



**ANNUAL PROGRAM PLAN & REVIEW (INSTRUCTIONAL)**  
ASGC ADOPTED SPRING 2011

The purpose of this document is to collect information to be used by the college planning bodies IPC (Instruction Planning Council), APC (Administrative Planning Council), SSPC (Student Services Planning Council), Budget Planning Committee, and CPC (College Planning Council) and may be used for Program Improvement and Viability (PIV). Through this process, faculty have the opportunity to review the mission and vision of their department/program. Then, using multiple measures and inquiry, faculty will reflect on and evaluate their work for the purposes of improving student learning and program effectiveness. This reflection will identify steps and resources necessary to work towards the program vision including personnel, professional development, facilities, and equipment. *Faculty should use their judgment in selecting the appropriate level of detail when completing this document.*

**The deadline for submission of the Annual Program Plan to the IPC is March 31.** Complete this document in consultation with your Dean who will then submit a copy to IPC. Members of the IPC review the document and return their comments to the author for use in the next annual program plan.

**Cañada College**

**Mission Statement**

It is the mission of Cañada College to ensure that students from diverse backgrounds have the opportunity to achieve their educational goals by providing quality instruction in general, transfer, career, and basic skills education, and activities that foster students' personal development and academic success. Cañada College places a high priority on supportive faculty/staff/student teaching and learning relationships, responsive support services, and a co-curricular environment that contributes to personal growth and success for students. The College is committed to the students and the community to fulfill this mission.

**Vision**

Cañada College ensures student success through personalized, flexible, and innovative instruction. The College infuses essential skills and competencies throughout the curriculum and assesses student learning and institutional effectiveness to make continuous improvement. Cañada responds to the changing needs of the people it serves by being involved in and responsive to the community, developing new programs and partnerships and incorporating new technologies and methodologies into its programs and services.



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Document Map:

- 0) Key Findings
- 1) Planning group
- 2) Authors
- 3) Program
- 4) Responses to previous Annual Program Plan & Review (APP&R)
- 5) Curricular Offerings
- 6) Program Level Data
- 7) Action Plan
- 8) Resource Identification



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Note: To complete this form, **SAVE** it on your computer, then send to your Division Dean as an **ATTACHMENT to an e-mail message.**

**Department/Program Title:** Chemistry

**Date submitted:** 3/28/2014

**0. Key Findings:**

- Enrollment in General Chemistry I, CHEM 210 and General Chemistry II, CHEM 220 continues to increase.
- CHEM 210 day sections are mostly offered as double sections. This means 60 students in one lecture room. The lecture section is divided into two lab sections to comply with the maximum occupancy allowed in the laboratory rooms. The LOAD of a double section is the same as the load of a single section.
- An evening hybrid single section of CHEM 210 was offered in Spring 2013 for the first time.
- CHEM 220 was offered as a single section in the Fall, its off-sequence semester, and as a double section in the Spring.
- Enrollment in Organic Chemistry I, CHEM 231 (formerly CHEM 234/237) and in Organic Chemistry II lecture and lab, CHEM 235 and CHEM 238 stays unchanged. Enrollment in these classes is low across the District.
- Due to decreased interest in the Honors Organic Chemistry classes, they will be offered as Honors contract instead of a separate section. The Honors sections do not add FTE/LOAD. Similarly contracts do not add FTE/LOAD.
- CHEM 410 was offered as a Learning Community linked to the PATH program with marginal success.
- There were two to three students enrolled in CHEM 695 per semester and summer session to conduct independent study research. It is challenging to supervise independent study research due to schedule conflicts and limited dedicated time beyond a full-time teaching schedule.
- Room 18-115 was identified as a research laboratory to conduct independent study students.
- CHEM 192 and CHEM 410 students are not assigned drawers since there are not enough laboratory drawers in the existing laboratory rooms for all classes. Setting up and taking down laboratory supplies and equipment per lab for these classes takes significant additional time away from the laboratory technicians.
- Signature assignments were identified for CHEM 210 and CHEM 238.
- Duplicating allocated budget is insufficient to cover expenses to duplicate midterms due to increased enrollment. All other instructional materials are posted on Webaccess.

