

Advanced Metals Processing
EMA 6625, Sections: 22214, 22215, 22216, 22217

Class Periods:

M, W, F (8:30 am – 9:20 am)

Location: NEB 201

Academic Term: Spring 2025

Instructor:

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352-294-1789

Teaching Assistant:

TBA

Course Description

This course covers the exploration of engineering principles in metal processing, emphasizing the science and technology involved in metal and manufacturing processes. It also addresses the strategic selection of materials and processes, relating them to a broad spectrum of applications for specific ferrous and non-ferrous metals. EMA 6625 is a 3-credit course for graduate students, whereas EMA 4623 is a 3-credit undergraduate course.

Course Pre-Requisites / Co-Requisites

EMA 4120 (Phys Met I)

Course Objectives

- Students will be introduced to the various processes involved in the processing of structural materials, providing a comprehensive understanding of the field.
- Students will learn how materials are chosen for specific structural applications, emphasizing the alignment of material properties with application demands.
- Students will explore how different processing techniques impact the microstructure of metals and how this, in turn, affects their properties.
- By using practical examples, students will see firsthand the effect of processing on the microstructures and properties of metals, enhancing their understanding through illustrations.
- The course aims to equip students with the ability to make informed decisions about material selection, using case studies and scenarios that reflect a variety of real-world applications

Materials and Supply Fees

N/A

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	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	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	Low
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	

Required Textbooks and Software

- Manufacturing Processes for Engineering Materials – 6th Edition
S. Kalpakjian and S.R. Schmid
Addison-Welsey Publishing, Co., Reading, PA
ISBN-13: 978-0134290553

Recommended Materials

- Physical Metallurgy Principles, Fourth Edition
Reza Abbaschian, Lara Abbaschian, Robert E. Reed-Hill,
Cengage LearningModern
- Physical Metallurgy & Materials Engineering – 6th Edition
R.E. Smallman and R.J. Bishop
Butterworth-Heinemann, Boston, MA, 1999

Required Computer

UF student computing requirement: <https://news.it.ufl.edu/education/student-computing-requirements-for-uf/>

Course Schedule

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

Week 1:	Introduction to Manufacturing Processes
Week 2:	Mechanical Behavior of Materials
Week 3:	Structure and Manufacturing Properties of Metals
Week 4:	Tribology
Week 5:	Exam 1
Week 6:	Casting and Heat Treatment
Week 7:	Casting and Heat Treatment
Week 8:	Bulk Deformation Processes
Week 9:	Bulk Deformation Processes
Week 10:	Exam 2
Week 11:	Sheet Metal Processes
Week 12:	Powder Metallurgy
Week 13:	Computer Integrated Manufacturing
Week 14:	Discussion
Week 15:	Exam 3

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

Important Dates

TBA

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance is required for CAMP section only and will be recorded. Students who miss more than 3 classes without prior notice will not be allowed to take the exam. Arrival on time is expected. Turn off all telephones before entering the classroom. Excused absences must be consistent with university policies in the university catalog and require appropriate documentation.

Excused absences must be consistent with university policies in the Graduate Catalog (<https://catalog.ufl.edu/graduate/regulations>) and require appropriate documentation. Additional information can be found here: <https://gradcatalog.ufl.edu/graduate/regulations/>

Course Format

This course uses a ***team-based learning approach*** that uses pre-class preparation materials (including reading assignments) and active learning activities during class time. Your completion and involvement in all these aspects of the course are critical to success.

Pre-Class Preparation Materials

Reading assignments will help you prepare for the active learning activities and are another critical aspect of learning the course content.

Active Learning Activities (CAMP section)

There will be group discussions and individual and group work on In-Class Exercises. Students are encouraged to ask questions and participate in class discussions and activities.

In-Class Exercises (ICE) will be given during the live classes. These exercises will be counted for credit.

ICEs will be available online for EDGE section students.

Homework

Homework problems for each module will be assigned, submitted, and graded through the E-Learning website. Group discussions towards homework solving and teamwork are encouraged but all answers that are turned in should be the result of your own work. In addition, you should keep records of the work leading to your answers throughout the semester, as they will be randomly requested for grading clarification.

Exams

There will be three exams to evaluate the progress of students during this semester.

Project: Students will be required to complete a paper on Process Metallurgy. The subject, which is to be selected by the student, should be identified and approved by the instructor. The project progress will be evaluated throughout the semester and the final report will be due on the last day of class. The report must utilize a 12-point font, single spacing with 1" margins and be 10-12 pages of text (figures, tables and references are not counted in the page count). At least 80% of the references must be open literature journals, proceedings, books, etc. No more than 20% of the references can come from the web. The paper must be original work and the paper will be evaluated for any evidence of plagiarism. All reports will be submitted and reviewed by TurnItIn.com. If there is any evidence of plagiarism, the student will be prosecuted for plagiarism and the paper will be given an "F" and zero-points on the project. This is an individual project and any evidence of students working in a group or copying each other's work will also result in an "F" and zero-points on the project for all of the students involved.

The UF definition of plagiarism can be found at:

http://flexible.dce.ufl.edu/media/flexibleufl.edu/documents/uf_policy_student_conduct.pdf

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, assignment changes, etc. in a timely manner. I prefer to be contacted via CANVAS.

Evaluation of Grades

Assignment	Percentage of Final Grade (Graduate Students)
Exam 1	15%
Exam 2	15%
Exam 3	15%
Homework	10%
In-Class Exercises	15%
Paper	30%

Grading Policy

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:

[UF Graduate Catalog](#)
[Grades and Grading Policies](#)

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.bluer.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

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.

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/process/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 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 Coordinator
- HWC OE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
- Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@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: <https://counseling.ufl.edu>, 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](mailto:title-ix@ufl.edu), 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://elearning.ufl.edu/>.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; <https://career.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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

On-Line Students Complaints: <https://distance.ufl.edu/getting-help/>; <https://distance.ufl.edu/state-authorization-status/#student-complaint>.