Ohlone College
Program Review Report

- **Program Description and Scope:**
  1. *Program Review Title:* Chemistry Transfer
  2. *Academic year:* 2012/2013
  3. *Review Type:* Instructional Disciplines
  4. *Program/Departments:* Chemistry (19001)
  5. *Authority Code:* 44-Science, Engineering, and Mathematics
  6. *External Regulations:* Yes [ ] No [X]
  7. *Provide a brief narrative that describes the instructional program/discipline.*

The transfer major program in chemistry serves students seeking professions in the sciences as well as life-long learning.

In this program we have the following courses: **Chemistry 101 A and B** which is General Chemistry and is the feeder of several other science courses such as, Biology 101A, Engineering 140, and **Chemistry 112 A and B** which is organic chemistry.

The department currently has 3 full time instructors however one of them (Yvette Niccolls) has been assigned as Coordinator of the division and currently has a lower teaching load. The lead instructor for Chem 101A and B is Dr. Maru Grant and the lead instructor for Chem 112 A and B is Dr. Anu Ganguly. We have 2 part time instructors that teach the one section of Chem 101 each. All sections of Chem 101A and B are taught by Dr. Ganguly.

During the summer sessions student retention and success are high, probably because students who enroll know already the expectations of the course. due to the large number of motivated high school students enrolled in the courses. When Chem 101A or B are offered during the summer, the course lasts six weeks, and it is very intense course since students and instructor are together everyday for six plus hours. Students get to know each other better, get a feeling of community and form study groups that help them with their success in the course. We had not been able to offer Chem 101A or B for two summers due to budget cuts, but we offered in summer 2012 with over 95% retention and 90% success. During the Spring and Fall attrition is about 50%. This high number is not surprising due to the rigorous nature of the program transfer chemistry courses. However we expect than once the changes that we are proposing have been implemented student success will be greater.

8. *Describe how the program specifically serves students, faculty and staff.*

The transfer major core chemistry program offers lower-division major field courses for science transfer students, general education credit for those transferring to the California State University or University of California systems, required courses to fulfill major requirements in two year terminal programs, and general education credit for AA and AS degrees. The transfer
major program in chemistry serves students seeking professions in the sciences and engineering as well as life-long learning.

The public school system of higher education in California is three-prong:
Community Colleges = first 2 years
CSU = both lower and upper division leading to bachelors or masters degree
UC = full program leading to PhD

Since the Community College system in California was created to provide the first two years of college training, preparing students to transfer to either the CSU or the UC system, makes imperative that Ohlone College courses are equal in quality and rigor to the equivalent lower division classes at CSU or UC.

This program enables students to develop a strong foundation in chemistry for successful transfer as described above. Furthermore, the theoretical knowledge and laboratory skills acquired by students in this program also enhances their success with obtaining entry-level jobs that require two years of college-level science.

9. Describe how the program addresses current needs and applies current technologies.

The Chem 101A/B classes are taught using most of the latest technology and effective methods for teaching.

The sequence that we have been following is "atoms first" where we first introduce the complete view of atomic structure including quantum mechanics, then go to compounds, reactions and stoichiometry.

During lecture we use immediate response devices, commonly called "clickers". This technology provides the instructor with instant and frequent assessment of student understanding. It also creates an interactive classroom where all students participate, including the shy ones. This technology also provides a quick way to take attendance.

Ideally the lectures are done using a tablet pc with a software (like Camtasia) that allows writing on the slides, recording the complete lecture and posting it in BlackBoard for the students to review and for the instructors to be able to share opinions and improvements.

These courses are web-enhanced. Using BlackBoard, the students have access to their courses' homework, notes, assignments and grades. Lab protocols are also posted in BlackBoard for the students to download and print rather than buying a lab manual.

In BlackBoard there is a space for discussions and blogs. We believe it is important that the students interact among themselves, they can send messages
and receive any updates or changes in the schedule.

Homework is assigned on line using the program called OWL (On-line Web-base Learning). OWL helps students improve their problem solving skills and visualize concepts, providing instant analysis and feedback to their responses, they can retry the problems as many times as needed until the concept has been mastered. There is variety of homework problems, including tutors, simulations, and short answer questions. Instructors can view cumulative statistics for each student including assignments attempted, total time spent on assignments, total number of questions submitted and so on. This software offers the instructor a way to easily find students at risk and provide help before it is too late.

