Skyline College
Program Name: Chemistry
Program Review
Executive Summary

Program Mission and Goals

- Provide a high quality and complete lower division chemistry program.
- Enable students to gain experience with laboratory equipment and learn procedures and skills to prepare them for upper division studies in the sciences.
- Enable students to succeed in subsequent classes at Skyline College, transfer institutions, and in employment.
- Provide science majors with a solid foundation in the fundamentals of general and organic chemistry.
- Enable students in the health professions to gain the knowledge and skills in chemistry to succeed in their educational programs.
- Provide general education and transition classes for students with non-science backgrounds or goals.
- Provide students with the knowledge and critical thinking skills needed to evaluate scientific information they encounter in research and in everyday life.

Three Strengths of the Program

First Strength:

Provides a comprehensive lower-division Chemistry program that meets the needs of students for transfer to science major programs, preparation for professional schools, entrance into health profession programs, and general education requirements.

Second Strength:

We have seen an increase in success and retention for all groups over the last five years.

Third Strength:

Our program is very efficient. Our load has increased by 24.77% over the last three years to 670. The faculty and staff of the Chemistry Program are all exceptionally knowledgeable in their area of expertise and share a strong commitment to student success. Faculty members maintain a current and meaningful curriculum in Chemistry. These members have built an excellent and efficient team/family that delivers the highest quality of educational services to our students.

Three Suggestions for Improvement

First Suggestion:

Although success and retention rates have increased among all ethnic groups, success for African American, Hispanic/Latino and Pacific Islanders are lower than the departmental average. This shows that additional resources for student support and tutoring outside of the classroom are needed to improve student success in Chemistry courses. This might include hiring tutors, embedded tutors, offering learning skills supplement courses, supplemental instruction sessions, continue the partnership with the Math, Engineering and Science Achievement (MESA) program, partnering with existing campus learning communities and student support programs such as the Learning Center and re-instituting the CHEM 192 prerequisite for CHEM 210. In the CHEM 210 course we will be implementing a recitation session to increase student success.

Given that the prerequisite of CHEM 192 for CHEM 210 has been removed, it will be even more critical for students to be properly advised into the appropriate initial chemistry course and to provide the additional support for students who go directly into CHEM 210 without first completing the recommended CHEM 192.

Second Suggestion:

Increases in the number of laboratories and increases in the cost of chemicals and equipment over the last few years should also be met with an increase of a budget to both purchase materials and chemicals. A long-term plan for maintaining, purchasing and replacing laboratory equipment is essential to staying current and being able to teach with modern technology.

Third Suggestion:

A new full-time faculty member is needed. The FTE/PTE ratio is under 50% for the chemistry department. The hiring of a new full-time faculty member would be of great help to continuing to build and develop the coursework and expand department resources and improve student learning. In addition, having an additional full-time faculty member would help with the continuity of instruction within the chemistry program.

Short Summary of Findings

The Chemistry program at Skyline College provides students with a full spectrum of chemistry courses, ranging from a non-major general education class to a full two-year General and Organic Chemistry sequence. Courses are taught with content and standards to ensure transferring students the necessary preparation to succeed in upper division science classes. The overall efficiency (faculty load) of our program is high. The program and faculty work closely with the MESA program to help students succeed; however, additional resources and methods to improve student success need to be identified and implemented. The chemistry program takes pride in the success of the students it has prepared for transfer to numerous prestigious four-year institutions and professional programs, including the campuses of the University of California, California State University, and many others. The program completely fulfills its intended mission and is introspective in its attempts to constantly improve student learning.

Faculty Signatures

Joaquín J. Rivera	Alec J. Bates	Safiyyah Forbes

Division Dean: _____

Ray Hernandez

Date Submitted: _____

Program Title: **Chemistry**
Date Submitted: **3/31/17**

1. **Planning Group Participants** (include PT& FT faculty, staff, students, stakeholders)
   List Names and Positions:
   Joaquin J. Rivera, Professor
   Alec J. Bates, Professor

2. **Contact Person** (include e-mail and telephone): Joaquin J. Rivera 650-738-4159

3. **Program Information**

   3A. Program Personnel
   Identify the number of personnel (administrators, faculty, classified, volunteers, and student workers) in the program:

FT Faculty: 3	**PT/OL Faculty (FTE): 9**
FT Classified: 1.25	**PT Classified (FTE):**
Volunteers:	**Student Workers: 1**

3B. Program Mission and Goals

State the goals/focus of the program and how the program contributes to the mission and priorities of the College and District. Discuss how this program coordinates, impacts and interacts with other programs in the College. Explain how this program meets the needs of our diverse community. (200 word limit recommended)

The chemistry program serves students from San Mateo County and surrounding areas by providing lower division transfer programs, which prepare students for continued education in four-year colleges and universities. Most of our students who complete the general and organic chemistry sequences transfer to four-year colleges.

The department offers:

- Chemistry in Action (CHEM 112) that meets a general education science with laboratory course requirement for non-science majors.

- Elementary Chemistry (CHEM 192) to help prepare students for success in the General Chemistry major's sequence.

- Chemistry for Health Professionals (CHEM 410) to prepare for health professions programs such as Respiratory Therapy and Nursing.

- Chemistry majors-level General Chemistry (CHEM 210-220) and Organic Chemistry (CHEM 234/237-235/238) sequence for students who are majoring in Chemistry, Biology, Physics, some Engineering majors, and those who are preparing for professional schools.

- Survey of Chemistry and Physics (CHEM114) to support the Associate Degree for Transfer in Elementary Teacher Education.

The department contributes to the College mission and goals by preparing students for academic transfer, acceptance to professional programs, entering the workforce, and by supporting an academic and scientific culture in our College. The department works closely with the MESA program and the Learning Center to develop study groups and problem solving sessions to support students across the chemistry curriculum. The relationship with the MESA program and the Learning Center adds much to student learning in Chemistry and has helped us attract and retain underrepresented students, as well as those who may be struggling because of work and family obligations.

The chemistry faculty are contributing to college wide efforts to improve student learning support. The introduction and continued implementation of the Skyline Promise has great promise to have a direct impact on student success. The Chemistry Department is fully committed to work with this program and we are excited to see how we might improve our student's success in achieving their future goals in a timely manner. We're also committed to the expansion of programs that will lead to better integration of student support services and instructional services, which is a direct path to student success (for example, development of integrated review workshops through the Learning Center). The SMT division is currently planning to create a STEM Center, which will greatly benefit the students in our chemistry courses.

