Chaffey College Program Review
Three Year Review 2011

PROGRAM OVERVIEW

Program Title: Chemistry

Program Code: 1905 - CHEMISTRY

Review Type: Instructional
Administrative
Student Support

Does this review contain any career technical education (occupational) programs?
No

External Regulations:
No

Chaffey College Mission Statement
Chaffey College improves lives within the diverse communities it serves through equal access to quality occupational, transfer, general education, and foundation programs in a learning-centered environment where student success is highly valued, supported, and assessed.

Please describe how your program supports the college's mission and discuss how your program evaluates its effectiveness in meeting the college mission:
Chemistry supports the college mission through course offerings, community involvement, and access. Courses are offered day, evening, and weekends with alternating patterns of low demand classes. Two hybrid courses are approved and hybrid Chem 10 is offered each semester. Chemistry currently has

Review Team Response

PROGRAM DATA
Enrollment
Enrollment by Day, Evening, Online, Arranged (CHEM)

<table>
<thead>
<tr>
<th>Measure</th>
<th>2008-09 to 2009-10</th>
<th>2009-10 to 2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Census Enrollment</td>
<td>-8.57%</td>
<td>-9.37%</td>
</tr>
<tr>
<td>Day</td>
<td>-12.22%</td>
<td>-18.13%</td>
</tr>
<tr>
<td>Evening</td>
<td>10.61%</td>
<td>12.79%</td>
</tr>
<tr>
<td>Online</td>
<td>-52.17%</td>
<td>104.55%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measure</th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>2148</td>
<td>1964</td>
<td>1780</td>
</tr>
<tr>
<td>Day</td>
<td>1678</td>
<td>1473</td>
<td>1206</td>
</tr>
<tr>
<td>Evening</td>
<td>424</td>
<td>469</td>
<td>529</td>
</tr>
<tr>
<td>Online</td>
<td>46</td>
<td>22</td>
<td>45</td>
</tr>
<tr>
<td>Arranged</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Given the data, what changes can be identified in enrollment patterns? Identify any important trends and explain them.

The data presented for the online class is incorrect. See table file on SLO page. Due to a coding error, data for one of the online classes is not presented in the table. The correct information is given below and was provided by Jim Fillpot. 2007-08 2008-09 2009-10 Total 2041 2148 1964 Day 1580 1678 1450 Evening 404 424 469 Online 45 46 45 Arranged 12 Based on the trends presented, the evening sections show steady growth, the online has steady enrollment and the day time classes show a slight reduction but the reduction is due to fewer classes being offered in the day. When requested to reduce course offerings due to budgetary needs, the evening and Saturday offerings have been protected and courses purposely deleted from day sections. Chemistry department no longer offers arranged- hour lab classes or Honors classes. This accounts for no arranged students after 2007-08. Once the budgetary crisis passes, the daytime course offering could be increased.

Retention
### Retention Rate by Day, Evening, Online, Arranged (CHEM)

#### Total Census Retention

<table>
<thead>
<tr>
<th>Measure</th>
<th>2008-09 to 2009-10</th>
<th>2009-10 to 2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Census Retention</td>
<td>2.66%</td>
<td>4.29%</td>
</tr>
<tr>
<td>Day</td>
<td>4.59%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Evening</td>
<td>-4.16%</td>
<td>9.6%</td>
</tr>
<tr>
<td>Online</td>
<td>6.37%</td>
<td>-15.8%</td>
</tr>
</tbody>
</table>
Given the data, what changes can be identified in retention patterns? Identify any important trends and explain them.

The table below shows the corrected data which includes all the online classes. 2007-08 2008-09 2009-10 Total 80.17 80.18 82.31 Day 80.67 79.59 83.31 Evening 77.92 82.78 79.34 Online 79.67 76.92 80.00 Arranged 91.67

DISCIPLINE: CHEMISTRY, GENERAL CHAFFEY COLLEGE 2005-2010 FROM OLAP CUBES CHAFFEY COLLEGE SP 2010 FROM OLAP CUBES STATEWIDE SP 2010 FROM CHANCELLOR’S OFFICE DATA- MART

Success 67.70 74.97 66.96 Retention 81.27 86.60 80.28 The data shows a slight, but consistent improvement in retention rates. The chemistry department has between 75 - 85% retention regardless of times courses are offered, format of course offered, or any of the variables presented. According to the Chancellor’s Office Data Mart in the Spring 2010 semester, Chaffey College Chemistry Department has a retention rate of 86.60 which is higher than the state average of 80.28. See the table directly above. Due to difficulty of subject matter, the Chemistry department is slightly lower than the school average but well within reasonable expectations for a physical science curriculum and is above the state average for comparable courses. The department is discussing methods in which to raise the retention rates.

Success
<table>
<thead>
<tr>
<th>Measure</th>
<th>2008-09 to 2009-10</th>
<th>2009-10 to 2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Census Success</td>
<td>4.68%</td>
<td>7.66%</td>
</tr>
<tr>
<td>Day</td>
<td>5.48%</td>
<td>8.12%</td>
</tr>
<tr>
<td>Evening</td>
<td>0.62%</td>
<td>7.98%</td>
</tr>
<tr>
<td>Online</td>
<td>15.9%</td>
<td>-22.35%</td>
</tr>
</tbody>
</table>

### Table:

<table>
<thead>
<tr>
<th>Measure</th>
<th>2008-09</th>
<th>2009-10</th>
<th>2010-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>66.45</td>
<td>69.56</td>
<td>74.89</td>
</tr>
<tr>
<td>Day</td>
<td>65.29</td>
<td>68.87</td>
<td>74.46</td>
</tr>
<tr>
<td>Evening</td>
<td>70.99</td>
<td>71.43</td>
<td>77.13</td>
</tr>
<tr>
<td>Online</td>
<td>66.67</td>
<td>77.27</td>
<td>60.00</td>
</tr>
<tr>
<td>Arranged</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Graph:

Success Rate by Day, Evening, Online, Arranged (CHEM)
Given the data, what changes can be identified in student success patterns? Identify any important trends and explain them.

