Sam Houston State University

CHEM 2401 Syllabus – Chemical Quantitative Analysis – Fall 2017

INSTRUCTOR:	Dr. Tarek M. Trad	**OFFICE:**	CFS 317J
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TIME AND LOCATION

Lecture: Chemical Quantitative Analysis – CHEM 2401 – 01: MWF 10:00 am – 10:50 am, Chemistry and Forensic Science Building (CFS), room 103
Laboratory: Wet Chemistry Labs will be held in CFS 309. Dry labs will be held in a location to be determined.

OFFICE HOURS

MWF 9:00 am – 10:00 am, and 11:00 am – 12:00 noon
Other times by appointment or on "walk in" basis

REQUIRED MATERIALS

- Textbook: *Exploring Chemical Analysis Fifth Edition*, by Daniel C. Harris
- Lab Notebook: Hayden McNeil Student Lab Notebook with permanent binding & 50 carbonless duplicate sets
- Lab Manual and Notes packet: *Available at the campus bookstore*
- Scientific calculator: TI 84 or similar scientific graphing calculator

COURSE DESCRIPTION

The fundamental principles of quantitative analysis are emphasized. Acid-base, complexometric, precipitation, and redox titrations, solution equilibria and spectrophotometric analysis are discussed. Laboratory exercises involve all types of volumetric procedures and colorimetric analysis. Four-hour laboratory. Prerequisite: A minimum grade of C in CHEM 1411 and CHEM 1412. Fall, Spring. Credit 4.

LEARNING OUTCOMES

This course is accompanied by a four-hour laboratory that focuses on implementing the concepts being covered in lecture, developing good analytical technique, developing basic data analysis & reporting skills. Successful completion of this course is expected to provide students with the following outcomes:

- Provide the student with the critical thinking skills to analyze, set-up and solve chemical problems typically encountered in a second year college chemistry course.
- Enable the student to gain a thorough understanding of calibrated measurements of concentration
- The ability to design and use sample preparation equations
- Analyze sets of experimental results by preparing histograms, estimating and interpreting confidence intervals
- Draw up a recipe for preparing a buffered solution at any specified pH, predict chemical concentrations in and pH of acid/base buffering systems
- Gain basic optical spectroscopy and titration skills to measure the concentration of a certain chemical in a solution
- Separation of components from complex mixtures via chromatography

GRADING SYSTEM

- *Exams (60% of total grade):* There will be three closed book major midterm exams. The dates for the exams will be announced approximately one week before the test. Exam questions may be in the form of multiple choice, calculation, short answer (essay), or a combination of these forms.

- *Final (20% of total grade):* The **Final Exam is comprehensive and closed book.** and will be given during finals week.
- *Laboratory (18% of total grade):* Laboratory begins the first full week of classes. Lab instructions will be posted on Blackboard or given by your teaching assistant. The first labs consist of Microsoft Excel and computational exercises. The remaining labs involve chemical measurements. Because I am committed to continually improving the lab, expect changes to lab instructions over the course of the semester. Major changes will be completed at least three days prior to the beginning of lab – minor changes Apr be made within the week of the lab itself. Safety and effective teamwork are important. Failing to observe safety precautions, (i.e. wearing goggles, using the hood when appropriate, safe disposal of chemical spills at the balances and dispensing areas etc.), or failing to fully participate (arriving late, leaving early etc…) will negatively impact your grade. One group will be assigned to clean the lab at the end of each lab. No lab grades are dropped.
- *Group Project (2% of total grade):* The project will consist of developing a poster presentation based on a recent journal article in the area of analytical chemistry. The group will choose an article using online library resources and get it approved by the instructor before proceeding with the project, then build a powerpoint poster presentation and send it to the instructor by a deadline which will be around the last week of class. Details of the project will be posted on blackboard during the semester.
- *Attendance:* will be assigned at the discretion of the instructor. Points awarded for class attendance will be considered as "Bonus" points. The number of points could be up to 10 for perfect attendance during the semester.
- Your overall grade will be determined based on the following point system:
    - Midterm Exams (3 @ 100 points each) 300
    - Final 100
    - Laboratory (9 experiments @ 10 points each) 90
    - Group Project 10

    Total possible points: 500

RANGE	*LETTER GRADE*
450.0 – 500.0	**A**
400.0 – 449.5	**B**
350.0 – 399.5	**C**
300.0 – 349.5	**D**
0 – 299.5	**F**

- I reserve the right to extend the cutoff percentages lower (but I will **NOT** raise them).

