July 19, 2013

1. College: **Sciences & Mathematics**
2. Department: **Chemistry & Biochemistry**
3. Course status: **existing; does not require modification**
4. Course prefix and number: **CHE 101**
5. Course title: **Conceptual Chemistry**
6. Course catalog description: **CHE 101 is an overview of the field of chemistry and its impact on science, technology, society and the environment. This conceptual approach involves a minimum of mathematics and investigates the chemistry found in the world around us, especially environmental issues. This course utilizes an integrated 2-hr lecture / 1-hr lab format and does not count toward a major or minor in chemistry. Lab fee required.**
7. Number of semester credit hours: **3**
8. Estimated total course enrollment per year: **100**
9. Course prerequisites and/or required qualifications for enrolling in the class: **none**
10. Course **is not/will not be** available online.
11. Foundational Component Area: **Life and Physical Sciences**
12. Explain why this course fits into this foundation component area: **CHE 101 is designed to be an introductory course for non-science majors. It presumes no previous knowledge of chemistry. Chemistry is the science of substances – their structure, their properties, and the processes that change them into other substances and the interactions between substances and radiation. Students will discover patterns of chemical behavior from observations and organize these discoveries in a conceptual framework that will lead to making predictions of chemical phenomena. In this course, students will learn and apply the principles of the scientific method through qualitative reasoning and logic. Students will relate the principles of chemistry to the physical world and human experience through class presentations, discussions, readings, simulations, and hands-on activities.**
13. Core Objectives
    - Critical Thinking - CHE 101 is intended to be a "studio" class in which the traditional separate lecture and laboratory sessions are integrated into one class session. Class lecture and discussion will be integrated with demonstrations done by the professor and hands-on activities carried out by the students. Critical thinking in chemistry courses is demonstrated by logical thinking, qualitative reasoning, and pattern elucidation based on the body of knowledge in chemistry. Demonstrations and activities emphasize observation, analysis, evaluation, and synthesis of information. Critical thinking skills will be taught to students by the professor by demonstrating their application in solving a problem and then expanded upon by dialogue with students while they work on hands-on activities to develop their own skills. All demonstrations and activities are intended to be short to provide students many opportunities to improve and apply their skills. The course is structured so that problems, examples, and projects are used to incrementally develop students' critical thinking skills. Examples are presented in the weekly timetable for the course. The semester concludes with a capstone project in which students will be assessed on their critical thinking skills. The

assessment rubric that will be used in the final project will be shared with the students early in the semester so that they will know the goals and expectations for critical thinking associated with the course. These rubrics will be used as formative guides in providing feedback to students as they prepare for the capstone project. The capstone project will be an extended chromatography project that will include simulations and hands-on experimentation. This project will require students to apply their understanding of chemistry developed through the semester. Chromatography involves understanding chemical principles (including solubility, polarity, molecular geometry, and bonding) and applying these principles to the effect a clean separation of the components of a mixture.

- Communication Skills - The studio format of the class provides opportunities for oral communication both between the students and the professor and among students when they are set to a task to work in small groups on a problem. Students will be instructed on how to perform these tasks in several of the assignments throughout the semester. Students will be expected to make formal presentations to the rest of the class. They will be instructed in the skills of making an oral presentation, such as organizing a presentation, preparation of visual materials, and delivery of the presentation to an audience. They will also have several assignments in which they will be required to prepare a written report. They will be provided with a template for a report and will be instructed on how to use it. Within the lab report, students are also required to demonstrate visually their grasp of the experimental concepts through representing data within graphs, tables, etc. The semester concludes with a capstone project in chromatography in which students will be assessed on their communication skills both in a written report and in an oral presentation. The semester timetable provides ample opportunities to develop and practice communication skills before the culminating capstone project in chromatography at the end of the semester. The rubrics for communication skills will also be shared with the students so that they will be informed of the goals and expectations in this category and used in a formative manner to guide students to a higher level of performance.
- Empirical and Quantitative Skills - In a studio course format, students will have kits of easily obtainable materials for all hands-on activities. They will do their work individually, in pairs, or in small groups depending on the task. The professor will show and discuss the proper and safe use of these materials in class and how to record observations, how to take and analyze data, and how to interpret results. In order to ensure safety, students will have written guides for all hands-on activities. Based on the demonstrations and written documentation, they will assemble and use the materials, make observations, collect the data from the experiment, and interpret the results. The activities and projects through the semester will have the goal of developing skills needed in the capstone project on chromatography. The skills will emphasize the careful handling of materials, assembly of equipment, safety, observation of phenomena, and careful measurement and reduction of data. The rubric will be shared with the students to inform them of goals and expectations of the level of empirical and quantitative skills desired. The semester concludes with a capstone project in chromatography in which students will be assessed on their empirical and quantitative skills.

- Teamwork - At the beginning of the semester, students will be instructed in team dynamics and behavior including the importance of regular participation in meetings, meeting deadlines, and contributing quality work to the overall effort. The rubric for teamwork used for assessing the capstone project will be shared to the students so that they will be informed of goals and expectations for teamwork in this course. Although there will be some individual activities, most of the projects and exercises will be done in small groups of 2, 3, or 4 students. Throughout the semester, students will be working in small teams to gain experience in team activities and correct shortcomings as the semester progresses. There will be a culminating capstone project on chromatography at the end of the semester. It will be performed in small teams which will be carefully monitored by the professor to ensure that the work is being done and group dynamics are fruitful. Students will evaluate each other as members of a team using a teamwork rubric. They will also reflect on the group / team project experience in general by responding to a short questionnaire on the collaborative learning experience.

Contact person for questions about this submission:

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