Visualizing molecules in three-dimensions is a major hurdle for chemistry students. Through the founding of last program review, we have acquired the programs Odyssey and Spartan from Wavefunction inc. These programs have been exceptional teaching tools for the general chemistry courses, using scientifically-based molecular simulations students have experienced an interactive environment for learning and exploration.

10. Discuss the impact of the program on the college and/or other programs.

This sequence of transfer chemistry courses offered at Ohlone serves the needs of students majoring in science with the intention of transferring to a four-year university. Some of the courses are prerequisite for other science courses. For example, the general chemistry course CHEM 101A is a prerequisite for the majors' biology class BIOT 101A; likewise it is often one of the required courses that comprise an engineering engineering major at UC, CSU, and private universities.

11. Discuss the impact of the program on the community and the impact of the community on the program.

Members of the community enroll in chemistry courses for a number of reasons. In addition to seeking to satisfy preprequisites for biology and biotechnology, students may wish to satisfy their curiosity and gain a greater understanding of the principles of materials, reactions, processes, and phenomena encountered in everyday life and/or in the news.

- College Mission
  1. Mission Statement
     The mission of Ohlone College is to serve the community by offering instruction for basic skills, career entry, university transfer, economic development, and personal enrichment for all who can benefit from our instruction in an environment where student learning success is highly valued, supported and continually assessed.
  2. Vision Statement
     Ohlone College will be known throughout California for our inclusiveness, innovation and superior rates of student success.
  3. Core Values, Goals & Objectives:
     College Core Values
     - We provide life-long learning opportunities for students, college personnel
and the community.

- We open access to higher education and actively reach out to under-served populations.
- We promote diversity and inclusiveness.
- We maintain high standards in our constant pursuit of excellence.
- We value trust, respect and integrity.
- We promote team work and open communication.
- We demonstrate stewardship for our human, financial, physical and environmental resources.

**College Goals/Objectives**

1. **Through innovative programs and services, improve student learning and achievement.**
   
   1. By 2013, have in place an ongoing system for identifying and assessing student learning outcomes at the program and course levels, which includes faculty dialogue and appropriate improvement plans.
   7. By spring 2013, increase the number of students receiving certificates of accomplishment and certificates of achievement to a rate at or above the peer group average.
   8. By 2015, increase the number of students taking 12.0 units or more per semester to a rate of 30% compared to headcount enrollment.
   9. By 2011, achieve 100% completion of professional development in online instructional methods and online course management for faculty who teach fully online or hybrid courses.

2. **Enhance college-wide interaction with, and acceptance of, diverse peoples, cultures, arts, and perspectives.**
   
   2. By 2015, increase the number of opportunities for study abroad for faculty, staff, and students.
   3. By 2015, increase the number of extracurricular opportunities, i.e., events, programs and/or clubs, for learning about cultures other than one's own for faculty, staff and students.

3. **Increase access to higher education of under-served and under-represented demographic groups in the District and local communities.**
   
   1. By 2013, increase the enrollment of under-represented groups to approximate the demographic percentages of the district population.
   2. Annually increase retention and success rates of under-served demographic groups.

4. **Briefly describe how the program supports the college mission, vision selected college values.**

   The chemistry transfer program actively supports and implements the goals, objectives and strategies of Ohlone College.

**Vision:** Ohlone college to be known throughout California for our inclusiveness, innovation and superior rates of student success.
Students taking the transfer major core chemistry courses offered at Ohlone college are receiving a superior education that is certainly equal in quality and excellence to one they would receive at any CSU or UC. These are rigorous courses that require time effort and dedication from the student in order to succeed. We are constantly innovating technologically and educationally. Instructors often attend workshops and seminars in order to improve their knowledge and expertise in the area.

Goal 1: Promote appreciation and understanding of diverse races and cultures by expanding the diversity of college personnel, international education offerings and exchanges, cross-cultural curricula, and ethnic/cultural events.

