

**CHEM 4211 INSTRUMENTAL METHODS IN ANALYTICAL CHEMISTRY  
SPRING 2017**

Time 10:30-11:50 AM, Tue & Thu

Location: Miner Hall 300

**Instructor:** XiuJun James Li, Ph.D.

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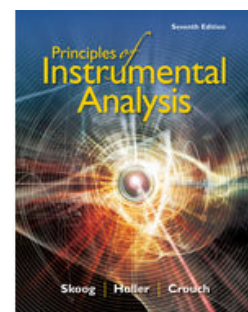
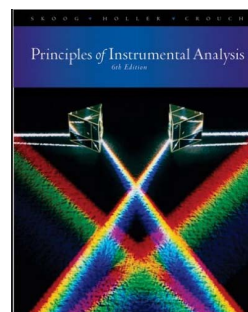
Office hours: by appointment currently; TBA later.

**COURSE PURPOSE**

This course is designed to introduce the instrumental methods to solve problems in chemistry, life sciences, environmental science, forensics and so on. Students will gain knowledge in an array of tools for obtaining qualitative and quantitative information about the chemical composition and structure of matter. Comprehension of the principles of instrumentation will be emphasized so that the students can incorporate them in chemical analysis and therefore will apply them to various fields in chemistry, life sciences, environmental science, forensics and beyond.

**TEXTBOOK AND OTHER STUDY MATERIAL**

**Principles of Instrumental Analysis**, 6th edition, by Skoog/Holler/Crouch (Brooks/Cole Cengage Learning, 2007/1998), or 7<sup>th</sup> edition. Additional reference material will be distributed during the semester.



**COURSE CONTENT OUTLINE**

- Introduction
- Atomic Spectroscopy
  - Atomic Absorption Spectrometry
  - Atomic Emission Spectrometry
- Molecular Spectroscopy
  - Ultraviolet Visible Molecular Absorption Spectrometry
  - Molecular luminescence spectrometry (Fluorescence)
  - Infrared Spectrometry
  - ~~Nuclear Magnetic Resonance Spectrometry~~
  - Molecular Mass Spectrometry
- Electroanalytical Chemistry
  - ~~Potentiometry~~
  - Voltammetry

- Separation Methods
  - Gas Chromatography
  - Liquid Chromatography
  - Capillary Electrophoresis (*and Microfluidic Lab on a chip*).

**EXAMS**

- Two “regional exams”, one mid-term exam, and one final exam will be offered during the course of the semester. The final examination will be comprehensive.

**Evaluations:**

- In-class quizzes, ‘Regional’ exams (2), and mid-term exam: 40%
- Final Exam (Comprehensive): 35 %
- Presentations & projects: 10 %
- Homework 10%
- Attendance: 5%
- Bonus Points (5%) will be offered based on student’s class participation and performance.

Breakdown:\*

100%	-	89%	-	79%	-	69%	-	59%	-	0%
		A		B		C		D		F

\* You have the option of dropping one ‘regional exam’ grade (the lowest one) to improve your average. When the final overall average from all students is too low or too high, the final grades might be curved.

**Absence:**

Doctor note can be accepted for the absence of class to avoid the absence penalty (5%). However, make-up exams will **NOT** be given. Please consider carefully the repercussions of making other commitments that coincide with exam days.

**Academic honesty:**

Materials (written or otherwise) submitted to fulfill academic requirements must represent a student’s own efforts. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Violations will be taken seriously and will be referred to the Dean of Students Office for possible disciplinary action. Students may be suspended or expelled from UTEP for such actions.

**Students with Disabilities**

If you have or believe you have a disability, you may wish to self-identify. You can do so by providing documentation to the Office of disabled Student Services located in Union E Room 203. Students who

have been designated as disabled must reactivate their standing with the Office of Disabled Student Services on a yearly basis. Failure to report to this office will place a student on the inactive list and nullify benefits received. If you have a condition which may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or the director of Disabled Student Services. You may call 747-5148 for general information about the Americans with Disabilities Act (ADA).

Syllabus is subject to change. Any changes will be announced in class, or by email, or posted on the course Blackboard site during the semester. Students are solely responsible for getting the most updated information.

### Tentative Course Schedule

Week		Contents	Note
1.	1/17; 1/19	Introduction	
2.	1/24; 1/26	Atomic Spectroscopy (Ch 8, 10, 11, 12) – Atomic Absorption Spectrometry – Atomic Emission Spectrometry – Atomic Mass Spectrometry – Atomic X-ray Spectrometry	
3.	1/31; 2/2		2/2 Census Day
4.	2/7; 2/9		2/10 Last day to select P/F Option
5.	2/14; 2/16		
6.	2/21; 2/23		Molecular Spectroscopy (Ch 13, 14, 16, 17, 19, 20, 21)
7.	2/28; 3/1	– UV/Vis Molecular Absorption Spectrometry	
8.	3/6; 3/8	– Infrared Spectrometry – Nuclear Magnetic Resonance Spectrometry	
9.	<b><u>Spring Break - (No Classes)</u></b>		
10.	3/20; 3/22	– Molecular Mass Spectrometry – Surface Characterization by Microscopy	
11.	3/27; 3/29		<b>Exam 2 (3/29)</b> 3/30 Course drop deadline
12.	4/3; 4/5		
13.	4/10; 4/12	Separation Methods (Ch 26, 27, 28, 30) – Gas Chromatography – Liquid Chromatography – Capillary Electrophoresis	
14.	4/17; 4/19		
15.	4/24; 4/26		
16.	5/1; 5/3		<b>Exam 3 (5/3)</b>
17.	<b><u>Final Exam: 5/8 10:00 am – 12:45 pm</u></b>		