Textbooks are a significant burden on our students. With textbook costing more than $200, some instructors have written online and in-house laboratory manuals to help reduce the cost to students. The manuals are kept up-to date with new revisions approximately every two years.

4. Summary of Student Learning Outcomes and Program Data

4A. Drawing from the TracDat PSLO report, summarize recent course and/or program SLO assessment, identify trends and discuss areas in need of improvement.
Submit the TracDat PSLO report with the completed comprehensive program review report.
Tool: https://sanmateo.tracdat.com/tracdat/

Respond to the following:

- Review the PSLO report and note any trends over the last five years
  - Instruction: Highlight the major areas on the course and program level in which students are doing well and those in need of improvement.
  - Student Services: Highlight the major areas in which students are doing well and those in need of improvement, including on the course level when applicable.
  - Career Technical Education: Note any trends in the last three years compared to the preceding three years or further.
- Identify changes that have occurred in your program as a result of annual SLO assessment.
- Explain any modifications to the program's SLO assessment process or schedule.
- Note that the PSLOs on TracDat match the ones listed on the departmental/ service area website and in the College Catalog.

Please refer to the TracDat PSLO Report on the following three pages.

Students have been successful in the program-level student learning outcomes in chemistry. Students have demonstrated high proficiency in Critical Thinking, Communication, and Experimentation – all central to the mission of chemical instruction. A number of initiatives have been instituted to improve student success in these areas and in the course and program more generally.

To improve communication skills, an in-house laboratory manual for CHEM 192 – Introductory Chemistry was developed to introduce formal lab report writing at the first course in the majors sequence. Faculty also worked with the Learning Center to develop workshops to introduce concepts related to lab report writing.

In CHEM 410 – Chemistry for Allied Health, students are required to identify functional groups in biologically important compounds. Students have demonstrated success in this outcome; however, additional work in identification of functional groups using computer modeling or physical molecular models to assist in the recognition and understanding of the chemical structures will further improve student performance on this outcome.

Student success in CHEM 210 - General Chemistry 1 has been an ongoing concern for the Chemistry department and was addressed by reintroducing a CHEM 192 prerequisite. However, this prerequisite has been removed to align with our sister colleges. To offset this change, the department is instituting recitation/discussion sessions as part of the scheduling pattern to bolster student success in problem-solving and critical thinking. (This is discussed in more detail in section 4C.)

CHEM/PHYS 114 is a new course that has been taught only once. It will be assessed in the Fall 2017 semester when it is next offered.

Assessment: Department Four Column

SKY Dept - Chemistry

Department Assessment Coordinator: A.J. Bates

PSLOs	*Assessment Methods*	*Results*	*Actions*
Problem-Solving & Critical Thinking - Students will critically analyze chemical problems conceptually and through experimentation. **PSLO Status:** Active **Planning Year:** 2012-2013 **Start Date:** 08/20/2012 **End Date:** 06/16/2013	**Instructional PSLOs -- Roll Up Course Assessment Results -** Course Assessment Reults **Success Criterion:** 80% of course-level success criteria met **Schedule:** 2016-2017	**Reporting Cycle:** 2016- 2017 **Result Type:** Criterion met This is an outcome that relates to multiple course-level outcomes across all courses in the department. The criterion was met in most of the course-level assessments. In CHEM 192, there were inconclusive outcomes in the 2011-2012 cycle. However, these shortcomings were addressed by an updating of the curriculum and the development of more relevant laboratory manual by the chemistry faculty. Improvements were noted and the criteria met in the assessments of these outcomes in the later assessment cycles for CHEM 192. In CHEM 210, some issues related to problem-solving in thermodynamics were noted in the 2011-2012 assessment cycle. Faculty modified their approach to incorporate more discussion of these topics in the lecture and the lab, and a corresponding improvement was observed in later assessment cycles. Critical thinking and problem-solving skills appear to be strong for CHEM 220-CHEM 238 in the majors sequence. CHEM 410 (Allied Health) and CHEM 112 (General Education) students also showed good outcomes for problem-solving in their courses. (03/26/2017) **Who discussed the assessment, results and/or action plans? When? Where (e.g., dept. meeting)?:** Chemistry Program Review Committee - Spring 2017 Meetings Various Chemistry Meetings since the previous program Review in 2011	**Action:** For CHEM 210, the scheduling pattern for the course has been changed to allow for a weekly recitation/discussion section to be led by the laboratory instructor. This will provide an opportunity for the students to have a structured time for discussion with their classmates on problem-solving techniques and allow for more one-on-one and small group assistance from the instructor. (08/14/2017) **Action Plan Category:** Use new or revised teaching methods **Action:** Because the CHEM 192 prerequisite has been removed as a prerequisite for CHEM 210 (though it remains as a strongly recommended course), additional assistance will likely be required by students entering the course without the requisite skills. In order to achieve this, the chemistry faculty have consulted with the Dean and plan to incorporate embedded tutors into the recitation sections for CHEM 210. Funding will need to be secured for this additional