Our college goals state that we strive to reach diverse populations. The chemistry department is striving to develop programs and course curriculum, which attract and retain the underrepresented student population, which is currently missing from our program. For example, even though the local school districts have 40% Latino/Hispanic population, there is only 5% in our chemistry classes. Dr Grant is involved in the organization of Raza Day. During this event students from different high schools attend Ohlone College where workshops and activities are organized for them. During this day the student learn not only of the requirements and steps needed to attend college but they also have a taste of the different areas that are offered at the college, specially the sciences.

Dr Grant is also involved in STEM awareness day. This event is similar to RAZA day but it emphasizes the importance of science, technology, engineering and mathematics. Instructors volunteer their time and resources to give workshops to students. The students that attend Olone College for a day come from either middle school or sixth grade. We look for external funds to support this event. Vendors contribute with free breakfasts or lunches for the students and recently we received support from the Newark Roraty Club.

The instructors are developing the Chemistry Tech program as well as assisting with the LAB project, which reaches out to underrepresented high school and junior high students.

Furthermore, the chemistry department provides life-long learning and outreach to the community. The Science, Engineering, and Technology Division offers a monthly Brown Bag Science Seminar which features speakers from the science professions who enlighten attendees in current topics of science. The Chemistry department has been an integral part of organizing and promoting this event. Students in the Transfer major courses and the community in general are strongly encouraged to attend the weekly science seminars offered at Ohlone College.

5. Briefly describe how the program supports selected college goals.

Formation of the Biology/Chemistry Learning Community has directly addressed Goal #1. The chemistry department constantly seeks ways to
enhance student learning and success. To this end, learning communities are encouraged among students and collaboration is fostered among faculty. Traditionally chemistry has been viewed as a tough subject, and certainly students were observed to have much difficulty in the past. Since many of the same students are enrolled in Chem 101B and Biol 101A, the department became convinced that by working closely together, we could find ways to enhance the success of this cohort. This collaboration was expanded to include Chem 112A/B as well. The formation of a Learning Community was proposed in order to increase the success of students enrolled simultaneously in both biology and chemistry, specifically:

General Chemistry (101A or 101B)
General Biology (101A or 101B)
Organic Chemistry (112A or 112B)

We believe this collaboration will benefit students in the following ways: Students will appreciate the pervasive connectedness between biology and chemistry.
Fundamental cross-disciplinary themes will be emphasized. If all the instructors stress the same identical principles this will help students see commonalities. Students will better appreciate how the concepts in one are intimately entwined and mutually support the other
More efficient learning will take place by virtue of the commonalities. It would be very helpful to students if there is greater consistency in methods of instruction. While it is certainly true that no two teachers teach alike and students can often adapt to differences in teaching styles, still the struggling, sleep-deprived student who is barely able to keep up with the torrent of material coming from both biology and chemistry would be greatly helped by collaboration. Instructors can strive to align their policies between chemistry and biology. Students would benefit from similar requirements in both disciplines. Students would already be familiar with rules and expectations. They would encounter similar philosophies regarding partial credit, essay questions, tardiness, neatness, punctuality, safety, make-up tests, etc. Students will see many of the same students in both their biology and chemistry course, forming friendships and study teams, thus greatly increasing student support and boosting student morale.

The chemistry department seeks to increase the proportion of full-time students. Strategies implemented include the creation of learning communities and cohort groups (described above).

The chemistry department is actively planning enhanced facilities and improved course availability as well. All the transfer major core chemistry courses include a Concept Review course (CHEM 131D) which provides students with much extra support and practice needed for success in these challenging courses. In addition, the General Chemistry courses has been using the SI program for several years now, where a peer student is the leader of discussion and problem solving sessions.
Ohlone’s Chemistry/Biology Learning Center offers expanded hours – this has been effective in increasing student success and retention.

The Ohlone chemistry department provides instruction that consistently allows Ohlone transfer students to perform in their junior year at the university at a level at or above that of students who started at the university as freshmen.

The chemistry faculty under the leadership of Dr. Maru Grant has developed a club "LISTOS" which attracts under-served and under-represented groups of students. This club just became a chapter of SACNAS: (Society for the Advancement of Chicanos/Latinos and Native Americans in the Sciences) a national society with over 70 chapters nationwide. SACNAS club not only include native american and hispanics students but encourages to join to any student that embraces diversity in the sciences. There are many activities that SACNAS offers including a national yearly meeting where the society helps its members financially in order to be able to attend. Through innovative activities and community outreach, students are made to feel encouraged and included. Their tightly knit support system helps prevent isolation and discouragement -- thus increasing retention and success among the underrepresented populations.

