

ECH 6937
Surface Science
Spring 2020

Instructor: Jason F. Weaver (weaver@che.ufl.edu)
Room 331 Chemical Engineering Building, Phone No. 392-0869

Class hours: T 12:50-1:40 (period 6): ROG 0110
R 12:50-2:45 (period 6-7): MAT 0010

Office hours: TBA

Grading: Attendance/Class discussion: 50%, Term paper: 50%

Textbook: "Principles of Adsorption and Reaction on Solid Surfaces", R.I. Masel, Wiley Series in Chemical Engineering, 1996. (ISBN 0-471-30392-5)

Website: Canvas

Goals:

1. To learn fundamentals of adsorption and reactions on solid surfaces.
2. To learn approaches for quantitatively describing adsorption and reaction phenomena on surfaces.

Topics

1. Surface Structure
2. Molecule Binding on Solid Surfaces
3. Adsorption Isotherms
4. Adsorption Kinetics
5. Reactions on Surfaces

ECH 6937----Surface Science

This course will cover the principles of adsorption and reactions on solid surfaces, focusing on the surfaces of metals, semiconductors and insulators. We will discuss surface structure and the nature of molecule binding on solid surfaces, including aspects of the electronic structure of solid surfaces. We will cover adsorption isotherms, adsorbate phase behavior, and the kinetics of adsorption onto solids. Lastly, we will discuss trends in surface reactivity as well as the mechanisms and kinetics of surface reactions. The course provides particular emphasis on developing quantitative descriptions of the rates of adsorption and reactions on surfaces.

Course Guidelines

The final grade will be determined in large part by participation in class and completion of reading assignments. The following provides guidelines about class participation;

- Attendance will be recorded on a sign-in sheet at each class meeting.
- Textbooks should be brought to class.
- A reading assignment will be given at each class and should be completed prior to the next class meeting.
- Two students will be assigned to lead the class discussion for each reading.
- All students are encouraged to participate in the class discussion.
- At the start of class, all students are required to submit one question about the reading assignment.
- Students must maintain a journal with notes about the reading assignments. The journal should summarize material covered in the textbook, and can include questions about the material, derivations of equations, solved examples, sketches, etc. The instructor will periodically collect the journals for review.