The table below shows the corrected information which includes all of the online classes. Chem 10 hybrid has an established record of higher success rates by ethnicity/gender – college-wide, 2009-10 for all categories but Asian and Caucasian when comparing the 2009-10 online success rate to the college-wide success rate. 2007-08 2008-09 2009-10 Total 65.80 66.45 69.56 Day 65.86 65.29 68.82 Evening 63.47 70.99 71.43 Online 75.00 66.67 71.11 Arranged 91.67 The chemistry department has an overall success rate ranging from 65 -75% and in general, has a higher success rate than each of the variables college-wide, 2009-2010. Lowest success rates are observed by African-American, Hispanic and Other Ethnicity groups but this reflects the school wide trend. The Chemistry department also has a slightly higher success rate than the success rate statewide. The chemistry department works diligently to help our students succeed through the effective use of SI (when available), access to instructors, use of Early Alert, promotion of success centers, Chem Club students tutoring and mentoring lower level chem students, use of online resources provided by outside vendors - Mastering Chemistry, OWL, MyPhysics Place, etc., and online resources provided by Chaffey- Moodle, Blackboard, eRes, etc. The department will continue to use all resources available to maintain and improve student success rates.

Review Team Response
Given the data, is the number of majors and certificates what you would expect? Please comment.

Has the number of majors and certificates increased or decreased over time? Why?

The data for the Chemistry department was not loaded into CurricUNet and the only way to access this page was to use a different program. Biology was chosen. The Chemistry Department offers an AS in Chemistry degree but there have been only 4 awards in the past 25 years: between 1984-85 to 2009-10. There are multiple contributing factors. 1) Chemistry is not a popular major and is considered a challenging major. As a result, not many students are chemistry majors. 2) The department has been contacted by students interested in obtaining the AS Chemistry degree so there are Chemistry majors who are interested. Unfortunately, not all of the courses required for the degree have been offered in the past several years. These interested students have been turned away. 3) The capstone course: Chem 70 – Quantitative Analysis has not been available in the past several years. There are several reasons for the non-availability of Chem 70 including a) Low enrollment in Chem 70 causing cancellation of the course the last 2 or 3 times the course was offered; b) Reduction in number of Chem 21 and Chem 22 classes which reduce the number of students who have met the prerequisite for Chem 70. c) This is the 4th course in a sequence – Chem 10-21-22-70. Students tend to take the “harder” sciences and math courses late in their Chaffey College enrollment. This means that eligible students are ready for transfer and may chose to take the course after transfer. d) The course needs to be up-dated to meet current changes in technology and instrumentation. A change in topic focus but which still provides the hands-on-technical training would benefit enrollment. e) There has not been institutional support for offering this low enrollment capstone course as shown by cancelling of low enrollment sections. The Chemistry department is discussing a change to the AS degree that will make Chem 70 a recommended course. Currently Chem 70 is a required course. This will make the Chemistry AS Degree closer to the proposed Transfer degree for Chemistry.

Review Team Response

STUDENT LEARNING OUTCOMES
Students in chemistry learn to apply critical thinking and hypothesis driven methods of scientific inquiry to chemical
Students in chemistry learn important chemical and physical concepts, symbolism and language used in chemistry, and the needed mathematical skills to apply to chemical events and processes to be su...

Critically think and communicate the understanding of chemical concepts.

**Discuss how the number, type, depth, and breadth of the courses support program SLO's.**
The chemistry department approached the process in a different manner than suggested by the question. The Program SLO's were developed and the individual course SLO's were written to support program SLO's. There are 6 program SLO's and the individual files have been attached to show the process used by the Chemistry Department. These files are works-in-process, are subject to modification and are not up-to-date at this time. However, work will resume late in the semester. The number and type of courses are sufficient to support the program SLO's but currently not all of the courses are being offered. Chem 70 is required to earn the AS degree in Chemistry but has not been offered over the past 4 years. Honors chemistry, which helps to support transfer, has not been offered for the past several years. Chem 7/8 is the non-science major chemistry course and supports general education. The Chemistry department is discussing other courses to add to the curriculum or modifying courses which will provide additional support for the program SLO's. Two additional courses are considered. A low-unit research-based course would give students experience in research and provide students with skills that would be beneficial after transfer and in the workplace. A 1-semester general chemistry survey would better prepare those students whose major only require 1 semester of chemistry.

**Discuss how courses in the program articulate with or complement each other.**
Chemistry has a highly sequential pattern of course offerings. As part of the COR updating process, the articulation of the courses must be addressed in terms of how a higher level course requires a lower level course as a prerequisite. This is the major work that must be completed as part of the COR updating process and is one of the hurdles to the updating process.

**Discuss how courses in the program interact with other programs on campus (for example: cross-listing, overlapping content, or shared resources).**
The chemistry department is a service department in that the chemistry courses are needed to support success in other science-based disciplines. The following is an incomplete list of disciplines requiring a chemistry conceptual knowledge base: biology, physics, earth science and geology, all of the health and animal sciences, drafting, and engineering, to name some of the disciplines on Chaffey Campus. Chemistry shares space and equipment with physical science, shares equipment with drafting and ice to earth science.

**How and when has your department assessed Program SLO's and how have you responded to the results?**
In Spring 2010, the Chemistry department evaluated the course and program SLO's. A decision was made to consolidate the three sets of program SLO's - Transfer, Gen Ed and Health Science - into one set of encompassing
SLO's. Once the Program SLO's were written, individual course SLO's were developed for each Program SLO. Selected course SLO's were evaluated to determine the effectiveness of the chosen evaluation tool. This is an on-going project. Please see the attached files to see the 6 Chemistry Program SLO's. Each file lists the Core competency in purple, the program SLO, and each of the course SLO’s as well as assessment, criteria, results and use of results. These files are works-in-process, are subject to modification and are not up-to-date at this time. However, work will resume late in the semester.