6. Briefly describe how the program supports selected college objectives.

   See previous discussion of selected college goals.

- Program SLOs & Assessment
  1. Program SLO -

   Perform proper safety procedures in the laboratory.

   a. Indicate program assessment strategies used.
      i. Other

      Students must demonstrate correct safe practices in the laboratory; they will be able to identify faulty behavior and safety violations when shown a video simulation of lab work.

      Students develop lab protocol using appropriate safety techniques while demonstrating the use of standard equipment.

   b. Describe the criteria and standards used to appraise student work.

      See attachment

   c. Enter assessment results and analyze student success in achieving this program SLO.

      Students in higher level courses obtained higher scores than students in introductory courses, however safety is equally important at all levels.
d. Describe revisions in curriculum or teaching strategies implemented to promote student success.

Instructors must emphasize the importance of safe procedures and must enforce safety during the lab sessions. This is specially important for adjunct instructors. Random visitations by full time instructors to their lab sessions must be performed in order to advice and make them aware of the importance of safety procedures in the chemistry laboratory.

e. Future Action (Improvements)
Describe changes you will make to promote improved student learning

The video that is currently being shown to the students is mostly for General chemistry laboratory. Since the techniques and procedures that Organic Chemistry uses are different and more rigorous than the ones used for general chemistry, a new video will be made exclusively for Organic Chemistry.

2. Program SLO -

Perform proper techniques and the correct use of standard equipment in the laboratory.

a. Indicate program assessment strategies used.
   i. Skills Assessment
   ii. Culminating project

b. Describe the criteria and standards used to appraise student work.
   i. Students have a power point presentation in the first semester of General Chemistry and a culminating project in the second.

   Power point presentation is assessed according to:
   a) Adequate use of Power Point properties (This is usually learnt in CAOT 150) 20%
   b) Reserach done for the topic including references. 20%
   c) Chemical concepts and accuracy of topic. 25%
   d) Critical thinking and innovations. 30%
   e) Participation. 10%

   ii. We summarize the results from lab reports. In order to have a passing score student should have 75% success in average of laboratory reports. Must demonstrate knowledge of the equipment used in GEn Chem and being capable of operating them.

a)
c. Enter assessment results and analyze student success in achieving this program SLO.

Work in progress.

d. Describe revisions in curriculum or teaching strategies implemented to promote student success.

As part of the course we programmed a meeting with the librarian to come to our lecture and teach students how to do scholastic research, rather than just using wikipedia or google.

We also advice the students to take CAOT 150 along with General Chemistry 101A. This course teach student how to make a better power point presentation and also a paper using the MLA format.

e. Future Action (Improvements)
   Maintain current student learning plan

3. Program SLO -

Apply major chemical principles to a variety of problems and applications.

a. Indicate program assessment strategies used.
   i. Performance Assessment
   ii. Department Testing
b. Describe the criteria and standards used to appraise student work.

Standardized final examination is given by the American Chemical Society. In order for the student to succeed, they need to reach a percentile that is the same one used in all general chemistry courses in all the universities using ACS testing.

c. Enter assessment results and analyze student success in achieving this program SLO.

For Organic Chemistry see attachment.

For General chemistry, work in progress.

d. Describe revisions in curriculum or teaching strategies implemented to promote student success.

Changes will be made according to the results from the standarized final examinations which will be examined by topic. For the topics that the students have the lowest success, more lecture time and problems sessions will be designated to those topics.

e. Future Action (Improvements)
   Maintain current student learning plan
   Describe changes you will make to promote improved student learning
Once the assessment per topic is done, we will understand the weakest parts of the current learning plan and will implement new changes according to results. For example, if students are weakest in Chemical Reactions then we will increase the amount of hours spent in that topic and have more problems and work sessions as well. Also, SI leader will focus more in these topics.

