**Metallurgy Lab**
**EMA 4020**
4023/4026: Tuesdays, 3rd and 4th periods, CSE E221
4021/4024: Wednesdays: 10th and 11th periods, Weil 270
4022/4025: Thursdays: 3rd and 4th periods, Weim 1070
Spring 2021
***Please wear closed-toe shoes and pants during the lab sessions***

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

Office Hours: TBD

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

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

***Course 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.

***Materials and Supply Fees:***
$80

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 (ABET):***
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

***References (Not Required):***

*Manufacturing Processes for Engineering Materials – 5th 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 – 6th 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

***Course Grading:***

Final Report: The final report will pull together by the members of each group. One report will be turned in for each group which summarize the results from the entire semester. The final report will be worth 90% of your grade and will be due on Wednesday of Finals Week (April 28th) to report all of the experimental results from the class. During the semester, results will be discussed to help the students understand the results. Class participation will also be graded (10%) and will reflect if the students are missing an excessive number of class periods.

**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**

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

***Tentative Schedule:***

| Week | Topics |
|---|---|
| 1 | Introduction |
| 2 | Rolling of Sample Material |
| 3 | Discussion of Rolling of Sample Material |
| 4 | Solidification and Segregation |
| 5 | Solution Heat treatments |
| 6 | |
| 7 | Aging Heat Treatment |
| 8 | |
| 9 | Spring Break |
| 10 | Deformation Processing and Heat Treatment |
| 11 | Heat Treatment: Recrystallization and Grain Growth |
| 12 | |
| 13 | Heat Treatment and Precipitation Hardening |
| 14 | |
| 15 | Work on report |
| 16 | Work on report |
| 17 | ***Final Report Due*** |

***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.

***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.