**What program or course changes have been made based on the result of the assessed outcome?**
Chemistry department assess both formally as a result of the SLO initiative and informally as part of professional responsibilities. Three example are given and information will be inputted in the attached files, then into CurricUNet. #1, informal, knowledge competency SLO #2, lab competency SLO #3. Colligative properties are among the last topics introduced in the Chem 21 lecture. To ensure that the Chem 21 students understand, a new lab experiment was introduced to the curriculum in F10. At the end of F10 semester, the Colligative property lab was evaluated and modified for Sp11. This informal assessment identified a curriculum need, developed, implemented and evaluated results. #2, formal, knowledge competency SLO #2. In F10, the ACS exam was administered for the first time to selected Chem 10 classes. Based on the results of the ACS test, the students demonstrated a below expectation understanding of the stoichiometry mole ratio concept. In Sp11, the instructor modified the instruction of this topic and will reevaluate at end of the semester. The successful modification in individual courses can then be incorporated across all sections of the course. #3, formal, laboratory competency SLO #3. The experiment with the lowest average score is identified with the expectation the least amount of student learning occurred with this experiment. In F10, one instructor noticed that the nomenclature labs in Chem 10 had the lowest average grades. In Sp 12, the instructor made sure that the nomenclature topic was introduced in the lecture prior to the lab exercises. This effect of this change will be assessed at the end of the semester. The successful modification in individual courses can then be incorporated across all sections of the course.

**Review Team Response**
Overall Program Level Implementation of SLOs is Developmental Plus. Due to a lack of space in the team response box, the SLO Rubic and a detailed reader's report will be emailed to you and your dean. Review team: Active and demonstrable assessment of SLOs

**Discuss how your services help maintain a high level of student satisfaction.**

**Discuss how you evaluate your effectiveness in meeting students' needs.**

**How and when has your service reviewed or revised SLO?s and/or AUO?s.**

**How has your program utilized SLO/AUO assessment results for program improvement?**

**Review Team Response**

**CURRICULUM UPDATE**

<table>
<thead>
<tr>
<th>Courses</th>
<th>Last Modified</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 75B Organic Chemistry - Active</td>
<td>03/02/2005</td>
</tr>
</tbody>
</table>
Courses should be updated every six years; if course updates are due, please describe your plan and timeline for updating courses:
Chemistry department is aware that the courses need updating. All of the courses are open in CurricUNet and are in the process of being updated as time allows. A conscious decision has been made to put an emphasis on developing and evaluating Course and Program SLO's as required by the college. The department is working to complete the different demands placed on the department and has established a priority list. Direct instruction and staff support, PSR work, SLO's development and assessment have been given a higher priority than updating the COR's. Work continues on the COR updating as time allows.

What steps has your program taken to proactively respond to changing and emerging student and community needs?
Needs Assessment
Labor Market Studies/Projections
Develop New Courses/Programs

**Briefly explain:**
A large research request was sent to Institutional Research in Fall 2010 to obtain a better understanding of the Chemistry program. Information was requested 1) to evaluate how the changes in Chem 21 and Chem 22 course configuration impacted course success; 2) to consider feasibility of a one-semester Gen Chem survey course to meet needs of students who require only one semester, 3) to evaluate effectiveness of California Diagnostic test for prediction of success in Chem 21; 4) evaluate employment trends in chemistry and chemical tech; and 5) other questions not included here. The research will provide a better understanding of how to best respond to changing and emerging student and community needs.

**Review Team Response**

**NON-INSTRUCTIONAL PROGRAM INFORMATION**

**How does your program improve, expand, or support student learning? How do you know?**
Activities that improve, expand, or support student learning. 1) In-house lab manuals are prepared by faculty (Oakdale lead). Student manuals and keys are consumable textbooks, updated or revised periodically. Benefits to this work include: a) less expensive resource. Most in-house manuals cost less than $15 compared to published lab manuals; b) provide laboratory experiences aligned with lecture concepts and c) ability to modify or change lab experiments and/or the lab key. The department must modify the experiments being used to reduce the volume of waste generated and remove specific chemicals which contribute to the overall waste amount. Assessment is through the program lab competency SLO. 2) Student Mentoring through Club Advising: Premed Club (Mamta Agarwal) and Chem Club (Sariwan Tjandra): Pre-Medical (PMS) Club advisor faculty advises students on various requirements for admission to medical institutions with D.O. and M.D. programs. The club 1) holds weekly study sessions to prepare for MCAT, 2) helps students get volunteer positions in area hospitals, 3) invites health care professionals as guest speakers, and 4) attends health care informational conferences throughout the state of California. Within past 2 years, PMS members have attended 2 Pre-Health Care Informational Conferences at UC Davis (Oct. 2009 and Oct. 2010), and 2 Pre-Health care Informational Conferences at UCLA (Mar. 2010 and Mar. 18, 2011 at UCLA. As a club advisor, Mamta Agarwal is spending about five-six hours every two weeks assisting students with various club activities. Student learning is supported through a) study sessions that help students prepare better for MCAT, b) working as a volunteer in health care positions help them satisfy one of the crucial requirement towards admission to the medical program, c) visits by guest speakers provide students knowledge of exactly what to expect as medical college student or a medical practitioner, d) attendance to various conferences has provided students opportunities to talk to people directly involved in admission to medical programs such as college deans, screening committee members just to name a few. Assessment is informal and could be measured by number of students. The Chemistry Club brings together students who share an interest in chemistry and related fields to provide the opportunity to be acquainted with each other. The advisor helps to plan and organize extracurricular activities that can help the club members to grow personally and professionally. Some activities that help student learning include tutoring for the Chem club and non-Chem club members, field trips, volunteer work,
visiting elementary school classrooms, doing hands-on activities or chemistry demonstrations, fund raising, and charity work. Some of these activities improve, expand, and support their learning by their observations of chemistry in action outside of the classroom. Club officers and some members also have opportunities to learn to be leaders. The advisor also attends all the Chemistry Club meetings bi-weekly. More than 20 hours are spent each semester in the club. 3) Supervision of student workers: Readers for Chem 10 (Sariwan Tjandra), Stockroom workers (Sam Gaddie) A) Supervision of stockroom workers. Student stockroom workers learn the following: 1) administrative skills including answering phones, issuing and filing paperwork, and basic computer skills; 2) safe chemical handling and reagent preparation; 3) lab and stockroom management including clean-up/set-up, organization and inventory of supplies, and safety equipment testing. Student learning is improved, expanded, and supported in the following ways. Student stockroom workers gain hands-on experience with chemistry and workplace skills. Two Federal Work Study positions are filled each semester and two or more student worker positions are funded through the department budget. All chemistry students benefit through direct support of the labs, greater access to stockroom assistance, and safer, cleaner labs. The lead instructional assistant spends 15 hours per week or 270 hours per semester providing student worker supervision. B) Chemistry Readers are hired every semester to read all the Chem 10 lab sections (13 – 15 sections). One to three sections are assigned for each reader. Timesheets are also collected near the end of each month. In addition to providing an opportunity for the students to earn extra income, the reader program also has an impact by providing an extra-curricular activity for the students. Students learn to be responsible and follow directions correctly. Students also have an opportunity to read and learn some chemistry to improve their learning. This program expands and supports their learning to be future tutors, SI leaders, and even teachers. About 10 hours or more are spent each semester in this work. 4) Maintenance of the building and the instrumentation is a constant responsibility of all faculty and staff. An AUO was written to address this need and the initial efforts were evaluated. This work directly impacts student learning since students need to be comfortable and feel safe in a chemistry laboratory. A self-evaluating survey was conducted in which most participants noted an improvement in the building. AUO: To provide a comfortable, productive learning environment for the students, the building must be continually maintained by faculty and staff to keep a clean, safe, productive environment.

