



College of Arts & Sciences
CHEM 4331: Instrumental Chemical Analysis

Instructor: Dr. Eric A. Banks

Class Hours: MWF 10:00 -10:50 AM

Email: ebanks@tamusa.edu

Class Location: STEM 105

Office: STEM Suite 311

Office Hours: TBD

Course Materials:

The following textbook is available at brytewave.redshelf.com:

Principles of Instrumental Analysis, Seventh Edition, Skoog, Holler and Crouch (SHC).

Optional/Supplemental: Quantitative Chemical Analysis, 10th edition, Daniel Harris. A personal laptop with the latest version of Excel is highly recommended.

Homework: Homework sets are assigned from end-of-the-chapter problems in SHC and/or from Harris and Lucy. Homework sets are NOT GRADED, and solutions are provided.

Calculators: Scientific calculators are required for this course. Programming mode is not allowed on exams.

Course Description

This is a one-semester course designed to introduce students to theory and application of instrumental techniques focused on spectroscopy, spectrometry, and chromatography. **Prerequisite:** CHEM 3331 and MATH 1314 with a grade of "C" or better **Corequisite:** 4131.

Learning Objectives

By the end of this course students will be able to:

1. Recognize the value of analytical instruments and their limitations.
2. Identify capabilities and limitations of instrumental methods.
3. Understand sensitivity, selectivity, time required and instrument cost as factors for instrument selection.
4. Understand instrumental methods and control of operating parameters available for study.
5. Understand basic operation and internal design of instruments available for study.

Student Responsibilities

Attendance Policy. All students are expected to attend all lectures and actively engage in class discussions, activities, and assignments. Attendance may be monitored. If you are absent, you are responsible for the material covered and are expected to get notes, announcements, and any other material from another student in the class. Absences are excused if due to illness (medical excuse), death of an immediate family member, religious holiday (please inform instructor), official University activity, cancellation of classes, military duties, pregnancy & related conditions, or participation in legal proceedings. Excessive absences (**more than 3**) and tardiness may be penalized. **Accumulation of more than three unexcused absences may result in a one letter grade reduction.**

Conduct and Behavior. As an instructor, my goal is to create a safe and engaging learning environment. Class disruptions are unacceptable, asking questions to clarify material during class does not qualify as a disruption and is encouraged. If you disrupt the class, you will be asked to leave for the day. Technology in the classroom may be a great a resource but it can also hinder the learning process. Therefore, students are not allowed to wear ear buds and headphones and/or use cellphones during class. All cellphones must be on vibrate or turned off for the entirety of the class/lab period. In case of an emergency call, leave the room before answering the call. Texting/Tweeting/etc. during class is absolutely prohibited. The use of laptops, tablets, or other devices for non-class related activities is not allowed.

Electronic Devices during Exams. All electronic devices must be completely stored during exams and quizzes, this does not include approved scientific calculators (see course materials). Academic misconduct and attempts to cheat during the exam will be pursued according to Texas A&M-San Antonio code of conduct policy. You are discouraged from leaving the room during an exam. If you need to use the restroom, ask and leave all electronic devices with the instructor.

Aggressive Behavior. The academic environment is meant for discussing ideas in a respectful manner. Tolerance, empathy, respect, and courtesy help us create a safe environment. Abusive and aggressive behavior will result in contacting the University Police Department and immediate removal of the student from the classroom.

Visitors. Only students enrolled in the course are allowed in the classroom. No visitors are allowed.

IMPORTANT. Each student receives this information during the first lecture. It is your responsibility to read this material and be familiar with the course content, procedures, and grading.

Grading

Your grade for the course is based on: Four 100-point exams.

These are the only opportunities for you to earn points throughout the semester. There are **no** opportunities for extra credit.

Exams: 4 x 100 points each = 400

To calculate your grade, use the following equation: $\left(\frac{\sum(\text{Points earned})}{\text{Total points}}\right) * 100$

Letter Grade:	A	B	C	D	F
% of Total Points:	90.0 - 100%	80.0 - 89.9%	70.0 - 79.9%	60.0 - 69.9%	0 - 59.9%

Exams. There are **no makeup examinations for unexcused absences!** Contact me soonest if you have an issue.

