

## ANALYTICAL CHEMISTRY - CHEM 3310

Spring, 2025

Dr. Tanya Shtoyko

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Office Hours:

M, T, W, R, F: 11:15 pm-12:15 pm

Open door polices:

It is also my policy to be available anytime I am at the University. If my door is open, please don't hesitate to come in to ask questions or to get help. I will do my best to assist you whenever possible.

**PREREQUISITES:** CHEM 1312/1112

### DESCRIPTION:

In this course you will build upon your understanding of chemistry by learning how certain chemical systems are modeled and the principles upon which numerous chemical analyses are based. The topics you will explore this semester include the statistical treatment of data, ionic equilibria including acid/base chemistry, spectrophotometry, electrochemistry including redox reactions and potentiometry, and analytical methods of separation.

### STUDENT LEARNING OUTCOMES:

By the end of the course, you will be able to:

1. describe how certain chemical systems are modeled (CTS, EQS).
2. explain the principles upon which many chemical analyses are based (CTS, EQS).
3. perform several techniques commonly used in chemical analysis (CTS, EQS, TW).
4. assess data obtained using common analytical methods (CTS, EQS, TW).
5. solve real life problems by designing and performing the chemical analysis (CTS, EQS, COM, TW).

CTS—Critical Thinking Skills

COM—Communications Skills

EQS—Empirical and Quantitative Skills

TW—Teamwork

Your performance will be assessed through homework assignments and exams (see below).

### Recording of Class Sessions

Class sessions will not be recorded by the instructor. It is a face-to-face class.

### IMPORTANT DATES:

January 27 – Census Day, deadline for all registrations and schedule changes

March 17-21 Spring Break for faculty and students (no classes)

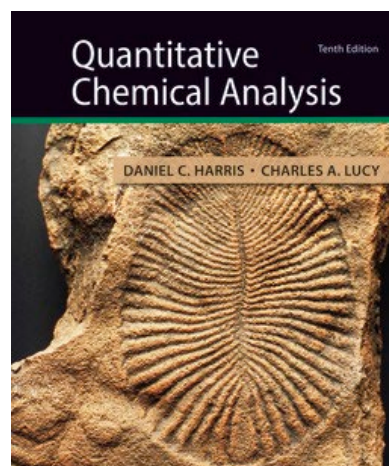
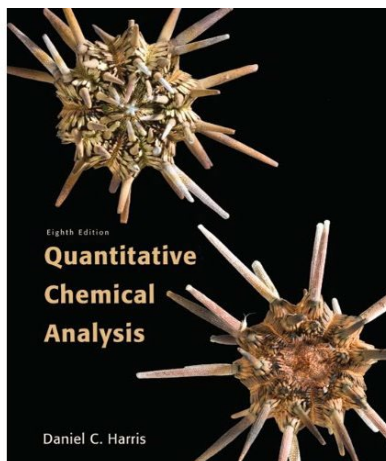
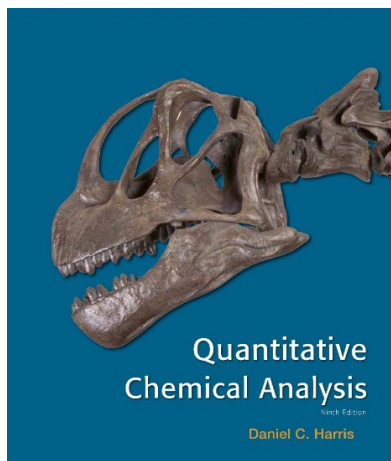
March 31 (Monday)– Last day to withdraw from the course with a “W”; see your instructor if you decide to drop a class.

**April 30 (Wednesday) from 10:15am–12:15pm – Final Exam**

### TEXT AND ONLINE HOMEWORK:

1. *Quantitative Chemical Analysis*, 8<sup>th</sup> ed., 9<sup>th</sup> ed, or 10<sup>th</sup> edition by Daniel C. Harris (hardcover text) (ISBN: 1429218150), loose-leaf version, or e-book. E-book is also available at UT Tyler Library:

<https://ebookcentral.proquest.com/lib/uttyler/detail.action?docID=6643919>



2. Six months access code for ACHIVE Online Homework  
<https://achieve.macmillanlearning.com/courses/t88guv>
3. High-speed Internet connection
4. Windows, Mac, or Chrome Operating System
5. Up-to-date Chrome or Firefox browser
6. Valid photo ID

**EVALUATION:** There will be three examinations, fifteen homework assignments, and one comprehensive ACS final examination during the semester. Each exam will count **100 points**. All homework assignments will have the same weight as one exam. The final grade will be calculated using the following weights:

3 exams (20% each or 100 points each)  
1 final ACS exam (20 % or 100 points)  
20 homework assignments (20% total)  
**Total 100.0%**

Grades will tentatively be based on a **90/80/70/60 scale** but may be adjusted based upon my evaluation of the overall class performance. Help sessions will be conducted during the semester and I will be available during my office hours. Please come ask me for help if you aren't clear about something. Don't wait until the last minute before an exam to seek assistance.

For each exam, students **should bring a scientific calculator, one 3"x5" card with any information you want, and a pencil with an eraser**. No other materials are permitted at your desk.