Describe staff functions and services (these can include diversity, specialties, staff preparation and training, professional activities and committee participation, accomplishments, grants, new programs etc.)

How does your program evaluate its effectiveness?
Chemistry instructional assistants functions as laboratory technicians and their work directly impacts student learning through the 1) preparation of lab reagents and materials used in the lab; 2) preparation and maintenance of the lab environment for all tasks not covered by M&O. This includes a constant pick-up of reagents, materials, etc left by students in balance rooms, sinks, lab rooms, etc. This work improves the physical learning environment; 3) ordering, storage, and disposal of chemicals and materials used by students. Many of these items are regulated as hazardous and special handling is required; 4) Support and training of student workers. The evaluation of this work is through the laboratory competency SLO #3 and the AUO. An important support function is providing immediate assistance in the event of an injury or hazardous spill in the labs. There are times when the faculty member teaching the lab requires immediate assistance while waiting for assistance from campus police, health center or paramedics. At other times, the stockroom assists by escorting a student to the Health Center. The laboratory has known hazards and care is taken to train the students to work safely in the lab. But accidents do happen. This is
the first opportunity the department has had to address the stockroom support of the chemistry program as part of the PSR process. It is obvious that AUO’s need to be developed and evaluation processes need to be determined. Without adequate stockroom support, the chemistry department can not adequately meet the College Mission.

Review Team Response

STUDENT SUPPORT - ACCESS

How do the services you provide to students facilitate access to learning? (e.g. - admissions applications, payment processing, pre-requisite clearances, assessment testing, adaptive technology, program applications, healthcare, student activities, and other specialized services.)
Access to learning shown by these services: Lab in session: replace broken glassware, refill empty bottles, replace waste bottles, fix equipment to complete lab experiments, respond to spills and accidents. Staff ensures that students have access to the materials, equipment, and faculty oversight. Students are not to do lab work if faculty not present. If stockroom is closed, faculty must leave the lab. Lab work is active learning and used to reinforce lecture concepts and teach lab technical skills for success is transfer and jobs; Access to the computer lab: complete lab reports, internet research and tutorial programs. Staff oversees computer lab, provides HASP keys, troubleshoots minor tech problems, notifies IT for larger tech problems; Resource: Often first contact within building and chemistry to assist students finding classes, faculty offices, etc. Stockroom needs to be open at all times labs are in session but with reduced staffing, is unable to maintain the hours.

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Description of Service</th>
<th>How many students received this service?</th>
<th>Measured with?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support function</td>
<td>ordering and inventory of chemicals and supplies, filing of paperwork, preparation of waste stream for disposal, set-up and tear down of the lab, recordkeeping, proper storage of hazardous materials, assisting with minor injuries and accidents</td>
<td>1400 1300 1200</td>
<td></td>
</tr>
<tr>
<td>Computer Lab supervision</td>
<td>locks, unlocks and supervises computer lab, fixes minor technology problems, notifs IT for major problems, assists IT with software inventory, provides log-on information and HASP keys, other services required as needed</td>
<td>1400 1300 1200</td>
<td></td>
</tr>
<tr>
<td>Chino</td>
<td>Support Function for lab classes since opening; F, Sp, Su</td>
<td>96 96</td>
<td></td>
</tr>
</tbody>
</table>
Additional information:
AUO’s need to be developed to define and assess the work of the stockroom work to support student access to the hands-on-learning lab environment. If the labs are not properly supported, access to learning the lab skills, access to reinforcement of lecture concepts and the learning environment is greatly decreased. Without the proper materials present, students can not complete experiments. Unclean, unmaintained labs can not be used by students and this limits access to the lab learning environment. All students who take a chemistry lab class use the stockroom at various times. This is over 1000 students per semester. An AUO with assessment needs to be developed to cover the access function of the stockroom. There is one instructional SLO that covers the lab and does not directly address the stockroom.

Review Team Response

STUDENT SUPPORT - SUPPORT

How do the services you provide to students support student learning? (e.g. 'counseling, orientations, workshops, financial assistance (scholarships, grants, etc'), career assessments, health education, service learning, advisory committees, and other specialized services.)

Laboratory work is active learning: hands-on work that support lecture concepts and teaches technical skills needed to be successful in future jobs and transfer science lab-based courses. With the staff support, the students enjoy a wide variety of lab experiences that address many different concepts and have exposure to a variety of lab skills. In addition, learning occurs best when students feel safe and comfortable in the lab environment. A clean, well-run laboratory is a safe and comfortable environment which supports learning. Supervision of the computer lab supports student learning by providing access to chemistry tutorial and molecular modeling software. Students are able to use the computers to prepare lab reports and research assignments. Purchasing, storing materials/chemicals, inventory maintained, hazardous waste stream preparation are a few of the activities the stockroom staff does which support student learning. Student support and access are inter-related.
<table>
<thead>
<tr>
<th>Lab environment</th>
<th>1400</th>
<th>1300</th>
<th>1200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pick-up misc materials left by students, Clean lab benches, hoods and other surfaces, Keep burets, pipets, common supplies clean and in good condition, Keep reagent bottles filled, Keep waste containers available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource to students</td>
<td>1400</td>
<td>1300</td>
<td>1200</td>
</tr>
<tr>
<td>Access to computer lab, Provide directions to lost students, Provide information about labs, instructor availability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lab prep</td>
<td>1400</td>
<td>1300</td>
<td>1200</td>
</tr>
<tr>
<td>hands-on-technical training, Hand-on-reinforcement of chemical concepts, Provides materials, equipment, and chemicals needed in lab, Provide equipment set-up, repair, maintenance</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional information:
Estimated unduplicated headcount which does not include the summer session. All chemistry lab students are supported by stockroom staff. Amount of stockroom time required to make solutions, prepare materials, maintain equipment, set-up and tear-down labs releases faculty to spend more time and interact more with students which supports learning. This is over 1000 students per semester at Rancho and Chino campuses, and starting F11, Fontana campus. An AUO needs to be developed to assess effectiveness of the stockroom activities. However, instructional SLO's can be used to access stockroom activities since student success is directly impacted by stockroom activities.

