

Ventura College Sabbatical Leave Report
Chemistry Curriculum Development Project for Fall 2018
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Instructor's Sabbatical Leave Status

Full-Time Hire Date: January 2009

Previous Leaves: 0

Sabbatical Taken: Fall 2018

I. Summary of the Project

A brand-new lab manual was locally printed at the Ventura College Bookstore and provided online as PDF files for students to use starting Spring 2019 for the CHEMV01AL course. This new manual was written in a consistent format to reduce student confusion with fully updated experiments, including four brand-new ones that incorporated writing and research as essential components. Each experiment was carefully edited and rewritten to be sure to include clearer instructions, better and more updated theory, and match current safety requirements and regulations. The newly-purchased Vernier data collection systems were tested and incorporated into various labs with instructions written for the students' use for each.

II. Components of the Project

- 1. Curriculum Development:** The material presented to the students in the lab manual was completely rewritten from beginning to end. The text, explanations, and procedures were changed and updated to encourage critical thinking and scientific and quantitative reasoning skills to align with ISLO-2 and the CSLOs for the course.
- 2. Lab Experiments:** Each of the now-twenty experiments were completely rewritten. The instructions were clarified and examples of calculations and theory were shown to increase student understanding. The procedures themselves were often altered or altogether changed to better match current scientific understanding as well as safety regulations for working in the laboratory and to include the new Vernier data collection systems. Some experiments were changed or moved to better align topics with the order in which the lecture course covers them. Much of the chemistry was also altered so that students can run experiments in a safer, more economical fashion. Examples for every calculation to be done in the lab as well as on the pre and post-lab assignments were added to help increase student comprehension. Four brand-new labs were added to the manual, including two "create your own" experiments in which students are asked to prepare the procedure for the lab themselves based on prior and current knowledge of techniques and theories. Students are also asked to prepare a complete written lab report, including

research to previous scholarly studies and information. This will emphasize their understanding of previous concepts as well as challenge them appropriately to help prepare them for the expectations in their next level of classes.

- 3. Pre-Lab And Post-Lab Assignments:** Each of the twenty experiments had their pre-lab and post-lab assignments reviewed, edited, changed, and in some cases entirely redone and/or created. These assignments include short answer, calculation, and essay-type questions. The pre-lab assignments were updated to match the new procedures as well as to include more types of information, such as questions that require outside research as well as reading the lab ahead of time. The post-lab assignments were also updated to match the new labs as well as to require more student thought about important but often misunderstood concepts of accuracy, precision, statistics, and experimental error effects. This will prepare students further for their next level of lab courses, where they will be expected to include this with all data that they present in their lab reports.
- 4. Student Access:** The completed lab manual was printed locally through the VC Bookstore as well as made available to students online to ensure the cost to them remains low/nonexistent.
- 5. Department Access:** The completed lab manual has been stored as an electronic file. We are currently working with the IT department on campus to make it accessible to all full-time department faculty via OneDrive.

III. Impact of the Project to the Students

Students in Spring 2019 have responded very positively to the new lab manual. The low/no cost was very well received. Students also indicated that they appreciated being able to download and print out the manual from online at any time. The addition of examples in each lab also seemed to show a improvement in student performance on pre-lab and post-lab assignments as well as during the lab itself. The edited and updated experiments went much smoother, as students were better able to follow the directions and collect the data that they needed more safely and were also more economical with reagents and chemicals. The new Vernier data systems allowed students to work in smaller groups for many labs, enhancing individual learning and providing more opportunities for hands-on experience, as well as collecting more accurate data that could be better analyzed and had less error. While writing their own procedures and full lab reports for the two “create your own” experiments was challenging for many students, it is hoped that this will better prepare them for their next level of classes where this will be expected.

IV. Impact of the Project to the Faculty

I taught a section of ChemV01AL in spring 2019 and was able to observe firsthand the impact that the new manual had on the students and their learning. It was gratifying to see that in a class where students typically struggle due to it being their first introduction to a full chemistry lab, they were grasping information better, deeper, and more quickly than before. Experiments seemed to run better and without as many mistakes or other issues so that information, not errors, could be reinforced for the students’ hands-on experience. Personally I have always enjoyed

teaching the first semester of General Chemistry, so it was satisfying to see it improved.

V. Impact of the Project to the Department

Overall the department has been greatly appreciative of the new manual. The consistent format has greatly helped to reduce student confusion. Faculty have also been able to contribute to improvements and modifications to better suit our curriculum, students, space, and equipment available. The ease of access and updating has been immensely better and will hopefully continue to improve in the future once it is stored on the district's OneDrive.

VI. Impact of the Project to the College

Due to the high enrollment in this course, the improvements made in the lab manual and curriculum will have a direct influence on the student population. The better alignment with ISLO-2 and the CSLOs as well as the inclusion of more modern teaching practices and a wider swathe of information presentation and accessibility to different learning styles will hopefully increase the success rate of this much-needed class. The streamlined, updated experiments will also help continue to reduce budgetary costs and increase safety.

VII. Future of the Project

Since science is an ever-changing, empirically-based field, it is anticipated that the lab manual for ChemV01AL will continually be updated as information continues to be discovered and better teaching practices developed. Already the manual has gone through a new edition for the Summer 2019 6-week session and will be updated again for Fall 2019 to increase clarity and continue to streamline and smooth out experiments. With the manual electronic in its entirety, these continual updates will become easier in the future.