Chemistry Program Review

- Name of Program: Chemistry Program Review
- Name of person(s) preparing document: Dee Sigismond, Denisha Dawson, Paul Fregene, Brandon Tenn, April Weathers, Krista Wilson
- Dates of meeting(s) to discuss and review document:
  
  1/10/14

  2/20/15

- Names of Participants and Titles:
  
  Denisha Dawson, Chemistry Professor
  Paul Fregene, Chemistry Professor
  Dee Sigismond, Chemistry Professor
  April Weathers, Chemistry Professor
  Krista Wilson, Chemistry Professor
  Brandon Tenn, Chemistry Professor

- Degrees and Certificates:
  
  Chemistry (AS)
  Year: 2014/2015
  Discipline: Chemistry (CHEM)

1. Have there been any changes in this program over the last years which have had a significant impact on the program's goals and/or effectiveness? If so, please explain the changes that have occurred and how the changes have impacted the program.

   The C-ID for chemistry 2A was approved in the summer of 2014. The Chemistry TMC was approved by the Chancellor's office February 2015. The Chemistry Department submitted an update to the curriculum committee to change our current Chemistry AS degree into a Chemistry AS-T degree. The curriculum committee expects the AS-T degree to be active Summer 2016.

   All of the chemistry courses are using new books and have switch to a new form of online homework, Sapling.

   Chemistry 2A, 4A and 4B have updated their laboratory experiments. The labs are now designed in-house and published to a website for students to print. Therefore, there is no laboratory manual necessary. This saves the students money and allows the instructors to make needed changes immediately.

2. Please summarize the progress the program has made on Student Learning Outcomes (SLOs) assessments at the course and program level since the last review and how the findings of those assessment have been utilized to improve student learning.

   As of 5/24/14 all Chemistry courses have the same Student Learning Outcomes, which are listed below. These are also the program level SLO's.

   A. Demonstrate an understanding of various chemical representations of elements, compounds, and chemical reactions.
   B. Solve problems utilizing chemical concepts and equations
   C. Collect and analyze laboratory data
   D. Demonstrate scientific literacy

   Chemistry 2A is current on its assessment as it was assessed in Fall of 2013. Chemistry 2B, 4A, 4B, 12A, and 12B will be assessed this semester so that the assessment utilizes the new SLO's. Once the course assessments are complete the program SLO's will be assessed for the 2015/2016 program review.

3. Include a plan for assessing the course and program SLOs that have not been assessed at this time.

   Embedded questions in exams and quizzes will be used to assess SLO A and B. Laboratory exams or laboratory response sheets will be used to assess SLO C and SLO D will be assessed from formal laboratory reports or papers. Once all the course SLO's are assessed that data can be used to assess the program SLO's since they are the same.

4. Please summarize any changes in retention, success, productivity, or other relevant data that have occured since completion of the last planning document, whether a comprehensive review or annual planning document.

   In the 2013/2014 academic year the overall completion rate for chemistry courses increased 0.88% from the previous year with large increases in chemistry 4A (13.26%). Some courses showed a decrease in completion rate during 2013/2014 academic year including Chemistry 2B (12.77%) and Chemistry 12B (5.26%), which are both organic chemistry courses with enrollment much lower than Chemistry 2A, chemistry 4A and Chemistry 4B and therefore this could mean a difference of only 1 or 2 students not completing the course.

   The number of graduates remained the same. There were two graduates in 2012/2013 and two in 2013/2014.

   The overall success rate increased for Chemistry courses in 2013/2014 from the previous year by 2.49% with Chemistry 2A increasing 3.71%, Chemistry 4A increasing 3.56%, and Chemistry 4B increasing 12.06%. There were declines in success rates for the 2013/2014 year in Chemistry 2B (3.87 %), Chemistry 12A (4.84%) and 12B (18.80%).

5. Provide a status update on the 5-year Planning Goals identified in the most recent comprehensive program review. Is the program on target to meet the most recent 5 Year Planning Goals?