**1. Planning Group** (include PT& FT faculty, staff, stakeholders)

List of names and positions:

Mr. Mohinder Bhatia – PT faculty

Dr. Lucas Cantin – PT faculty

Dr. Nicholas DeMello – PT faculty



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Dr. Jean Dupon – PT faculty  
Dr. Jeanette Medina – FT faculty  
Dr. Robert Tricca – FT faculty  
Roslind Young – FT staff  
Justine Walsh – PT staff  
Dr. Allan Wilcox – PT faculty

**2. Writing Team and Contact Person:**

Writing Team: Jeanette Medina, Robert Tricca, Roslind Young, Justine Walsh  
Contact Person: Jeanette Medina

**3. Program Information**

**A. Program Personnel**

Identify all personnel (faculty, classified, volunteers, and student workers) in the program:

**FT Faculty:** Jeanette Medina, Robert Tricca

**PT Faculty:** Mohinder Bhatia, Lucas Cantin, Nicholas DeMello; Jean Dupon; Allan Wilcox,

**FTE** (Fall 2012) 4.16  
(Spring 2013) 4.32

**FT Classified:** Roslind Young

**PT Classified (hrs/wk):** Justine Walsh (18 hrs/wk)

**Volunteers:** None (no volunteers allowed in chemistry laboratories or chemistry stockroom due to liability considerations)

**Student Workers:**

Jamela Lanese Brown, Ernest Agyei Frimpong, Kim Vo Thien Nguyen, Sarah Victoria Hill

**B. Program mission and vision**

Include the purpose of the program, the ideals the program strives to attain, and whom the program serves. The program mission and vision must align with the college's mission and goals. (200 word limit)



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The mission of the chemistry department is to offer rigorous, sufficient and updated course work to support all students in achieving their individual academic goals: Associate degree in Physical Sciences; preparation for transfer to into STEM fields; general education; and personal enrichment are the current exit points.

The vision of the chemistry department is to provide a variety of educational opportunities for students to acquire discipline specific fundamental background and laboratory skills necessary to be successful in chemistry and chemistry related fields. The use of analytical laboratory instrumentation; and individual and group projects are integral part of the chemistry curriculum. The chemistry department faculty and staff keep abreast of changes and advances in the field. The chemistry department continuously assesses its effectiveness and incorporates new techniques and methodologies in response to changes in students' needs.

### C. Expected Program Student Learning Outcomes

Tool: **TracDAT folders in the SLOAC sharepoint.** Click on the link below to access your folder and log in with your complete smccd e-mail account, ex:smithj@smccd.edu and password <http://sharepoint.smccd.edu/SiteDirectory/CANSLOAC>

List expected Program Student Learning Outcomes (PSLOs) (minimum of 3) and assessment tools for each.

There is confusion among the Physical Sciences Program Faculty regarding the courses to be targeted to assess PLOs. The second semester of Organic Chemistry was chosen as the most appropriate course.

1. Students completing this program will be able to use the scientific method and appreciate its importance to the development of scientific thought.  
Assessment tool: Question(s) on the final exam in Organic Chemistry II, CHEM 232 (formerly 235).  
Assessment tool: Selected lab report in Organic Chemistry II lab, CHEM 232 (formerly 238).
2. Students completing this program will demonstrate the ability to document and communicate their work effectively.  
Assessment tool: Signature Assignment laboratory report for the experiment "Qualitative Organic Unknown Analysis and Identification" in CHEM 232.
3. Students completing this program will demonstrate critical thinking and the ability to analyze physical systems in terms of scientific concepts.  
Assessment tool: Signature Assignment laboratory report for the assignment "Qualitative Organic Unknown Analysis and Identification" in CHEM 232.