Review Team Response
Services support student learning.

STUDENT SUPPORT - OTHER

How do the services you provide to students promote transfer, completion, specialized services, and/or future success? (e.g. graduation ceremony, CSU/IGETC certifications, university transfer, securing employment, transcript requests, enrollment verification, conferring of degrees/certificates, scanning/imaging documents, phone calls received, face-to-face contacts, refunds granted, and other specialized services.)
The stockroom promotes student transfer, completion, and future success through specialized services. Students complete lab work since the needed chemicals, equipment, and a clean, safe laboratory environment are provided and maintained by the stockroom. Students are more successful after transfer since they have learned the lab techniques required in future science-lab classes. The laboratory hands-on work (active learning) engages students beyond the text book and can provide motivation to continue in science. Often the instructional assistants are the first people students meet when entering the chemistry building and students interact with the stockroom on a regular basis while completing the lab experiments. For students, there is nothing more frustrating then trying to
complete the lab due to missing materials or equipment that does not work properly since this leads to an inability to be successful in the lab environment.

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>How does this contribute to student success?</th>
<th>How many students received this service?</th>
<th>Measured with?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Support</td>
<td>Unexpected copies made in other buildings in lab time; key requests when locker keys break or assigned keys do not work; spill clean-ups; escort students to health centers</td>
<td>1400 1300 1200</td>
<td></td>
</tr>
<tr>
<td>Safe, Efficient Lab environment</td>
<td>Minor repair of facilities; Notification of M&amp;O for larger repairs; Periodic Cleaning of fume hoods and chemical storage area; Servicing DI water system; Processing of hazardous waste prior to pick-up</td>
<td>1400 1300 1200</td>
<td></td>
</tr>
<tr>
<td>Student Stockroom Worker</td>
<td>Employment experience; proper techniques and handling of chemicals; personal safety; intro to lab management; administrative skills; intro to applicable regulations – OSHA and EPA; using MSDS's</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning for Chino and Fontana</td>
<td>Planning of labs and prep-rooms, preparation of FF&amp;E lists, assisting with ordering of supplies and equipment; initial unpacking, moving-in and readiness of facility; initial preparation of student lab materials; helping to solve unanticipated problems when facilities first used; expert advise to facilitate regulatory compliance while construction is in progress.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulatory Compliance</td>
<td>Chemical Hygiene Officer; knowledge of hazardous waste regulations applicable to waste stream – HAZWOPER training required; preparation and maintenance of required documentation – MSDS, Safety equipment test logs; reporting of unsafe conditions to</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Additional information:**
Estimated unduplicated headcount which does not include the summer session. All chemistry lab students are supported by stockroom staff. This behind-the-scenes work supports student learning and student access directly and indirectly through the preparation, maintenance, compliance, student contact and other activities that are required to have a properly-functioning department. An AUO needs to be developed to assess effectiveness of the stockroom activities. However, instructional SLO’s can be used to access stockroom activities since student success is directly impacted by stockroom activities.

**Review Team Response**

**VISIONARY IMPROVEMENT PLAN (VIP)**

Please identify 1-3 program improvement goals for the next three years. Goals should state 'what' you plan to achieve and the rationale 'why' for doing so. 'How' you achieve your goals will be entered under Steps to Success. Keep in mind that your VIP should be SMART:

- Specific
- Measurable
- Action-oriented
- Realistic
- Time-bound

All plans should improve or expand student learning.

**Year Three Goal:**
GOAL #4: Comply with outside agencies; OSHA, EPA, Water districts, to ensure safety of student learning environments. The department, if only because this department is chemistry, must meet regulatory obligations of the various federal, state and local regulatory groups. This is to ensure the safety of the students, faculty and staff and to ensure the financial well-being of the college. Financial penalties associated with failure to comply are often substantial and compliance requires instructional involvement. The regulations in some cases are more strictly interpreted and enforced simply because this is chemistry. Both the faculty and staff have changed in the chemistry department and history which had surrounded the compliance with the regulations has been lost and must be regained. An AUO must be developed. Driving force: Federal, State and Local Regulations

**To which planning direction does this goal apply?**
Excellence in teaching and learning
Flexible and continuous student support

Year 1 Steps to Success (activities) and VIP Assessment:
OSHA regulation which requires that a Chemical Hygiene Plan be developed, adhered to and updated on a yearly basis must be satisfied. The chemical hygiene plan states who must receive safety training and requires documentation of knowledge acquisition, what safety equipment must be maintained and documentation of how often inspected, specific chemical warnings and labeling. The current Chemical Hygiene Plan is dated 2001 and is definitely out-of-date. Attendance at a recent Academic Laboratory Workshop pointed out the need to provide safety training for Adjunct Faculty. A suggestion was made to work with other community college to provide a standard training that would be acceptable to all colleges where the adjunct faculty is employed. The Chemistry Department Chemical Hygiene plan will be updated and the required documentation will be initiated. Other local community college chemistry departments will be contacted to form a group that will work on developing a standardized safety training program for adjunct instructors.

Year 2 Steps to Success (activities) and VIP Assessment:
To continue with the safety training of student workers, faculty and staff by developing or implement standardized safety training. Implement the standardized safety training for all student workers, staff and faculty and continue with the required documentation.