   Goal 1 is to maintain consistency across multiple sections of a given course. This goal has been consistently completed. All sections of a course use a common syllabus, same laboratory experiments, and a common final. Adjunct mentoring is occurring in order so that their sections are also consistent.

   Goal 2 is to maintain the established SLO assessment cycle. This is an ongoing goal. Chemistry 2A assessment is current and the other courses 2B, 4A, 4B, 12A and 12B will be completed this academic year with the new SLO's.

   Goal 3 is to ensure that faculty are abreast of the most recent innovations. This goal has been difficult to meet due to budgetary constraints. However, Professor Brandon Tenn and Professor April Weathers will be attending the Sapling Learning Workshop on Flipping the chemistry classroom on February 27th in Austin. Professor April Weathers will begin teaching a Chemistry 2B hybrid course in the fall 2015.
Goal 4 is to investigate a possible correlation between completion of advisories and student success and retention. The math advisory, Math-C, for Chemistry 2A was changed to a prerequisite in summer 2014. The next assessment cycle of this course will help us determine if this goal has been met as the data is currently unavailable. The data showed that changing the English advisory did not change student success.

Goal 5 is to provide students with a state of the art laboratory experience. This is an ongoing goal. Through an HSI STEM grant the chemistry department was able to make major strides in this goal. Laptops, electronic data collection devices are currently being used in the laboratories.

Are the program's 5 Year Planning Goals still relevant?
Yes

Has there been a change in the priority of the program's 5 Year Planning Goals?
The new order would be

1. Provide students with the state of the art laboratory experience
2. Ensure faculty are abreast of the most recent innovations
3. Maintain consistency across sections
4. Maintain the established SLO assessment cycle
5. Investigate the correlation between completion of advisories and student success and retention.

The Chemistry faculty feel that goal 5 has been met, since a prerequisite analysis for Introductory Chemistry (CHEM 2A) was conducted during the 2013-14 academic year. Goals 3 and 4 have also have been currently met. However chemistry faculty feel these goals are important and ongoing, so they will remain in our list of 5 year goals. Goals 1 and 2 are more difficult to accomplish due to budgetary issues. (Numbering refers to reordering of goals defined in this section.)

6. Program SLOs
   a. Chemistry (AS)
      i. Collect and analyze laboratory data.
      ii. Demonstrate an understanding of various chemical representations of elements, compounds, and chemical reactions.
      iii. Solve problems utilizing chemical concepts and equations.
      iv. Demonstrate scientific literacy.

7. 5-Year Plans

Goal Statement 1: Maintain consistency across multiple sections of a given course.
Objectives:

In order to maintain consistency across multiple sections of a given course the department will hold periodic planning and evaluation meetings, use a common syllabus, common laboratory experiments, common laboratory schedule, common assessment methods and common finals. The full time faculty will mentor part time faculty in order that they may participate in the consistency goal.

Target Date for Completion: 02/05/2016
Person(s) Responsible for Completion: Professor Brandon Tenn Professor Paul Fregene Professor Krista Wilson Professor Denisha Dawson Professor April Weathers Professor Dee Sigismond
Benchmark: All courses are consistent.

Describe the Means of Assessment: Review course syllabus, laboratory experiments and schedule, final, and SLO assessment results.

Program Outcomes:

1. Demonstrate an understanding of various chemical representations of elements, compounds, and chemical reactions.
2. Solve problems utilizing chemical concepts and equations.
3. Collect and analyze laboratory data.
4. Demonstrate scientific literacy.

Strategic Planning Goals:

1. Assure student access and success.
2. Improve communication throughout the district.

ISLOs:
   a. Communication

Goal Statement 2: Maintain the established SLO assessment cycle for all chemistry courses.
Objectives:

All Chemistry courses will be assessed using the current SLO’s according to the cycle determined by the department. Once the course SLO’s have been assessed then the program SLO’s will be assessed.

Target Date for Completion: 02/05/2016
Person(s) Responsible for Completion: Professor Brandon Tenn Professor Paul Fregene Professor Krista Wilson Professor Denisha Dawson Professor April Weathers Professor Dee Sigismond
Benchmark: All courses and program will be current on assessment.