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**4. Response to Previous Annual Program Plan & Review**

Tool: <http://sharepoint.smccd.edu/SiteDirectory/canio/ipc>

(log in with your complete smccd e-mail account, ex: smithj@smccd.edu and password)

List any recommendations for the program and your responses to these recommendations based on previous Annual Program Plan and/or CTE Professional Accreditation report.

Guideline: Original documents can be linked or attached, as needed.

The 2012-2013 Annual Program Plan/ Review Feedback Form – UPC contained no recommendation.

**4. Curricular Offerings (*current state of curriculum and SLOAC*)**

| Course Prefix | Course Number | Course Title  | Date of last revision | SLO Cycle completed * |
|---------------|---------------|---|-----------------------|-----------------------|
| CHEM          | 192           | Elementary Chemistry                                | 3/23/10               | Yes                   |
| CHEM          | 210           | General Chemistry I                                 | 3/14/11               | Yes                   |
| CHEM          | 220           | General Chemistry II                                | 3/14/11               | Yes                   |
| CHEM          | 231           | Organic Chemistry I                                 | 11/11                 | No                    |
| CHEM          | 234           | Organic Chemistry I                                 | 2/09/10               | Yes                   |
| CHEM          | 235           | Organic Chemistry II                                | 12/08/09              | Yes                   |
| CHEM          | 237           | Organic Chemistry Laboratory I                      | 2/09/10               | Yes                   |
| CHEM          | 238           | Organic Chemistry Laboratory II                     | 2/15/11               | Yes                   |
| CHEM          | 410           | Chemistry for Health Sciences                       | 12/10/10              | Yes                   |
| CHEM          | 680H          | Honors Colloquium in Chemistry                      | 1/31/09               | Yes                   |
| CHEM          | 695           | Independent Research Study                          | contract              | Yes                   |
| CHMT          | 310           | Introduction to Chemical Laboratory Technology      | 2/09/10               | No                    |
| CHMT          | 340           | Introduction to Chemical Laboratory Instrumentation | 5/05/09               | Yes                   |

CHEM 234 and CHEM 237 were combined into CHEM 231 to be in agreement with the course offerings at College of San Mateo. This action was officially approved by the Curriculum Committee in December of 2011. CHEM 231 was first offered in Fall 2012. CHEM 234 and CHEM237 SLO data were copied into the new CHEM 231 record on tracdat. CHEM 234 and CHEM 237 SLO records were deleted. The four-year CHEM 231 SLO started in Fall 2012. CHEM 680H has not been offered since Fall 2009. A request to bank it will be submitted. CHMT 310 and CHMT 340 are the two courses specific to the Chemical Laboratory Technology program which have not been offered since 2010 due to lack of student interest. Both CHMT 310 and CHMT 340 are listed as inactive in tracdat. These courses



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will be officially banked. The Chemical Laboratory Technology Certificate and the AS degree will also be banked.

**All curriculum and SLOAC updates must be completed when planning documents are due.**

SLOAC = Student Learning Outcomes Assessment Cycle

Tools: **TracDAT folders in SLOAC** sharepoint <http://sharepoint.smccd.edu/SiteDirectory/CANSLOAC>

**Curriculum Committee** <http://sharepoint.smccd.edu/SiteDirectory/cancurriculum/>

**A. Attach the following TracDat and Curriculum data in the appendix:**

- List courses, SLOs, assessment plans, and results and action plans (attach report from [TracDAT folders in SLOAC sharepoint](#)).  
A twenty nine-page report is available in TracDat. It is not attached to this document as per instructions of the SLOAC coordinator.
- List courses with COR's over 6 years old (attach documents from [Curriculum Committee](#))  
None

**B. Identify Patterns of Curriculum Offerings**

Guidelines: What is the planning group's 2-year curriculum cycle of course offerings by certificates and degrees? What is the ideal curriculum cycle? Discuss any issues.

