



MATERIALS ENGINEERING 152

Solid State Kinetics

Spring 2008 Greensheet

COURSE OBJECTIVES

Upon completion of MatE 152 you will understand the materials phenomena controlling the kinetics (an activation barrier for a thermodynamically favored process to occur) of surfaces & interfaces of solids, nucleation and growth, diffusion, and phase changes. You will also be able to apply these concepts to related technologies.

COURSE INFO

Class: M & W 1:30-2:45 pm, E327

INSTRUCTOR INFO

Dr. Stacy Gleixner

408-924-4051

gleixner@email.sjsu.edu

Office Hours in E385B: M & W 10:30-11:30, T & R 10:30-12

I am also available by appointment. Feel free to call or send e-mail to set up an appointment for another time if you can't come during regular office hours.

ONLINE RESOURCES

This course will conduct all of its communications outside of class using Blackboard Learning System (WebCT). You will be able to send questions to your instructors using Blackboard for both lecture and lab. You will also be able to send messages to the rest of the class and to both sections. All of the online resources such as homework and exam solutions will be at WebCT. To access the class site at Blackboard you must be enrolled in the course. Go to the <http://sjsu6.blackboard.com/> Your username is your 9 digit ID and your password is the 4 digit month and day of your birthday (such as 0804 for August 4th).

TEXT

Required Text: Phase Transformations in Metals and Alloys, by Porter and Easterling, Chapman & Hall

Thermo text: You also will need a good thermo text. If you don't have one, I recommend Introduction to Thermodynamics of Materials, by David Gaskell, Taylor & Francis Publishing (An older version of this is on reserve at the King Library.)

Some other kinetics texts on reserve at the King Library are:

Transformations in Metals, P.G. Shewmon, Mc-Graw Hill, 1969.

Diffusion in Solids, P.G. Shewmon, Mc-Graw Hill, 1963.

ACTIVE PARTICIPATION IN CLASS

Your **ACTIVE** participation in the lecture is required. That means you will be required to ask questions, answer questions, and work together with your peers to solve problems during the

class time. The reading assignments for each week are listed on the Class Activity Schedule (attached to this Greensheet). **You are expected to do the reading before class.** Always bring your calculator and it is helpful to bring your textbook along.

CLASS PREPARATION ASSIGNMENTS

In this class, you will have assignments to do to prepare for each class period. These are designed to help you come to class prepared as well as to keep you on track with your projects. In some cases, these will be similar to traditional homework problems. In other cases, you will be asked to answer questions on the assigned reading or to track down data or equations you will need to work on in-class calculations. In all cases, the assignments will be carefully designed to make you better prepared for the class period, your project, and the tests. If you can not solve the assignment on your home, come to office hours, post questions to the discussion board, or consult your fellow students. Any work you pass in for these assignments you must have actively participated in creating and fully understand.

BLACKBOARD DISCUSSIONS

We will be using the Blackboard (WebCT) discussion board to continue to learn and apply the material outside of class. All students are expected to participate in the discussions. To participate, you can post questions, answer other postings, or refer students to related links and applications you found. Full participation would be a minimum of five thoughtful postings over the course of the semester.

PROJECTS

There will be 4 project assignments. The projects will be calculations based assignments that involve a brief written document as well as a brief individual oral quiz. The goal of the projects is to give an opportunity to apply the concepts and equations covered in the class in a complex situation.

EXAMINATIONS & QUIZZES

There will be a midterm and a comprehensive final exam. You must bring a calculator to the examinations. The tests will be closed book, closed notes but you will be supplied with an equation sheet. To study for the tests, you should review the readings, course lecture notes, homework, and learning objectives **well in advance** of the test date. Go to office hours with a list of questions. Utilizing external material or copying off of fellow students on an exam or quiz will result in an F for your course grade and you will be reported to the University for academic dishonesty.

ACADEMIC HONESTY

Your own commitment to learning, as evidenced by your enrollment at San Jose State University, and the University's Academic Integrity Policy, requires you to be honest in all your academic coursework. Faculty members are **required** to report all infractions to the Office of Student Conduct and Ethical Development. The policy on academic integrity can be found at http://sa.sjsu.edu/student_conduct.

Strict standards of academic honesty will be enforced in this class. Students who plagiarize any portion of their reports will receive an F (0) on that report with no chance of make-up and be reported to the University. Assignments that you turn in must have been worked out entirely by you. You can study with friends and work out the problem together, but you must then independently work it through and record your own work. *Students who provide their homework or reports to other students such that they can be copied are also committing a breach of academic honesty. This includes leaving your work on shared computers, leaving your flash drive where others can copy it, etc.* If you wish to help other students learn the material, studying together is acceptable as long as each individual goes on to produce their own independent work.

For more information about avoiding plagiarism in written reports, see: <http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml>

INSTRUCTIONS FOR TURNITIN.COM ARE:

1. Go to www.turnitin.com
2. If you don't already have an account, click on "New User"
3. To add this course,, click on "Enroll in a course" and use:

class ID:	2156960
enrollment password:	kinetics

ACCOMMODATION FOR STUDENTS WITH DISABILITIES

If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with DRC to establish a record of their disability.

GRADING METHOD

Course Element:	Percentage
Class Preparation	10%
Projects	40%
WebCT Discussion	5%
In-class Activities	5%
Midterm	15%
Final Exam	25%
Total	100

Total Course Score	Letter Grade
97-100	A+
93-96	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
60-69	D
< 60	F

Class Schedule

Week	Class Topic	Assignments
1: 1/23	Review of Thermodynamics	Review your thermo book
2: 1/28	Review of Thermodynamics/ Review of Phase Diagrams	Review your thermo book; P & E 1.1-1.2
3: 2/4	Solution Thermodynamics	P & E 1.3-1.4
4: 2/11	Solution Thermodynamics	P & E 1.5-1.7
5: 2/18	Fick's First & Second Law	P&E: 2.1-2.2 M: Phase Diagrams Project Due W: Oral Quiz on Project
6: 2/22	Solutions to the Diffusion Equations	P&E: 2.3-2.5
7: 3/3	Advanced Diffusion Models & Mechanisms	P&E: 2.6-2.8
8: 3/10	Surface & Interface Energy	P & E: 3.1-3.3 M: Diffusion Project Due W: Oral Quiz on Projects
9: 3/17	Interface Shape & Migration W: MIDTERM	P & E: 3.4-3.5 W: MIDTERM
3/24	SPRING BREAK: No Class	
10: 4/2	No class on Mon: Cesar Chavez Day Homogeneous Nucleation	P & E: 4.1
11: 4/7	Heterogeneous Nucleation, Growth	P & E 4.1-4.2 M: Surfaces Project Due W: Oral Quiz on Project
12: 4/14	Alloy Solidification/ Solid Nucleation	P & E 4.3-4.5, 5.1-5.2
13: 4/21	Precipitate Growth/ Transformation Kinetics	P & E: 5.3-5.4
14: 4/28	Spinodal Decomposition	P & E: 5.5 M: Nucleation Project Due W: Oral Quiz on Project
15: 5/5	Diffusionless Transformations	P & E: 6.1-6.4
16: 5/12	Review Last Day of Class: Monday 5/12	
Finals	Final: Wed 5/21, 12:15-2:30 am	