Tentative lecture schedule. Subject to change (Dates, topics and exam coverage are tentative. The instructor reserves the right to make changes as deemed necessary.)

Syllabus. Subject to change (Dates, topics and exam coverage are tentative. The instructor reserves the right to make changes as deemed necessary.)

	Day	Topic	Exams/Key Dates	Homework
1	Jan 15		Holiday – NO CLASS	
	Jan 17	Chapter 1	Syllabus/Introduction	
	Jan 19	Chapter 1		
2	Jan 22	Chapter 1		
	Jan 24	Chapter 5		
	Jan 26	Chapter 5		
3	Jan 29	Chapter 6		Set 1 Assigned
	Jan 31	Chapter 6		
	Feb 2	Chapter 6		
4	Feb 5	Chapter 7		
	Feb 7	Chapter 7		
	Feb 9	Chapter 7		Set 2 Assigned
5	Feb 12	Chapter 8		
	Feb 14	Chapter 8		
	Feb 16		Exam I	
6	Feb 19	Chapter 9		
	Feb 21	Chapter 9		
	Feb 23	Chapter 9		
7	Feb 26	Chapter 16		
	Feb 28	Chapter 16		
	Mar 1	Chapter 16		
8	Mar 4	Chapter 17		
	Mar 6	Chapter 17		
	Mar 8	Chapter 17		
9	Mar 11		Spring Break	
	Mar 13			
	Mar 15			
10	Mar 18	Chapter 19		
	Mar 20	Chapter 19		

	Mar 22	Chapter 19		
11	Mar 25	Chapter 19		
	Mar 27	Chapter 20		
	Mar 29		Exam II	
12	Apr 1	Chapter 20		
	Apr 3	Chapter 20		
	Apr 5	Chapter 26		
13	Apr 8	Chapter 26		
	Apr 10	Chapter 26		
	Apr 12	Chapter 27		
14	Apr 15	Chapter 27		
	Apr 17	Chapter 27		
	Apr 19	Chapter 28		
15	Apr 22	Chapter 28		
	Apr 24	Chapter 28		
	Apr 26		Exam III	
16	Apr 29	TBD		
	May 1	Final Exams 1 - 7		
	FINAL EXAM	TBA		

Student responsibilities

University Email Policy and Course Communications: The best way to contact me is through email, ebanks@tamusa.edu. All correspondence between professors and students must occur via University email accounts. You must have your Jaguar email account ready and working. If it is not working, contact the help desk at sahelp@tamus.edu or at 210-784-HELP (4357). If you don't hear back within 48 hours, contact them again. They have a lot of requests during the first part of the semester, so you may need to follow up with them. All students are strongly encouraged to come to office hours or make appointments at other times to discuss course material and answer questions.

Attendance Policy. All students are expected to attend lectures and actively engage in discussions, activities, and online assignments. If you are absent, you are responsible for the material covered and are expected to get notes, announcements, and any other material from another student in the class. Absences will be excused if due to illness (medical excuse), death of a close family member, religious holiday (please inform instructor), official university activity or cancellation of classes, military duties, pregnancy & related conditions, and participation in legal proceedings.

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Texting during class is absolutely prohibited. The use of laptops, tablets or other devices for non-class related activities is not allowed. **Electronic Devices during Exams.** All electronic devices must be completely stored during exams and quizzes; this does not include approved scientific calculators (see course materials).

Academic misconduct and attempts to cheat during the exam will be pursued according to Texas A&M-San Antonio code of conduct policy. You are discouraged from leaving the room during an exam. If you need to use the restroom, ask and leave all electronic devices with the instructor. **Aggressive Behavior.** The academic environment is meant for discussing ideas in a respectful manner. Tolerance, empathy, respect, and courtesy help us create a safe environment. Abusive and aggressive behavior will result in contacting the University Police Department and immediate removal of the student from the classroom. **Visitors.** Only students enrolled in the course are allowed in the classroom. No visitors are allowed. **IMPORTANT.** Each student receives this information during the first lecture. It is your responsibility to read this material and be familiar with the course content, procedures, and grading.

