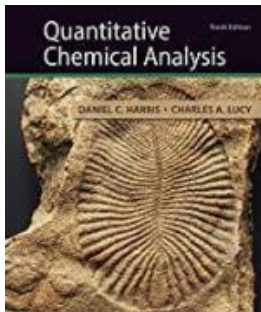
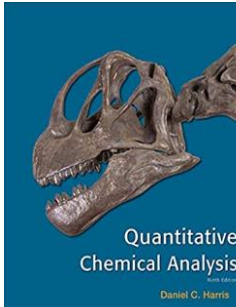
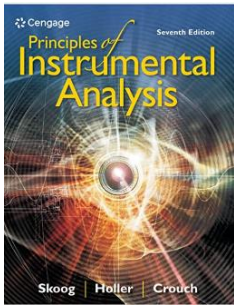




College of Sciences
Department of Chemistry and Biochemistry
Syllabus

Course name:	INSTRUMENTAL METHODS IN ANALYTICAL CHEMISTRY
Course no.:	CHEM 4211
Course CRN:	24216
Semester/year	Spring 2023
Undergraduate credit hours:	2
Class location:	Liberal Arts 210
Class meeting time:	M-W 10:30am-11:50am
Class instructor:	J. Angel Hernandez-Viezcas
Contact methods:	UTEP Email, Blackboard messages, or conference through Zoom
Email:	jahernandez19@utep.edu
Office hours:	By appointment at CCSB 3.0502 or Zoom meeting
Preferred contact method:	Email
Assigned TA:	TBD

Course description:	This course addresses quantitative measurements and calculations, chemical equilibrium as applied to analyses and separations.
Course pre-requisites:	To enroll for this course, you will need to meet the following prerequisites: CHEM 3322, CHEM 3352 and CHEM 4212
Required textbooks:	<p>Quantitative Chemical Analysis By Daniel C. Harris, W. H. Freeman ISBN-13: 978-1464135385 ISBN-10: 146413538X</p>   <p>Other study material Principles of Instrumental analysis By Skoog, Holler, Crouch 7th edition</p> 
Required and Supplemental readings:	At least 10 chapters from the book will be covered, and to successfully pass this course, students will be required to complete reading the assigned book chapters. Additionally, students will be required to review supplementary posted materials on the Blackboard Learn® platform.
IClicker	We will use the <i>IClicker-Classroom Response System</i> , UTEP has purchased the license therefore it should have no cost to the students. https://www.utep.edu/technologysupport/_Files/docs/iClicker-Cloud-Software-Installation.pdf

<p>Course requirements:</p>	<p>Time commitment is essential to complete the course requirements. All of the material reviewed during class can be evaluated during examinations. Make sure you understand all that is reviewed during class, many topics are interconnected and failure to understand one will affect the understanding of other topics. If you don't understand a concept please ask questions or arrange a meeting with the professor.</p> <p>All students are required to have access to a computer that connects to the internet and a working UTEP e-mail account (@miners.utep.edu). Other e-mail systems should not be used for this course. If you do not own a computer, you can make use of several computer labs on campus or apply for a long-term laptop loan at the library. For information on how to log in or connect to the VPNnet, contact the UTEP Help Desk at (915) 747-4357 (HELP) or helpdesk@utep.edu, or check their information page https://www.utep.edu/technologysupport/learningremotely.html. Students are expected to be able to use Blackboard® email, as well as perform internet searches, study independently, and have good time management skills. Similarly, it is anticipated that students know how to use word processing, spreadsheet, and visual media software, as well as the capability to open pdf-type files, store all course assignments and, if necessary, submit them electronically through the Blackboard® Learn platform.</p> <p>We will have face to face exams. In exceptional ocatons the class will have an online exam. For online exams the Lockdown Browser will be used. (www.respondus.com/lockdown/download.php?id=586140509). It is the student's responsibility to ensure they have all the software and connectivity requirements.</p> <p>Students will not be allowed to re-submit an assignment or quiz, NO EXCEPTIONS.</p>
<p>Major learning objectives:</p>	<p>After completing the course, the student will be able to:</p> <p>This course is designed to introduce the instrumental methods to solve problems in chemistry.</p> <p>1-Students will gain knowledge in an array of tools for obtaining qualitative and quantitative information about the chemical composition and structure of matter.</p> <p>2-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.</p>
<p>Course outcomes:/ competencies</p>	<p>After completing the course, the student will demonstrate the following learning outcomes/competencies:</p> <ol style="list-style-type: none"> 1. Explain the theoretical principles behind the instrumental techniques and their applications; 2. Evaluate the suitability of the instrumental methods for the analysis of samples in various formats and from complex matrices;
<p>Assessment strategies:</p>	<p>Attendance: Mondays and Wednesdays from 10:30am to 11:50. The student must comply with a minimum of 80% attendance.</p> <p>Assistance and in class participation: During the lecture there will be questions that will be answered through IClicker.</p> <p>Assignments and quizzes: Assignments are due on blackboard at before the assigned date.</p> <p>Midterm Exams: There will be three examinations during the semester. The material covered is accumulative. E.g. concepts from the first examination might be asked during the second examination.</p> <p>Final Exam: material reiewed during the semester</p> <p>Extra Credit: TBD</p>