Year Three Goal:
GOAL #2: Ensure (Provide) equal student access and support at all campuses and centers to provide effective student learning-centered environments. All the college sites: Rancho, Chino and Fontana have laboratories to support Chemistry laboratory instruction. The department needs to establish a full-time faculty and adequate staff presence at each campus. Driving Force: Institutional Mission; Provide quality education in chemistry through courses at all campuses

To which planning direction does this goal apply?
Excellence in teaching and learning
Flexible and continuous student support

Year 1 Steps to Success (activities) and VIP Assessment:
Chem 10 will be taught concurrently at Fontana and Chino for the first time in F11 IF adequate stockroom staff is available to support the lab preparation and maintenance. Without adequate support, the ability to adequately teach the laboratories in a safe and effective manner is severely compromised. If adequate stockroom staffing is provided, student success at each center is expected to be similar to the student success at the Rancho campus, and through ACS testing results, comparable or better than nation-wide results.

Year 2 Steps to Success (activities) and VIP Assessment:
Chem 10 will be taught concurrently at Fontana and Chino IF adequate stockroom staff is available to support the lab preparation and maintenance. Without adequate support, the ability to adequately teach the laboratories in a safe and effective manner is severely compromised. If adequate stockroom staffing is provided, student success at each center is expected to be similar to the student success at the Rancho campus, and through ACS testing results, comparable or better than nation-wide results.
success at the Rancho campus, and through ACS testing results, comparable or better than nation-wide results.

Year Three Goal:
GOAL #5: Reducing the waste stream protects valuable instructional financial resources and allows these resources to directly impact student learning and the student learning environment. The chemistry department generates laboratory waste which must be handled and disposed of in accordance with federal, state, and local regulations. On more than one occasion, the disposal of the waste stream has decimated the budget of M&O. A request was made to reduce the waste stream of the chemistry department laboratories. This will release needed funds to support the learning environment of the college. Driving force: M&O, College Budget, College-wide Sustainability Initiative.

**To which planning direction does this goal apply?**
Excellence in teaching and learning
Flexible and continuous student support
Connectedness
Sustainability

Year 1 Steps to Success (activities) and VIP Assessment:
The high waste-stream laboratory experiments have been identified. For year 1, replace or modify one experiment which is known to produce a large amount of waste.
The amount of waste generated by the Chemistry department will be reduced by a documented amount based on the particular experiment replaced or modified.

Year 2 Steps to Success (activities) and VIP Assessment:
For year 2, replace or modify one experiment which is known to produce a large amount of waste.
The amount of waste generated by the Chemistry department will be reduced by a documented amount based on the particular experiment replaced or modified.

Year Three Goal:
GOAL #6: Update all course COR's to satisfy the requirement of all faculty to maintain the courses in the department. This is the review and revision of the curriculum to ensure that it is rigorous, logically sequenced, and reflective of the current state of the chemistry. This also includes the development and maintaining modern and competitive chemistry courses to serve the science and non-science majors. Driving Force: Institutional Requirement, Chem Dept.

**To which planning direction does this goal apply?**
Excellence in teaching and learning
Flexible and continuous student support

Year 1 Steps to Success (activities) and VIP Assessment:
Complete the COR's for 1/3 of the chem department courses
Approval of updated COR's by Curriculum committee

Year 2 Steps to Success (activities) and VIP Assessment:
Complete COR's for another 1/3 of the courses
Approval of updated COR's by Curriculum committee

Year Three Goal:
GOAL #7: Modify the format of how the Chem 21 and Chem 22 courses are taught to improve student learning and improve the registration process. Currently, Chem 21 consists of a 3-hour lecture and two 3-hour labs: Chem 21 L-1 and Chem 21 L-2. The Chem 22 has the same format. The department would like to change to a 3-hour lecture, 1-hour discussion and a 3-hour lab. Students will benefit from the discussion section format by providing extra instruction in problem solving, reinforcement of difficult concepts in a smaller student-faculty ratio. This is part of the review and revision of the curriculum to ensure that it is rigorous, logically sequenced, and that this course sequence is modern and competitive. Driving force: Chemistry Department

To which planning direction does this goal apply?
Excellence in teaching and learning
Flexible and continuous student support

Year 1 Steps to Success (activities) and VIP Assessment:
Complete the modification into CurricUnet and obtain approval of the curriculum committee.
Finish the process and obtain curriculum committee approval

Year 2 Steps to Success (activities) and VIP Assessment:
Offer the modified courses
Evaluate the new format through the course SLO’s.

Year Three Goal:
GOAL #1: Evaluating program and course SLO’s to demonstrate that the SLO’s are correctly stated and assessment methods provide usable information. SLO assessment is a multi-year, multi-course project: This is an institutional requirement that course-level SLO’s are assessed and the course-level SLO’s will be used to assess the program SLOs. The department would like to initially assess a) the competency program SLO to ensure that the students are learning at a level comparable to the national level and b) the laboratory program SLO to improve ineffective laboratory experiments. Driving Force: Institutional Initiative

To which planning direction does this goal apply?
Excellence in teaching and learning

Year 1 Steps to Success (activities) and VIP Assessment:
Competency program SLO: American Chemical Society (ACS) course specific exams will be used to evaluate the effectiveness of the course knowledge and compared to national standards established by the ACS. A trial run of using the tests in selected Chem 10, Chem 21 and Chem 22 classes was completed in Fall 10 and Spring 11. In year 1, the testing will be expanded to more chemistry courses and a preliminary assessment of the results will be undertaken. Laboratory program SLO: Average laboratory grades are collected for the courses that have multiple sections: Chem 10 and General Chemistry series – Chem 21/22. The experiments with the lowest average scores will be evaluated for effectiveness in support of learning concepts and hands-on- lab techniques. The experiments will be modified or changed.
Competency program SLO: The department is looking to determine if the courses offered are equivalent to the same courses offered nation-wide. If areas of deficiency are noted, then adjustments to the course curriculum will be undertaken. If no deficiency is noted, then the testing will be expanded beyond the selected sections of Chem 10, Chem 21 and Chem 22. Laboratory program
SLO: We would expect to see the average grade on a laboratory experiment improve after modification or replacement.