PSLOs	Assessment Methods	Results	Actions
			resource. (08/14/2017) **Action Plan Category:** Reconfigure student support service
Communication & Reporting in Chemistry - Demonstrate the ability to interpret and report chemical information critically, clearly, and effectively. **PSLO Status:** Active **Start Date:** 10/27/2012	**Instructional PSLOs -- Roll Up** **Course Assessment Results -** Course Assessment Reults **Success Criterion:** 80% of course-level success criteria met **Schedule:** 2016-2017	**Reporting Cycle:** 2016- 2017 **Result Type:** Criterion met Students in the majors sequence, allied health, and general education sequences all demonstrated high proficiency with this outcome. The use of the Sapling Learning online homework, the use of CHEMDraw structure-drawing software, and the requirements for formal written laboratory reports all likely contribute to the success of students in this area. (03/26/2017) **Who discussed the assessment, results and/or action plans? When? Where (e.g., dept. meeting)?:** Chemistry Program Review Committee - Spring 2017 Meetings Various Chemistry Meetings since the previous program Review in 2011	**Action:** Continue the use of Sapling Learning and CHEMDraw and the requirement for written reporting of laboratory findings. Continue to monitor assessment to insure this remains a strength of the program. (08/14/2017) **Action Plan Category:** Conduct further assessment
Application of Technology - Use appropriate computer programs and laboratory instrumentation to acquire, analyze, and report data and findings in chemistry . **PSLO Status:** Active **Start Date:** 10/27/2012	**Instructional PSLOs -- Roll Up** **Course Assessment Results -** Course Assessment Reults **Success Criterion:** 80% of course-level success criteria met **Schedule:** 2016-2017	**Reporting Cycle:** 2016- 2017 **Result Type:** Criterion met Students successfully apply technology and laboratory instrumentation in their laboratory work across the curriculum. In CHEM 220 and CHEM 237-238, direct assessment of labs in which instrumentation relating to the use of voltmeters, pH meters, and spectrophotometers was conducted, and students demonstrated a strong proficiency. (03/26/2017) **Who discussed the assessment, results and/or action plans? When? Where (e.g., dept. meeting)?:** Chemistry Program Review Committee - Spring 2017 Meetings Various Chemistry Meetings since the previous program Review in 2011	**Action:** Develop assessment of spectrophotometer use in CHEM 210, to evaluate the application of technology in CHEM 210 more directly. (08/13/2018) **Action Plan Category:** Conduct further assessment
Experimentation - Carry out a chemical experiment to test a hypothesis and critically analyze the results. **PSLO Status:** Active **Start Date:** 10/27/2012	**Instructional PSLOs -- Roll Up** **Course Assessment Results -** Course Assessment Reults **Success Criterion:** 80% of course-level success criteria met **Schedule:** 2016-2017	**Reporting Cycle:** 2016- 2017 **Result Type:** Criterion met In the majors sequence, students have demonstrated high proficiency in their experimental in General and Organic Chemistry. These experiment have quantitative and qualitative analysis components and students have demonstrated success in both. Students in the allied health	**Action:** The chemistry department engages in ongoing updating and revising of our in-house laboratory manuals, in an effort to maintain engaging and relevant laboratory experiences for our students. As revisions continue, additional

PSLOs	Assessment Methods	Results	Actions
		and general education sequence have also demonstrated success in experimentation. In recent years, the laboratory manuals have been revised and updated to include additional Inquiry-based experiments to challenge students to think critically about the design of their experiments and the procedures that they follow. (03/26/2017) **Who discussed the assessment, results and/or action plans? When? Where (e.g., dept. meeting)?:** Chemistry Program Review Committee - Spring 2017 Meetings Various Chemistry Meetings since the previous program Review in 2011	inquiry-based experiments will be incorporated into the lab manuals. In Organic Chemistry, additional experiments and activities related to the use of Nuclear Magnetic Resonance Spectroscopy will be introduced to make even more significant use of our newly acquired instrumentation. (08/14/2017) **Action Plan Category:** Use new or revised teaching methods
Chemical & Scientific Literacy - Use the periodic table and other reference sources effectively, and apply chemical knowledge to everyday life, including using household chemicals safely, and analyzing information and reports on science in the popular press. **PSLO Status:** Active **Planning Year:** 2015-2016 **Start Date:** 07/19/2016	**Instructional PSLOs -- Roll Up** **Course Assessment Results -** Course Assessment Reults **Success Criterion:** 80% of course-level success criteria met **Schedule:** 2016-2017	**Reporting Cycle:** 2016- 2017 **Result Type:** Criterion met Students in the chemistry courses have demonstrated scientific literacy through their written lab reports, ability to use laboratory equipment, and their ability to interpret and communicate use chemical symbols and formula. (03/26/2017) **Who discussed the assessment, results and/or action plans? When? Where (e.g., dept. meeting)?:** Chemistry Program Review Committee - Spring 2017 Meetings Various Chemistry Meetings since the previous program Review in 2011	**Action:** A new course to the department, CHEM/PHYS 114 has yet to be assessed in our student learning outcomes assessment cycle. It will next be taught in the Fall 2017 semester and will be assessed then. Because this course is intended to give a background in chemistry and physics to future elementary school teachers, a foundation in scientific literacy is essential and will be directly assessed in the course. (08/14/2017) **Action Plan Category:** Conduct further assessment
Allied Health: Biologically Important Compounds - Identify functional groups and understand the role of biologically important molecules carbohydrates, lipids, proteins, and nucleic acids) in the body. **PSLO Status:** Active **Planning Year:** 2015-2016 **Start Date:** 07/19/2016	**Instructional PSLOs -- Roll Up** **Course Assessment Results -** Course Assessment Reults **Success Criterion:** 80% of course-level success criteria met **Schedule:** 2016-2017	**Reporting Cycle:** 2016- 2017 **Result Type:** Criterion met Students have demonstrated high achievement of this outcome in their laboratory experimentation work in CHEM 410. Exam results were not as high as the laboratory work; however, overall the criteria for success were met. Additional work in identification of functional groups on their own, separate from their role in specific chemical reactions studied in the lab, will help to reinforce the concept and likely improve student performance. Methods to achieve this goal include computer modeling or the use	**Action:** Focus on the identification of important biological structures in compounds, making use of molecular modeling software or physical molecular models in the lab. (05/01/2017) **Action Plan Category:** Use new or revised teaching methods

4B. Summarize courses/services in the program that map to institutional student learning outcomes and discuss the results of the assessment and analysis.

Respond to the following:

- Explain what the course level assessment results reveal about student fulfillment of ISLOs.
- If the department participated in campus wide assessment, explain what insights were obtained.

Students in all chemistry courses improve their **critical thinking** skills by analyzing complex chemistry problems in both lecture and laboratory settings. In the lecture, students apply concepts discussed in class and the reading assignments and illustrated in laboratory experiments in order to solve problems in small groups, in online problem sets, and on quizzes and exams. In the laboratory, students are required to develop experimental plans and molecular-level models of chemical systems to interpret, analyze, and relay chemical information. Students acquire data in the laboratory, and then tabulate and process that information by graphing, algebraic manipulation, or dimensional analysis. Based on course and program-level assessment, students in the chemistry program are successful in outcomes relating to problem-solving and critical thinking.

