

**Chemistry 2810**  
**Quantitative Analysis**  
**Fall 2019**

**Instructor:** Dr. Stephanie A. Myers

**Office:** SCI C3008

**Phone:** 706-667-4514

**Email:** [stephanie.myers@augusta.edu](mailto:stephanie.myers@augusta.edu)

**Course website:** <http://spots.augusta.edu/smyers1/Chemistry2810/Chemistry2810.htm>

**Objectives:**

- Students will develop time management and efficiency skills in lab.
- Students will clearly and properly label and record observations and measurements in lab notebooks.
- Students will become proficient at solution preparation and use of volumetric glassware.
- Students will become proficient at applying stoichiometric calculations, particularly to solution preparation, volumetric and gravimetric analyses.
- Students will use Gaussian statistics to analyze the results of multiple trials.
- Students will learn to be self-critical of their lab results and use their data analysis to determine if they should repeat or modify an experiment.
- Students will use spreadsheets to analyze calibration curves and titration curves.
- Students will be introduced to the theory and practice of basic instrumentation, specifically absorbance spectrophotometry, gas chromatography and potentiometry; including use of calibration curves.
- Students will become proficient at analyzing common aqueous equilibria.

**Prerequisites:** CHEM 1212 (C or better)

**Required Materials:** *Quantitative Chemical Analysis, 9<sup>th</sup> edition* by Daniel C. Harris.; a scientific calculator (recommended TI-30X IIs, or TI-36X Pro); a lab notebook with pre-numbered duplicate pages; a pair of safety glasses or goggles; a lab coat; a permanent (Sharpie) marker. All lab instructions and handouts can be found on the course website. This textbook will also be used for CHEM 4840.

**Grading:** Your grade for the class will include a combination of class and lab work. There are usually 1000-1200 available points for the class; about half of the total points are from exams and about half are from lab. Your grade will be based on a percentage of the points earned out of the total points possible, where A= 90% or more; >80% is a "B"; >70% is a "C"; >60% is a "D" and less than 60% is an "F." Cheating will not be tolerated. This includes collaborating on graded homework, quizzes or on exams. You may discuss homework and labwork, but all graded work should represent your own individual effort. Copying someone else's answers IS cheating and will receive a zero at best. See the catalog or the student handbook for more specific details on academic honesty. The official policy is at: <https://www.augusta.edu/compliance/policyinfo/policy/academic-honesty.pdf>

Students who violate the academic honesty policies of the university or those set forth in this syllabus may face consequences ranging from a zero on the assignment to a failing grade for the course. Cheating on any of the exams will result in a failing course grade. Points will be available in the following ways:

**Exams:** There will be 3 in-class exams worth 100 points each. The final exam is worth 150 points.

**Prelabs:** The top portion of your worksheet will contain questions pertaining to a lab. These prelab questions *must* be answered and turned in to me before you may begin each lab. These will be worth 10 points and will be graded and turned back to you immediately for feedback. The bottom half will have a 3" x 5" section for reporting your final results of the prelab. NOT ALL LABS HAVE PRELABS.

**Notebook grading:** For each day you are in lab, you are expected to turn in the duplicate pages of your lab notebook, documenting your progress for the day *before you leave lab*. Each page must be labeled with your name, the experiment the data refers to and contain the date (or dates) when information was recorded. If this information is not provided, the page will not count. Do not put two different experiments on the same page. Do not staple the pages together. All pages referring to a particular experiment must be turned in before the final results are turned in. These pages contain your experimental data. For each experiment, several students will be selected at random for grading. Sometimes all reports will be spot checked for a particular item (5 pts) If the report is graded in its entirety, the grade (worth 20 points) will be based on the ability of the instructor to obtain your final results from the data recorded in your notebook pages. This will require a particular emphasis on labeling of data and recording of data (with significant figures, units, etc.). If your notebook is selected for grading and pages for that experiment have not been turned in (although results have), the notebook will be graded as if those pages do not exist. If you have also shown work on the notebook pages, that could help me to find any mistakes and give you feedback, lessening the impact on your grade of any differences between my answer and your own. Each student will have their notebook graded at least three times over the course of the semester.

**Results:** Results must be turned in on a 3X5 index card which includes your name, unknown number (or other sample identifier), the result in the requested units with absolute error. If these features are not included, the results will be returned and late penalties will apply. Results will be graded on (1) accuracy (percent error from actual/expected value) and (2) precision in the form of significant figures and absolute error. Points will be subtracted for incorrect or incomplete information. The degree of accuracy and precision required for full credit will depend on the experiment. You will not be told these requirements, nor the correct value, only that your result is higher or lower than the true value. Labs will be worth at least 30 points, with multiple results increasing the value of the lab. The minimum score (before penalties for precision or lateness) will be half the value of the experiment.

