



Course Approval Form

For instructions see:
<http://registrar.gmu.edu/facultystaff/catalog-revisions/course/>

Action Requested:

☒ Create new course ☐ Inactivate existing course
☐ Modify existing course (check all that apply)
☐ Title ☐ Credits ☐ Repeat Status ☐ Grade Type
☐ Prereq/coreq ☐ Schedule Type ☐ Restrictions
☐ Other:

Course Level:

☒ Undergraduate
☐ Graduate

College/School: COS Department: CHEMISTRY & BIOCHEMISTRY
Submitted by: G.L.R. WEATHERSPOON Ext: 3-1456 Email: grobert1@gmu.edu

Subject Code:

CHEM Number: 214

Effective Term:

☒ Fall
☐ Spring
☐ Summer
Year 2016

Title: Current General Chemistry Laboratory-II
Banner (30 characters max w/ spaces) Gen Chem Lab- II
New

Credits: (check one) ☒ Fixed 1 or ☐ Variable to

Repeat Status: (check one) ☐ Not Repeatable (NR)
☐ Repeatable within degree (RD)
☐ Repeatable within term (RT)

Maximum credits allowed: 1

Grade Mode: (check one) ☒ Regular (A, B, C, etc.)
☐ Satisfactory/No Credit
☐ Special (A, B C, etc. +IP)

Schedule Type: (check one) ☐ Lecture (LEC)
☒ Lab (LAB)
☐ Recitation (RCT)
☐ Internship (INT)

☐ Independent Study (IND)
☐ Seminar (SEM)
☐ Studio (STU)

Prerequisite(s):

CHEM 211, CHEM 213, CHEM 212

Corequisite(s):

CHEM 212

Instructional Mode:

☒ 100% face-to-face
☐ Hybrid: ≤ 50% electronically delivered
☐ 100% electronically delivered

Restrictions Enforced by System: Major, College, Degree, Program, etc. (include code)

"C" grade or higher in CHEM 211 and CHEM 213 OR transfer equivalencies for CHEM 211 and CHEM 213.
Concurrent enrollment in CHEM 212 or prior grade of "C" or higher in CHEM 212 or transfer equivalency.

Equivalencies: (check only as applicable)

☒ YES, course is 100% equivalent to: CHEM 204

☐ YES, course is being renumbered to/will replace the following:

Catalog Copy for NEW Courses Only (Consult University Catalog for models)

Description (No more than 60 words, use verb phrases and present tense)	Notes (List additional information for the course)
CHEM 211 and CHEM 213 are prerequisite to CHEM 214. General Chemistry laboratory course for students majoring in science, engineering, or mathematics. Laboratory experience will demonstrate general chemistry principles and applications. Students majoring in science, engineering, or mathematics should choose this course sequence.	<ul style="list-style-type: none">- Repeat Status = N2; limits the maximum number of attempts that a student can take the course to 2 attempts without departmental approval.- CHEM 212 (3 credit lecture) + CHEM 214 (1 credit lab) are equivalent to CHEM 212 (4 credit linked lecture & lab course) prior to Fall 2016.- Fulfills Mason Core requirement in natural science (lab).-Notes: Credit will not be given for this course and CHEM 103, CHEM 104.-CHEM 214 is equivalent to CHEM 204 prior to Fall 2016.
Indicate number of contact hours: When Offered: (check all that apply) <input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Summer <input checked="" type="checkbox"/> Spring	Hours of Lecture or Seminar per week: 0 Hours of Lab or Studio: 3

Approval Signatures

Department Approval _____ Date _____ College/School Approval _____ Date _____
If this course includes subject matter currently dealt with by any other units, the originating department must circulate this proposal for review by those units and obtain the necessary signatures prior to submission. Failure to do so will delay action on this proposal.

Unit Name	Unit Approval Name	Unit Approver's Signature	Date

For Graduate Courses Only

Graduate Council Member

Provost Office

Graduate Council Approval Date

For Registrar Office's Use Only: Banner _____ Catalog _____

revised 6/22/15

Course Proposal Submitted to the College of Science Curriculum Committee (COSCC)

The form above is processed by the Office of the University Registrar. This second page is for the COSCC's reference.
Please complete the applicable portions of this page to clearly communicate what the form above is requesting.