All courses in the chemistry program help students improve **scientific literacy** and **effective communication**. The lab component of chemistry courses is essential for the outcome of drawing conclusions based on the scientific method, computations, and observational, experimental evidence. Students practice scientific communication by keeping a laboratory notebook and writing lab reports. Students improve their communication skills by answering questions in both paragraph form and chemical symbol and equation formats. All courses have students construct and analyze statements in a formal symbolic system (chemical symbols, formulas, and equations). Lab reports require students to derive conclusions based on their data and to communicate those results through scientific language.

In the Spring 2012 semester, CHEM 220 – General Chemistry 2 was included in the assessment of the Effective Communication ISLO. Students were assessed based on a formal lab report relating to pH titrations, an experiment that ties together nearly one third of the work in General Chemistry 2. Fourteen students met the qualifications to be included in the ISLO assessment. Of the fourteen, two met the criteria for excellent, six-good, three-adequate, three-needs improvement. Though overall these demonstrate a successful outcome, the Chemistry Department would like to see even better performance in effective communication. To this end, the department discussed methods to improve lab report writing, including the introduction of formal reporting in CHEM 192, and scaffolding of the process of writing reports as courses progress. Faculty also worked with the learning center to develop workshops related to lab reporting writing in chemistry. Course-level assessments in communication skills have continued to be positive.

Students also demonstrate skills central to **technology and computer literacy**. Many of the laboratory experiments in Chemistry require students to measure data using electronic instrumentation (balances, spectrophotometers, gas chromatographs, *etc.*) and to use computer

software to analyze, interpret, and report that data. Students interpret infrared and nuclear magnetic resonance spectra using computer analysis tools and tabulate and graph data using Microsoft Excel or similar software. Most problem sets are completed through an online homework system, Sapling Learning, which uses embedded molecular modeling and chemical structure drawing components.

Laboratory work and discussion groups are an important part of the chemistry program and these apply to the student **citizenship**. Working in the laboratory requires students to interact with their peers by working in pairs or groups demonstrating cooperation and leadership skills. Students demonstrate a high level of success in their laboratory work in fulfilling the related course and program-level outcomes.

4C. Summarize results of student data packets from the Office of Planning, Research and Institutional Effectiveness (PRIE), and where appropriate, any other relevant data.
Tool: http://www.skylinecollege.edu/prie/programdata.php

Respond to the following:

- Review 5-year data to describe trends in student success, retention, demographics.
- Were any student populations disproportionately impacted or underperforming?
- Analyze trends and discuss plans to address significant findings.
- Analyze trends in student success with respect to mode of delivery and/or technology. For instructional programs, address any differences between on-campus and distance education

Year	Success Rate	Retention Rate
2011-12	62.8%	71.0%
2012-13	64.2%	73.9%
2013-14	64.7%	72.9%
2014-15	66.0%	77.1%
2015-16	71.1%	80.7%

Although enrollment has remained steady over the last five years, success and retention rates have increased. Success and retention rates have increased among all ethnic groups. Success for African American, Hispanic/Latino and Pacific Islanders are lower than the departmental average. Differences in success rates between ethnic groups shows a similar trend in Chemistry as in the college as a whole. Thus any methods for addressing these differences at the college level should be applicable at the discipline level in Chemistry as well. Stronger student support through programs that support these ethnic cultural groups i.e. ASTEP, Puente, Kababayan and strategies of more intrusive academic support such as tutoring, supplemental instruction, etc. can help close this achievement gap.

Our student population has held steady-- largely younger (18-22) transfer-bound students. By gender, enrollment is 44% male, 54% female. The largest group of students falls in the 18-22 category with a retention rate between 69-86% and a success rate between 59 and 88% over those five years. The under 18 group is only about 64 students in 2015-16 with a high percent (91%) retention and high percent (86%) success.

Student demographics have remained consistent since our last Program Review. The overall demographic profile of chemistry students is different than that for the College as a whole. Chemistry students are more likely to be Filipino or Asian, female, 18-22 years of age, continuing, day students who plan to transfer. Chemistry has slightly fewer White, African American and Hispanic/Latino students than the College. Additional efforts must be made to recruit students from these groups. Improving the visibility of the Chemistry department and illustrating the many rewards of taking Chemistry classes to these underserved populations will allow these students to gain valuable knowledge of the Chemistry department and the many advantages to taking Chemistry courses. For example we can partner with learning communities such as ASTEP and Puente, reach out to the different high schools that serve most of these group of students and work with their science teacher to do DEMOs and talk about the Skyline chemistry department and the different career paths a chemistry degree can offer. There are a lot of groups on campus that we can tap into and introduce the department and have an open discussion on the variety of career pathways for chemistry graduates. We can also highlight the department annually during National Chemistry week by doing some activities that will get students engage, curious and even excited about Chemistry.

While student success in the Chemistry program is slightly lower than the College as a whole, this trend is hardly uncommon in higher education and can be attributed to the exceptionally demanding nature of the subject matter relative to that encountered in most other academic disciplines.

We have seen an increase in success and retention in CHEM 210 after the implementation of CHEM 192 as a prerequisite. Unfortunately, because Cañada and CSM have decided to discontinue this prerequisite, we were forced to discontinue it here at Skyline as well. We have decided to introduce a recitation session into our CHEM 210 course to help improve success without the barrier of this prerequisite. With the removal of CHEM 192 as a prerequisite the sequence is decreased thus improving time to completion in student's goals.

4D. Program Enrollment and Efficiency

For programs with curricular offerings, state the last three years of fall semester FTES, FTE and LOAD. Spring semester data may also be submitted as needed. For programs without curriculum offerings, and those with curriculum offerings and services, please provide information on the efficiency of services. Assess the efficiency of the program. (Program efficiency information can be obtained from PRIE).

FALL 2015:
PTEF: 6.42
FTES: 143.35
LOAD: 670

FALL 2014:
PTEF: 6.0
FTES: 120.89
LOAD: 604

FALL 2013:
PTEF: 5.96
FTES: 106.71
LOAD: 537

Our load has increased by 24.77% over the last three years. Throughout this increase in productivity, chemistry continues its high retention (81% in 2015-16) and success (71% in 2015-16) rates.

Our load of 670 for the Fall 2015 semester is significantly higher that the state productivity and efficiency measure of 525. This is also higher than the campus wide load of 565.