**SLO Matrix**

*Key: I-Introduced, P-Practiced with Feedback, M-Demonstrated at the Mastery Level*

<table>
<thead>
<tr>
<th>Course</th>
<th>SLO-1</th>
<th>SLO-2</th>
<th>SLO-3</th>
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<tbody>
<tr>
<td>CHEM 101A</td>
<td>M</td>
<td>M</td>
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<tr>
<td>CHEM 101B</td>
<td>M</td>
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<tr>
<td>CHEM 112A</td>
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<td>CHEM 112B</td>
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<tr>
<td>CHEM 131D</td>
<td>I</td>
<td></td>
<td>P</td>
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**SLO Matrix Comments**

**Course SLO & Assessment**

**CHEM 101A General Chemistry**

1. Perform unit conversions and apply the correct rules of significant figures in chemical computations.
2. Describe the major contribution of famous scientists whose work influenced chemistry.
3. Explain the organization of the Periodic Table; predict and discuss trends of the elements, properties and electron configurations.
4. Write correctly balanced chemical equations and employ them in solving a variety of chemical applications including oxidation-reduction processes.
5. Discuss the geometry and polarity of molecules and use these properties to predict chemical reactivity.
6. Make predictions and perform calculations to determine qualitative and quantitatively changes of properties in systems in the gas, aqueous and solid phases.
7. Explain principles of thermochemistry and use calculations to solve problems involving heat transfer.
8. Describe the wave characteristics of light; explain the photoelectric effect and other phenomenon leading to the quantum-mechanical model of the atom.
9. Demonstrate proper techniques, safety procedures and the correct use of standard equipment in the chemistry laboratory.

**Indicate planned course assessment strategies**

<table>
<thead>
<tr>
<th>Rubrics</th>
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<tbody>
<tr>
<td>Culminating Project</td>
</tr>
<tr>
<td>Performance Assessment</td>
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<tr>
<td>Department Testing</td>
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**Describe the criteria and/or performance standards used to appraise student work.**

Will develop a Rubric and pilot it during Spring 2013.

**Enter assessment results and analyze student success in achieving course SLOs.**
Will analyze the results of our assessment during Fall 2013.

Describe revisions in curriculum or teaching strategies implemented to promote student success.

Revisions will be described according to assessment results in fall 2013.

Future Action (Improvements)

Maintain current student learning plan

**CHEM 101B General Chemistry**
1. Practice basic lab skills, emphasizing safety.
2. Perform calculations pertaining to chemical equilibrium, acid-base equilibria including pH, thermodynamics, electrochemistry and nuclear chemistry.
3. Describe how chemistry, often called the "Central Science," interrelates with biology, geology, and a host of other scientific fields.
5. Predict behavior based on learned properties of buffers, voltaic cells, electrochemical cells, and nuclear isotopes.
6. Discuss properties of equilibrium -- in particular, in acidic or basic solutions; perform related calculations, including the relevant equilibrium constants, the quantities, the pH, and the concentrations.
7. Perform calculations pertaining to the kinetics of chemical systems.

**Indicate planned course assessment strategies**

Describe the criteria and/or performance standards used to appraise student work.

**Enter assessment results and analyze student success in achieving course SLOs.**

Describe revisions in curriculum or teaching strategies implemented to promote student success.

**Future Action (Improvements)**

- **Student Achievement:** A series of measures including course completion, course retention, persistence, program completion, and others.
  1. **List expected student achievement outcomes:**

    Successfully thrive in the subsequent course after completing the prerequisite course with a C or better (in the case of General Chemistry, the student must successfully thrive in General Chemistry Chem 101A after passing the Chemistry Assessment Test).

    2. **Analyze changes in data, identify trends, and provide possible contextual explanations for each measure used. (Example measures include: course completion, course retention, persistence, program completion).**

    2011-12: Our annual FTES had been steadily increasing at around 2 to 5 %, but in the last two years, it went up to 11%. Students success has also been increasing with the highest in Spring of 2009. The success rate for underrepresented students,
basically Latino students has also been increasing with the highest rate again in Spring 2009. The improvement of success rate maybe attributed to the incorporation of the placement test and the pre-requisite course (Chem 102) for the entrance to Chem 101A, therefore having students with the same level of preparation during the first course of General chemistry, allows the instructor to focus more on the curricula and not going over concepts that the students are supposed to have mastered in the pre-requisite course.