CLASS POLICIES

- *Cell Phones:* As cell phones are disruptions to the learning environment, <u>these must be silenced</u> during lectures and tests.
- *Attendance:* It is among the minimum requirements. All students are expected to be on time for class. Showing up late will not be tolerated and may result in appropriate actions taken by the professor at his own discretion. Attendance during exams is required, unless prior arrangements are made. No make-up exams will be given. Excused absences on exams must be pre-approved.
- *Collaboration:* In general I encourage you to work with others. Collaboration will enable you to get much more out of the class than if you work alone. Specifically I would encourage you to work with others to prepare for exams and to discuss laboratories and lectures. Your lab reports must be in your own words (No direct copying of text) and give appropriate credit to all relevant sources, including fellow students with whom you worked. No collaboration is allowed during exams, and submitting answers that you have not derived yourself is prohibited in all submitted work.

- *Attendance and make*-up policy: Attendance will be taken in lecture, but it is not part of your grade, however, it might provide some bonus points as mentioned earlier. That being said: (1) you are responsible for all of the material covered in class, and (2) I will work to make the lectures as useful and relevant as I can and to provide some supplementary notes that will be available whether you make it to lecture or not. If you miss a lecture, check Blackboard for materials and/or arrange to obtain notes from a fellow student. Unexcused laboratory, assignment and exam absences will result in a grade of 0 for all grades based on the exams and experiments that were missed. Late assignments and late lab write ups because of **unexcused reasons or absences**[1] receive a grade of zero and cannot be made up.

CELL PHONES AND ELECTRONIC DEVICES

Lectures: With the exception of approved graphing calculators and wrist watches, no other electronics (for example cell phones and computers) are allowed during lecture, unless the user has requested and received permission from the instructor to use a specific device. The first violation of this policy will be met with a warning. If there are subsequent violations, the student Apr be asked to move the back rows of the classroom or to leave, and the lecture will pause until this has been accomplished.

Exams: On exams the visible presence of a cell phone, earbuds or other electronic device (excepting approved calculators and watches) during the exam is not permitted and will be penalized. Exceptions will be granted to individuals who have requested and received permission to use a specific device from the instructor.

ACADEMIC DISHONESTY

All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives Apr initiate disciplinary proceedings against a student accused of any form of academic dishonesty including but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials. Specific policy for chem. 2401: First violations will automatically result in a grade of 0 for the work in question. Second violations will result in failure of the course.

STUDENT ABSENCES ON RELIGIOUS HOLY DAYS POLICY

Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. Section 51.911 (a) (2) defines a religious holy day as: "a holy day observed by a religion whose places of worship are exempt from property taxation under Section 11.20…." A student whose absence is excused under this subsection Apr not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence.

University policy 861001 provides the procedures to be followed by the student and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s). The instructor

[1] An excused absence is one that you get BEFORE you miss class, unless you are really ill or in an extreme emergency situation, in which case you should notify the class professor as soon as you can, or get a friend or family member to do so. You should be able to provide official written documentation in support of excused absences, and may be requested to do so. For absences due to athletic, religious or other reasons, notify me in **advance** via email, and be ready to provide written verification from your professor, coach, etc…. **Any other absence is an unexcused absence.** When you have an excused absence, the missed work must be made up at a different time. It is your responsibility to reschedule and complete coursework missed due to an excused absence.

will complete a form notifying the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed.

STUDENTS WITH DISABILITIES POLICY:
It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should register with the Office of Services for Students with Disabilities located in the Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786, and e-mail disability@shsu.edu). They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that Apr affect adversely your work in this class, then I encourage you to register with the SHSU Services for Students with Disabilities and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Services for Students with Disabilities.

VISITORS IN THE CLASSROOM
Only registered students Apr attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance. Students wishing to audit a class must apply to do so through the Registrar's Office.

SHSU POLICY STATEMENTS
The **Sam Houston State University Policies** on (1) Academic Dishonesty, (2) **Student Absences on Religious Holy Days, (3) Students with Disabilities, and (4) Classroom Visitors** are each designed to strengthen community and learning and are fully applicable in this course. You are encouraged to review a summary of these important policies online at http://www.shsu.edu/syllabus/

Additional context and details on all of these policies are available on the following web page:
http://www.shsu.edu/dept/academic-affairs/aps/aps-students.html

TENTATIVE COURSE OUTLINE AND ACTIVITIES:

- Chapter numbers are taken from Harris' "Exploring Chemical Analysis" textbook, 5th edition.
- Instructor may alter the schedule as the course proceeds.

CHAPTER 4 **CHAPTER 7**	Statistics Gravimetric and Combustion Analysis **TEST 1 – Friday, September 22**
CHAPTER 8 **CHAPTER 9** **CHAPTER 10**	Introducing Acids and Bases Buffers Acid-Base Titrations **TEST 2 – Friday, October 20**
CHAPTER 18 **CHAPTER 19** **CHAPTER 20**	Let There Be Light Spectrophotometry: Instruments and Applications Atomic Spectroscopy **TEST 3 – Monday, November 27**
CHAPTER 21	Principles of Chromatography and Mass Spectrometry
FINAL	**Monday, December 04, 10:30 am – 12:30 pm**

For information on drop/register dates, and other important dates, please visit the Academic Calendar page on the SHSU website.