Describe the Means of Assessment: All courses and program assessment will be posted in the appropriate assessment program as well as on the Chemistry website.

Program Outcomes:

1. Demonstrate an understanding of various chemical representations of elements, compounds, and chemical reactions.
2. Solve problems utilizing chemical concepts and equations.
3. Collect and analyze laboratory data.
4. Demonstrate scientific literacy.

Strategic Planning Goals:

1. Assure student access and success.
2. Improve communication throughout the district.

ISLOs:
   a. Communication
   b. Computation
   c. Cognition

Goal Statement 3: Ensure faculty are abreast of the most recent innovations in their fields.
Objectives:

Faculty will research professional development opportunities, look for funding to attend, and participate in these opportunities. Faculty that are able to attend such workshops, seminars, etc. will update the faculty who were unable to attend on new innovations.
Program Outcomes:
1. Demonstrate an understanding of various chemical representations of elements, compounds, and chemical reactions.
2. Solve problems utilizing chemical concepts and equations.
3. Collect and analyze laboratory data.
4. Demonstrate scientific literacy.

Strategic Planning Goals:
1. Assure student access and success.
2. Improve communication throughout the district.
3. Enhance technology and systems integration.
4. Partner with the community.
5. Promote a Sustainable, Supportive, and Safe Learning Environment.

ISLOs:
- Communication
- Computation
- Cognition
- Global and Community Consciousness and Responsibility
- Personal Development and Life-Long Learning

Goal Statement 4: Investigate the possible correlation between completion of advisories and student success and retention.

Objectives:

Once success and retention data for current year are available the investigation of the correlation between completion of advisories and student success and retention can be investigated.

Program Outcomes:
1. Demonstrate an understanding of various chemical representations of elements, compounds, and chemical reactions.
2. Solve problems utilizing chemical concepts and equations.
3. Collect and analyze laboratory data.
4. Demonstrate scientific literacy.

Strategic Planning Goals:
1. Assure student access and success.
2. Improve communication throughout the district.

ISLOs:
- Communication
- Computation
- Cognition

Goal Statement 5: Provide students with a state-of-the-art laboratory experience

Objectives:

To update the laboratory experiments and equipment.

Program Outcomes:
1. Demonstrate an understanding of various chemical representations of elements, compounds, and chemical reactions.
2. Solve problems utilizing chemical concepts and equations.
3. Collect and analyze laboratory data.
4. Demonstrate scientific literacy.

Strategic Planning Goals:
1. Assure student access and success.
2. Improve communication throughout the district.
3. Enhance technology and systems integration.

