

Course Syllabus
EMA 6316 Materials Thermodynamics
Fall 2017

1. Catalog Description – The goal of this course is to teach thermodynamics of material systems.
2. Pre-requisites - EMA 4314: Energetics and Kinetics in Materials Science or any equivalent Thermodynamics course
3. Course Objectives - This is a graduate level course on materials thermodynamics. This course deals with the following areas: the laws of thermodynamics, thermodynamic variables and the relationships between those variables, equilibrium, statistical thermodynamics, phase diagrams, solution models, reactions with gases and capillarity. The use of thermodynamics for practical scientific and technical applications will be emphasized in the course.
4. Contribution of course to meeting the professional component - This is a 3-credit course.
5. Instructor
Professor Jaime Benitez
Office location: 313 MAE
Telephone: 352-392-5541 (office)
E-mail address: jaime.benitez@ufl.edu
Office hours: Monday, Wednesday, and Friday, 10:00 to 10:40 AM
6. Teaching Assistant
Catherine Sahi
Office location: B09 Rhines Hall
E-mail address: csahi@ufl.edu
Office hours: TBA
7. Meeting Times – Monday, Wednesday, Friday 4th period
8. Meeting Location – NEB 100
9. Material and Supply Fees - None.
10. Textbooks and Software Required – “Thermodynamics in Materials Science”, 2nd edition by Robert DeHoff, CRC, 2006 [ISBN 0849340659]. Supplementary reading, software, and links to various other resources/websites are provided and updated throughout the semester. Additionally, some homework problems will require access to a graphical/function solving software program. MatLab (available in the CIRCA labs) or Octave (Freeware) are recommended, however, any software that accomplishes the objectives of the course are allowed
11. Course Outline – Tentative course outline is as follows:

| Week | Topics | Chapters |
|------|---|------------|
| 1 | Introduction; Laws of Thermodynamics | 1–3 |
| 2 | Variables and Relations | 4 |
| 3 | Variables and Relations | 4 |
| 4 | Equilibrium | 5 |
| 5 | Equilibrium; Statistical Thermodynamics | 5–6 |
| 6 | Unary Heterogeneous Systems | 7 |
| 7 | Unary...; Solutions | 7–8 |
| 8 | Solutions | 8 |
| 9 | Phase Diagrams | 9 |
| 10 | Thermodynamics of Phase Diagrams | 10 |
| 11 | Phase Diagrams | 10 |
| 12 | Thermodynamics of Phase Diagrams | 10 |
| 13 | Reacting Systems | 11 |
| 14 | Reacting Systems | 11 |
| 15 | Reacting Systems | 11 |
| 16 | CALPHAD | Supplement |
| 17 | Review | |

12. Attendance and Expectations – Class attendance is recommended, but not required. The class is taught in an interactive lecture format, and includes discussion and practice problems. Cell phones should be turned off in class. Reading of newspapers, work on assignments for this or other classes, or other activities that are not part of the class are not allowed during class time.

13. Grading –

| | |
|------------------------|-----|
| Exam 1 (September 15): | 1/4 |
| Exam 2: (October 20) | 1/4 |
| Exam 3: (December 6) | 1/4 |
| Homework | 1/4 |

14. Homework – Weekly (more or less) homework assignments will be made and graded S/U. Solutions will be posted. You may turn in the homework anytime prior to the deadline.

Note that the homework will be posted in pdf format, which requires the use of the Acrobat Reader. If you do not have it installed on your computer, it can be downloaded for free from <http://www.adobe.com/supportservice/custsupport/download.html>

15. Grading Scale –

| | | | | | | | | | | | | |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Percentage | ≥ 90 | ≥ 88 | ≥ 84 | ≥ 80 | ≥ 76 | ≥ 72 | ≥ 68 | ≥ 65 | ≥ 62 | ≥ 59 | ≥ 56 | < 56 |
| Letter Grade | A | A- | B+ | B | B- | C+ | C | C- | D+ | D | D- | E |

16. Make-up Exam Policy – Homework may not be turned in late without prior approval of the instructor. Make-up exams are given only for reasons of illness and in accordance with University of Florida regulations.

17. Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.
18. 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.
19. 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.
20. 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.

UNIVERSITY OF FLORIDA

Student Honor Code (Abridged)

Preamble: In adopting this Honor Code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the University community. Students who enroll at the University commit to holding themselves and their peers to the high standard of honor required by the Honor Code. Any individual who becomes aware of a violation of the Honor Code is bound by honor to take corrective action. Student and faculty support are crucial to the success of the Honor Code. The quality of a University of Florida education is dependent upon the community acceptance and enforcement of the Honor Code.

The Honor Pledge: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty 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."

Violations of the Student Honor Code include (in part):

(a) **Plagiarism**, in the form of quoting oral or written materials including but not limited to those found on the internet, whether published or unpublished, without proper attribution; or submitting a document or assignment which in whole or in part is identical or substantially identical to a document or assignment not authored by the student.

(b) **Unauthorized Use of Materials or Resources ("Cheating")**. A student shall not use unauthorized materials or resources in an academic activity. Unauthorized materials or resources shall include:

1. Any paper or project authored by the student and presented by the student for the satisfaction of any academic requirement if the student previously submitted substantially the same paper or project to satisfy an academic requirement.
2. Any materials or resources prepared by another student and used without the other student's express consent or without proper attribution to the other student.
3. Any materials or resources that the faculty member has prohibited.
4. Use of a cheat sheet when not authorized to do so or use of any other resources or materials during an examination, quiz, or other academic activity without the express permission.

(c) **Prohibited Collaboration or Consultation**. A student shall not collaborate or consult with another person on any academic activity unless the student has the express authorization.

1. Prohibited collaboration or consultation shall include but is not limited to:

- Collaborating when not authorized to do so on an examination, take-home test, writing project, assignment, or course work.
- Collaborating or consulting in any other academic or co-curricular activity after receiving notice that such conduct is prohibited.
- Looking at another student's examination or quiz during the time an examination or quiz is given. Communication by any means during that time, including but not limited to communication through text messaging, telephone, e-mail, other writing or verbally, is prohibited unless expressly authorized.

2. It is the responsibility of the student to seek clarification on whether or not use of materials or collaboration or consultation with another person is authorized prior to engaging in any act of such use, collaboration or consultation.