No extensions, re-scheduling, or re-taking of examinations, quizzes, and other assessments will be allowed without a University-approved excuse.

Grading scale & criteria:

Grading Scale:

- >90 % = A
- 80-89% = B
- 70-79% = C
- 60-69% = D
- <60% = F

Grading Components:

Coursework & Examinations:	Weighted Value
• Homework and in class participation	15%
• Presentation & Projects	15%
• Midterm Exams	40%
• Final Exam	30%
• Extra credit	2.5%

Dropping & Grading policies for dropping the course, withdrawals, and incomplete:

Students may drop individual courses or completely withdraw from the university, and grades are based on when the actions are taken. Refer to the online Academic Calendar at www.utep.edu/calendar or the “Important Dates” section to know the specific deadline dates.

- a) **Student-initiated Drops:** It is the student’s responsibility to officially drop a course that she/he no longer wishes to take. Failure to do so may result in a grade of “F” on the student’s academic record. Athletes must receive permission from the Miner Athletic Advising Center before dropping a course. International students with F or J visas must receive permission from the Office of International Programs before dropping a course.
- b) **Administration Drops:** During registration periods for upcoming semesters, students will be dropped from registered courses for failure to meet prerequisites or co-requisites after final grades have been posted for the current semester and before beginning late registration for the next semester. A student may petition the department chair of the course in question for a prerequisite or co-requisite waiver.
At the instructor’s discretion, a student may be dropped from a course because of excessive absences (i.e., 4 or more) or lack of effort. Students may also be administratively withdrawn from a course during the semester for other reasons, with the concurrence of the academic dean or department chair. A grade of “W” will be assigned before the course drop deadline and a grade of “F” after the course drop deadline. A grade of “F” received due to disciplinary action imposed by the University overrides a grade of “W” received through a student-initiated or faculty drop. Students will be notified of their drop through their UTEP e-mail account.
- c) **Grade Assignment for Drops and Withdrawals:** Grades will be assigned as follows when a student drops a course or completely withdraws from the University:
 1. If a student drops a course before the official census date of a semester, neither the course nor a grade will appear on the student’s academic record.
 2. If a student drops from a course after the census date, but before the student-initiated course drop deadline listed in the Class Schedule, a grade of “W” will be assigned.
 3. If the student drops after the student-initiated course drop deadline, instructors will determine a grade of “W” or “F” for each course. A grade of “W” is considered only under exceptional circumstances and must be approved by the instructor and department chair for the course. A student may petition for a grade of “W” in writing with the necessary supporting documentation.

Incomplete course work: An “I” (incomplete grade) can only be considered if requested by the student in advance of the conclusion of the course and only for legitimate, documented exceptional circumstances/emergencies after you have completed at least half of the course

requirements. Failure to request and negotiate the terms of an “Incomplete” grade before the conclusion of the course will result in denial except in the most extraordinary circumstances.

