

Course Change Request

New Course Proposal

Date Submitted: 04/27/20 7:38 pm

Viewing: **CHEM 323 : Quantitative Chemical Analysis Laboratory**

Last edit: 04/27/20 7:38 pm

Changes proposed by: msikowit

Are you completing this form on someone else's behalf?

No

Effective Term: Fall 2020

Subject Code: CHEM - Chemistry

Course Number: 323

Bundled Courses:

Is this course replacing another course? No

Equivalent Courses:

Catalog Title: Quantitative Chemical Analysis Laboratory

Banner Title: Quant Chem Analysis Lab

Will section titles vary by semester? No

Credits: 1

Schedule Type: Laboratory

Hours of Lab or Studio per week: 6

In Workflow

1. CHEM Chair
2. SC Curriculum Committee
3. SC Associate Dean
4. Assoc Provost- Undergraduate
5. Registrar-Courses
6. Banner

Approval Path

1. 04/27/20 7:47 pm
Gerald Weatherspoon (grobert1):
Approved for CHEM Chair

Repeatable: May be only taken once for credit, limited to 3 attempts (N3) **Max Allowable Credits:**
3

Default Grade Mode: Undergraduate Regular

Recommended Prerequisite(s):

Recommended Corequisite(s):

Required Prerequisite(s) / Corequisite(s) (Updates only):
CHEM 322

Registrar's Office Use Only - Required Prerequisite(s)/Corequisite(s):

| And/Or | (| Course/Test Code | Min Grade/Score | Academic Level |) | Concurrency? |
|--------|---|------------------|-----------------|----------------|---|--------------|
| | | | | | | |

Registration Restrictions (Updates only):

Registrar's Office Use Only - Registration Restrictions:

Field(s) of Study:

Class(es):

Level(s):

Degree(s):

School(s):

Catalog Description:

Laboratory component of CHEM 321.

Justification:

CHEM 321-Quantitative Chemical Analysis (4 credit lecture+lab) is being decoupled into CHEM 322-- 3 credit lecture (Summer 2020) and CHEM 323-- 1 credit lab (effective Fall 2020). Students that take CHEM 322 online in the summer will be able to take CHEM 323 during the academic year in person.

Does this course cover material which crosses into another department? No

Learning Outcomes:

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 lecture.
- 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)

Attach Syllabus

[Chem 321_Lab_Fall 2020.pdf](#)

Additional Attachments

Staffing:

Hussam, Roy, Fayissa

Relationship to Existing Programs:

Class taken only by Chemistry undergraduate majors and minors

Relationship to Existing Courses:

Lab component of CHEM 321.

Additional Comments:

Reviewer Comments

GEORGE MASON UNIVERSITY
Quantitative Chemical Analysis
Laboratory CHEM 323 LAB Fall 2020
Planetary Hall Room 408

Goals and requirements of the course

Modern science and technology cannot sustain without quantitative chemical analysis. Precise and accurate measurement of chemical species and chemical analysis of material composition are required by all branches of science. This course is designed to introduce the process and method of chemical analysis - in practice. Since many of you are going to work as a professional chemist, biologist, doctor, environmental scientist, etc., it is to your advantage to learn one of the most vital tools of the trade i.e., quantitative chemical analysis. Students must have passed and learned general chemistry (CHEM 211 and CHEM 212) and calculus (MATH 113 and MATH 114) to take this course. The lecture aspect of the course, which introduced the students to the theory associated with each experiment, has been completed in CHEM 322 during the summer of 2020. Students are expected to know and use word processing and spreadsheet programs to write laboratory reports, process laboratory data.

Text: Exploring Chemical Analysis (Fifth Edition) by Daniel C. Harris, Macmillan, 2013.

Lab Supplement (LS): Quantitative Chemical Analysis Lab Supplement (posted), GMU, and pdf Lab Experiment to accompany the text (LE-Harris).

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.

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.)

- 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 lecture.
- 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.

