

**CHEM 4211 INSTRUMENTAL METHODS IN ANALYTICAL CHEMISTRY
SPRING 2022**

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

Location: PSCI 403 & Zoom

Instructor: XiuJun James Li, Ph.D.,
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Office hours: by appointment on Zoom currently; TBA later.

Online Teaching (some portions):

1. Synchronous Teaching: Zoom:

Join Zoom Meeting

<https://utep-edu.zoom.us/j/83688013299?pwd=VEdnM0k3NFB0ZWwhBRkoyQ1ZBSWpBUT09>

Meeting ID: 836 8801 3299

Passcode: qRUK1bum

2. Asynchronous Teaching: Pre-recorded video.

3. We may also use **App REEF** Polling for in-class activities.
Search ""

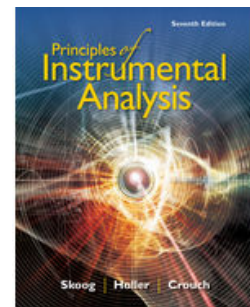
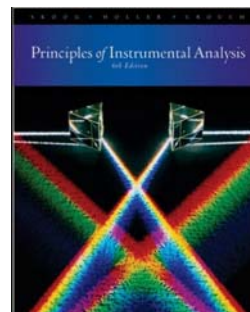
COURSE PURPOSE

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 7th 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 Spectroscopy~~
 - Molecular Mass Spectrometry
- Electroanalytical Chemistry (*depends on time availability*)
 - ~~— Potentiometry~~
 - Voltammetry
- Separation Methods
 - Gas Chromatography
 - Liquid Chromatography
 - Capillary Electrophoresis (*and Microfluidic Lab on a chip*).

EXAMS

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

Evaluations:

- In-class work, quizzes and attendance 10 %
- Homework 15 %
- Presentations & projects: 5 %
- Unit Exam 1* 18 %
- Unit Exam 2* 24 %
- Exam 3 (final, comprehensive) 28 %
- Final Grade*: 100 %
- Bonus Points (5%) may be offered based on student’s class participation and performance (If the bonus to be offered, the instructor will announce this is a bonus question, and who answered it first and correctly will get the bonus.)

Breakdown:*

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

*: There are two unit tests. The one that you get the lowest score among these two tests (denoted as Unit Exam 1 herein) will take a less percentage, i.e., 18%, while the other unit exam will take a higher percentage, i.e., 24%. This is to increase your overall score.

Make-up exams including quizzes etc will **NOT** be given. Please consider carefully the repercussions of making other commitments that coincide with exam days and class time. When the final overall average from all students is too low or too high, the final grades might be slightly adjusted.

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.

Important dates:

1. 03/14-18/2022, Spring Break
2. 04/01/2022, Spring Drop/Withdrawal Deadline
3. 05/05/2022, Final Exam

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, disclosure of exam questions, and collusion. Violations will be taken seriously and will be referred to the Dean of Students Office, and the Office of Student Conduct and Conflict Resolution (<https://www.utep.edu/student-affairs/osccr/>) 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).

All grades of Incomplete must be accompanied by an Incomplete Contract that has been signed by the instructor of record, student, departmental chair, and the dean. Although UTEP will allow a maximum of one year to complete this contract, the College of Science requests it be limited to one month based upon completion data. A grade of Incomplete is only used in extraordinary circumstances confined to a limited event such as a missed exam, project, or lab. If the student has missed a significant amount of work (e.g. multiple assignments or tasks), a grade of Incomplete is not appropriate or warranted.

COVID-19 PRECAUTION STATEMENT

We need to follow CDC, El Paso, and UTEP's regulations to ensure high safety such as **the indoor face mask mandate**.

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to covidaction@utep.edu, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID-19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area, and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit epstrong.org.

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.	<u>Spring Break - (No Classes)</u>		
10.	3/20; 3/22	– Molecular Mass Spectrometry – Surface Characterization by Microscopy	
11.	3/27; 3/29		Exam 2 (3/29) 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		Exam 3 (5/3)
17.	<u>Final Exam: 5/8 10:00 am – 12:45 pm</u>		