

## **EMA 4020L – Metallurgy Lab**

M: 10<sup>th</sup> – 11<sup>th</sup> periods

Fall 2015

Rhines 115

Instructor: G.E. Fuchs  
116 Rhines Hall  
846-3317  
gfuch@mse.ufl.edu

Office Hours: TBD

References (Not Required):

*Manufacturing Processes for Engineering Materials – 5<sup>th</sup> Edition*  
S. Kalpakjian and S.R. Schmid  
Addison-Welsey Publishing, Co., Reading, PA

*Engineering Design*  
G.E. Dieter  
McGraw-Hill, New York, NY, 1991

*Physical Metallurgy Principles, Third Edition*  
R.E. Reed-Hill and R. Abbaschian  
PWS-Kent Pub. Co., Boston, MA, (1992)

*Modern Physical Metallurgy & Materials Engineering – 6<sup>th</sup> Edition*  
R.E. Smallman and R.J. Bishop  
Butterworth-Heinemann, Boston, MA, 1999

*Selection of Engineering Materials*  
G. Lewis  
Prentice-Hall, Englewood Cliffs, NJ, 1990

Co-requisite: EMA 4120 (Phys. Met I) and EMA 4623 (Process Metallurgy)

Description: Laboratory aspects of metals processing. Science and Technology of metal and manufacturing processing.

Objective: To introduce the student to microstructure-properties-processing inter-relationships in structural materials.

Approach: Demonstrate connections between processing, microstructures and properties in metals. Use laboratory experiments to illustrate effect of processing on microstructures and properties.

Contribution of Course to Meeting the Professional Component: This is a 1 credit course which count for engineering sciences.

Relationship of Course to Program Outcomes: This course addresses the following MSE Program outcomes (Note: Numbers refer to the list of MSE Program Outcomes)

1. Apply knowledge of mathematics, science and engineering principles to materials science and engineering.
2. Design and conduct materials science and engineering experiments and analyze and interpret the data.
3. Design a materials science and engineering system, component or process to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.
4. Communicate technical data and design information effectively in speech and in writing to other materials engineers.

ABET

(b) an ability to design and conduct experiments, as well as to analyze and interpret data

(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(d) an ability to function on multidisciplinary teams

(g) an ability to communicate effectively

Grading:

- 1.) Lab reports, each worth 10% of your total grade, will be completed on an approximately bi-weekly schedule and will be due approximately 1 week after completion of the lab. Late reports will be accepted, but penalized 10% per day after due date. All work must be shown for full/partial credit. Some of the reports will be selected for oral presentations.
- 2.) Final Report: The final report will pull together all of the individual lab reports and summarize the results. The final report will be worth 50% of your grade and will be due on last day of class (Monday, December 7<sup>th</sup>) to report all of the experimental results from the class.

**Grading Scale: 93-100 A, 90-92 A-, 87-89 B+, 83-87 B, 80-82 B-, 77-79 C+, 73-77 C, 70-72 C-, 67-69 D+, 63-67 D, 60-62 D-, < 60 E**

- 3.) No exams will be given during the course.
- 4.) All grading based on curve.
- 5.) The reports must be original work and will be evaluated for any evidence of plagiarism. If there is any evidence of plagiarism, the paper will be given an "F" and zero-points.

Accommodation for Students with Disabilities: Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

UF Counseling Services: Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.

SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.

Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.

Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

Software Use: All faculty, staff and student 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.

### Tentative Schedule

<b>Week</b>	<b>Monday (10<sup>th</sup>-11<sup>th</sup>)</b>
1	No Class
2	
3	<b><i>Holiday</i></b>
4	Introduction
5	Solidification and Segregation
6	
7	Solution Heat Treatment
8	
9	Rolling (Deformation Processing)
10	
11	Heat Treatment: Recrystallization and Grain Growth
12	
13	Heat Treatment and Precipitation Hardening
14	
15	
16	<b><i>Final Report Due</i></b>