The complete chemistry offering cycle includes one year of general chemistry and one year of organic chemistry. This complete cycle is taken by students majoring in Biology and Physical Sciences. A large number of returning students holding a BS or even Master degrees take these courses to complete Professional School preparation requirements (Pre-Dental, Pre-Medicine, Pre-Pharmacy, Pre-Veterinary, and Pre-Optometry).

The ideal chemistry cycle is as follows:

| Semester              | Course  |
|-----------------------|---|
| Fall of first year    | General Chemistry I – CHEM 210                      |
| Spring of first year  | General Chemistry II – CHEM 220                     |
| Fall of second year   | Organic Chemistry lecture and lab I – CHEM 231*     |
| Spring of second year | Organic Chemistry lecture and lab II – CHEM 235/238 |

\*CHEM 231 replaced CHEM 234/237 in the Fall of 2012



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We have sufficient enrollment to offer the general chemistry sequence every semester and during the summer session. One section of general chemistry I, CHEM 210 is being offered as an evening hybrid course in addition to the regular day section. Currently, we can only offer organic chemistry I in the Fall semester and organic chemistry II in the Spring semester. There is insufficient enrollment to justify offering organic chemistry every semester. Two sections of Chemistry for Allied Sciences are offered every semester, one regular and one evening hybrid. This course is also offered in the summer.

## 6. Program Level Data

### A. Data Packets and Analysis from the Office of Planning, Research & Student Success and any other relevant data.

Tool: [http://www.canadacollege.edu/inside/research/programreview/info\\_packet/info\\_packet.html](http://www.canadacollege.edu/inside/research/programreview/info_packet/info_packet.html)

Guidelines: The data is prepared by the Office of Planning, Research & Student Success and is to be attached to this document. Include the following:

- Describe trends in the measured parameters.
- Reflect and analyze causes of trends.

Average enrollment per section

|            | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 |
|------------|-----------|-------------|-----------|-------------|
| Cañada     | 25.3      | 24.2        | 25.0      | 24.2        |
| *Chemistry | 25.3      | 21.7        | 25.0      | 22.0        |

\*All Chemistry classes have a laboratory component. There is a maximum laboratory enrollment restriction of 30 students due to safety regulations. The other Colleges in the District have lower maximum enrollment caps.

The above data shows that the average enrollment per section has leveled in both semesters. The average enrollment per section in Spring is higher than in the Fall, probably due to a second section of CHEM 220 offered in the Spring. Enrollment in Organic Chemistry has remained flat but enrollment in general chemistry seems to continuously increase. The number of sections of general chemistry I offered cannot be increased accordingly since we do not have laboratory space to accommodate additional day sections. If we can find additional laboratory space to teach more sections, we will need to request additional instructional staff.





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Chemistry Department Efficiency

|      | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 |
|------|-----------|-------------|-----------|-------------|
| WSCH | 2032      | 2050        | 2263      | 2161        |
| FTE  | 3.84      | 4.16        | 4.16      | 4.32        |

Load

|           | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 |
|-----------|-----------|-------------|-----------|-------------|
| Cañada    | 550       | 516         | 502       | 479         |
| Chemistry | 529       | 493         | 544       | 500         |

The Weekly Student Contact Hours increased modestly in the year 2012-2013 compared to the previous year. The Full Time Equivalent increased comparatively. Load data is shown below. Despite the enrollment limitation of 30 students per laboratory section and the decreased enrollment observed in some sections, the Chemistry Department has maintained a Load comparable to the College's Load and even surpassed it in the 2012-2013 academic year. This is probably due to some general chemistry sections being offered as double lecture sections with a 60 student enrollment. The lecture section is split into two laboratory sections.

Success rate

|           | Fall 2011 | Spring 2012 | Fall 2012 | Spring 2013 |
|-----------|-----------|-------------|-----------|-------------|
| Cañada    | 68.4%     | 70.1%       | 68.6%     | 69.8%       |
| Chemistry | 71.2%     | 78.7%       | 69.1%     | 72.7%       |

The success rate of the Department is between 4% and 12% higher than the success rate of the College. It declined considerably in the Fall of 2012 but started to increase again in Spring 2013. All faculty, including adjunct faculty, are committed to provide students the necessary support to help them be successful. Students receive continuous academic assistance in the form of office hours, study groups, study sessions, extra practice problems, etc.

