GEORGE MASON UNIVERSITY
Quantitative Chemical Analysis Laboratory
CHEM 321 LAB

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Text : *Exploring Chemical Analysis (Fifth Edition) by Daniel C. Harris, W. H. Freeman, 2013. Quantitative Chemical Analysis (Eighth Edition) by Daniel C. Harris, W. H. Freeman.*
Lab Supplement (LS)*: Quantitative Chemical Analysis Lab Supplement (posted), and* other web materials at *www.whfreeman.com/exploringchem5e* such as pdf Lab Experiment to accompany the text (**LE-Harris**).

LABORATORY SCHEDULE (TENTATIVE)

Date	Experiment	Comments
Week 1	Introduction and Check in Introduction to data analysis	
Week 2	Calibration of glassware: buret, pipet, measuring cylinder, and volumetric flask	Use smaller volumes to practice precision
Week 3	Gravimetric Analysis of Iron in Iron Ore	
Week 4	Gravimetric Analysis and data collection and analysis	
Week 5	Determination of Chloride	
Week 6	Preparation of standard base and purity of Potassium hydrogen phthalate (KHP)	
Week 7	Auto-pH titration: TRIS with HCl. Gran plot for V_e and K_b of TRIS Which indicator is best?	Use Vernier system
Week 8	Determination of carbonate and bicarbonate in a mixture by titration	
Week 9	Determination of the same mixture by pH titration	
Week 10	EDTA Titration: Zn in Mouthwash	
Week 11	Redox Titration: Determination of Hydrogen Peroxide	
Week 12	VIS spectroscopy of dyes in beverage	Use Vernier diode array to get the spectra max wavelength
Week 13	pKa of acid-base indicator *	Use Vernier to get the spectra max wavelength
Week 14	Lab final exam and cleanup	

Late lab reports: ***Lab reports turned in the following day will automatically lose 5%. Lab report late penalty is 5% per day (weekdays and weekends). Late lab reports when graded lab reports are turned in will not be accepted. A score of ZERO will be recorded for the experiment.***

- **THERE ARE NO MAKE-UP LABS IN CHEMISTRY 321**. In the event of an unavoidable absence, the instructor must be notified as soon as possible to obtain approval for attending another lab section. If no prior notice of the absence is given to the instructor, then a grade of zero will be given for the missed lab. ***ALL STUDENTS MUST COMPLETE THE LAB SAFETY ORIENTATION ON DAY#1 IN ORDER TO REMAIN ENROLLED IN THE LABORATORY COURSE.*** A student cannot receive a passing grade in this course unless at least ***ten*** of the eleven lab experiment sessions are attended ***and satisfactory reports for them handed in on time***. Attending a lab session and not performing the experiment does not constitute completing an experiment. Dry-labbing (analyzing data that you did not collect) is an honor code violation and will be dealt with accordingly. Letter grades are not assigned in the laboratory; the percentage of points earned for the lab will be incorporated into the overall grade calculated for the course by your lecture instructor.

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Breakdown of point distribution / CHEM 321 / FALL 2015

Item	#points each
Lab Reports	50
Quizzes	10
Final Exam	100

Grading

Lab grades are 40% of course grades.

- **STUDENT RESPONSIBILITIES**
- **Participation in Laboratories is Critical:** Hands-on laboratory experience is critical to learning techniques, a key component to your success in future laboratory courses, in basic science courses. The laboratory introduces students to important concepts in chemistry in a very concrete way, reinforces concepts from the lecture, and teaching scientific thinking. ***Laboratory work in this course is not optional; do your own work.*** You cannot learn by simply watching your lab partner and operating in a spectator role. Every student is expected to be actively engaged in each laboratory exercise and to do the assigned laboratory work.
- *Your work should be your own. Learning through interaction with your colleagues is encouraged, however, your report work and responses to questions posed for discussions/reflection, etc. must be uniquely yours. Since the integrity of scientific data is of utmost importance, all data and observations must be recorded directly into the lab notebook in blue or black ballpoint pen immediately. Data is not to be recorded on loose sheets of paper and/or in the lab manual, then transferred to the lab notebook. Failure to adhere to the above will result in initiating an academic integrity violation report, which can lead to failure in the course.*

