Ventura College Sabbatical Leave Proposal
Chemistry Curriculum Development Project for Spring 2019
Submitted by Malia Rose-Seisa
Chemistry Department
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Instructor's Sabbatical Leave Status
Full-Time Hire Date: January 2009
Previous Leaves: 0

I. Background of the Project

By its nature as an empirically-based science, chemistry is an ever changing, rapidly evolving field in which new discoveries are made each and every day to better our understanding of the natural world. General Chemistry I (CHEMV01A) and its laboratory component (CHEMV01AL) are required courses for nearly every science major and many healthcare fields, including biology, engineering, computer science, physics, pre-medicine, pre-nursing, and others. It also satisfies the general education requirement for physical science for both CSU-GE and IGETC. On average, this course serves approximately 525 students per academic year, with an additional 55-60 students enrolled during the summer session. This course is in very high demand with fill rates averaging close to or above 100%. CHEMV01AL in particular has very full sections with equally full wait lists despite the department having added three new sections in just the last academic year, bringing its total to 21 course sections offered in fall, spring, and summer terms.

CHEMV01AL is a two-unit class that meets for six hours each week. It allows students the hands-on opportunity to practice the theory and calculations taught in lecture as well as teaching them invaluable practical skills, laboratory technique, and in-the-moment problem solving to complete one to two experiments per week that are graded for their accuracy, demonstrated understanding of concepts, and their performance of procedure in the laboratory itself. As the first of a four-semester long chemistry laboratory course sequence, CHEMV01AL provides students with the very foundation of knowledge that will be repeated in later academic courses as well as their chosen professions. As such, it is imperative that students receive the best, most up to date, and highest quality education to ensure their success in this course as well as their later endeavors.

The current curriculum in use for CHEMV01AL is a collection of experiments put together by present and past faculty. Some of them date back thirty or more years and are scans of typewritten originals. The format of each experiment is different which leads to confusion for students. Much of the information is outdated. Some experimental instructions do not follow current safety procedures or accepted techniques. While faculty have endeavored to update and edit the laboratory manual as much as they can, it has usually been done in piecemeal style due to a lack of available time and resources. The lab manual is in dire need of a complete rewrite from top to bottom to standardize it, to refresh the material to current information,

and to better the students' experience with a more polished, professional lab manual that remains at easily accessible at no/low cost to students.

This curriculum update has become of even more pressing importance due to a required upgrade in our laboratory equipment. Recently while trying to replace old and broken data sensors and other measuring instruments, the department was told that the supply company no longer sells our models as they have been obsolete for many years. The entire PASCO interface, a data collection system, and Data Studio, the software required to run the interface, are no longer sold and will no longer be supported by their manufacturer for update or repair. This system is required for over three-quarters of the experiments taught in CHEMV01AL. Upgrading from the department's outdated system to a more current one would require a complete rewrite of the experiment instructions on every lab in which they are used. This upgrade would serve to modernize the students' laboratory education as well as increase the course's sustainability so that the department could actually purchase better-quality equipment that could be repaired or replaced, if necessary.

II. Purpose of the Sabbatical Project

The purpose of this project is to author a brand new, up-to-date, complete and consistent lab manual for CHEMV01AL that will be available to students in both a print and electronic form for very low/no cost. The original file will also be kept in the department so that any future edits, updates, or improvements that will inevitably be needed can be done easily. All current experiments will be reviewed and either updated fully or replaced with new ones that fit current chemical knowledge, safety procedure, laboratory techniques, and create engaging, dynamic teaching environments. The assignments themselves will be rewritten to add clarity as well as give more opportunities for students to practice topics and concepts. This includes the background information, procedures, data tables, example calculations, and post-lab and pre-lab questions. All eighteen (18) experiments will be rewritten in order to incorporate the current versions of PASCO (or other new data collection system, pending department approval) and all other current instrumentation used by the department in CHEMV01AL, as well as incorporating new theories, techniques, instruments, and procedures to make the material presented to the students up to date. This project will be undertaken in cooperation and conversation with the department faculty to incorporate their suggestions and improvements.

III. Components of the Sabbatical Project

1. **Curriculum Development**: The content for CHEMV01AL is contained entirely in the lab manual. Most of these experiments were written years ago and have only been minorly updated since. As a result, many need editing and reworking in order to better match them with the current Student Learning Outcomes and Course Outline of Record. More writing assignments will also be incorporated into the CHEMV01AL lab manual to better prepare students for the expectations of writing scientific papers on experimental results in this and their future courses as well as to continue to develop critical thinking and scientific and quantitative reasoning skills to align with ISLO-2.