**B. Analyze evidence of Program performance. Explain how other information may impact Program (examples are business and employment needs, new technology, new transfer requirements)**

Tool: **TracDAT folders in SLOAC** sharepoint <http://sharepoint.smccd.edu/SiteDirectory/CANSLOAC>

Guidelines:

- Explain how the assessment plan for Program Student Learning Outcomes (listed on #3c) measures quality and success of each Program.



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- Summarize assessment results of Program Student Learning Outcomes.
- Describe and summarize other data that reveals Program performance.
- Explain how changes in community needs, technology, and transfer requirements could affect the Program.

Specific examples of SLOs, PLOs and Program performance can be obtained from the 29 pages SLOAC report in TracDat. In general, the results from course level SLOs have guided changes in teaching methodology to improve student success. For example, we have been able to identify some areas within specific topics in which students need additional support. Some of the support can be done by modifying the delivery of the topic in the classroom or providing additional more focused practice exercises. Program performance metrics analysis can be found in section 6A. of this report. In addition, we determined the need for additional computers that can be used by students during lecture/laboratory exercises to conduct virtual laboratories or use data acquisition systems. We also determine the need for gas discharge tubes and spectrometers to help students visualize the particulate nature of matter, the core foundation of the chemistry discipline. Program level SLO have proven to be more challenging to analyze. Given the broad nature of the Physical Sciences Program SLOs that include the chemistry, earth sciences and physics disciplines and the very few students who complete a degree in this program, we have not been able to gather meaningful data to guide us in making improvement to our program yet.

Low enrollment in Organic Chemistry might be due to a curriculum modification effective in Fall of 2012. This class is now offered as a five unit course that includes three hours of lecture and six hours of laboratory per week. Prior to the Fall 2012, the class was offered as separate lecture and laboratory components. Students could take the individual components at different campuses or in different semesters. This is not currently the case.

Low retention in CHEM 410 might be due to insufficient Mathematics preparation. Conversation with the Math Department to adopt their self-paced online Math preparation course recommended to students enrolling in the Medical Assisting Program was started.

### **C. Other Considerations**

## **7. Action Plan**

Include details of planning as a result of reflection, analysis and interpretation of data.

### **Guidelines:**

- Describe data and assessment results for Program Student Learning Outcomes. Analyze and reflect on assessment results for Program Student Learning Outcomes and other measures of Program performance.
- Analyze and reflect on other evidence described in previous sections. Identify the next



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steps, including any planned changes to curriculum or pedagogy.

- Identify questions that will serve as a focus of inquiry for next year.
  - > Determine the assessments; set the timeline for tabulating the data and analyzing results.
  - > Describe what you expect to learn from the assessment efforts.

2013-2016 long-term goals:

- Rewrite and update laboratory experiments to minimize expenses and improve safety (Three new laboratories were added to CHEM 210; a new inexpensive laboratory manual by Pearson for CHEM 410 was identified and will trouble shoot in 2013-2014).
- Develop a supplemental Math for CHEM 410 (Initial communication with Ray Lapuz but curriculum modification might be needed).
- Desing a study to determine the causes of low enrollment in Organic Chemistry (Fall 2013-Spring 2014).
- Continue to seek opportunities for industry partnerships and independent study on campus (see 2013-2014 short-term goals).
- Determine the appropriatness of the hybrid delivery format for laboratory courses (CHEM 410 and CHEM 210 have proven to be an alternative to students who cannot attend classes during the day).
- Continue to implement, assess, reflect and modify SLOs and PLOs as a mean to determine program performance and program needs.

