Topics Covered

1) Phase Equilibria
   a) One-component System
   b) Binary System
   c) Ternary System
   d) Experimental Methods for Determining Phase Diagrams

2) Diffusion
   a) Atomic Theory
   b) Fick’s 1st Law
   c) Fick’s 2nd Law
   d) Solutions to the Diffusion Equation
   e) Correlation Effects
   f) Moving Boundary Value Problem
   g) Diffusion in Concentrated Alloys – Darken’s Analysis
   h) Phenomenological Equations
   i) Diffusion in Multiphase Systems
   j) Diffusion in Ionic Solids
   k) High Diffusivity Paths
   l) Thermal Diffusion

3) Defects and Phase Transformation
   a) Nucleation and Growth
   b) Spinodal Decomposition
   c) Diffusionless Transformation
   d) Surfaces
   e) Grain Boundaries
Texts Used

Diffusion in Solids – P. Shewmon
Phase Transformation in Metals and Alloys – D.A. Porter, K.E. Easterling and M. Sherif
These texts are optional and not required

Exams

1st midterm February 11, 2015 Wednesday in class
2nd midterm March 25, 2015 Wednesday in class
Final May 11, 2015 Monday 2:00-4:00 pm

Blackboard

Since this class is taught on DEN there will be two Blackboard websites for this class and it is important that you log on to the correct website depending on what information you are looking for.

The main Blackboard website which is the website where all USC classes reside is located at https://blackboard.usc.edu and the username and password is the same as your USC e-mail account. All course information(syllabus, problem sets, exams, grades) will posted on this website.

The second Blackboard website exist because this is a DEN course and this website which also uses the same Blackboard software exist to post the video of the lectures and the pdf files of the SmartBoard notes. To access this Blackboard website go to https://www.uscden.net/webapps/login/. You have to create an account with a username and password.

Problem Sets

There will be six problem sets. The will be posted on Blackboard on Monday and due in class one week later. The schedule for the problem sets are:

Problem Set #1 posted January 26
Problem Set #2 posted February 2
Problem Set #3 posted February 23
Problem Set #4 posted March 2
Problem Set #5 posted April 6
Problem Set #6 posted April 13
Grading

Problem Sets 20%
Midterm I 25%
Midterm II 25%
Final 30%

Statement on Academic Conduct and Support Systems

Academic Conduct
Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in Scampus in Section 11, Behavior Violating University Standards https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/. Other forms of academic dishonesty are equally unacceptable. See additional information in Scampus and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct/.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity http://equity.usc.edu/ or to the Department of Public Safety http://capsnet.usc.edu/department/department-public-safety/online-forms/contact-us. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men http://www.usc.edu/student-affairs/cwm/ provides 24/7 confidential support, and the sexual assault resource center webpage sarc@usc.edu describes reporting options and other resources.

Support Systems
A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute http://dornsife.usc.edu/ali, which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, USC Emergency Information http://emergency.usc.edu/ will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.