Academic Accommodations for Persons with Disabilities: The Americans with Disabilities Act of 1990, as amended, and the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights protection for individuals with disabilities. Title II of the ADA and Section 504 of the Rehabilitation Act require that students with disabilities be guaranteed equal access to the learning environment through the provision of reasonable and appropriate accommodations of their disability. If you have a disability that may require accommodation, please contact Disability Support Services (DSS) for the coordination of services. The phone number for DSS is (210) 784-1335 and email is dss@tamusa.edu.

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Academic Learning Center: All currently enrolled students at Texas A&M University-San Antonio can utilize the Academic Learning Center for subject-area tutoring. The Academic Learning Center is an appointment-based center where appointments are made through the Navigate platform. Students access Navigate through Jagwire in the Student Services tab. The Center is active on campus outreaching to students to highlight services offered. You can contact the Academic Learning Center by emailing tutoring@tamusa.edu or calling (210)-784-1332. Appointments can also be made through JagWire under the services tab.

Counseling Resources: There may be times when personal stressors interfere with your academic performance and/or negatively impact your daily functioning. If you or someone you know is experiencing life stressors, emotional difficulties, or mental health concerns at Texas A&M University – San Antonio, please contact the Student Counseling Center (SCC) located in Modular C, Room 166 (Rear entrance) or call 210-784-1331 between the hours of 8 a.m. and 5 p.m., Monday – Friday. After-hours crisis support is available by calling 210-784-1331. Please contact UPD at 911 if harm to self or harm to others is imminent.

All mental health services provided by the SCC are free, confidential (to the extent permitted by law), and are not part of a student's academic or university record. SCC provides brief individual and group therapy, crisis intervention, consultation, case management, and prevention services. For more information, please visit www.tamusa.edu/studentcounseling.

Emergency Preparedness: JagE Alert is Texas A&M University-San Antonio's mass notification system. In the event of an emergency, such as inclement weather, students, staff, and faculty who are registered in JagE Alert, will have the option to receive a text message, email, and/or phone call with instructions and updates. To register or update your information visit: <https://tamusa.bbcportal.com/>.

More information about Emergency Preparedness and the Emergency Response Guide can be found here: <https://www.tamusa.edu/upd/index.html>.

Financial Aid and Verification of Attendance: According to the following federal regulation, 34 CFR 668.21: U.S. Department of Education (DoE) Title IV regulation, a student can only receive Title IV funds based on Title IV eligibility criteria which include class attendance. If Title IV funds are disbursed to ineligible students (including students who fail to begin attendance), the institution must return these funds to the U.S. DoE within 30 days of becoming aware that the student will not or has not begun attendance. The faculty will provide the Office of Financial Aid with an electronic notification if a student has not attended the first week of class. Any student receiving federal financial aid who does not attend the first week of class will have their aid terminated and returned to the DoE. Please note that any student who stops attending at any time during the semester may also need to return a portion of their federal aid.

Jaguar Writing Center: The Jaguar Writing Center provides writing support to graduate and undergraduate students in all three colleges. Writing tutors work with students to develop reading skills, prepare oral presentations, and plan, draft, and revise their written assignments. Students can schedule appointments with the Writing Center in JagWire under the student services tab. More information about what services we offer, how to make an appointment, and how to arrange your appointment can be found on our website at www.tamusa.edu/Writing-Center. The Writing Center can also be reached by emailing writingcenter@tamusa.edu.

Meeting Basic Needs: Any student who has difficulty affording groceries or accessing sufficient food to eat every day, or who lacks a safe and stable place to live and believes this may affect their performance in the course, is urged to contact the Dean of Students (DOS@tamusa.edu) for support. In addition, you may notify the instructor if you are comfortable doing so.

Military Affairs: Veterans and active-duty military personnel are welcomed and encouraged to communicate, in advance, if possible, about special circumstances (e.g., upcoming deployment, drill requirements, disability accommodations). You are also encouraged to visit the Patriots' Casa in-person, Room 202, or to contact the Office of Military Affairs with any questions at military@tamusa.edu or (210)784-1397.

