratory guidelines.

Week(s)/Block	Topic	Learning Outcomes	Student Deliverables
1 A Block 2 B Block 3 C Block	Additive manufacturing and polymer properties and performance	Additive manufacturing Glass transition temperature Thermal melt and flow Co -polymers Types of polymers Polymer properties Polymer thermal degradation (DSC) Polymer strength (Tensile, compression, Charpy Testing) Polymer orientation versus Strength Reading and using ASTM standards	Student notebook(s) entries Laboratory data Analysis Background reading & questions Granta CES analysis Skills Tests Solidworks Dogbone Design/FEA analysis White Paper on polymer application and additive manufacturing (2500 words)
4 A Block 5 B Block 6 C Block	Heat Transfer in Materials	Types and mechanisms of heat transfer Heat Equation Diffusion in materials Thermal properties (diffusivity, conductivity, specific heat) Comparison of material categories for heat transfer Heat transfer modeling	Student notebook(s) entries Laboratory data Analysis Background reading & questions Jupyter notebook/lab modeling heat flow Thermocalc modeling Technical Report (1000 words)

		Measurement of heat transfer using TMPS and Arduino	
7 A Block 8 B Block 9 C Block	Polymer Synthesis, Biomaterials applications of polymers	Polymer synthesis Polymer properties Effect of MW on Polymer properties Polymer characterization (DSC, Melt Flow, Rheometry) Biopolymers and biopolymer properties Polymer crystallization kinetics and growth rate	Student Notebook(s) Laboratory Data Analysis
10 A Block 11 B Block 12 C Block 13 A Block 14 B Block 15 C Block	Heat Treatment of metals and effect on microstructure and properties	Microstructure of metals Metal crystallization and kinetics Heat treatment of metals (relaxation, crystallization, grain growth) Temperature profiles and simulation of microstructure Nucleation and growth of grains Metal property characterization (Tensile, Hardness, Charpy, Miscrostruture) Metallographic preparation of samples	Student notebooks Experimental proposal (1000 words) Laboratory data analysis MiniTab experimental design Thermocalc simulations Statistical Analysis of data Professional poster drafts (1, 2) Professional poster reviews of peers Final Professional Poster
12/16/2020 @ 7:30 AM - 9:30 AM	Student Poster Presentation (exam block) (Virtual)	Professional poster presentations Disciplinary Literacy	Professional poster (>500 words)

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. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

F2F Course Policy in Response to COVID-19

We will have face-to-face instructional sessions to accomplish the student learning objectives of this course. In response to COVID-19, the following policies and requirements are in place to maintain your learning environment and to enhance the safety of our in-classroom interactions.

- You are required to wear approved face coverings at all times during class and within buildings. Following and enforcing these policies and requirements are all of our responsibility. Failure to do so will lead to a report to the Office of Student Conduct and Conflict Resolution.
- This course has been assigned a physical classroom with enough capacity to maintain physical distancing (6 feet between individuals) requirements. Please utilize designated seats and maintain appropriate spacing between students. Please do not move desks or stations.
- Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class.
- Follow your instructor's guidance on how to enter and exit the classroom. Practice physical distancing to the extent possible when entering and exiting the classroom.
- If you are experiencing COVID-19 symptoms (Click here for guidance from the CDC on symptoms of coronavirus), please use the UF Health screening system and follow the instructions on whether you are able to attend class. Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms.
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. Find more information in the university attendance policies.

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 **4,000 words**. To satisfy this requirement, every assignment's word count must be fulfilled (see Table below).

Assignment	Draft Due Date	Draft Revision Due Date	**Final Due Date**
White Paper on polymer application and additive manufacturing (2500 words)	September 14, 2020	September 28, 2020	**October 5, 2020**
Heat Transfer Technical Report (1000 words)	October 9, 2020	October 16, 2020	**October 30, 2020**
Heat Treatment Experimental proposal (1000 words)	November 6, 2020	November 9, 2020	**November 13, 2020**
Student professional poster (poster 500 words)	November 15, 2017	November 21, 2017	**November 28, 2017**

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.)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.)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	Documents make only weak generalizations, providing little or no support, as in summaries or narratives that fail to provide critical analysis.

	provide adequate discussion but rely on weak support for arguments.	
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 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 rely on word usage that is inappropriate for the context, genre, or discipline. Sentences may be overly long or short with awkward construction. 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.

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance is required for this class including the online and live portions of the class. Students can receive an exemption for in person learning if they have appropriate documentation for the absence. Excused absences must be consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Written Drafts	50 points each	70%
Final Drafts	100 each	
Class Notebook	varies	10%
Skills Assessments	Varies	10%
Final Poster assessment	100	10%
		100%

Grading Policy

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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

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 Honor Code (https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-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://care.dso.ufl.edu.

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