Load values are similar to other lab-heavy SMT departments; comparing in Fall 2015, our load is higher than Physics (572) and not too much lower than Biology (757).

4E. Career Technical Education Program Required Information and Data (CTE Programs only)

Tools: Major Employers in San Mateo County:
http://www.labormarketinfo.edd.ca.gov/majorer/countymajorer.asp?CountyCode=000081

Staffing Patterns in Local Industries and Occupations:
http://www.labormarketinfo.edd.ca.gov/iomatrix/staffing-patterns1.asp

Respond to the following:

- Review the program's Gainful Employment Disclosure Data. Identify any areas of concern.
- Discuss the role of the Advisory Committee and provide minutes of the most recent Advisory Committee meeting.
- Describe how changes in business, community and employment needs, new technology, and new transfer requirements could affect the program.

N/A

5. Curricular Offerings

Tools: CurricUNET: http://www.curricunet.com/smcccd

5A. Program Curriculum and Courses. If your program does not offer curriculum please state "N/A".

Respond to the following:

- All courses, including prerequisites, must be reviewed and updated at a minimum of every six years. (Be sure to complete Appendix D: Course Outline and Prerequisite Checklist Table).
- List courses that have been banked/deleted.
- NOTE: Be sure to add any new courses to the department's three-year calendar of assessment and request that they be added to TracDat.
- NOTE: If new courses were added since the last CPR, be sure that they've been mapped to ISLOs and PSLOs on TracDat, including relevant interdisciplinary degrees.

All courses have been reviewed, updated, and submitted to the Curriculum Committee as part of this year's Program Review cycle. All the courses have been approved by the Curriculum Committee this semester.

No courses have been banked/deleted as of spring 2017.

All currently offered (as of spring 2017) courses have been added to the Student Learning Outcome Assessment Cycle (SLOAC).

All courses, including those added since last Program Review, have had SLO's developed (and in some cases, updated) and all have been mapped to PSLO's (which themselves have been re-developed) and in turn mapped to ISLO's.

5B. Identify Patterns of Curriculum Offerings. If your program does not offer curriculum please state "N/A".

Reflections:

- Review the 2-year curriculum cycle of course offerings to ensure timely completion of certificates, degrees, and transfer.
- Identify strengths of the curriculum.
- Identify issues and possible solutions.
- Discuss plans for future curricular development and/or program modification.

The Chemistry Department is committed to providing a complete program of Chemistry course offerings to meet the diverse needs of students attending Skyline College. Courses are taught with a strong emphasis on the laboratory portion of the course providing training and experience in the latest scientific technologies and instrumentation. The Department has a strong commitment to assist students having no prior chemistry experience as well as those with a weak chemistry background. Pursuant with our transfer mission, we commit to providing lecture and laboratory courses that have the necessary breadth, depth, and rigor to ensure our students are successful upon transfer. We also commit to scheduling these courses in such a way that our students will be able to successfully complete all required courses and transfer within two years.

Chemistry classes are a typical part of the freshman and sophomore level curriculum in university offerings. We teach introductory chemistry for students who did not take chemistry in high school. This course is necessary to prepare students for subsequent college-level chemistry courses.

In addition, we offer the typical two-year sequence of General Chemistry and Organic Chemistry. This sequence is equivalent to the first two years of chemistry taken by science majors at liberal arts colleges and universities and is necessary for some science majors who wish to transfer to university at the junior year level. The general chemistry – organic chemistry sequence is also required for entry into many professional schools (including medical, pharmacy, dental, and veterinary) and serves students who have already completed bachelor's degrees without these courses.

A semester of chemistry is required of most students entering the allied health fields. Our Chemistry for Health Professionals (CHEM 410) fulfills this requirement for our students entering many programs including nursing, respiratory therapy, and radiology programs.

We also provide a course for non-science majors (CHEM 112 – Chemistry in Action) who require a laboratory science class to fulfill their general education requirements.

CHEM 114, Survey of Chemistry and Physics, supports student requirements for the AA-T in Elementary Teacher Education. The course is offered every other year in the fall. This course is coordinated with Cañada who will offer the same course on alternate years.

All of our courses provide students with the opportunity to learn common laboratory techniques and to gain experience using standard laboratory equipment.

6. Action Plan

Provide your action plan based on the analysis and reflections provided in the previous sections.
Tool: https://sanmateo.tracdat.com/tracdat/

Actions:

- Identify next steps to be taken and set a timeline.
- Identify questions that will serve as a focus of inquiry for the next Annual Program Plan and/or Program Review.
    - Determine the assessments; set the timeline for tabulating the data and analyzing results.
    - Describe what you expect to learn from the assessment efforts.

There are several obstacles that may hinder the further growth of the Chemistry Department. One such issue is the cost to purchase chemicals and laboratory equipment/instrumentation. With the strong emphasis on the laboratory component of our courses, it is critical to the program that we adequately equip and maintain laboratory rooms with modern, fully functional equipment. Our Chemistry supply budget for equipment and supply and various consumables has not changed over the past many years. The cost of many chemicals and supply has gone up ranging from 5-15% along with increase in shipping cost. It seems we are always short on money to buy the equipment and chemicals necessary to run our program. For our students to remain competitive for transfer and in the current job market, it is essential for them to be exposed to a broad range of experimental methods and experience of handling hazardous materials. These experiments require the use of expensive glassware and chemicals. We need to have a gradual increase in supply budget in order to cope with higher material cost and inflation. As for glassware replacement, the department should explore legally acceptable mechanisms that will make funding replacement glassware a shared cost between the College and the students. We feel that students who know that they will be assessed a portion of the cost of the glassware they break will handle glassware more safely and with greater care and thus promoting greater laboratory safety.

Several pieces of equipment and instrumentation are reaching their lifespan and need to be replaced.

The FTE/PTE ratio is under 50% for the chemistry department. We need an additional full-time faculty member. The hiring of a new full-time faculty member would be of great help to continuing to build and develop the coursework and expand department resources and improve student learning. In addition, having an additional full-time faculty member would help with the continuity of instruction within the chemistry program.

Programmatic changes have increased the demand on the stockroom and more services need to be provided. There is a lack of student help in the stockroom and by the time the students are trained, they are ready to graduate and move on or transfer. Therefore we need an instructional aid to help in the stockroom and the labs.

