Special Topics in Physical Chemistry
(Surface Science on Nanomaterials)
CHM 6580
Spring 2016

Class Meeting Times:	W 7-8(1:55-2:45; 3:00-3:50pm) F 7(1:45-2:45pm)
Class Room:	CLB 313
Instructor:	Dr. Wei David Wei
Phone:	352-392-2050
E-mail:	wei@chem.ufl.edu
Office Hours:	W: 3:50-4:40pm F: 2:45-3:35pm or by appointment
Office Location:	CLB 311D
Grading Criteria:	(30%) Class participation, quizzes, and in-class discussions (20%) Problem sets (20%) Term paper and group work (30%) Final presentation
Scheme:	100-90%(A); 89-85%(A-) 84-80%(B+); 79-75%(B); 74-70%(B-) 69-67(C+); 66-64%(C); 63-60%(C-) 59-57(D+); 56-54%(D); 53-50%(D-) <50% (F)
Holidays (no class):	Feb 29- Mar 4 (Spring Break)
Tests:	No final exam Quizzes and Problem sets in class
Class Text:	Materials will be provided. No required textbook for the course. We will be working from selected book chapters,

handouts, review articles and research papers, distributed electronically. However, there are many excellent texts that treat various aspects of the course and will be helpful in gaining a better understanding and in preparation of the term papers. Extra recommended reading materials are:

Kolasinski, Surface Science: Foundations of Catalysis and Nanoscience

Hornyak Gabor L., Introduction to Nanoscience & Nanotechnology

O'Connor, Sexton, Surface Analysis Methods in Materials Science

Somorjai, Introduction to Surface Chemistry and Catalysis

Course Objectives: Understand chemical and physical phenomena particular to surfaces and interfaces of nanomaterials

Introduction to modern surface science methods and their application to current research topics on nanomaterials.

Critical interpretation of surface analysis data and surface science research reports.

Attendance is absolutely mandatory and participation in class discussion is a very important part of the course. A key objective of the course is critical reading and interpretation of surface analysis data and papers. All will be done in the class. If you must miss class, please contact me in advance.

Term paper will be 4-6 pages to present a surface analysis method not discussed in class or discuss a modern problem or novel material that has been addressed or characterized using a combination of techniques. The papers will be peer-reviewed by two of your classmates before final "submission" on the last day of class. Short presentations (~30min.) will take place in the last weeks of the semester. More details on this later.

The following is a tentative schedule for the semester. All aspects of this schedule are subject to change, but we will try to keep on schedule.

Date		Topic	Notes
Jan 6	1	Introductions	
8	2	Kinetic theory of gases Ultra-high vacuum	
13	3	Surface Structures	
15	4	Low-energy electron diffraction	
20		Adsorption Diffusion and growth at surfaces	
22	5	Overview of surface analytical methods	
27	6	Nanoscience and nanotechnology	
29	7	Thermal desorption spectroscopy	
Feb 3	8	Reactions at surfaces Thin film growth on surfaces	
5	9	Scanning probe microscopy overview	
10	10	AFM	
12	11	SEM	
17	12	STM	
19	13	SNOM	
24	14	Vibrational spectroscopy overview	
26	15	IR	
March 2		Spring break	
4		Spring break	
9	16	SERS	
11	17	HREELS	
16	18	Surface composition analysis	
18	19	Electron/ion energy analyzers	
23	20	Excitation sources	
25	21	XPS	
30	22	AES	

Apr 1	23	SEM/EDX	
6	24	Surface photoemission spectroscopy	
8	25	UPS and 2PPE	
13	26	Student presentations	
15	27	Student presentations	
20	28	Student presentations	