3. **Analyze program budget trends and expenditures. Comment on how the program can best use budget resources.**

4. **Analyze the program's current use of staff, equipment, technology, facilities, and/or other resources. Comment on how the program can best use these resources.**

5. **Describe any additional notable program achievements (optional).**

6. **Additional Program Table Data**

7. **Future Action**

**Program Analysis**

After assessing student learning outcomes/impacts, student/program achievement, and the status of previous program improvement objectives (PIOs), analyze the data and any identified trends, and summarize you findings. Use these data and trends to prioritize, revise, or develop new PIOs

1. **Describe program achievements and successes.**

   A significant increase in retention has been achieved in the past 3 years. This is specially significant for the underrepresented students. See program description and scope.

2. **According to the evidence, what are the areas needing improvement?**

   We need to modernize and update laboratory programs in both Gen Chem and Ochem. It is extremely important to do it for Ochem since we need to change the lab protocols as being green, ie using less amount of chemicals and choose the most environmentally friendly ones.

**Program Improvement Objectives:**

1. **Objective:**

   Improve teaching laboratory safety and utility in order to provide students a safe, flexible and interactive learning environment.

   a. **Action Plan**

   Year 1:

   Faculty will develop and implement a plan to address safety issues and the need for updated facilities, immediate and longer range, to attain a modern, functional laboratory to facilitate the achievement of the more specific SLOs for each program in chemistry.

   Year 2:
Continue to implement the safety plan; investigate and apply for funding sources and design specific construction plans to create a new science center.

Year 3:
Continue construction of new science center.

b. Staffing
Year 1:
Hire additional lab technician enhancing faculty and students safety and hire additional student technicians.

Year 2:
Hire additional student technicians.

Year 3:
Hire additional student technicians.

c. Equipment (Include items that fit under department budget codes)
Year 1:
Equipment needs to be determined by safety, storage and design plans outlined in the safety plan

Year 2:
Continue to obtain needed equipment as per safety plan.

Year 3:
Continue to obtain needed equipment as per safety plan.

d. Technology (Include items that fit under IT budget codes)
Year 1:
Convert the Organic Chem lab into a smart lab with a Computer podium and projector, with wireless connection.

Year 2:
22 laptop computer to be use in Chem 112 and Chem 101.
Cart for storage the laptops.

**Year 3:**
Optimize internet and wireless capabilities for students within laboratories to maximize computer assisted analysis of data and enable students to work interactively.

e. *Facilities (Include items that fit under the Facilities budget codes)*
   **Year 1:**
   Finish the construction and renovation of laboratories and stockroom, storage and instrumentation room.

   Transfer of chemicals, materials and equipment to new facilities.

   **Year 2:**
   Start the design of the new science center.

   **Year 3:**
   Continue the design of the new science center.

f. *Other (Include other resources needed)*
   **Year 1:**
   release time for one or more faculty work on developing building plans and funding sources

   **Year 2:**
   release time for one or more faculty work on developing building plans and funding sources

   **Year 3:**
   release time for one or more faculty work on developing building plans and funding sources

g. *Assessment Plan: List Assessment Strategies*
   **Year 1:**
   Program SLO assessment, OSHA assessment, student feedback
Year 2:
Program SLO assessment, OSHA assessment, student feedback

Year 3:
Program SLO assessment, OSHA assessment, student feedback

h. Which college goal(s) does this program improvement objective work to achieve? Clearly describe how your PIO will help achieve one or more of the college goals and objectives, has impact beyond the particular department, and contributes to student learning/success.
1. Through innovative programs and services, improve student learning and achievement.
Rationale:
Chemistry students should know and follow safety procedure in order to perform any chemistry experiment.

4. Use human, fiscal, technological, and physical resources responsibly, effectively, and efficiently to maximize student learning and achievement.
Rationale:
Students should have a safe environment where they can learn without the fear of being at risk of any malfunction that would provoke and accident.