ISLOs:
- Communication
- Computation
- Cognition

8. Yearly Objectives

<table>
<thead>
<tr>
<th>Priority</th>
<th>Objective</th>
<th>5 Year Planning Goal</th>
<th>Person(s) Responsible</th>
<th>Timeline</th>
<th>Resources</th>
<th>Program SLOs</th>
<th>Institutional SLOs</th>
<th>Strategic Planning Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Increasing faculty awareness of the most recent innovations in online learning</td>
<td>Ensure faculty are abreast of the most recent innovations in their fields.</td>
<td>April Weathers</td>
<td>February 28, 2016</td>
<td>The faculty will need support and funding for travel and conference fees.</td>
<td>1. Demonstrate an understanding of various chemical representations of elements, compounds, and chemical reactions.</td>
<td>1. Improve communication throughout the district. 2. Enhance technology and systems integration.</td>
<td>1. Communication 2. Cognition 3. Global and Community Consciousness and Responsibility 4. Personal Development and Life-Long Learning</td>
</tr>
<tr>
<td></td>
<td>Cell 1</td>
<td>Cell 2</td>
<td>Cell 3</td>
<td>Cell 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Develop Chemistry TMC</td>
<td>Ensure faculty are abreast of the most recent innovations in their fields.</td>
<td>Professor Brandon Tenn, Professor Paul Fregene, Professor Krista Wilson, Professor Denisha Dawson, Professor April Weathers, Professor Dee Sigismond</td>
<td>To be completed within 6 months of the release of the TMC template.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Solve problems utilizing chemical concepts and equations.</td>
<td>2. Collect and analyze laboratory data.</td>
<td>3. Demonstrate scientific literacy.</td>
<td>1. Assure student access and success.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. Improve communication throughout the district.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Collect and analyze laboratory data.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Demonstrate scientific literacy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Assess program level SLO’s</td>
<td>Maintain the established SLO assessment cycle for all chemistry courses.</td>
<td>Professor Brandon Tenn, Professor Paul Fregene, Professor Krista Wilson, Professor Denisha Dawson, Professor April Weathers, Professor Dee Sigismond</td>
<td>To be completed by the next program review.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Course SLO data</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Assure student access and success.</td>
<td>2. Improve communication throughout the district.</td>
<td>3. Promote a Sustainable, Supportive, and Safe Learning Environment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Assess Chemistry 2B, 4A, 4B, 12A, and 12 B with the new SLO’s.</td>
<td>Maintain the established SLO assessment cycle for all chemistry courses.</td>
<td>Professor Brandon Tenn, Professor Paul Fregene, Professor Krista Wilson, Professor Denisha Dawson, Professor April Weathers, Professor Dee Sigismond</td>
<td>To be completed before next program review.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Data from OGIR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Assure student access and success.</td>
<td>2. Improve communication throughout the district.</td>
<td>3. Promote a Sustainable, Supportive, and Safe Learning Environment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Evaluate the need for increasing the number of sections</td>
<td>Maintain consistency across multiple sections of a given course.</td>
<td>Brandon Tenn, April Weathers, Krista Wilson, Denisha Dawson Dee Sigismond</td>
<td>February 2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OGIR data</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Demonstrate an understanding of various chemical representations of elements, compounds, and chemical reactions.</td>
<td>2. Solve problems utilizing chemical concepts and equations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Demonstrate an understanding of various chemical representations of elements, compounds, and chemical reactions.</td>
<td>2. Solve problems utilizing chemical concepts and equations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Demonstrate an understanding of various chemical representations of elements, compounds, and chemical reactions.</td>
<td>2. Solve problems utilizing chemical concepts and equations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Solve problems utilizing chemical concepts and equations.
2. Collect and analyze laboratory data.
3. Demonstrate understanding of various chemical representations of elements, compounds, and chemical reactions.
4. Maintain consistency across multiple sections of a given course.

Professor Brandon Tenn, Professor Paul Fregene, Professor Krista Wilson, Professor Denisha Dawson, Professor April Weathers, Professor Dee Sigismond

May 2016

Time

1. Demonstrate an understanding of various chemical representations of elements, compounds, and chemical reactions.
2. Solve problems utilizing chemical concepts and equations.
3. Collect and analyze laboratory data.
4. Demonstrate scientific literacy.

1. Assure student access and success.
2. Improve communication throughout the district.
3. Enhance technology and systems integration.

1. Communication
2. Computation
3. Cognition
4. Personal Development and Life-Long Learning

9. Evaluation
1. Was the time frame for completion of the Program Review adequate? Yes
2. Was the Review Module Clear and understandable? Yes
3. Was it easy to use? Yes
4. Were the questions relevant? Yes
5. Did you find the Program Review process to have value? Yes
6. Was the data you reviewed completed and presented in a clear format? Yes No, it would be better by year instead of by semester.
7. Please identify data source(s) used to provide data for this review OGIR IE metrics
8. Would you like additional data? No
9. Please offer any comment that could improve and/or streamline Program Review.
   We feel it is way too detailed and restrictive. It should be simple and just focus on goals and student success and improvement in short, simple questions.

10. Appendices

11. Other: If there is anything else you would like to be considered in the annual planning document, please describe it here.

   Professor Brandon Tenn gave a presentation on May 21, 2014 to 4th graders at St. Paul Lutheran School on Chemistry Careers.

   Professor Brandon Tenn and Professor April Weathers will be attending the Sapling Learning workshop on Flipping the Chemistry Classroom on February 27, 2015 in Austin, Texas.

   Professor April Weathers will be participating in Merced College's first science fair as a mentor and judge.