2013-2016 program performance action plan

Signature assignments were piloted in CHEM 210 and CHEM 238 to evaluate the Physical Sciences Program PLOs. It was determined that “the Synthesis of Aspirin” experiment and lab report was appropriate to assess the three PLOs. However, it was agreed that this is not the right class to assess the performance of the program since it is a class that it is typically taken early in any of the disciplines. Qualitative Analysis of unknown samples used in CHEM 238 as the signature assignment was also determined to be an appropriate capstone laboratory exercise to assess the three PLOs. This experiment will be used again in Spring of 2014 by adding a few critical thinking foloow up questions.

Identified needs based on SLO data analysis:

1. To create an instrument replacement schedule.
2. To purchase new instructional materials such as: (1) a Geiger counter set and radioactivity accessories; (2) a set of gas discharge tubes and spectrometers; (3) a laptop cart; (4) molecular models. A more comprehensive list is found in section 8C.



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2013-2014 Short-term goals:

1. To streamline general chemistry test grading to help free up instructor time to supervise independent research.
2. Explore the possibility to automatize the grading of some laboratory reports to free up instructor time.
3. To find out contact information from UC-Berkeley and Stanford University faculty who could be interested in undergraduate research collaboration.
4. To identify development activities that focus on writing grants and proposals to support the undergraduate research program at Cañada.
5. To start creating an instrument replacement and maintenance schedule so we can appropriately teach the topics outlined in our course outlines of record.
6. To check Sapling online homework system as an alternative to Mastering Chemistry to provide a more effective academic student support for our students and free up instructor time to support independent research.
7. To develop greener laboratory experiments to increase safety and reduce waste budget.
8. To develop a radioactivity experiment for CHEM 410 and CHEM 220 to be used with the Geiger counter set. Radioactivity is an important topic that needs to be covered in these courses.
9. To develop an atomic structure experiment/activity to demonstrate the use of the gas discharge tubes and its relationship to atomic structure. Atomic Structure is the most fundamental concept of chemistry.

## **8. Resource Identification**

The increased number of students enrolled in general chemistry has affected the Department in the following ways:

1. There are not enough laboratory drawers to be assigned to students in each class. Students in majors classes are assigned drawers in pairs. Students in CHEM 192 and CHEM 410 are not assigned drawers.
2. Our fulltime and 48% Laboratory Technicians spent most of their time setting up and taking down laboratory experiments, especially for the classes in which students do not have drawers. They have very limited time for instrument maintenance.
3. Our fulltime faculty spend most of their time with students in the classroom, labroom, office hours or creating updated instructional resources to support all the students. They also have very limited time to maintain instruments. Yet, functional instruments are the key of a successful chemistry program.
4. Our Department's and duplicating budgets are no longer sufficient to cover increased laboratory and class expenses.
5. We need additional laboratory rooms/drawers or additional floating glassware/plasticware to support CHEM 192 and CHEM 410.
6. We need additional staff support.



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**A. Faculty and Staff hiring requests**

**Guidelines:**

- Explain clearly and with supporting data showing how hiring requests will serve Department/Division/College needs.
- Include information from the most recent Comprehensive Program Review or Annual Program Plan, whichever was last year's document.

To allow faculty the necessary dedicated time to develop updated curriculum and instructional materials in response to student learning outcomes data. To offer relevant practical experience in accordance with required instrumentation topics listed in the course outlines of record. To allow faculty the time to appropriately supervise and train students to conduct safe and meaningful independent undergraduate research, the Department has identified the following staffing needs:

1. A 48% instrument maintenance/independent research support Laboratory Technician.
2. A 25% classroom support Technician.

**B. Professional Development needs**

**Guidelines:**

- List faculty and staff professional development activities.
- Describe faculty and staff professional development plans for next year.
- Explain how professional development activities improved student learning outcomes.

Faculty and staff attend conferences and training to keep current in the discipline. Professional Development activities improve student learning outcomes by allowing faculty and staff to introduce discipline specific concepts and skills utilizing updated pedagogy and methodology that has proven to be successful. In addition, independent study research opportunities can be offered to interested students. Conferences are often a conduit to establish collaborations that will allow our Department offer research experiences to students that a Department of our size can never offer.