FOR ALL COURSES (required)

Course Number and Title: CHEM 214 General Chemistry Laboratory-II

Date of Departmental Approval: 10/12/2015

FOR INACTIVATED/REINSTATED COURSES (required if inactivating/reinstating a course)

- Reason for Inactivating/Reinstating:

FOR MODIFIED COURSES (required if modifying a course)

- Summary of the Modification:
- Text before Modification (title, repeat status, catalog description, etc.):
- Text after Modification (title, repeat status, catalog description, etc.):
- Reason for the Modification:

FOR NEW COURSES (required if creating a new course)

- Reason for the New Course:
 1. The current lecture and laboratory linked CHEM 212 course is being decoupled so that traditional GMU students can repeat only the portion of the course desired to improve their grade, without having to seek or apply for lab waivers. CHEM 214 will serve as the concurrent/co-req laboratory component of the modified CHEM 212 lecture.
 2. We have lab waivers but not lecture waivers, which means that our students are required to repeat lecture and lab if they fail the course. Decoupling the linked courses will allow OUR STUDENTS to repeat the failed component only, i.e. repeat lab only if they pass the lecture portion of the course---the same as is currently done with organic, physical, instrumental analysis, inorganic and biochemistry courses. The mechanism that we currently have in place for transfer students (and summer sessions) allows visiting students to enroll in lecture or lab only, which gives them an unfair advantage over traditional GMU matriculating students.
 3. Decoupling the lecture and lab components of the course will eliminate the need for lab waivers each semester.
 4. Enrollment snapshots will accurately reflect the numbers as they stand, independently of each other, in the lecture and lab courses. This will eliminate the mismatch that students often encounter when lab waivers have been filed and there are open seats in lab, yet the lecture shows as CLOSED.
- Relationship to Existing Programs:

- Relationship to Existing Courses: CHEM 202 (3 credits), which is the lecture only portion of second semester General Chemistry, is being inactivated. CHEM 204 (1 credit hour), which is the laboratory only portion of second semester General Chemistry, is being inactivated. The two decoupled courses will be CHEM 212 (3 credits) and CHEM 214 (1 credit). CHEM 212 lecture + CHEM 214 lab will be equivalent to the CHEM 212 (4 credits) course as it existed prior to Fall 2016.
- Semester of Initial Offering: Fall 2016
- Proposed Instructors: Tenured faculty, tenure track faculty, adjuncts, graduate lecturers and graduate teaching assistants in the department
- Insert Tentative Syllabus Below---A copy of the Fall 2015 lab syllabus for CHEM 212 is attached.

George Mason University – CHEMISTRY 212
Laboratory Syllabus Fall 2015---VERSION3

Laboratory Manual: Suzanne Slayden, *Chemistry 211/212/251 Laboratory Manual; Fall 2015*, GMU Bookstore, Johnson Center.

Information regarding computer spreadsheet results can be accessed by using the following website.
<http://chem.gmu.edu/results> Following the guidelines stated when processing and presenting data (tables, graphs, page layouts, etc.).

Day	Laboratory Experiment	Pages
Mon., Aug. 31 st to Fri., Sept. 4 th	Expt. 0. Check-in, Enrollment Verification, Course Policies Lab Safety, Excel Tutorial and Discussion; Initial Login to Database	
Monday, Sept. 7 th	Labor Day --- Monday Labs Do Not Meet	
Tues., Sept. 8 th to Mon., Sept. 14 th	Expt 1. Synthesis of a Coordination Compound of Fe(III); KTOF3 (formal lab report required); QUIZ #1	143
Tues., Sept. 15 th to Mon., Sept. 21 st	Expt 2. Determination of Water of Hydration in KTOF3 ; QUIZ #2	153
Tues., Sept. 22 nd to Mon., Sept. 28 th	Expt 3. KTOF3 Redox Titration of Oxalate in KTOF3; QUIZ #3	159
Tues., Sept. 29 th to Mon., Oct. 5 th	Expt 4. Molecular Mass by Freezing Point Depression (formal lab report required); QUIZ #4	167
Tues., Oct. 6 th to Tues., Oct. 13 th	Expt 5. Chemical Kinetics: Crystal Violet; QUIZ #5	173
Oct. 12 th Oct. 13	Columbus Day --- Monday Labs Meet on Tuesday, Oct. 13th (Tuesday labs do not meet this week; experiment performed 10/6/2015).	
Wed., Oct. 14 th to Tues., Oct. 20 th	Expt 6. Measurement of Equilibrium Constant (formal lab report required); QUIZ #6	181
Wed., Oct. 21 st to Tues., Oct. 27 th	Expt 7. Acidity Constant by pH Titration Curves; QUIZ #7	193
Wed., Oct. 28 th to Tues., Nov. 3 rd	Expt 8. Dissociation Constants of Acids and Bases (formal lab report required) ; QUIZ #8	217
Wed., Oct. 4 th to Tues., Nov. 10 th	Expt 9. Molar Solubility and the Common-Ion Effect ; QUIZ #9	201
Wed., Nov. 11 th to Tues., Nov. 17 th	Expt 10. Thermodynamics of the Dissolution of Borax ; QUIZ #10 (formal lab report required)	209
Wed., Nov. 18 th to Tues., Nov. 24 th	Expt 11. Electrochemical Measurements	227
	Thanksgiving Holiday – Nov. 25 - 29	
Mon., Nov. 30 th to Fri., Dec. 4 th	Expt 12. Identification of an Organic Acid--- Cleanup and Checkout	235
Mon., Dec. 7 th to Fri., Dec. 11 th	LAB FINAL EXAM	