2. **Lab Experiments**: All eighteen CHEMV01AL will be evaluated for content, safety, efficacy, and reliability and either edited, rewritten, or replaced accordingly. All experiments involving the PASCO collection and Data Studio software need to be updated with appropriate instructions for whichever more current system the department elects to adopt. Better alignment of the schedule of topics between CHEMV01A and CHEMV01AL is also desperately needed as most students take both classes concurrently and struggle when a concept is covered in lab before it is addressed in lecture. Experimental procedures also need to be adjusted in consideration of the department's limited chemical supply budget and to reduce expensive hazardous waste generated as well as to make each more environmentally-friendly. All experiments need to be updated to follow current safety protocols to ensure compliance with OSHA and chemical safety. Lastly, all experiments will be written and presented to students in a single format to avoid unnecessary confusion.
3. **Pre-Lab And Post-Lab Assignments:** Each of the eighteen experiments will include a pre-lab (done before the experiment) and post-lab (done after the experiment is completed) assignment for students. These will be updated as well to better ensure student comprehension of topics, to utilize more current pedagogical best practices, and to reflect the course's SLOs and ISLO.
4. **Student Access:** The completed lab manual will be 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 will be stored as an electronic file that will be kept with the VC Chemistry Department, making any future edits and changes much easier.

IV. Value of Sabbatical Project to VCCCD and Ventura College

This project will serve as a badly-needed curriculum update for one of the largest courses the Ventura College Department of Chemistry offers. It will serve to better align classroom materials to developed SLOs, ISLO-2, and the COR to ensure smooth articulation and transfer. This project will also assist the faculty and department as a whole by making the inevitable future edits to the curriculum much simple, and, in turn, keeping the curriculum more regularly up to date. It will also allow the department to upgrade its equipment to current supported models and utilize funding provided for this through previous Program Review initiatives.

V. Value of Sabbatical Project to Students

CHEMV01AL satisfies the physical science with a lab requirement for CSU-GE and IGETC and is also a prerequisite for many majors. As such, it is foundational to students' start in their scientific careers, making it imperative that the instruction they receive is complete and of the highest quality to prepare them for what comes next. This project would seek to ensure that the lab curriculum offered to students in their first semester of chemistry is up-to-date, reflecting best practices both scientific as well as pedagogical, and thorough all while keeping the class materials available to all students at little to no monetary cost.

It is also the hope that this project will allow a better alignment of CHEMV01AL to its corresponding lecture component, CHEMV01A to increase student success in both. CHEMV01A has the lowest success rate of all courses in the department due to being the first chemistry course in the sequence that students take. Giving students more opportunities to practice concepts as well as to offer repetition of lessons from lecture in lab and vice versa may help to increase the success rate in both and improve students' academic progress. Working to make the labs more efficient, less wasteful, and safer for both students and instructors will ensure a positive and flourishing learning environment.

VI. Value of Sabbatical Project to Instructor

Personally, I have taught multiple sections of CHEMV01AL for nine total semesters and am intimately familiar with the course. As an instructor, I have always greatly enjoyed teaching this course due to it being one of the very first opportunities to introduce students to a scientific laboratory environment and being given the opportunity to work directly with them multiple times each week. It is a great personal passion of mine to ensure that our students are getting the absolute best quality education and preparation that we can offer, especially in a class as foundational as their very first semester in collegiate-level chemistry. When queried, the Chemistry Department unanimously voted that the CHEMV01AL manual was the curriculum in most desperate and immediate need of rewrite due to its high impact on students and the department as a whole.

While the CHEMV01AL manual has been regularly updated in the past, these changes were always minor due to time limitations. They were also often lost as instructors would not always teach CHEMV01AL again the next semester and not all information was passed down to those who were. Having a single faculty member taking lead on this project will make it cohesive and consistent and also allow a complete rewrite from beginning to end. It will also allow participation from all current faculty who teach or have taught the course to include what methods they have seen work with their students and what changes they have done or would like to suggest in the future. The lab manual will then reflect the current VC chemistry faculty and up-to-date knowledge rather than outdated procedures from decades past. It will also allow for the inclusion of more current teaching methods to improve student learning and retention.

Thank you for your consideration.

Sincerely,

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