**NOTE THE POLICY FOR SMART DEVICES BELOW:**

*Cell phones and smart watches/electronic devices must be put away during exams. If they are observed out in a visually accessible place (i.e. between legs, on the floor, etc.), it will be assumed that they are being used to cheat and your exam will be taken, you will receive a zero score (0 points) for the exam, and you will be referred to the Office of Judicial Affairs*

**POLICIES:** My expectation is that you will attend all classes unless directed otherwise. There will be homework assignments and I expect that you will complete these assignments in a timely

manner. Homework assignments are graded; they will also help you learn and apply concepts and skills you are learning. If you are unable to attend a class, it is your responsibility to obtain all material discussed and assignments given.

You will be allowed to make up a missed exam with an **excused absence**. Normally, these reasons would include medical emergencies, a death in your family or required travel for a UT @ Tyler's event (e.g., athletic team travel). If at all possible, please let me know ahead of time if you are not able to take an exam at its scheduled time so that we can arrange another time for you to take it. If the absence is not excused, you will receive zero points for the exam.

### **STUDENT ACADEMIC CONDUCT:**

While students are encouraged to study and prepare for examinations with other students, each student must work alone and neither give nor receive help from any sources when taking exams. ***Under NO circumstances will cheating be tolerated!*** University regulations are very explicit about academic dishonesty and these regulations will be strictly enforced. **The minimum penalty for cheating is a zero for the exam;** the maximum penalties, up to expulsion from the university, will be pursued in extreme or repeat cases. Students are expected to help enforce this policy and are encouraged to obtain a copy of *A Student's Guide to Conduct and Discipline at UT Tyler*, available in the Office of Student Affairs.

### **ARTIFICIAL INTELLIGENCE USE POLICY:**

For this course, artificial intelligence (AI) use is not permitted. The work submitted by students in this course will be generated by themselves. This includes all process work, drafts, brainstorming artifacts, editing, and final products. This extends to group assignments where students must collaboratively create the project. Any instance of the following constitutes a violation of UT Tyler's Honor Code: a student has another person/entity do any portion of a graded assignment, which includes purchasing work from a company, hiring a person or company to complete an assignment or exam, using a previously submitted assignment and/or using AI tools (such as ChatGPT).

### **STUDENT RIGHTS AND RESPONSIBILITIES:**

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <http://www2.uttyler.edu/wellness/rightsresponsibilities.php>

### **GRADE REPLACEMENT/FORGIVENESS:**

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions that students need to be aware of. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

### **STATE-MANDATED COURSE DROP POLICY:**

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date).

Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

### **DISABILITY SERVICES:**

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University offers accommodations to students with learning, physical and/or psychiatric disabilities. If you have a disability, including non-visible disabilities such as chronic diseases, learning disabilities, head injury, PTSD or ADHD, or you have a history of modifications or accommodations in a previous educational environment you are encouraged to contact the Student Accessibility and Resources office and schedule an interview with the Accessibility Case Manager/ADA Coordinator, Cynthia Lowery Staples. If you are unsure if the above criteria applies to you, but have questions or concerns please contact the SAR office. For more information or to set up an appointment please visit the SAR office located in the University Center, Room 3150 or call 903.566.7079. You may also send an email to [cstaples@uttyler.edu](mailto:cstaples@uttyler.edu).

### **STUDENT ABSENCE DUE TO RELIGIOUS OBSERVANCE:**

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

### **STUDENT ABSENCE FOR UNIVERSITY-SPONSORED EVENTS AND ACTIVITIES:**

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

### **SOCIAL SECURITY AND FERPA STATEMENT:**

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

### **EMERGENCY EXITS AND EVACUATION:**

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit.

### **THE NEW CONCEALED CAMPUS CARRY LAW:**

We respect the right and privacy of students who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>.

### **UT TYLER IS A TOBACCO-FREE UNIVERSITY:**

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors.

Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products.

There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit [www.uttyler.edu/tobacco-free](http://www.uttyler.edu/tobacco-free).

### SCHEDULE OF CLASSES

<u>Weeks*</u>	<u>Topic*</u>	<u>Chapter*</u>
Week 1	Class introduction, expectations, concentrations Statistics	1 3
Week 2	Statistics Chemical equilibria	3 4
Week 3	Chemical equilibria Activity coefficients	6 8
Week 4	Systematic treatment of equilibria <b>EXAM I (100 points)</b>	8
Week 5	Monoprotic Acid/base equilibria	9
Week 6	Polyprotic Acid/base equilibria	10
Week 7	Acid-base Titrations	11
Week 8	Spectrophotometry and Fluorescence <b>EXAM II (100 points)</b>	18
Week 9	Spectrophotometry	19 (partially)
Week 10	Electrochemistry	13,15
Week 11	Electrodes and Potentiometry	14
Week 12	Potentiometry	14
Week 13	Analytical separations <b>EXAM III (100 points)</b>	22
Week 14	Chromatography	22
<b>April 30 (Wednesday) from 10:15am–12:15pm FINAL EXAM (100 points)</b>		

**\*Note: If required by unforeseen circumstances, the right to change the schedule is retained.**

## **The sign-up instructions for Online Achieve Homework**

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Students,

1. Go to <https://achieve.macmillanlearning.com/courses/t88guv>
2. Click "create an account" located under the username box. Supply the requested information and click "Create account".
3. Select your payment options and follow the remaining instructions.

My course is called [Shtoyko-Spring 2025-CHEM 3310-001 Analytical Chemistry](#)

Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments.