Advanced Phase Diagrams
EMA6106, Section Number 6101

Class Periods:  MWF, 4th Period
Location:  CISE 114
Academic Term:  Fall 2019

Instructor:
G.E. Fuchs
gfuch@mse.ufl.edu
352-846-3317
Office Hours:  116 Rhines, TBA

Teaching Assistants:
Please contact through the Canvas website
  •  None

Course Description
This is a graduate course in phase diagrams, including uniary, binary and ternary phase diagrams in metals, ceramics, etc. Topics covered include the thermodynamics behind phase diagrams, computational techniques to estimate phase diagrams and real-world uses of phase diagrams to solve problems. The course will include extensive use of ThermoCalc software. (3 credit hours).

Course Pre-Requisites / Co-Requisites
None

Course Objectives
a.  to develop an understanding of phase diagrams, including the thermodynamics of phase diagrams;
  b.  to become familiar with traditional terminology, conventions and uses of phase diagrams in materials science and engineering;
  c.  to develop an understanding the capabilities and limitations of computational techniques for estimating phase diagrams.

Materials and Supply Fees
None

Required Textbooks and Software
None

Recommended Materials
  •  Title:  Phase Equilibria, Phase Diagrams and Phase Transformations
  •  Author:  Mats Hillert
  •  Publication date and edition:  2008, 2nd Edition
  •  ISBN number:  978-0521853514
  
  •  Title:  Phase Transformation in Metals and Alloys
  •  Author:  David A. Porter, Kenneth E. Easterling and Mohamed Y. Sherif
  •  Publication date and edition:  2009, 3rd Edition
  •  ISBN number:  978-1420062106

Course Schedule
Week 1:  Introduction
Week 2:  Introduction to phase diagrams
Week 3:  Binary phase diagrams
Week 4: Binary phase diagrams and thermodynamics  
Week 5: Binary phase diagrams and thermodynamics  
Week 6: Exam 1 and Ternary phase diagrams  
Week 7: Ternary phase diagrams  
Week 8: Predominance diagrams  
Week 9: Other types of phase diagrams  
Week 10: Computational techniques and ThermoCalc  
Week 11: Exam 2 - ThermoCalc  
Week 12: ThermoCalc  
Week 13: ThermoCalc  
Week 14: ThermoCalc  
Week 15: Exam 3  
Finals Week: Optional Final Exam (12/11/19, 3-5pm)

**Attendance Policy, Class Expectations, and Make-Up Policy**  
Attendance is strongly encouraged but will not be recorded. While attendance is not mandatory, experience has shown that those who attend lectures learn more and earn higher grades in the course. Arrival on time is expected. Turn off all telephones before entering classroom. Excused absences must be consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

**Evaluation of Grades**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentages without Optional Final Exam</th>
<th>Percentages with Optional Final Exam</th>
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<tbody>
<tr>
<td>Homework Sets (10)</td>
<td>20% Total</td>
<td>15%</td>
</tr>
<tr>
<td>Midterm Exams (3)</td>
<td>20% Each</td>
<td>15%</td>
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<tr>
<td>Term Paper</td>
<td>20%</td>
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<tr>
<td>Optional Final Exam</td>
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<tr>
<td>Total</td>
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**Grading Policy**

<table>
<thead>
<tr>
<th>Percent</th>
<th>Grade</th>
<th>Grade Points</th>
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<tbody>
<tr>
<td>93.4 - 100</td>
<td>A</td>
<td>4.00</td>
</tr>
<tr>
<td>90.0 - 93.3</td>
<td>A-</td>
<td>3.67</td>
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<tr>
<td>86.7 - 89.9</td>
<td>B+</td>
<td>3.33</td>
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<tr>
<td>83.4 - 86.6</td>
<td>B</td>
<td>3.00</td>
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<tr>
<td>80.0 - 83.3</td>
<td>B-</td>
<td>2.67</td>
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<tr>
<td>76.7 - 79.9</td>
<td>C+</td>
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<tr>
<td>73.4 - 76.6</td>
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<td>70.0 - 73.3</td>
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<td>66.7 - 69.9</td>
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<td>63.4 - 66.6</td>
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<td>60.0 - 63.3</td>
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<td>0 - 59.9</td>
<td>E</td>
<td>0.00</td>
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Homework assignments are given approximately bi-weekly, due within 1 week of assignment. Late homework accepted until solutions handed-out, but penalized 10% per day after due date. All work must be shown for full/partial credit. Once a solution set has been posted, late homework can not be accepted for a grade.

**Term Paper:** All students will be required to complete a 10-12 page paper (counting the text only) on some aspect of the application of phase diagrams to materials science and engineering. Note that there is a 10 page minimum (counting the text only) for this paper. A font size of 12, 1” margins and single spacing in the paragraphs should be used. The paper should also include appropriate tables and figures (not included in the
text page count). All work taken from the literature should be appropriately referenced. The subject should be identified prior to Friday, February 23rd and approved by the instructor. The report shall be the students work and plagiarization of books, papers, internet sites, etc will result in a zero “0” grade. The report will be due on last day of class (April 25th). Please turn in the report electronically in either a MS Word or PDF format. All papers will be submitted to TurnItIn.com and evaluated for plagiarism.

More information on UF grading policy may be found at:
http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades

**Students Requiring Accommodations**

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

**Course Evaluation**

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu/evals. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/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://www.dso.ufl.edu/sccr/process/student-conduct-honor-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](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/](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://lss.at.ufl.edu/help.shtml](https://lss.at.ufl.edu/help.shtml).

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. [https://www.crc.ufl.edu/](https://www.crc.ufl.edu/).

Library Support, [http://cms.uflib.ufl.edu/ask](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/](https://teachingcenter.ufl.edu/).

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. [https://writing.ufl.edu/writing-studio/](https://writing.ufl.edu/writing-studio/).