2. PIO Assessment
a. Enter assessment results with analysis.
A plan was developed to address safety issues and updated facilities. In summer 2011, the chemistry labs were moved to a new facility that was constructed. Unfortunately this facility has different faults which are being addressed right now.

b. Describe how PIO achieved one or more of the college goals and objectives, had an impact beyond the particular department, and contributed to student success/learning.
Future action

c. Analyze the impact of reallocation or addition of resources. If money or resource was not used, give rationale.
Future ACTION

d. Future Action
1. **Objective:**

Increase the number of students getting a certificate of achievement in chemistry or an Associate's degree to promote transfer and employment opportunities.

a. **Action Plan**
   
   **Year 1:**
   
   Review the requirements for obtaining an associate's degree or a certificate of achievement. Change them if necessary.

   Identify students that would benefit by obtaining an associate's degree or a certificate.

   **Year 2:**
   
   Identify students that would benefit by obtaining an associate's degree or a certificate.

   Continue offering active workshops to assist students fulfilling the requirements to apply for an associate's degree or a certificate.

   **Year 3:**
   
   Identify students that would benefit by obtaining an associate's degree or a certificate.

   Continue offering active workshops to assist students fulfilling the requirements to apply for an associate's degree or a certificate.

b. **Other (Include other resources needed)**
   
   **Year 1:**
   
   A room with wi-fi is needed to frequently meet with students.

   Laptops are needed for the students to fill out applications.

c. **Assessment Plan: List Assessment Strategies**
   
   **Year 1:**
   
   Obtain a list of students that could benefit by obtaining an associate's degree or a certificate.

   This plan could be achieved as part of the activities of a student club. LISTO Club would be an excellent one to do this, since most of the students that do not finish their credits to transfer to a 4 year university are in the latino...
community.

**Year 2:**
Contact all students in the list of the previous year and see their status.

Update the list of students that could benefit by obtaining an associate's degree or a certificate.

**Year 3:**
Contact all students in the list of the previous year and see their status.

Update the list of students that could benefit by obtaining an associate's degree or a certificate.

d. *Which college goal(s) does this program improvement objective work to achieve? Clearly describe how your PIO will help achieve one or more of the college goals and objectives, has impact beyond the particular department, and contributes to student learning/success.*

1. Through innovative programs and services, improve student learning and achievement.

Rationale:

Objective 7 and 8: Most students at Ohlone are planning to transfer to a 4-year University, while some of them do, some others, for different reasons, do not transfer and just drop school. By not only encouraging but giving guidance and support to students on taking the appropriate courses and applying for a certificate or degree, it will increase the earning power of those students that for some reason or another can not obtain a bachelor's degree.

7. Increase access to higher education of under-served and under-represented demographic groups in the District and local communities.

Rationale:

Many underrepresented students do not have opportunities to attend college due to lack of information. It is vital that we educate and encourage this population of students to pursue higher education. The Hispanic group is the target group that is being currently assisted.

2. **PIO Assessment**

   a. *Enter assessment results with analysis.*

   Students used to not apply for a certificate of achievement because of lack of knowledge or interest. Chemistry instructors now are educating them in the
advantages of obtaining it. 87% of students enrolled in Chem 101B have applied for it since Fall 2010.

b. Describe how PIO achieved one or more of the college goals and objectives, had an impact beyond the particular department, and contributed to student success/learning.

Students that feel that chemistry or science will not be their major, realize the advantages of getting a certificate of achievement. In cases were students would drop the course, they prefer to finish and get their certificate.

c. Future Action
   Current level of focus maintained. Describe.

1. Objective:

Update and continue modernizing the Chemistry program and curriculum so that every course we offer is aligned with the equivalent courses offered at any 4 year university, specially UCs and CSUs.

a. Action Plan
   Year 1:

   Continue improving lecture and laboratory activities.
   Lectures will be updated and new clicker questions and new demos for the students will be implemented.
   Laboratory experiments protocols need to be revised, including the use of the different technology that the department has acquired, edited and make them available to students free of charge. There should also be a master copy of sample solutions and results available for instructors including the prep sheets for the lab technicians.
   Equipment should be implemented so most of the lab experiments use updated equipment.

