

Materials Laboratory 1

Class Periods: Labs:

EMA3080C 12030 Section 04G8 Monday P 3-5 (9:35 – 12:35 PM)

EMA3080C 12031 Section 2329 Monday P 7-9 (1:55 – 4:55 PM)

EMA3080C 23958 Section MTL4 Wednesday P 3-5 (9:35 – 12:35 PM)

EMA3080C 12032 Section 2694 Wednesday P 7-9 (1:55 – 4:55 PM)

Lecture: Tuesday P 6 (12:50 – 1:40PM) Fine Arts C (120). We will try and find a new room

Location: B06 Labs – Lecture TBD

Academic Term: Fall 2025

Instructor:

Nancy Ruzycki

nruzycki@mse.ufl.edu

MAE 317 C

Office Hours: Tuesdays (TBD)

Teaching Assistant/Peer Mentor/Supervised Teaching Student:

Please contact through the Canvas website

- [Alex Johnstone \(Undergraduate Mentor\)](#)
- [Israel Reimer \(Graduate Assistant\)](#)

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):

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 collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	medium
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
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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. Students are expected to follow CDC and University guidelines for safe interactions in a FTF environment. *If a student who is withheld from campus attends class, the student should be asked to leave the classroom and be reported to the Dean of Students Office.*

Required Computer

Recommended Computer Specifications: <https://it.ufl.edu/get-help/student-computer-recommendations/>
 HWCOE Computer Requirements: <https://www.eng.ufl.edu/students/advising/fall-semester-checklist/computer-requirements/>

Course Schedule(Subject to change)

Weeks	Topic	Learning Outcomes	Student Deliverables
0	Building the softskills for teamwork and lab practices	Using the DITTO framework to build skills to be successful in the complex laboratory setting	Norms, actionables and ways of work together for successful laboratories
1-4	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 standard Regulations for Medical devices	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)
5-8	Heat Transfer in Materials	Types and mechanisms of heat transfer Heat Equation Diffusion in materials	Student notebook(s) entries Laboratory data Analysis Background reading & questions Jupyter notebook/lab modeling heat flow Jupyter notebook/materials project data mining Thermocalc modeling Technical Report (1000 words)
9-11	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
12-15	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	Student notebooks Experimental proposal (1000 words) Laboratory data analysis MiniTab experimental design Thermocalc simulations Statistical Analysis of data

		Metal property characterization (Tensile, Hardness, Charpy, Microstructure) Metallographic preparation of samples	Characterization reports Professional poster drafts (1, 2) Professional poster reviews of peers Final Professional Poster (this is held during exam week and is in lieu of an exam) December 3, 2025 2:30 to 4:30 PM
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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 Date	Final Due Date
White Paper on polymer application and additive manufacturing (2500 words)	September 8, 2025		September 19, 2025
Heat Transfer Technical Report (1000 words)	October 6, 2025		October 24, 2025
Heat Treatment Experimental proposal (1000 words)	November 3, 2025		November 14, 2025
Student professional poster (poster 500 words)	November 13, 2025	November 19, 2025	December 1, 2021
Student Poster Contest	Wednesday December 3 – 2:30 to 4:30 PM		

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.

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. GPTs may be used to edit and provide feedback to students only. Any excessive use of GPTs to write papers will be considered plagiarism.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Formative Assessments (Pre-readings, pre-work Pre-tests, in class formative, skills tests)	varies	20%
Lab notebooks	varies	15%
Written assignments and summative assessments	varies	65%
		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

Academic Policies & Resources

To support consistent and accessible communication of university-wide student resources, instructors must include this link to academic policies and campus resources: <https://go.ufl.edu/syllabuspolices>. Instructor-specific guidelines for courses must accommodate these policies.

Commitment to a Positive Learning Environment

The Herbert Wertheim College of Engineering values varied perspectives and lived experiences within our community and is committed to supporting the University's core values.

If you feel like your performance in class is being impacted, please contact your instructor or any of the following:

- Your academic advisor or Undergraduate Coordinator
- HWCoe Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@ufl.edu