***Informal lab reports must be turned in prior to exiting lab on the day that the experiment is performed.
Formal lab reports are due at the **beginning** of the lab period on the date indicated above.

- **Late lab reports (formal and informal) will receive an automatic 25% deduction. Lab reports turned in the following day will automatically lose 35%. Lab reports turned in 48 hours or more past the due time will not be accepted. A score of ZERO will be recorded for the experiment.**
- **THERE ARE NO MAKE-UP LABS IN CHEMISTRY 212.** 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 eleven of the twelve lab experiment sessions are attended **and satisfactory reports for them handed in on time. In addition, ALL STUDENTS ARE REQUIRED TO ATTEND AND COMPLETE THE EXCEL TUTORIAL SESSION.** 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. Lab grades will be normalized to a class mean of 80% for each laboratory section to ensure equity in the grading process.

Breakdown of point distribution / CHEM 212 / FALL 2015

Item	Qty	#points each	Total points	%age of total
Informal Lab Reports	7	80	560 points	31.82%
Formal Lab Reports	5	110	550 points	31.25%
Excel / Computer Lab	1	100	100 points	5.68%
Quizzes	10	20	200 points	11.36
Final Exam	1	250	250 points	14.20%
Lab Safety/Check-In	1	100	100 points	5.68%
			Total 1760 points	100.0%

Grading

The following is to serve as a general guide to determine whether or not a student performs satisfactorily in the laboratory component of the course.

Relative Percentage	Rating
100%	Satisfactory
90%	Satisfactory
80% (class mean)	Satisfactory
75%	Borderline Satisfactory
70%	Unsatisfactory
<70%	"F" = failing

Example: The total number of points available in Chem212 lab for the semester is 1600. A student earns a total of 992 points (includes informal lab reports + formal lab reports + quizzes + final exam score). The percentage of points earned is 62.0%. Performance at this level is considered unsatisfactory, demonstrating that the student has not acquired a mastery of the experiments (theoretical and experimental aspects), and the student will not be able to advance to the next level course, i.e., Chem 313 in this case. A percentage value will not be recorded in the database nor submitted to the lecture professor. A letter grade of "F" will be entered, indicating unsatisfactory performance in the course, and the student automatically receives a grade of "F" for the course (lecture and lab are linked courses).

- ***Lab grades are normalized to a class mean of 80% for all sections. Satisfactory performance per lab exercise (experiment and lab report) is >70%. **A score below 70% on a lab report is considered UNSATISFACTORY and will not count toward successful completion of the lab exercise.** Three (3) unsatisfactory grades will result in automatic failure of the lab portion of the course. In addition, **a student that does not have an overall score of 70% for the semester will receive a letter grade of "F" for the lab and the lecture course (these are linked courses).**
- Students that fail lecture and earn >80% in lab may repeat the lecture without the lab. A lab waiver, obtained in the Department of Chemistry & Biochemistry, is required for this option.
- Students that fail lecture and earn <80% in lab will be required to repeat lab along with the lecture.

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 the computer database. Be sure to indicate lab partner/group member names on the pages of your lab notebook when appropriate.*
 - *For example, lab partners will have identical data for an experiment and will retrieve class data from the [Results Retrieval website](#) . 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. Supply 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, the Head GTA, or the GenChem Lab Coordinator in the department.*

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 first to resolve the matter. If the matter is not resolved, it is then vetted with the Head GTA for General Chemistry and MUST BE resolved 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. The rubric will help you understand the expectations for the lab report, along with the discussion questions listed on the Results Retrieval website: <http://chem.gmu.edu/results>. If you have questions or concerns about grades on quizzes or lab reports you should first meet with your lab instructor during office hours to discuss the matter. **The Head GTA for General Chemistry will not meet with students to discuss grading matters if they have not gone through the proper channels. The lab instructor of record will be consulted prior to any and all meetings.**

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 introductory 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.
-