

PHY392T Surface Science, Fall 2000

Unique Number: 57615

Class - Meets MWF 10-10:50 in RLM 6.114

Instructor - Professor Greg O. Sitz

phone 471-0701

email GOSITZ@PHYSICS.UTEXAS.EDU

office RLM 10.313

office hours: Monday 11-12, Tuesday 5-6, or by appointment.

Text - *Surface Physics*, by Zangwill. This book will provide background material on many of the topics covered in the class, and is a good book to have in your collection.

Requirements - Your grade will be based on two factors: (1) homework in the form of a set of questions related to a weekly reading assignment taken from the recent literature. There will be 14 of these, and they will be scored on an acceptable/unacceptable basis; (2) a more elaborate project in the form of a problem your own choosing that you devise and solve.

Grade scale:

To make an A: 12 “acceptable” homework assignments and the project.

To make a B: 12 “acceptable” homework assignments, no project, or 10 “acceptable” homework assignments and the project.

To make a C or pass: 10 “acceptable” homework assignments, no project, or 8 “acceptable” homework assignments and the project.

Project: This is intended as a more involved problem and can be on anything nominally related to the course. The problem should be suitable to be used as a homework problem in a future version of this course. You can select a topic that is related to your thesis research. I will distribute an example of what I have in mind on September 1. There are three deadlines associated with your project: on October 27 a short, written description is due; on November 17 a rough draft of a solution and outline of the final goals is due; on December 8 the complete problem and solution are due.

Comments - This course will be a survey class of selected topics in modern surface physics and chemistry. A series of subjects will be covered (see the syllabus on the next page) with a recent paper or two assigned weekly as a specific sample of the material. The general focus will be on kinetic and dynamics processes occurring at solid surfaces with emphasis on experimental techniques and results.

Syllabus

Week of August 30:	Electron scattering and spectroscopy
September 6:	Molecular dissociation and trapping (Professor Mullins)
September 11:	Surface structures and LEED (Professor Fink)
September 18:	Electronic Structure at Surfaces I
September 25:	Electronic Structure at Surfaces II
October 2:	Interaction Potentials
October 9:	Collective Excitations
October 16:	Physical Adsorption
October 23:	Chemisorption
October 30:	Phase Transitions
November 6:	Tunneling Spectroscopy (Professor Shih)
November 13:	Surface Kinetics, film growth
November 20:	Surface Kinetics, reactions
November 27:	Surface Dynamics, energy transfer
December 4:	Surface Dynamics, reactions

Quotes

“a single layer of oxygen atoms would decrease the electron emission of the tungsten by a factor of 10,000, whereas a single layer of thorium atoms would increase the emission 100,000-fold” -Irving Langmuir

“The surface was invented by the devil” -Wolfgang Pauli

“How often have I said to you that when you have eliminated the impossible, whatever remains, however improbable, must be the truth?” - Sherlock Holmes (Arthur Conan Doyle)