Religious Observances: Texas A&M University-San Antonio recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holidays according to their tradition. Under A&M System policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they notify their instructors before the end of the second week of classes for regular session classes.

The Six-Drop Rule: Students are subject to the requirements of Senate Bill (SB) 1231 passed by the Texas Legislature in 2007. SB 1231 limits students to a maximum of six (6) non-punitive course drops (i.e., courses a student chooses to drop) during their undergraduate careers. A non-punitive drop does not affect the student's GPA. However, course drops that exceed the maximum allowed by SB 1231 will be treated as "F" grades and will impact the student's GPA.

Statement of Harassment and Discrimination: Texas A&M University-San Antonio is committed to the fundamental principles of academic freedom, equality of opportunity, and human dignity. To fulfill its multiple missions as an institution of higher learning, A&M-San Antonio encourages a climate that values and nurtures collegiality, diversity, pluralism, and the uniqueness of the individual within our state, nation, and world. All decisions and actions involving students and employees should be based on applicable law and individual merit. Texas A&M University-San Antonio, in accordance with applicable federal and state law, prohibits discrimination, including harassment, on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation, gender identity, or gender expression. Individuals who believe they have experienced harassment or discrimination prohibited by this statement are encouraged to contact the appropriate offices within their respective units.

Texas A&M University-San Antonio faculty are committed to helping create a safe learning environment for all students and for the university. If you have experienced any form of sex- or gender-based discrimination or harassment, including sexual assault, sexual harassment, domestic or dating violence, or stalking, know that help and support are available. A&M-San Antonio has staff members trained to support survivors in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, and more. The university strongly encourages all students to report any such incidents to the university. Please be aware that all A&M-San Antonio employees (other than those designated as confidential resources such as counselors and other healthcare providers) are required to report information about such discrimination and harassment to the university. This means that if you tell a faculty member

about an incident of sexual harassment or sexual violence, or other related misconduct, the faculty member must share that information with the university's Title IX Coordinator. If you wish to speak to a confidential employee who does not have this reporting responsibility, you can contact the Student Counseling Center at (210) 784-1331, Modular C.

Students' Rights and Responsibilities: The purpose of the following statement is to enumerate the essential provisions of students' freedoms and responsibilities to learn at Texas A&M University-San Antonio. All students are required to follow all policies and regulations as set forth by The Texas A&M University System, including the A&M-San Antonio Student Code of Conduct.

Students' Rights

1. A student shall have the right to participate in a free exchange of ideas, and there shall be no university rule or procedure that in any way abridges the rights of freedom of speech, expression, petition, and peaceful assembly as set forth in the U.S. Constitution.
2. Each student shall have the right to participate in all areas and activities of the university, free from any form of discrimination, including harassment, based on race, color, national or ethnic origin, religion, sex, disability, age, sexual orientation, gender identity, gender expression, genetic information, or veteran status in accordance with applicable federal and state laws.
3. A student has the right to personal privacy except as otherwise provided by law, and this will be observed by students and University authorities alike.
4. Each student subject to disciplinary action arising from violations of university student rules shall be assured a fundamentally fair process.

Students' Responsibilities

1. A student has the responsibility to respect the rights and property of others, including other students, the faculty and staff, and the administration.
2. A student has the responsibility to be fully acquainted with and compliant with the University Student Rules found in the Student Handbook, Student Code of Conduct, on our website, and in the University Catalog.
3. A student has the responsibility to recognize that student actions reflect upon the individuals involved and upon the entire University community.
4. A student has the responsibility to recognize the University's obligation to provide a safe environment for learning.
5. A student has the responsibility to check their University email for any updates or official University notifications.
6. We expect that students will behave in a manner that is dignified, respectful, and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation, or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

Using AI: Chemistry 4331 assumes that all work submitted by students will be generated by the students themselves, working individually or in groups. Students should not have another person/entity do the writing of any portion of an assignment for them, which includes hiring a person or a company to write assignments and/or using artificial intelligence (AI) tools like ChatGPT. Use of any AI-generated content in this course qualifies as academic dishonesty and violates Texas A&M-San Antonio's standards of academic integrity.