   Year 2:

   Increase the number of sections offered in Chem 101A.
   Continue improving lecture and laboratory activities.
   Collaboration with chemistry faculty at Bay area universities.
   Attendance to chemistry conferences in order to learn new developments in the teaching of chemistry

   Year 3:

   Continue improving lecture and laboratory activities.
   Collaboration with chemistry faculty at Bay area universities.
   Attendance to chemistry conferences in order to learn new developments in the teaching of chemistry
b. **Staffing**

**Year 1:**

Hire a lab technician for the lab evening sessions.
Provide assigned time for full time faculty to update laboratory curriculum.

**Year 2:**

Hire more adjunct faculty to teach more sections offered in Chem 101A

c. **Equipment (Include items that fit under department budget codes)**

**Year 1:**

10 Go Link adaptors that connect lab computers to the probes
10 of each of the following probes:
- temperature probes
- pH
- colorimeter
- pressure
- conductivity

**Year 2:**

Replacement of broken glassware and old equipment.
4 more Vernier spectrophotometers. $1,600.00 each

**Year 3:**

4 more Vernier spectrophotometers. $1,600.00 each

d. **Technology (Include items that fit under IT budget codes)**

**Year 1:**

A laptop computer to augment the set which is currently used and stored in the COW cart on the Fremont campus. Currently there are not enough computers available for the students to perform the lab exercises in teams of two. Cost $1200

**Year 2:**

10 laptop computers for the laboratory, so each student will have their own computer. $1,200 each

Site license of students' version of Odyssey $1500
Site license of students' version of Spartan Model $1500

Year 3:

site license of students' version of Odyssey $1500
Site license of students' version of Spartan Model $1500

e. Facilities (Include items that fit under the Facilities budget codes)
   Year 1:
   
   Ergonomic chairs for chemistry labs.

f. Other (Include other resources needed)
   Year 1:

   Staff development funds for guest speakers to increase the expertise and
   knowledge of the chemistry faculty in this field.

   Year 2:

   Staff development funds to attend BCCE Biannual conference on Chemical
   Education in the summer of 2014 or any other relevant conference that will
   help our faculty increase their awareness on the new developments in the
   teaching of chemistry.

   Year 3:

   Staff development funds to attend the ACS conference or any other
   conference that will help our faculty increase their awareness on the new
   developments in the teaching of chemistry.

g. Assessment Plan: List Assessment Strategies
   Year 1:

   When instructor and students have the same version of the software, both
   full-time and adjunct instructors will have access to the solutions of the
   problems generated by the program and therefore will know what the
   students are doing and will be able to provide timely and effective
   feedback. Assessment is completed via student completion of the problems
   and questionnaire at end of course.

h. Which college goal(s) does this program improvement objective work to
   achieve? Clearly describe how your PIO will help achieve one or more of the
   college goals and objectives, has impact beyond the particular department,
   and contributes to student learning/success.
1. Through innovative programs and services, improve student learning and achievement.
Rationale:

Students will be learning using state of the art technologies, very similar to those found at any other Universities.

Students are using technology in the lab but we do not have enough for each student. Every student should be able to use a personal computer and have his/her own equipment to perform every experiment in the chemistry curriculum.

4. Use human, fiscal, technological, and physical resources responsibly, effectively, and efficiently to maximize student learning and achievement.
Rationale:

Having students use their own equipment, it will give them better understanding of the concepts taught and will have the experience of using the equipment rather than just watching the instructor demonstrating the experiments. Use of current technology will better prepare students for transfer and/or job opportunities.

7. Increase access to higher education of under-served and under-represented demographic groups in the District and local communities.
Rationale:

A good preparation in Chemistry will help students be accepted in programs such as ELP at Berkeley and other that serve mainly under-represented students.

2. **PIO Assessment**
   a. *Enter assessment results with analysis.*

   Students get higher percentile in the standardized exams that the average course in the USA that use the ACS examination. Students entering a 4 yr university feel more confident because of the preparation received at Ohlone College.

   b. *Describe how PIO achieved one or more of the college goals and objectives, had an impact beyond the particular department, and contributed to student success/learning.*

   Transfer rates are higher now.

   there is reputation around that the science courses at Ohlone College are as rigorous or more that the ones offered at UC Berkeley or any other UC or CSU.
c. Future Action

- **Outside Review Results**
  1. List each team members name and title.
     None.
  2. Discuss key feedback provided by team and how it was incorporated into the report.
     None.

- **Attached Files**
  1. Program Assessment.docx