

## Program Efficacy

**2019 – 2020**

**Program Being Evaluated**

Chemistry

**Name of Division**

Science

**Name of Person Preparing this Report**

**Extension**

Sheri Lillard 8646  
 Carol Jones, Jessy Lemieux, Michael Torrez, Mark Hamza, Alicia Doyle, Shonia Hayes

**Names of Department Members Consulted**

Carol Jones, Jessy Lemieux, Michael Torrez, Mark Hamza, Alicia Doyle, Shonia Hayes; additional 22 adjunct faculty invited to participate.

**Names of Reviewers**

Kenny Melancon, Wallace Johnson, Judy Joshua

Work Flow	Date Submitted
Initial meeting with department	Online: Jan 30 and ongoing; Feb 20 Dept. meeting.
Meeting with Program Review Team	Feb 20
Report submitted to Program Review co-chair(s) & Dean	<b>by NOON on March 13 (Mar 6)</b>

**Staffing**

List the number of full and part-time employees in your area.

Classification	Number Full-Time	Number Part-time, Contract	Number adjunct, short-term, hourly
Managers	1		
Faculty	6	26	
Classified Staff	2		
<b>Total</b>	<b>9</b>	<b>26</b>	

### Lower Level vs Upper Level

There is a clear improvement in SLO success going from CHEM 101 (55.6%) to CHEM 150/151 (61.8%) to CHEM 212/213 (64.6%). One recent change (not yet significantly reflected in the collective data) is that in Fall 2019, the Department voted to move away from a common SLO assessment and give instructors the freedom to assess the SLOs in the way that best fits their teaching style and course design. We expect that continued discussion in the Department about what types of SLO assessments used by individual instructors are most indicative of a student's learning will permit us to more accurately assess which content the student actually knows or doesn't know, compared to a sub-optimal assessment tool.

	<b>% Meets SLOs</b>
<b>All CHEM 101</b>	<b>55.6%</b>
Day sections	56.2%
Evening sections	53.5%
Saturday or Friday/Saturday	62.5%

The CHEM 101 success for SLOs mirrors the success rate for this course in general, and needs improvement. As with all of our courses, the evening sections have lower success with SLOs, and this analysis was discussed previously. Each semester we offer one Saturday section, and about once per year we have tried a Fri/Sat combination. It is interesting that the few sections offered either all-day Saturday (3 hrs of lecture and 3 hrs of lab) or a Friday/Saturday combination have a marked improvement of 9 percentage points (17%) compared to CHEM 101 evening. One possibility is that these classes tend to be smaller (and have never been offered as double sections), thus leading to improved SLO success. Also, the students who take a Saturday course are most likely working during the week, as we generally see with evening students, so the comparison of evening vs Saturday should be relating to a similar population. It is possible that a focused schedule (class on Saturday only and work during the week only) compared to work + school during the weekdays provides a student with better rest and recovery, and the ability to study CHEM 101 content during the week without having to rush to school following a long workday. It may be useful for us to design a survey for our weekend students, to learn in more detail what their schedules actually look like, to see if this is a valid explanation. In addition, this pattern may appeal to more determined students, as we often see with summer classes. If this improved success proves to be a result of scheduling design, then as a Department, we may want to explore providing a weekend pathway for both of our program sequences (CHEM 101/104 and CHEM 101/150/151/212/213).

With three recent changes happening, we expect to see better overall results for CHEM 101 moving forward.

**Beginning Fall 2019, instructors can choose their own SLO assessment tool.** In late Fall 2019 (after the EMP was submitted), the Department approved moving away from a common assessment for all courses. Since SLOs were first required at SBVC, CHEM 101 has had a common assessment. For about 10 years, that assessment was a quiz consisting of 12 multiple-choice questions (written by the Department). At first, we were instructed to give the assessment as a quiz, but over time, many instructors moved these questions onto their final exams. The difficulty with a common assessment is that we all present the content differently, our students get used to the way we frame questions, and many instructors don't use multiple-choice exams at any other point during the semester. The SLO result should measure the student's understanding, and not

reflect an unfamiliar exam format. This year, some of our Department SLO discussions have considered the benefits of allowing instructors to assess the outcome statements as they see best. Some instructors have decided to keep the multiple-choice questions (which we revised in Fall 2019 for clarity; some faculty who used them reported improved results). Other instructors are opting to write their own assessment questions, whereas others are planning to use existing exams or quizzes (so students are not limited to only 3 questions per SLO) to measure the outcomes.

**Beginning Spring 2020, all of our CHEM 101 classes have resumed to single sections.** One persistent problem with CHEM 101 is that for more than 10 years we were directed to stack two courses into a double-section of lecture, which split out into two separate sections of lab each week. This model is highly ineffective and not conducive to student engagement, learning, and mastery of the material. As an introductory course for students pursuing both STEM fields and allied health pathways, as well as for students meeting their general education requirement for science with a lab, it is critical for students to be able to interact with their instructor, freely ask questions, and receive individualized attention. As pointed out in a *Chronicle of Higher Education* article earlier this year, “fixing [gateway] courses is, in essence, a social justice issue, one that higher education has an ethical, and overdue, obligation to address” (<https://www.chronicle.com/article/Do-Gateway-Courses-Foster/247853>). It is very difficult to run an engaging classroom setting, demonstrate problem-solving, and keep tabs on student learning during a lecture class of more than 50 students. It’s not surprising that the SLO success for this course has been the lowest of all the groupings.

**Beginning Fall 2020, we have strengthened our prerequisites.** READ 100 or ENGL 101 (instead of ENGL 015), and MATH 102 (instead of MATH 090) completion will now be required. College-level reading and strong algebra skills are necessary for students to have as they enter CHEM 101 if they are going to be successful in the class. If students struggle with the calculations, they begin to fall behind and rarely catch up. They either don’t pass the course or they withdraw, and we hope they return the next semester. If students can’t read and clearly comprehend the lecture materials, it becomes difficult for them to grasp the critical thinking that is necessary to solve the problems. Furthermore, if they cannot read the lab manual adequately, it could be a safety issue to themselves and others.

	<b>% Meets SLOs</b>
<b>All CHEM 104/105</b>	<b>65.5%</b>
Day sections	63.7%
Evening sections – CHEM 104 only	66.3%
Hybrid (Day) – CHEM 104 only	78.1%

CHEM 105 is a relatively recent addition (first being scheduled in Fall 2016), and is essentially a combination of CHEM 101 and CHEM 104 compressed into a single semester. This General, Organic, Biochemistry (GOB) course, is required by CSU nursing students in order to meet the required coursework, but with fewer units. CHEM 105 is extremely demanding, and its lower SLO success compared to CHEM 104 is what drops the daytime success for CHEM 104/105. As we continue to offer CHEM 105, and optimize the content to ensure successful learning, we expect the SLO success to increase.