The department is changing the scheduling pattern in CHEM 210 for Fall 2017 to allow for discussion/recitation sessions in order to improve student success in the course, and to offset the impact of the removal of CHEM 192 as a prerequisite for the course. This will allow for more structured problem-solving time in class. Embedded tutors during the sessions will assist the instructor in addressing student needs as related to critical thinking and problem solving strategies during these sessions.

The data clearly shows we are a productive and successful program. It is also obvious that we cannot continue to grow since most of our available space are currently over-filled. Although we may consider increasing the number of sections offered, in reality, we are limited by the number of laboratory rooms and by our supply budget. In general, chemistry increases productivity by offering double sections (one common lecture with double lab sections). This practice is limited by the availability of classrooms that can accommodate double the number of students for the joint lecture as well as laboratory rooms. Offering additional laboratory sections has put strains on our supply budget and laboratory personnel since there has not been increase of supply budget. It is also unclear if this practice of doubling lecture sections is well-suited for student learning.

7. Resource Identification

7A. Professional Development needs

Actions:

- List the professional development activities the faculty and staff participated in this year.
- Explain how professional development activities in the past six years have improved student learning outcomes.
- Describe professional development plans for next year.

The Chemistry department is actively involved in many professional development activities. All full time and some part time faculty regularly attend monthly department meetings, The faculty and staff participate in various institutional flex activities related to a myriad of topics including technology, equity, student academic and personal needs, and others.

Faculty have participated in:

- Canvas training
- Webinars sponsored by Sapling Learning, the American Chemical Society and various publishers about topics on chemistry in general and/or teaching chemistry.
- NMR training
- Training on strategies for supporting nonnative English speakers in college classes.
- Hazardous Communication / Chemical Hygiene, PPE, GHS Training.
- Training on understanding the Introversion Extroversion Spectrum
- Meta-Majors and Guided Pathways Workshops
- Free Online Education Resources Workshops

These activities gave faculty members new tools to incorporate in their classrooms and help students succeed.

7B. Office of Planning, Research & Institutional Effectiveness requests

Actions:

- List your program's data requests from the Office of Planning, Research & Institutional Effectiveness.
- Explain how the requests will serve the Student/Program/Division/College needs.

CHEM 210 and CHEM 192 Data Analysis – Success Rates and Prerequisite

CHEM 210 OVERALL Success Rates Summer 2005 - Summer 2015	**Success Rate (C or better)**		
	Overall	with CHEM 192	without CHEM 192
Non-computerized prerequisite (9 terms)	**58.6**	52.9	60.0
No prerequisite (18 terms)	**60.5**	52.0	62.8
Computerized prerequisite (4 terms)	**72.0**	73.7	70.0

Subsequent Success: CHEM 192-210	**Enrolled in CHEM-192 Fall '14**	**Passed CHEM-192**	**Progress to CHEM-210 Spring '15**	**Passed CHEM-210**
Number of Students	147	**78**	54	**47**
% Success		**53%**		**87%**

Success Rate:	FALL 2012	SPRING 2013	FALL 2013	SPRING 2014	FALL 2014	SPRING 2015	FALL 2015	SPRING 2016	FALL 2016
CHEM-192	52.5%	49.0%	47.5%	48.7%	53.1%	56.8%	64.8%	61.6%	60.6%
CHEM-210	49.4%	62.3%	57.9%	52.5%	62.5%	69.6%	66.7%	86.9%	62.3%
CHEM-220	50.9%	49.1%	52.5%	44.4%	42.2%	54.0%	48.2%	55.7%	54.2%

Discussion:

CHEM 192 was a prerequisite for CHEM 210 prior to Fall 2008. At that point, it was removed as a prerequisite to align with Cañada College. CSM did so as well. Prior to that time, the CHEM 192 prerequisite could not be reasonably enforced, as electronic prerequisite checking was not available. From 2008 to 2014, CHEM 192 was listed as a recommended course for CHEM 210. In Summer 2014, CHEM 192 was reinstated as a prerequisite for CHEM 210 at all three colleges in the district.

At Skyline College, we have allowed students to bypass the prerequisite of CHEM 192 if they have successfully completed one year of high school chemistry. Most four-year institutions require an introductory course (like CHEM 192) or performance on a placement exam consistent with having mastered the core concepts of high school chemistry.

The faculty of the three colleges in the district felt that reinstating the prerequisite of CHEM 192 for CHEM 210, with electronic prerequisite checking available, would improve student success in CHEM 210. At Skyline College, the faculty focused on aligning the curriculum of CHEM 192 to better prepare students for CHEM 210. This work included writing an in-house, online laboratory manual for CHEM 192. For Summer 2014-Summer 2015, the CHEM 210 success rate increased by 11.5% from 60.5% to 72%. In the Fall 2015-Spring 2016 academic year, the success rate rose to 77%. While Skyline College observed significant increases in student success in CHEM 210, Cañada College and CSM did not. As a result, both colleges chose to remove the CHEM 192 prerequisite, effective Fall 2016. Though Skyline College did not remove the prerequisite for that term, electronic prerequisite checking was no longer available. The success rate for CHEM 210 in Fall 2016 was 62.3%.

Because electronic prerequisite checking is no longer possible for the CHEM 192 prerequisite, the faculty has decided to change CHEM 192 from a prerequisite to a recommendation, as the prerequisite could not be equitably enforced in a timely manner for CHEM 210 students.

Because of the change, the Chemistry faculty has decided to change the scheduling pattern for CHEM 210 to allow for a weekly discussion/recitation section in which the instructor, with the help of embedded tutors, will work with students to develop problem-solving skills and bolster student performance in areas that might be affected by insufficient preparation for the course. The faculty also would like to have Supplemental Instruction offered for CHEM 210 through the Learning Center. A significant challenge for both of these is finding good candidates for tutors or SI leaders that are available to do the work.

The Chemistry faculty also plans to work with the counseling department to advice students into the appropriate first-level course in Chemistry. Students who have completed a year of high school chemistry successfully should be advised into CHEM 210. However, students who struggled in high school chemistry, did not take high school chemistry, or for whom a refresher is needed should be advised to take CHEM 192. It is often important for students transferring in science-related fields to maintain a minimum 2.5 GPA in the General Chemistry sequence (CHEM 210-220). Entering CHEM 210 properly prepared will better enable students to succeed at the level needed for transfer.