- ****Because some laboratory activities in this course will be performed in pairs or groups, there may be some questions about what you can claim as your own work rather than as "group work". Whenever you collect data as a group, all group members should have identical raw data entered into datasheet and submit it before leaving the lab. Be sure to indicate lab partner/group member names on the pages of your lab notebook and datasheet when appropriate.*
    - *For example, lab partners will have identical data for an experiment. The data may be discussed but each student is responsible for processing his/her own data, generating his/her own charts and figures,* ***properly formatting the charts and figures independent of further interactions or communications with the lab partner/group members. Supplying lab partners with access to your EXCEL data tables, figures and answers to discussion questions is an honor code violation. Using lab reports from a previous term is an honor code violation. Resources are made available to all students so that each student should be able to complete the lab report independent of the lab partner for the exercise****.*
    - *Sample calculations are to be completed independent of lab partners.*
    - *Discussion questions, summary and conclusions are to be written independent of lab partners or group members.*
- *However, ANYTHING you hand in for grading purposes with your name alone on it should be YOUR work…..even if the information has been previously discussed with your lab partner or as a group. NEVER COPY ANYTHING from someone else which you claim as your own. It is much better to not hand in an assignment than to copy another's assignment…because this is a violation of the Honor Code…not only by the person(s) who copied, but also by the person who allowed the copying. This applies to work (laboratory assignments) that you completed in a previous semester and attempt to turn in at a later date if/when repeating the laboratory course. If you ever have questions about what is and is not appropriate, be sure to ask for clarification from the lab instructor.*

If you are a student with a disability and you need academic accommodations, please see the instructor after contacting the Disability Resource Center (DRC) at 703-993-2474. All arrangements for academic accommodations must be initiated through that office.

SAFETY

1. **Safety Rules & Regulations:** All students enrolled in the chemistry laboratory classes are expected to strictly follow the safety rules and regulations. Students will receive a warning for the first time offense. Students that continue to ignore the safety rules and regulations will receive a ***40 points deduction*** for the lab exercise being performed (second offense and beyond). ***A student that continues to violate the safety rules and regulations will be permanently removed from the laboratory portion of the course, which will automatically result in a grade of "F" for the course (lecture & lab).***

GRADING POLICIES

1. **Maintain Your Records:** It is your responsibility to maintain records of all graded materials. Lab instructors will regularly post scores on Blackboard, giving you an opportunity to double-check the scores in case of recording errors. Recording errors

are to be cleared up with the lab instructor ***prior to the last day of lab***. Requests for re-grades and total points adjustment (due to addition errors, etc.) will not be entertained after the lab class officially ends (the date of the lab final exam). ***All grading error issues must be discussed with the lab instructor within one week after receiving the graded material.***

2. **Grading Rubric:** A grading rubric for the formal and informal lab reports will be posted on each lab instructor's Blackboard site. If you have questions or concerns about grades on quizzes or lab reports you should meet with your lab instructor during office hours to discuss the matter.

HONOR CODE

1. **GMU HONOR CODE:** All students enrolled in the course are expected to abide by the honor code. The instructor reserves the right to award a grade of zero for any plagiarized work. This includes any work that is not your own, *i.e.,* it has been copied from the internet or another classmate or used during the previous time that you took the course. Work that has been copied cannot be submitted for credit. In other words, copying another person's lab report will result in the lab instructor filing an honor code violation with the Office of Academic Integrity. It is your responsibility to be familiar with the GMU Honor Code and have a working knowledge of activities that are considered honor code violations: http://oai.gmu.edu/honor-code/ ***Cheating, along with some examples of forms of cheating, can be found at http://oai.gmu.edu/the-mason-honor-code-2/cheating/ .*** *If you are complicit with cheating activity, inclusive of "giving help or information/work to a friend/classmate", then you will also be included in the honor code violation that is filed with the Office of Academic Integrity. (Refer to STUDENT RESPONSIBILITIES section above.)*
    - First time offenders will receive a grade of ZERO for the lab exercise (quiz and lab report).
    - Second time/repeat offenders will receive a grade of "F" for the lab portion of the course, thereby resulting in a grade of "F" for the entire course (lecture and lab are linked courses).
    - *The above listed sanctions also apply to transfer students that completed the lecture portion of the course at another university and are registered for the lab only portion of the course at George Mason University.*
    - If a student has previously been reprimanded for honor code violations in other courses at the university, the recommendation will be for a grade of "F" for course as well as expulsion from the university.

LEARNING GOALS/EXPECTATIONS

- **Learning goals and expectations:** Learning goals for students enrolled in this course include chemistry body of knowledge, comprehension, critical and analytical thinking, communication, and presentation. Since the topics covered in the laboratory course vary each week, students will be exposed to the subject/topic areas and assessed at an intermediate/advanced level.

    a) Learn about general safety and operations in the laboratory
    b) Aware of personal protective equipment (PPE) and always properly attired
    c) Learn how to write a pre-lab (organization skills)
    d) Interpretation of data and results

e) Quizzes at the beginning of the lab period each week to assess familiarity with reading assignment associated with the experiment
f) Pre-lab talks given to provide further clarity and present any modifications in the procedure
g) CUMULATIVE LABORATORY FINAL EXAM; mastery of concepts, calculations; application of topics to solve problems (theoretical and algorithmic)
h) Review of honor code and types of activity that will be reported to the Office of Academic Integrity.