List of experiments and schedule

| Week of (tentative) | Experiment | Reference | Text Chapter, Pages |
|--------------------------------------|---|--------------------------|----------------------------|
| Aug 26 | Introduction and check in. Introduction to data analysis | Text | 3,4,5, 32-48 |
| Sept 2 | Calibration of glassware: buret, pipet, and measuring cylinder | Text | |
| Sept 9 | Gravimetric analysis of iron in iron ore*. Data collection and analysis | LE-Harris Text LS | Pg 10 7, 131-143 |
| Sept 16 | | | |
| Sept 23 | Precipitation titration. Determination of chloride | LS Text | Lecture Chapter 6, 123 |
| Sept 30 | Preparation of standard base and purity of potassium hydrogen phthalate (KHP) | LE-Harris Text LS | Pg 26 215, 192-206 |
| Oct 7 | Evaluation of acid-base indicators. Manual and auto pH titration of TRIS with HCl. Gran plot from pH titration | | |
| | Determination of carbonate and bicarbonate in a mixture by titration*. | LE-Harris Text LS | Pg 26-32 Chapter 10 |
| Oct 14 | Determination of the same mixture by pH titration * | LE-Harris Handout, LS | Pg 32-34 |
| Oct 21 & Oct 28 | EDTA Titration: Zn in Mouthwash | LS | 13, 265-275 |
| Nov 4 & Nov 11 | Redox titration: Determination of hydrogen peroxide * | LE-Harris LS | Pg 44-Ch 16 Lecture |
| Nov 18 & Nov 25 | Visible spectroscopy of dyes in beverage. | LS Text | Lecture Pg 384-386, 397 |
| November 25 – 29 Thanksgiving Recess | | | |
| Dec 2 | Lab Final Exam, Cleanup and Checkout** | | |

LABORATORY REPORT

Prelab write-up: Students must write a prelab in the assigned lab notebook as follows In order to save time and show your readiness this is essential. The student is not permitted to begin the experiment unless the prelab (in proper lab notebook with carbon copies) is written as follows:

- I. Name, Date, and Unknown: Write your name (and your partner's name if the experiment was carried out jointly), date. Leave a space for unknown number.
- II. Title: The title of the experiment.
- III. Introduction: In a paragraph or two, describe the purpose and principle of the experiment. The principle involves reactions and equations related to the experiment or the means by which you reach your stated objective.
- IV. Apparatus and Chemicals: List all that are going to be used.

- V. Procedure: Write in your own words, brief step-by-step procedure (1, 2, 3 etc.) as if you can perform the experiment even without the lab manual. Also show calculations for the preparation of reagents and chemicals.

Start with a new page in your lab notebook for the rest of the lab write-up. The final lab report must include all carbon copy of your lab notebook.

Late lab reports: Lab report late penalty is 5% per day (weekdays and weekends). Late lab reports after graded lab reports have been returned 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-lab (analyzing data that you did not collect) is an honor code violation and will be dealt with accordingly.

GRADING POLICIES:

Lab grades are distributed in the following manner:

Lab notebook – 5%

Lab quizzes – 10%

Lab performance – 5 %

Lab report – 60%

Lab final – 20%

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

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. 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).

HONOR CODE

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/> .

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.

EMERGENCY

In the event of a bomb scare or other emergency (such as power cuts, tornado drills), class will not necessarily be cancelled. Instead, all members of the class should assemble outside the front entrance to the building in the designated location until such time that the class has been officially dismissed. Otherwise, the student will receive a zero for missed work.

DISABILITY

If you are a student with a disability and you need academic accommodations, please see me and contact Disability Services at 703-993-2474, <http://ods.gmu.edu>. All academic accommodations must be arranged through ODS.

TITLE IX

Notice of mandatory reporting of sexual assault, interpersonal violence, and stalking: As a faculty member, I am designated as a “Responsible Employee,” and must report all disclosures of sexual assault, interpersonal violence, and stalking to Mason’s Title IX Coordinator per University Policy 1202. If you wish to speak with someone confidentially, please contact one of Mason’s confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-380-1434 or Counseling and Psychological Services (CAPS) at 703-993-2380. You may also seek assistance from Mason’s Title IX Coordinator by calling 703-993-8730, or emailing titleix@gmu.edu.