**Plans for next year:**

1. American Chemical Society National Meeting – August 2014 in San Francisco  
This is the most authoritative chemistry professional organization. This meeting offers different professional and educational tracks, equipment and publications exhibits, opportunity for networking.



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2. Two Year College Chemistry Consortium (2YC3) webinars on pedagogy, chemistry curriculum updates at two-year colleges, grant opportunities at two-year colleges, etc. <http://www.2yc3.org/>  
This is a forum for chemistry educators to enhance student learning via professional development.
3. Laboratory Safety Institute  
Webinars, [http://labsafetystore.org/shop/category\\_PC02/Webinars.html?shop\\_param=cid%3D%26](http://labsafetystore.org/shop/category_PC02/Webinars.html?shop_param=cid%3D%26)  
– Flex Day activity  
To keep abreast of changes in chemical waste management and disposal.
4. View the February, 2011, ACS webinar “Fundamentals of Effective Scientific Writing – Manuscripts and Grants.” <http://acswebinars.org/sainani>
5. View the “Beyond Bening” webinar and instructional materials designed to implement sustainable greener chemistry into the classroom. [http://www.beyondbenign.org/professional/community\\_college.html](http://www.beyondbenign.org/professional/community_college.html)

**C. Classroom & Instructional Equipment requests**

**Guidelines:**

- List classroom & instructional equipment requested, including item description, suggested vendor, number of items, and total cost.
- Explain how it will serve Department/Program/Division/College needs.
- List the requests (item description, suggested vendor, number of items, and total cost).
- List special facilities and equipment that you currently use and require.

We request an increase of 10% to the current annual stockroom budget to cover increased expenses of larger general chemistry classes and glassware broken by students.

2013 Chemistry Program review equipment request

| Item                                  | Reason for the request   | Vendo                 | Cost each | Qty    | Total Cost* |
|---------------------------------------|--|-----------------------|-----------|--------|-------------|
| 3 Spectrum Tubes/ With 1 power supply | To introduce atomic structure using modified teaching methods in response to SLO data.   | Fisher                | \$300     | 4 sets | \$1200.00   |
| Gieger Counters with kit              | To develop radioactivity curriculum which is part of the CHEM 220 and 410 CORs.  | Minerl<br>b<br>Images | \$440     | 10     | \$4400      |
| Plastic-ware sets                     | Needed in lieu of laboratory drawer inventor for CHEM 192 and CHEM 410.  | Fisher                | \$36.25   | 36     | \$1305      |
| Metal-ware sets                       | Needed in lieu of laboratory drawer inventor for CHEM 192 and CHEM 410.  | Fisher                | \$143.75  | 32     | \$4600.00   |
| Laser for FT-IR/Certified diagnostics | Infrared spectroscopy is an organic chemistry I required topic. Our FT-IR purchased in 2006 needs the laser unit replaced. It is currently not operational | Perkin-<br>Elmer      | \$5500    | 1      | \$5500      |



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|  |  |                   |          |    |           |
|--|--|-------------------|----------|----|-----------|
| Pipetman Starter Kit                       | To dispense accurate small amounts of chemicals needed in analytical determination that cannot be measured any other way. They are used across the curriculum. Using accurate small amounts is a safer and more inexpensive way to handle toxic materials  | Fisher            | \$723.52 | 3  | \$2500.00 |
| Laboratory Oven                            | Several experiments across the curriculum require dry glassware, either for safety (explosive materials in contact with water), or simply to avoid side reactions or inaccurate results given by the presence of water.  | Fisher            | \$2750   | 2  | \$5500.00 |
| Bomb calorimeter                           | To allow students a hands on activity in thermodynamics. This is a required topic across the curriculum. SLO data shows low success in comprehending the concept. The bomb calorimeter will be used to improve teaching methods.   | Parr              | \$8500   | 1  | \$8500    |
| Molecular Model kits. Molymod-MKO-VSEPR-14 | Molecular models help students visualize the chemical structure and three-dimensional shape of molecules. This cannot be done otherwise. Predicting and understanding molecular shape is a required topic in general and organic chemistry. SLO data shows low success rate. Molecular models will be used improve teaching methods. | Web elements shop | \$48     | 32 | \$1536    |
| Hydrolysis apparatus set                   | SLO data shows that students have difficulty understanding decomposition reactions, acid-base chemistry, gas pressure, water displacement, electrolysis. This apparatus experimentally demonstrates several of these concepts to students manipulating it.   | United Nuclear    | \$45     | 20 | \$1100    |
| AA Standard set                            | The atomic absorption instrument requires calibration against standards for validation of results.   | Fisher Sci        | \$80.00  | 7  | \$560     |

