CHEM 5318 / 6318

Advanced Analytical Chemistry

(Advanced Instrumental Analysis)
Fall 2024
10:30 AM - 11:50 AM, M & W
CCSB 1.0204
CHEM 5318-CRN 16713.
CHEM 6318-CRN 13134.

Instructor: XiuJun (James) Li, Ph.D.
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Office hours: by appointment

- **Certificate** in College Instruction for Effective Teaching by the American Council on Education (**ACE**) and Association of College and University Educators (ACUE)

Online Teaching (some portions)**:**

1. **Synchronous Teaching: Zoom:**
   Join Zoom Meeting
   https://utep-edu.zoom.us/j/83513639474?pwd=npn62FoA8nftbblJ0SKvTqbmo6Bt2V.1
   Meeting ID: 835 1363 9474
   Passcode: pBK4m4y0
2. **Asynchronous Teaching:** Pre-recorded video.
3. We may also use **App iClicker** Polling for in-class activities.
   Search “Advanced AC”

References (Recommended but not required for the class)**:**

- Principles of Instrumental Analysis, 7th edition, by Skoog (**ISBN:** 9781337670074)
- Microfluidic Devices for Biomedical Applications, 2nd Edition, Elsevier, by Xiujun Li (**ISBN:** 9780128199718)
- Certain journal articles and review papers

Brief Course Description:

- This course presents multidisciplinary instrumental analysis techniques for bioanalysis, environmental analysis, and material characterization. While focusing on advanced instrumental analysis techniques (e.g. capillary electrophoresis, microfluidic lab-on-a-chip, biosensors, nanotechnology, and so on), it will also cover fundamentals of advanced analytical chemistry (e.g. quality assurance), various detection methods (e.g. laser-induced fluorescence detection and XPS). From this course, the student will learn the fundamentals of advanced instrumental analysis techniques and their application in chemistry, life science, material science, and bioengineering.

Objectives:

- To learn contemporary instrumental analysis techniques.

- To develop research abilities to propose new solutions to solve problems using modern analytical chemistry techniques.
- To develop interdisciplinary research abilities.
- To become conversant with recent research advances in analytical chemistry.

Contents:

- Introduction of advanced analytical chemistry
- Fundamentals of advanced analytical chemistry
    - Calibration methods
    - Quality assurance…
- Laser-induced Fluorescence
- Separation Science
    - Fundamentals
    - Capillary Electrophoresis (CE) separation
    - Detectors
- Miniaturized microfluidic Lab-on-a-chip
    - Microfabrication
    - Microchip CE separation
    - Application
- Nanosensors
- Surface characterization
    - XPS (X-ray photoelectron spectroscopy)
- *Electroanalytical Chemistry (if time permits):*
    - *Fundamentals*
    - *Voltammetry*

Evaluations:

- Class Participation/Attendance: 5 pts (only a total of 2 absences will be excused)
- Paired Literature presentations: 15 pts (20 mins presentation including 2-3 mins questions)
- Exam 1, Exam 2 and quizzes: 60 pts
- Final research project presentation: 20 pts (30 mins presentation 5 mins questions)

  Grades:
  A: 90% - 100%, B: 80% - 89%, C: 70%-79%, D: 60%-69%, F: <60%

Important dates:

- Oct 16 Exam 1 (Tentative).

- Nov 1 Fall Drop/Withdrawal Deadline.
- Nov 20 Exam 2 (Tentative).
- Dec 4 Last day of class

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.

Incomplete Grade Policy
Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to the instructors immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.

Accommodations Policy
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 in order 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 on the University. Students requesting an 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.

Scholastic Integrity
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. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones' own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) for possible disciplinary action. To learn more, please visit HOOP: Student Conduct and Discipline.

Guidance on Artificial Intelligence

The use of generative AI tools such as Chat GPT is permitted in this course for the following activities, which must be noted or cited:

- Language correction
- Grammar check

However, you may not use AI tools to complete the following activities:

Write a part or the entire assignment, find ideas or anything that is not mentioned above.

Students must cite any borrowed content sources to comply with all applicable citation guidelines, copyright law, and avoid plagiarism. Instances that violate these guidelines will be referred to the Office of Student Conduct and Conflict Resolution.

PLAGIARISM DETECTING SOFTWARE

Some of your course work and assessments may submitted to SafeAssign, a plagiarism detecting software. SafeAssign is used review assignment submissions for originality and will help you learn how to properly attribute sources rather than paraphrase.

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