Course/Instructor & Institutional Policies

Attendance: **The University requires that students comply with a minimum of 80% attendance.** Attendance is mandatory, an important component required in this course, and is determined by online class participation (IClicker). In this regard, online courses are no different than traditional face-to-face courses; however, attendance must be considered differently. Exceptions will be made in the case of University excused absences (sponsored activities approved by the Dean of students). You will only be able to make up for activities, exams, or assignments (scheduled or unscheduled) in the case of University excused absences (sponsored activities approved by the Dean of students).

Alternative means of submitting work in case of technical issues: I strongly suggest you **submit your work with sufficient time** to spare in the event that you have a technical issue with the course website, network, and/or your computer. I also suggest you **save all your work** (answers to discussion boards, quizzes, exams, and written assignments) in a separate Word document as a backup. This way, you will have evidence that you completed the work and will not lose credit. If you are experiencing difficulties submitting your work through the course website, please contact the UTEP Help Desk. You can email me your backup document as a last resort.

Calendar:	Week No.	Monday	Wednesday	Note
	1	01/15 MLK No Class	01/17 Introduction and syllabus	
	2	01/22 Chapter 18	01/24 Chapter 19	
	3	01/29 Chapter 20	01/31 Chapter 20	
	4	02/05 Chapter 21	02/07 Chapter 22	
	5	02/12 Chapter 23	02/14 Exam 1	
	6	02/19 Chapter 24	02/21 Chapter 24	
	7	02/26 Chapter 25	02/28 Chapter 25	
	8	03/04 Presentations	03/06 Presentations	
	9	03/11 Break	03/13 Break	
	10	03/18 Chapter 26	03/20 Exam 2	
	11	03/25 Special topics	03/27 Special topics	March 28 Drop date
	12	04/01 Special topics	04/03 Special topics	
	13	04/08 Special topics	04/10 Special topics	
	14	04/15 Special topics	04/17 Special topics	
	15	04/22 Special topics	04/24 Exam 3	
	16	04/29 Special topics	05/01 Special topics	
17	Final TBD			
Student progress:				
Group work:	Most of the assignments will be individual work. However, depending on the size of the class students will work in team to present a project.			
Writing standards:	Before submitting assignments, please check your work for misspellings, grammar, and sentence structure. References in written reports should follow the latest Publication Manual of the American Psychological Association (APA Style 6 th ed). All written documents should follow APA formatting rules, be double-spaced, have 1-inch margins, and have a Times New Roman font size of 12. Please feel free to seek assistance from the UTEP Writing Center or other writing support. The UTEP Writing Center is free and always happy to help you.			

Late assignments:	Homework and other assignments must be turned in when scheduled in order to be graded with 100% of the score points to be awarded. No extensions are granted for scheduled activities such as discussion boards, quizzes, examinations, or assignments.
Instructor course evaluation:	The instructor will provide more details on how the course will be evaluated. There is an internal evaluation and a University standard online evaluation in which you will have the opportunity to rate the instructor’s performance and the course content. It is recommended that you complete these evaluations so that we continue improving the course.
Accommodations for individuals with disability:	The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of university programs, services, and activities with documented disabilities to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship to the University. Students requesting accommodation based on a disability must register with the UTEP Center for Accommodations and Support Services (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, email them at cass@utep.edu , or apply for accommodations online via the CASS portal .
Copyright statement for course materials:	All materials used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. They may not be further disseminated.
Copyright and fair use requirements:	The University requires all members of its community to follow copyright and fair use requirements. You are individually and solely responsible for copyright and fair use laws violations. The University will neither protect nor defend you nor assume any responsibility for a student’s violations of fair use laws. Violations of copyright laws could subject you to federal and state civil penalties, criminal liability, and disciplinary action under University policies.
Student conduct and academic integrity:	<p>Academic dishonesty is prohibited and considered a violation of the UTEP Handbook of Operating Procedures. Students are expected to be above reproach in all academic activities. Students who engage in academic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and dismissal from the university. “Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports, and any act designed to give an unfair advantage to a student or the attempt to commit such acts.” Regent’s Rules and Regulations, Part One, Chapter VI, Section 3.2, Subdivision 3.22. Since scholastic dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. From the UTEP Dean of Student Affairs (http://studentaffairs.utep.edu/Default.aspx?tabid=4386).</p> <p>Examples of “cheating” include:</p> <ul style="list-style-type: none"> ▪ Copying from the homework, in-class work, or exam paper of another student, engaging in written, oral, or any other means of communication with another student during an exam or homework assignment, or giving aid to or seeking aid from another student during a test; ▪ Possession and/or use during an exam or home test of materials that are not authorized by the person giving the test, such as class notes, books, or specifically designed “crib notes”; ▪ Using, obtaining, or attempting to obtain by any means the whole or any part of a non-administered test, test key, homework solution, or computer program; using a test that has been administered in prior classes or semesters but which will be used again either in whole or in part without permission of the instructor, or accessing a test bank without instructor permission; ▪ Collaborating with or seeking aid from another student for an assignment without authority;

