

July 18, 2013

1. College: **Sciences & Mathematics**
2. Department: **Chemistry & Biochemistry**
3. Course status: **existing; does not require modification**
4. Course prefix and number: **CHE 133**
5. Course title: **General Chemistry I (CHEM 1311); CHE 133L General Chemistry Lab (CHE 1111)**
6. Course catalog description: **CHE 133 Atomic and molecular structures, stoichiometry, gas laws and thermodynamics.**
7. Number of semester credit hours: **4**
8. Estimated total course enrollment per year: **500**
9. Course prerequisites and/or required qualifications for enrolling in the class: **Co-requisites: CHE 133L; Prerequisite: MTH 138 or MTH 143 or minimum math score of 25 on ACT or 580 on SAT.**
10. Course **is/will be** available online.
11. Foundational Component Area: **Life and Physical Sciences**
12. Explain why this course fits into this foundation component area: **Chemistry is the science that addresses the structure, composition and energetics of matter and the changes it undergoes. In the general chemistry course, students will be introduced to the scientific approach of connecting fundamental physical laws to other natural and life sciences and their influence on human life.**
13. Core Objectives
  - Critical Thinking - From day one in the lecture and laboratory settings, instructors will be providing students with information and instruction about critical thinking skills and problem solving. Instructors will work problems and provide specific examples of the thought processes required to work problems in chemistry. During the laboratory portion, students will use their problem solving ability and critical thinking skills to analyze their data and develop logical conclusions. They are required to use these skills on every experiment they perform, but they will be specifically assessed on their Critical Thinking skills on Experiment #7 Vinegar Analysis. In a previous experiment, they made and standardized the solution they will be using in the Vinegar Analysis. Prior to the experiment they will be required to predict how much of their solution will be required to titrate a commercial vinegar solution. In addition, they will be required to discuss what it means when more (or less) solution is used. They must demonstrate a logical manipulation of their data. This will be assessed by the instructors using a rubric.
  - Communication Skills - Being able to communicate your findings is a critical skill in chemistry. Throughout the semester, instructors will discuss the different ways of presenting laboratory results. Information will not only be presented by the instructors, but additional information will be provided in the CHE 133 Laboratory Manual about written, visual, and oral communication. The students must be able to communicate effectively with each other as they work in teams through the entire semester. They must be able not only to ask pertinent questions but also listen to others in the team to achieve meaningful results. The students have multiple opportunities to develop their scientific writing skills. Instructors

will provide examples of appropriate scientific writing and instruction on the important aspects of scientific writing. The students will be assessed on their writing abilities on Written Report #3, which involves the results of three related experiments, Preparation and Standardization of Sodium Hydroxide Exp #5, Acid/Base Titration Exp #6, and Vinegar Analysis Exp #7. Students will use a solution they prepared to analyze an unknown acid and a commercial vinegar. They will be assessed on their ability to quantitatively analyze their data and logically discuss the implications of their results. The students' written communication skills will be assessed by the instructors using a rubric. During these experiments, the instructors will provide very little assistance so the students have to rely on their communication skills to accomplish the work. Their oral communication skills will be peer-assessed using a rubric. The students' ability to convey information visually will be assessed by developing a graph of their collected data during the Identification of an Unknown Solid experiment (#1). Instructors will lecture over the key factors expected in an organized, clear, and accurate graph. Additional information and examples on graphing will also be provided in the CHE 133 Laboratory Manual. Students will be assessed on their ability to construct and present mass and volume information in an organized, clear, and accurate graph by the instructors using a rubric. Both reports will be uploaded in D2L.

- Empirical and Quantitative Skills - In class and lab multiple opportunities will be provided for students to practice empirical and quantitative skills. Several labs will require students to demonstrate their ability to manipulate and analyze numerical data collected in laboratory exercises. Prior to Experiment #7 Vinegar Analysis students will be required to make a prediction based on a solution they prepared and standardized in a previous experiment. The students will have to manipulate their data to determine how much of their solution will be required to analyze the commercial vinegar sample. They will also have to consider what it will mean if the titration requires more (or less) solution to finish. Empirical and Quantitative skills will be assessed by the instructor using a rubric.
- Teamwork - In the laboratory setting, students are required to work in teams. Students must be able to communicate with not only the members of their teams but also with the instructors in the laboratory. The skills that are required to work effectively as a team will be explained by the instructors at the first meeting of the laboratory. Students will have worked with their teams for most of the semester prior to the Acid/Base Titration and Vinegar Analysis experiments. Students will be provided a rubric to assess their team specifically for these experiments.

Contact person for questions about this submission:

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