We would like to continue monitoring success and retention data by course. In particular, we would like to track the data for CHEM 210 and compare the results with and without the CHEM 192 prerequisite. By looking at this data, we will be able to assess whether CHEM 192 should be reinstated as a prerequisite, or if the department has put in the necessary supports to give students who have or have not taken CHEM 192 an equal opportunity to succeed in CHEM 210. CHEM 210 is currently one of the gateway courses that serves as a barrier to entry for many students looking to earn a science degree or apply to a science related professional program. Ensuring students have a high success rate in this course will improve students' abilities to meet their academic or professional goals.

Chemistry Department - Success Rates by Course

Fall 2012 - Spring 2014		FALL 2012			SPRING 2013			FALL 2013			SPRING 2014		
		Head-count	Success Rate	Retention Rate	Head-count	Success Rate	Retention Rate	Head-count	Success Rate	Retention Rate	Head-count	Success Rate	Retention Rate
Department TOTAL:		460	**61.7%**	74.1%	479	**66.7%**	73.8%	420	**65.5%**	75.3%	496	**64.0%**	70.8%
CHEM-112	Chemistry in Action				30	**83.3%**	83.3%				17	**94.1%**	94.1%
CHEM-114	Survey of Chemistry/Physics												
CHEM-192	Elementary Chemistry	61	**52.5%**	62.3%	51	**49.0%**	60.8%	40	**47.5%**	57.5%	78	**48.7%**	53.8%
CHEM-210	General Chemistry I	164	**49.4%**	70.1%	167	**62.3%**	71.3%	152	**57.9%**	71.7%	158	**52.5%**	62.7%
CHEM-220	General Chemistry II	55	**50.9%**	70.9%	57	**49.1%**	54.4%	61	**52.5%**	59.0%	63	**44.4%**	47.6%
CHEM-234	Organic Chemistry I	40	**77.5%**	82.5%	19	**31.6%**	47.4%	29	**69.0%**	93.1%	24	**79.2%**	91.7%
CHEM-235	Organic Chemistry II	11	**54.5%**	72.7%	24	**95.8%**	100.0%	10	**70.0%**	70.0%	22	**77.3%**	86.4%
CHEM-237	Organic Chemistry Lab I	38	**84.2%**	84.2%	12	**41.7%**	50.0%	21	**76.2%**	81.0%	20	**90.0%**	90.0%
CHEM-238	Organic Chemistry Lab II	9	**66.7%**	66.7%	19	**100.0%**	100.0%	6	**66.7%**	66.7%	19	**84.2%**	94.7%
CHEM-410	Chemistry for Health Sciences	128	**75.0%**	81.3%	132	**80.3%**	85.6%	126	**84.1%**	89.7%	133	**80.5%**	85.7%

Fall 2014 - Fall 2016		FALL 2014			SPRING 2015			FALL 2015			SPRING 2016			FALL 2016		
		Head-count	Success Rate	Retention Rate	Head-count	Success Rate	Retention Rate	Head-count	Success Rate	Retention Rate	Head-count	Success Rate	Retention Rate	Head-count	Success Rate	Retention Rate
Department TOTAL:		495	**65.3%**	75.4%	530	**66.6%**	78.7%	522	**68.7%**	76.7%	532	**73.6%**	84.8%	502	**69.2%**	80.3%
CHEM-112	Chemistry in Action				27	**74.1%**	81.5%				27	**81.5%**	85.2%			
CHEM-114	Survey of Chemistry/Physics							14	**92.9%**	92.9%						
CHEM-192	Elementary Chemistry	147	**53.1%**	66.0%	148	**56.8%**	75.0%	159	**64.8%**	73.6%	146	**61.6%**	**80.1%**	127	**60.6%**	74.8%
CHEM-210	General Chemistry I	88	**62.5%**	72.7%	112	**69.6%**	79.5%	117	**66.7%**	80.3%	122	**86.9%**	**91.8%**	154	**62.3%**	76.6%
CHEM-220	General Chemistry II	64	**42.2%**	53.1%	50	**54.0%**	70.0%	56	**48.2%**	57.1%	61	**55.7%**	**70.5%**	48	**54.2%**	68.8%
CHEM-234	Organic Chemistry I	36	**77.8%**	91.7%	27	**51.9%**	70.4%	34	**52.9%**	58.8%	20	**40.0%**	**55.0%**	33	**66.7%**	72.7%
CHEM-235	Organic Chemistry II	18	**44.4%**	66.7%	32	**81.3%**	87.5%	11	**81.8%**	81.8%	23	**69.6%**	**95.7%**	16	**81.3%**	87.5%
CHEM-237	Organic Chemistry Lab I	37	**86.5%**	86.5%	24	**66.7%**	66.7%	35	**60.0%**	62.9%	12	**58.3%**	**66.7%**	32	**65.6%**	78.1%
CHEM-238	Organic Chemistry Lab II	18	**83.3%**	83.3%	24	**87.5%**	87.5%	8	**100.0%**	100.0%	22	**72.7%**	**90.9%**	12	**91.7%**	100.0%
CHEM-410	Chemistry for Health Sciences	137	**82.5%**	90.5%	133	**73.7%**	85.0%	128	**85.2%**	90.6%	131	**88.5%**	**93.1%**	121	**90.9%**	95.0%

Discussion of Student Success Data by Course:
(See table on previous page)

From 2012-2016, the Skyline College Chemistry Department has seen an overall increase in the departmental success rates. During this same period, a improvement in student success was observed in CHEM 192, CHEM 210, and CHEM 410. The courses CHEM 112, CHEM 235, CHEM 237, and CHEM 238 have maintained high success rates throughout this period as well. The faculty has worked on revisions of the curriculum and approaches to teaching and learning to help improve student learning in these course, and the student results appear to support the success of those revisions.

However, we have noticed that the success rate in CHEM 220 has remained flat during this period. To help improve student success, additional in-class discussion and problem-solving time has been increased in the current semester, and Supplemental Instruction is being offered through the learning center. The faculty works closely with the SI leaders to insure that they are highly competent in the concepts and problem-solving methods that students will need to apply. We are hopeful that these strategies will help to augment student success and that we can apply these methods in future semesters as well. Additionally, a recitation/discussion session model will be considered if it proves successful in CHEM 210.