\*Quotes for all items listed are available upon request.

**Maintenance request:**

The Deionized water filters have not been replaced since we moved into the renovated building 18. Deionized water is used in a large number of experiments across the curriculum and in independent undergraduate research. Filters need to be replaced periodically based on use. We can set a replacement schedule of one filter per year for the next three years starting with the system in room 18-305. The replacement quote for all three systems is below.



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**TO: CAÑADA COLLEGE**  
 4200 Farm Hill Road  
 Redwood City  
 CA 94061

**Attn:** Rosalind Young

|                       |                               |
|-----------------------|-------------------------------|
| <b>Proposal #</b>     | <b>474075</b>                 |
| Date:                 | 03-19-14                      |
| Reference:            | Option S Water system service |
| Terms:                | Net 30                        |
| FOB:                  | PPD / ADD Point of Origin     |
| Price Firm            | 30 Days                       |
| Shipment Date:        | Approx 2 Weeks ARO            |
| <b>Sales Contact.</b> | <b>Leo Szilardy</b>           |

We appreciate your inquiry and are pleased to propose the following:

**Quotation: One time service for Purelab Option S7 Water systems-Chemistry Bldg**

| Item #    | Qty | Description  | Price Each | Extended |
|-----------|-----|--|------------|----------|
| W2T142441 | 3   | 10", 5 Micron Activated Carbon filter cartridge-AC5-10 | \$32.00    | \$66.00  |
| W2T167305 | 3   | Internal Pre-treat cartridge-LC140                     | \$98.00    | \$294.00 |
| W2T167303 | 3   | Storage tank vent filter-LC136M2                       | \$183.27   | \$183.27 |
| W2T460737 | 1   | 12 Pack sanitization tablets-CT1                       | \$12.00    | \$12.00  |
| W2T167307 | 3   | 7.5 lphr Reverse Osmosis membrane                      | \$212.00   | \$636.00 |
| W2T167306 | 3   | Twin pack Purification pack LC141                      | \$175.00   | \$525.00 |
| W2TSP5189 | 6   | Technician Labor for sanitization and pack exchange    | \$125.00   | \$750.00 |

**Total price for above scope: \$2,466.27**  
**(Sales tax and freight not included)**

**D. Office of Planning, Research & Student Success requests**

**Guidelines:**

- List data requests for the Office of Planning, Research & Student Success.
- Explain how the requests will serve the Department/Program/Division/College needs.

Develop a method to identify Chemistry majors to collect relevant information on Program SLOs/ signature assignments to make improvements to our Program as needed.

**E. Facilities requests**

**Guidelines:**

- List facilities requests.
- Explain how the requests will serve the Department/Program/Division/College needs.





**ANNUAL PROGRAM PLAN & REVIEW (INSTRUCTIONAL)**  
**ASGC ADOPTED SPRING 2011**

1. The Department is in desperate need of additional laboratory drawers to accommodate all the students we are serving and to be able to offer more lab sections. There is no real room for expansion inside the existing laboratories.
2. We need a built-in cabinet to encase the gas tanks in room 18-311A (instrument room) to comply with safety regulations.
3. We will welcome the opportunity to explore alternative laboratory rooms on campus to hold CHEM 192 and CHEM 410 labs.