Course Number: MECE 4330-Spring 2017
Course Title: Intro to Physical Metallurgy
Course Time/Place: Tues and Thurs, 3:05 pm-4:20 pm, Education #1.530
Instructor: Dr. Mataz Alcoutlabi
Office/Phone: Eng. 3.262/(956) 665-8945
Office Hours: Tue 12:15 -1:30 pm
Email: mataz.alcoutlabi@utrgv.edu
Website: http://faculty.utrgv.edu/mataz.alcoutlabi/


Lecture notes will be available on Blackboard

Resource Material and reference book:

Prerequisites:
MECE 2340 Materials Engineering and PHYS 2426.

Course Description:
The objective of this course is to provide a basic understanding of the underlying principles that determine the evolution of structures in metals and alloys during their processing and its relation with their properties and performance in service. This course provides an overview, of the broad area of metals and metal alloys by emphasizing on the relationships between their structure/composition, processing, properties and performance. Major topics will include structure, properties, and selection of alloys, significance of heat treatments and their effects on mechanical and other properties of materials. The reminder of the course will cover steel, phase transformation in steel (equilibrium, non-equilibrium), heat treatment of steel; nonferrous alloys and metallic alloys (heat treatable and non-heat treatable).
This course will also provide students a broad understanding of cutting edge development in metallic, ceramic and polymer nanocomposites and their potential applications in energy storage and food science/packaging and safety. The class lectures on metals and alloys will be supplemented by some lab demonstrations and by a field trip to a local industry.

Learning Objectives/Course Outcomes
1. To understand and develop cognitive understanding of metallic materials concepts.
2. To understand and apply method and appropriate technology for the solidification, processing and characterization of metals and alloys.
3. Explain the basic structure of metallic materials and relate structures to their engineering properties and performance.
4. To identify and recognize the differences among competing scientific concepts for the optimization of the properties and performance of metals and alloys.
5. To recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry and to communicate findings, analyses, and interpretation both orally and in writing.
Grading Policy
Midterm exam I  20%
Midterm exam II  20%
Final exam  25%
Homework and quizzes  20%
Project presentation  10%
Binder  5%

Final grades are assigned according to the following grading policy:
90 and above  A
80-89.9  B
70-79.9  C
60-69.9  D
59.9 and below  F

Attendance:
1. Attendance will be taken every time the class meets. Any student arriving to class 5 minutes after the class has started will not be allowed in class. Students will be allowed a maximum of three absences for the whole semester. Five points will be deducted from the total (100%) for each absence exceeding the maximum allowable unless documentation justifying that absence is provided.
2. Students will not be permitted to leave the classroom during lectures and exams except for extreme emergencies.

Homework, Quizzes and Exams:
1. Absolutely no late assignments will be accepted.
2. Absolutely no cell phones, laptops, iPads, iPods, or any other smart technology devices are allowed in exams.
3. Make-ups for in-class exams for documented emergencies will be scheduled during the last week of class.
4. There will be a weekly in-class quiz.

Scholastic Integrity:
As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism, and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

Drop Policy:
Students can withdraw from a course through the Office of the Registrar on or prior to:
- January 30, 2017, Monday: Last day to drop a class before it appears on the transcript and counts toward the “6-drop” limit. Last day to receive a 100% refund for dropped classes (other policies apply when a student is withdrawing from all classes).
- April 13th, 2017, Thursday: Drop/Withdrawal Deadline; last day for students to drop the course and receive a “DR” grade. After this date, students will be assigned a letter grade for the course that will count on the GPA.

Course Drops:
According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the “3-peat rule” and the “6-drop” rule so
they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.

Students with Disabilities:
If you have a documented disability (physical, psychological, learning, or other disability which affects your academic performance) and would like to receive academic accommodations, please inform your instructor and contact Student Accessibility Services to schedule an appointment to initiate services. It is recommended that you schedule an appointment with Student Accessibility Services before classes start. However, accommodations can be provided at any time. Brownsville Campus: Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at accessibility@utrgv.edu. Edinburg Campus: Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at accessibility@utrgv.edu.

Sexual Harassment, Discrimination, and Violence:
In accordance with UT System regulations, your instructor is a “responsible employee” for reporting purposes under Title IX regulations and so must report any instance, occurring during a student’s time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity, including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect in an environment free from sexual misconduct and discrimination.

Mandatory Course Evaluation Period:
Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (https://my.utrgv.edu/home); you will be contacted through email with further instructions. Online evaluations will be available April 12, 2017-May 3, 2017. Students who complete their evaluations will have priority access to their grades.

Topics and Tentative Course Schedule

Week 1
Introduction to Physical Metallurgy, the Structure of Metals

Week 2
Characterization Techniques, Solidification of Metals

Week 3
Mechanical properties and Plastic Deformation of Metals

Week 4
Vacancies in crystals, Thermodynamics and Diffusion in Solid Solutions

Week 5:
Interstitial Diffusion, Solidification of Binary Alloys,

Week 6:
Exam I
Phases, Binary Phase Diagrams
Week 7:
Ternary Phase Diagrams, Annealing Recovery and Cold working

Week 8:
Iron-Carbon Alloy Systems, Heat Treatment of Steel

Week 9:
Heat Treatment of Steel

Week 10:
Viscoplastic behavior of metals: Modeling and Creep of Metals

Week 11:
Metallic Alloys, Nonferrous Alloy Systems

Week 12:
Exam II
Nonferrous Alloy Systems

Week 13:
Project Presentations

Week 14:
Project Presentations

Week 15:
Project Presentations
ACKNOWLEDGEMENT OF RECEIPT OF SYLLABUS

By signing below, I hereby affirm that I have received a copy of the syllabus for MECE 4330 Intro to Physical Metallurgy and have been informed by the Instructor that it is my responsibility to carefully read and understand this document and abide by all its content. I also agree to prepare and submit to the Instructor, at the end of the semester, a folder that contains all my homework assignments, quizzes, exams, projects, reports and/or literature review (if applicable).

__________________________________________
Student ID Number

__________________________________________
Printed Name

__________________________________________
Signature

__________________________________________
Date