**Year 2 Steps to Success (activities) and VIP Assessment:**
Competency program SLO: Continue to give the ACS tests to larger number of Chemistry courses and expand further into the courses taught by adjunct instructors. Laboratory program SLO: Continue the work from year 1 and expand into additional courses. Competency program SLO: The department is looking to determine if the courses offered are equivalent to the same courses offered nation-wide. If areas of deficiency are noted, then adjustments to the course curriculum will be undertaken. If no deficiency is noted, then no adjustments will be made. Laboratory program SLO: We would expect to see the average grade on a laboratory experiment improve after modification or replacement.

**Year Three Goal:**
GOAL #3: Incorporating instrumentation and resources provided by the grants into chemistry curriculum to improve and expand student learning. The instruments, software, computers and other resources provided by the STEM and STEP grants are only valuable if incorporated into the curriculum. The grants provided the funds to purchase the items but did not provide funding to support the incorporation into the curriculum. The result is a slow incorporation of resources into the curriculum. Student learning is positively impacted by the increased level of instruction and hands-on-experience using current real-world instrumentation. This will facilitate learning with modern equipment and computer technology to increase success in employment or transfer. Driving Force: Effective use of grant-funded instrumentation and increased level of student learning.

**To which planning direction does this goal apply?**
Excellence in teaching and learning
Flexible and continuous student support

**Year 1 Steps to Success (activities) and VIP Assessment:**
Incorporate the eft-NMR ($110,000) into the curriculum by either developing experiments or adopting developed experiments. The NMR is slowly being introduced into the Organic Chemistry laboratory this year and usage will be expanded next year. However, this is only one project of many projects that need to be done to take advantage of the grant-funded resources. Students will demonstrate an increased ability to interpret NMR spectra and demonstrate competency on this section of the ACS Organic Chemistry exam.

**Year 2 Steps to Success (activities) and VIP Assessment:**
Continue to incorporate the eft-NMR into the curriculum by expanding the courses which use the instrument. Students in other chemistry classes will demonstrate an increased awareness of the NMR technique, its importance and ability to use the instrument.

**Year Three Goal:**
GOAL #8: Develop a modern focus in Chem 70 which reflects the use of modern instrumentation to improve student learning and takes advantage of the interest in CSI to increase enrollment in the course. This is part of the review and revision of the curriculum to ensure that it is rigorous, logically sequenced, and that this course sequence is modern and competitive. This facilitates learning experience with modern equipment and computer technology. Driving force: Chemistry Department

**To which planning direction does this goal apply?**
Excellence in teaching and learning
Flexible and continuous student support

**Year 1 Steps to Success (activities) and VIP Assessment:**
Develop laboratory curriculum, test the experiments and advertise the course
Demonstrate that the lab curriculum is ready to be implemented.

**Year 2 Steps to Success (activities) and VIP Assessment:**
Offer the course
Enough students enroll so that the course is offered.

**Review Team Response**
Goals are clear, concise, attainable and tied to SLO assessment results. The goals may be too numerous for effective realization.

**PROFESSIONAL DEVELOPMENT ACTIVITIES THAT SUPPORT STUDENT LEARNING OR IMPROVE YOUR PROGRAM**

List Recent departmental professional development activities connected to student learning.

<table>
<thead>
<tr>
<th>Recent activities</th>
<th>Recent workshops/courses taken</th>
<th>Recent conferences/training</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Distance Teaching, Aug/09</td>
<td>Academic Laboratory Workshop 3/11</td>
<td>League of Innovations Conference 3/11</td>
<td>eft-NMR training: F 09 and Sp 10</td>
</tr>
<tr>
<td>First Aid Training - F 10</td>
<td>HAZWOPER training F 10</td>
<td>BCCE 8/10</td>
<td>MS-GC Training Sp and F 10</td>
</tr>
<tr>
<td>School wide meetings</td>
<td>Technology is Not The Enemy, F10, FSC</td>
<td>ACS Leadership Training-Volunteers</td>
<td>Meeting with Curriculum office on updating COR F 10</td>
</tr>
<tr>
<td>How to Respond Effectively to Student Stress, Chaffey FSC, Fall 2010</td>
<td>Success Strategies For Students Who Speak English As a Second Language, F10/FSC</td>
<td>Moodle Training Su 10</td>
<td>ACS National Chemistry at CSU SB F 09</td>
</tr>
<tr>
<td>PSR Overview Sp 11</td>
<td>Molecular Modeling Workshop F 09</td>
<td>Professional Relations Committee Training F 09</td>
<td>San Gorgonio Section Meeting F 08</td>
</tr>
<tr>
<td>Moodle Lab Sp 11</td>
<td>Art of Performing for the Classroom Workshop F 09</td>
<td>Webinar Training for iClicker Su 10</td>
<td>Chemistry Department Brochure Su 10</td>
</tr>
<tr>
<td>Edustream F 10</td>
<td>PASCO probe ware training, Aug/09</td>
<td>West Lilly Conference on Teaching and Learning, Cal Poly Pomona, Sp09</td>
<td>Annual Chemistry Demo Day</td>
</tr>
</tbody>
</table>
### How are student learning outcomes affected by these professional activities? What steps are recommended for improvement?

Attendance at American Chemical Society sponsored functions: (BCCE, 2YC3, Leadership Training, Local Section Activities) and other science professional societies (CSTA, Chem Ed Division); affect student learning by providing direct professional development which can be taken into the classroom as new laboratory experiences, better methods to teach particular chemistry concepts, introduction to new software and equipment. First aid training for faculty and staff improves the first responder response which results in safer learning environment.

### Discuss departmental engagement on campus in connection to student learning.

<table>
<thead>
<tr>
<th>Governance committees</th>
<th>Other college-related committees</th>
<th>Other campus participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Grievance committee</td>
<td></td>
<td>Participation in outreach activities on campus</td>
</tr>
<tr>
<td>PSR Committee - several years</td>
<td></td>
<td>Attending Budget workshops</td>
</tr>
<tr>
<td>Early Alert Committee</td>
<td></td>
<td>Chemistry Department Meetings</td>
</tr>
<tr>
<td>Professional Relations Committee</td>
<td></td>
<td>Pre Medical Club Advisor</td>
</tr>
<tr>
<td>Coordinator Meetings: Department and School-wide</td>
<td></td>
<td>Attendance at faculty-networking events</td>
</tr>
<tr>
<td>Technology Committee</td>
<td></td>
<td>Chemistry Club Advisor</td>
</tr>
</tbody>
</table>
How does your program benefit from your campus engagement?
The faculty and staff members are involved in different campus committees so that the department and campus-side needs can be expressed in different venues. This broad representation means that the program benefits from campus engagement through first-hand knowledge of changes which impact the department, faculty, staff or students. One important benefit is the net-working that occurs to help form a larger sense of community across the campus and improve working relationships across departments and administrative units.