	<ul style="list-style-type: none"> ▪ Substituting for another person, or permitting another person to substitute for one's self to take a test; ▪ Falsifying research data, laboratory reports, and/or other records or academic work offered for credit. <p>“Plagiarism” means the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the unacknowledged submission or incorporation of it in one's own academic work offered for credit or using work in a paper or assignment for which the student had received credit in another course without direct permission of all involved instructors. NOTE: This includes cutting-and-pasting and photocopying from online and other material. “Collusion” means the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on academic dishonesty.</p>
<p>Student resources:</p>	<p>UTEP provides a variety of student services and support. Familiarize yourself with the bookmarks on the right-hand side of the Blackboard student portal (visible before entering a course), as well as the resources below.</p> <p>Academic Resources</p> <ul style="list-style-type: none"> ▪ UTEP Library: Access a wide range of resources, including online, full-text access to thousands of journals and eBooks, plus reference service and librarian assistance for enrolled students. ▪ University Writing Center (UWC): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources. ▪ Math Tutoring Center (MaRCS): Ask a tutor for help and explore other available math resources. ▪ History Tutoring Center (HTC): Receive assistance with writing history papers, get help from a tutor and explore other history resources. ▪ RefWorks: A bibliographic citation tool; check out the RefWorks tutorial, fact sheet, and quick-start guide. ▪ IClicker: https://www.utep.edu/technologysupport/_Files/docs/iClicker-Cloud-Software-Installation.pdf <p>Individual Resources</p> <ul style="list-style-type: none"> ▪ Military Student Success Center: Assists personnel in any branch of service to reach their educational goals. ▪ Center for Accommodations and Support Services: Assists students with ADA-related accommodations for coursework, housing, and internships. ▪ Counseling and Psychological Services: Provides various counseling services, including individual, couples, and group sessions, as well as career and disability assessments. <p>Technology Resources</p> <ul style="list-style-type: none"> • Help Desk: Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Help desk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus. Phone: 915-747-4357 (HELP) Email: helpdesk@utep.edu

Important dates:	<table> <tr><td>Classes Begin</td><td>Jan. 16</td></tr> <tr><td>Census Day</td><td>Jan. 31</td></tr> <tr><td>Spring Break</td><td>Mar.11-15</td></tr> <tr><td>Drop Deadline</td><td>Mar. 28</td></tr> <tr><td>Cesar Chavez Holyday</td><td>Mar. 29</td></tr> <tr><td>Last Day of classes</td><td>May 2</td></tr> <tr><td>Final Exam</td><td>TBD</td></tr> </table>	Classes Begin	Jan. 16	Census Day	Jan. 31	Spring Break	Mar.11-15	Drop Deadline	Mar. 28	Cesar Chavez Holyday	Mar. 29	Last Day of classes	May 2	Final Exam	TBD
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COVID-19 Precautions:	<p>Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you feel unwell, please let me know as soon as possible so 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 support you and help with communication with your professors. The Student Health Center is equipped to provide COVID-19 testing.</p> <p>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.</p>														

Student presentation topics

Present the instrument, background, capabilities and an application note (Literature based).

- XRD
- XANES (X-ray absorption near edge structure)
- EXAFS (Extended X-ray absorption fine structure)
- Voltammetry and Amperometry
- TEM
- SEM
- Hyperspectral analysis
- Raman Spectroscopy
- Microfluidics
- AMS (Accelerator mass spectrometry)
- LIBS (laser induced breakdown spectroscopy)
- MALDI (Matrix-assisted laser desorption/ionization)