**Reports:** There will be an introduction to spectroscopy, and your final experiment which will require formal reports. See the specific requirements on the course website for each paper.

**Other assignments:** If I get creative and invent any other assignments, they will be given a point value when assigned.

### **General Policies:**

**Attendance:** You are expected to attend lecture and lab sessions regularly. If you miss a lecture session, it is your responsibility to find out what material was covered and what announcements were made. If you are absent from **six lectures or labs**, you will be dropped from the course. This instructor will only withdraw a student after midterm (10/7) with the accompanying WF grade, regardless of when your absences occurred. Midterm is the last day that a student may withdraw from a course with a grade of W.

**Exam Make-ups:** If you are aware of an upcoming absence (e.g., athletics) you must schedule to take the exam early. If you have an unplanned absence, you must contact me within 1 hour after the end of the exam, and you may make it up provided you can do so before the exam is returned to students. You must provide authoritative documentation before taking a makeup exam. The grade will remain officially a zero until I receive the agreed upon, written documentation of your excuse. Makeup exams may be more difficult than the original exam.

**Late Penalties:** There will be a 5 point late penalty on the total assignment for each business day (*or any part thereof*) past the deadline. Computer problems are not considered a legitimate excuse for late assignments. Early assignments are gratefully accepted (and you may even get some helpful hints).

**Test Procedure:** Only a pencil (not a pen!) with eraser and an appropriate calculator may be with you at your desk during a test (including the final exam). You bring a drink, but by doing so you have given permission for me to inspect it. Other materials (bookbags, phones, etc.) must be left at the front of the classroom, this includes smart watches or watches that even appear moderately intelligent. Any other items found at your desk will be considered an attempt to cheat and you will receive a zero on that exam.

**Help:** The lab manual used might be ambiguous or inappropriate to your specific situation. The purpose of this lab course is to give you an opportunity to learn to consider how things apply to your specific situation rather than blindly following directions. This does not mean that you can't ask for help or further explanation. I want you to think through an experiment *before you attempt it and before the last minute*. Consequently, there are a few limitations. *No questions about an assignment (including exams!) will be answered on the day that assignment is due and only reluctantly afterwards; any question is cheerfully (although perhaps not directly) answered/discussed before this time.* Vivat Socrates!

### **Quant Lab Policies**

Students are expected to have good laboratory practices at all times. These are detailed in Chapter 2 of the text. Also, see department safety rules on the course website, including closed-toe shoes with backs, clothes covering from your *shoulders to your feet*, lab coats, and safety glasses/goggles. Students consistently having unsafe practices will be asked to leave the lab and may be withdrawn from the course.

You are expected to attend all lab sessions until you have completed all assignments. If you finish your experiments before the end of the term...and notify the instructor...you will not be counted as absent from further lab periods. There are no makeup lab times available (unless something weird prevents the use of a normal lab time). Under extreme circumstances, you may receive an extension on a due date provided (1) you notify the instructor of the problem within 24 hours of missing a lab and (2) you provide authoritative documentation (I decide who is an authority) of your excuse as soon as possible. An extension would be agreed upon at the time of notification as well as what documentation would be most appropriate for the absence and when that would be due. All late penalties will apply unless and until documentation is received.

*No students will be allowed to work in the lab outside of the scheduled times.* Attempting to do so will result in immediate withdrawal from the course. Any student who is late leaving lab will have 1 point deducted from their lab score *per minute late*.

Only a calculator and laboratory notebooks are allowed for use inside the lab. Scrap paper, textbooks, etc. will be confiscated for the lab period. Come to lab prepared. Record all measurements/observations directly into your lab notebook.

Students are responsible for returning all materials in the same condition as they were received (or better). Students who break expensive items or many things through carelessness may be charged to replace them. If a student does not check out before the end of the term a hold will be placed on their registration until they check out and return drawer keys.

Students must label ***all*** their chemicals with content (including concentration), NFPA code, date, and student name. Solutions should not be stored in volumetric flasks between lab periods. Any inappropriately stored material may be dumped at any time (including unlabeled or mislabeled items). Lab drawers will be randomly inspected. Do not put labeling tape on items in the oven. You may label glassware with a permanent marker, and remove the writing with acetone. This is the **ONLY** use for acetone in this lab.

Drying Ovens may only be opened during the following times: 2:30-2:45, 3:45-4, 5-5:15.

**This syllabus is subject to change, with appropriate notice to students. The most recent (official) version of the syllabus will be the one on the course website.**