Teaching/Years of Service

<table>
<thead>
<tr>
<th>Chemistry</th>
<th>0-5 years</th>
<th>6-10 years</th>
<th>11-15 years</th>
<th>16-20 years</th>
<th>21+ years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Given the data how has your program been impacted?
This information does not acknowledge the extensive teaching experience of each of the current full-time chemist instructors since all have greater than 15 years of college teaching experience that contributes to the effectiveness of the department and student success. The retired chemistry instructor had over 20 years of experience and her contribution is not acknowledged. The program impact is that the extensive experience provides a strong student-centered learning-environment. In addition, this section does not address the years of service or contribution of the long-term adjunct faculty. Many have been teaching at Chaffey for more than 10 years. Nor does this section recognize the knowledge and experience of the stockroom support staff.

Does your program anticipate retirements within the next 3 years?
The department just lost a full-time member to retirement and a second member is eligible to retire.

Review Team Response

PROJECTED NEEDS

Is any part of the program funded by sources other than the instructional budget (such as grants, partnerships, or other means)? If yes, please identify the source, amount, and length of funding.
The chemistry department has received grant-supported funding to purchase needed equipment and software. The following grants have provided limited support but were not Chemistry Department grants: Copernicus, STEM, and STEP. Each year the department has applied for and received ASCC grants. Since none of the grants were specifically targeting chemistry, the total amount of funding is not known but is estimated at $250,000 - $300,000. Currently, there are no outside funding sources.

After reviewing and analyzing the data and assessment results in this report, please describe and provide rationale for any projected resource needs required to accomplish your Visionary Improvement Plan using the boxes below. Your requests
should be based on student need.

FT Faculty:

Year 1:
One faculty is needed to meet VIP goals and college mission: completing SLO evaluations and assessment; updating course and degree curriculum; improving student learning by smaller classes sizes; a full-time faculty presence at all campuses/centers/all times courses are offered; provide all delivery methods; provide at least one section of each course/yr with full-time faculty; address regulatory requirements; assist with continual program improvement. 6 VIP goals are outside the department. A full-time faculty member presence on each campus/center request with 3 faculty members is challenging. In F11/Sp12, 776 fte of course work is planned and less than 300 fte will be taught by full-time faculty – this is 61.3 % covered by adjunct/overload. Load does not address the effect of the 80% lab load. Faculty in chemistry commonly teach 18 – 19 hours per week in direct instruction which decreases the time to address the VIPs and contributes to the difficulty in completing projects.

Hiring Criteria:

Institutional Level Considerations
Supports Chino expansion
Supports Fontana expansion
Support efficiency over growth (# of sections remain the same)
New and expanding student populations (e.g., Veteran’s, Early Alert)

Department Concerns
Separation of a FT faculty member that creates hardship on the department. Additional consideration needs to be given to replacing the position due to factors such faculty specialization (e.g., not all remaining faculty members can teach all of the classes), seniority of remaining faculty members, etc.
Programs that have extensive technical requirements which are evolving (e.g., software, complex and varied labs)
Supports diversity of program and course offerings

Year 2:

Hiring Criteria:

Year 3:

Hiring Criteria:

STAFF

Year 1
Approved staff positions need permanently filling to support student learning, access and support all campuses at all times that chemistry lab classes are in session. The chemistry staff functions as lab techs and their work directly impacts student learning through: 1 preparation of lab reagents and materials used in the lab; 2 preparation and maintenance of the lab environment for all tasks not covered by M&O: a constant pick-up of reagents, materials, etc in balance rooms, sinks, lab rooms, etc. to improve the
physical learning environment; 3 ordering, storage, and disposal of chemicals and materials used by students – many items are regulated as hazardous and require special handling; 4 support and training of student workers; and 5) support of faculty for accidents and hazardous material management. Training is time-intensive and safety requirements must be done and learning documented - OSHA. It is a waste of money to complete required training for each STW.

Year 2

Year 3

EQUIPMENT

Year 1
Capital expense items still needed includes LC, AA, UV-Vis, analytical balances. The following equipment constantly wears out or breaks: centrifuges, pH meters and/or electrodes, teaching grade spectrometers, melting point apparatus, volt meters, etc. Each item has a cost of $700 - $2000. Currently, the equipment seems to be OK and in sufficient quantity, but this can change at a moment's notice and the expectation is that within the next three years, replacement of a few or many items will be required. No estimation on costs can be made since the department can not accurately predict when items break or wear out and needs that occur must be met immediately. Past PSR recommendation suggested developing a yearly replacement schedule but a 3-year PSR cycle makes predictions of what to replace difficult and the department does not wish to spend funds unnecessarily. A request is made to develop a fast and easy procedure with adequate funding to replace or repair needed equipment.

Year 2

Year 3

TECHNOLOGY

Year 1

Year 2

Year 3
Updating of the laptop computers purchased in F 09. Costs can not be predicted 3-years in advance.

SOFTWARE

Year 1

Year 2

Year 3
Updating of Odyssey and Spartan software purchased in F 09. Costs can not be predicted 3-years in advance.

OTHER

Year 1
First scheduling rights on a room designated as a Chemistry lecture room. Currently, chemistry lectures are taught in a variety of rooms which do not always contain a periodic table, essential to teaching of chemistry. One designated room which holds 48 students would meet the majority of the lecture courses. This room would be close to the chemistry department for access to chemicals and equipment used in demos, contain a lecture-sized periodic table, have a sink, have access to water, storage for some demos, chemistry related posters, molecular models, bulletin board, chem opportunity postings, and other items which would provide a chemistry-orientated student-centered learning environment to improve student understanding of chemistry concepts and access to opportunities in chemistry. Estimated cost is minimal.

Year 2

Year 3

Review Team Response

Review Team Response
Goals are measurable and tied to data. Some goals emphasize expansion that may not be supported at the institutional level. Some goals are facilities issues met by problem solving strategies.