In general, the Organic Chemistry courses (CHEM 234-235) have had reasonably high success rates in the department. However, there are semesters that are anomalies. This can partly be explained by the low headcount in some semesters of the course, resulting in a sample that is not statistically significant. The variation is much more noticeable in CHEM 234 than in CHEM 235. As the first course in the Organic Chemistry sequence, CHEM 234 applies concepts of General Chemistry to a new way of thinking about chemicals and their reactions. Often, students entering CHEM 234 have taken General Chemistry at other institutions and are fulfilling prerequisite courses for their science majors or are returning to school in preparation for applying to professional programs (medicine, dentistry, pharmacy, *etc.*). As a result, students enter the course with varied preparation and many need additional assistance. Offering formal Supplemental Instruction for CHEM 234 could be very helpful. Identifying leaders for SI sessions for Organic Chemistry is especially difficult because after students complete the Organic Chemistry sequence, they often transfer or continue to professional school. An SI session lead by faculty or by graduate or upper division students from 4-year universities could be viable alternative.

Both CHEM 237 and CHEM 238 – the Organic Chemistry laboratory classes – have consistently high success rates, indicating students are mastering the laboratory techniques and analysis outcomes required in the course.

We would also like to look at success data for each course for students in the majors sequence fulfilling the immediate course prerequisite at Skyline College to get a better understanding of how students fulfilling the prerequisite at Skyline College vs. other institutions are succeeding in our courses.

7C. Faculty and Staff hiring, Instructional Equipment and Facilities Requests

See the table on the following page.

Comprehensive Program Review: Resource Needs Summary Table

Program: Chemistry **Date: March 25, 2017**

	Needs	How does this request align with your assessment of student outcomes?	How does this request align with your action plan?	Estimated cost for facilities and equipment
Personnel	1. Chemistry Faculty (General) 2. Instructional Aid 3. Tutors / SI Leaders	1. The FTE/PTE ratio is under 50% for the chemistry department. 2. There is lack of student help in the stockroom. Programmatic changes have increased demand on the stockroom and more services must be provided. 3. Embedded tutors are needed to augment student success in problem-solving in CHEM 210.	1. The action plan calls for the addition of a full-time faculty members. 2. The action plan calls for additional support in the stockroom. 3. We are incorporating Recitation/Discussion sections in CHEM 210 and plan to have embedded tutors.	
Equipment	1. Increase the Chemistry Supply Budget. 2. Buy more organic chemistry micro kits 3. Buy additional hot plates/stirrers 4. Buy additional Mel-temps 5. Top loading balances	For our students to remain competitive for transfer and in the current job market, it is essential for them to be exposed to a broad range of experimental methods and experience of handling hazardous materials. These experiments require the use of expensive glassware and chemicals.	The action plan call for an increase in supply budget and buying new equipment.	2. 20 x $480 per kit = $9,600 3. 20 x $400 per hot plate = $8,000 4. 10 x $1,000 per Mel-temp = $10,000 5. 3 x $ 1,000 per balance = $3,000
Facilities	1. Additional Office Space	The office space for the adjunct faculty is too small. The chemistry department needs a reasonable office space for adjunct faculty to prepare for classes and to meet with students in office hours.	Reasonable space allowances for the adjunct faculty will allow students easier access to their instructors and improve student success.	

APPENDIX A

VISION, MISSION, VALUES AND GOALS OF SKYLINE COLLEGE

Please check current catalog for most recent goal statements.

Vision Statement

Skyline College inspires a global and diverse community of learners to achieve intellectual, cultural, social, economic and personal fulfillment.

Mission Statement

To empower and transform a global community of learners.

Values Statement

Education is the foundation of our civilized democratic society.
Thus:

Campus Climate: We value a campus-wide climate that reflects a 'students first philosophy' with mutual respect between all constituencies and appreciation for diversity. Both instruction and student services are dedicated to providing every student with an avenue to success.

Open Access: We are committed to the availability of quality educational programs and services for every member of our community regardless of level of preparation, socio-economic status, cultural, religious or ethnic background, or disability. We are committed to providing students with open access to programs and responsive student services that enable them to advance steadily toward their goals.

Student Success: We value students' success in achieving their goals, and strengthening their voices as they transform their lives through their educational experience.

Academic Excellence: We value excellence in all aspects of our mission as a comprehensive community college offering preparation for transfer to a baccalaureate institution, workforce and economic development through career technical education programs and certificates, Associate of Arts and Associate of Science degrees, basic skills development, and lifelong learning. We are committed to academic rigor and quality with relevant, recent, and evolving curriculum and well-equipped programs that include new and emerging areas of study. We are dedicated to an educational climate that values creativity, innovation and freedom of intellectual exploration, discovery, thought, and exchange of ideas.

Community Connection: We value a deep engagement with the community we serve and our role as an academic and cultural center for community including business, industry, labor, non-profits, government and the arts. We are dedicated to maintaining a college culture and institutional climate that is warm and welcoming to all.

Shared Governance: We value just, fair, inclusive, and well understood, transparent governance processes based upon open and honest communication.

Sustainability: We value an institutional culture that represents a strong commitment to environmental sustainability and justice. We are committed to the tenets of sustainability "To meet present needs without compromising the ability of future generations to meet their needs."

APPENDIX B

Definition of Terms

WSCH: Weekly Student Contact Hours are based on the first census week of a Fall term. They do not include second census week data, but they do include all positive attendance data for the term (converted to WSCH) including classes which start after the first census

FTE: The full-time equivalent faculty count is determined by the set of rules provided to each college at the time the data is requested. Generally, the figures are the decimal fraction of the teaching hours or units ascribed to the faculty member for teaching work done. Non-teaching time is specifically excluded so that it does not affect the value of the data. Work done by non-certified-personnel is not included.

LOAD: Teaching Load is taken as the ratio of WSCH to FTE

N GRADES: The total number of grades awarded (A+B+C+D+F+CR+NCR+I+W)

RETENTION: The sum of all non-W grades divided by N grades times 100, expressed as %

SUCCESS: A+B+C+CR grades divided by N grades times 100, expressed as %

APPENDIX C

FREQUENTLY ASKED QUESTIONS

1. Why are faculty asked to perform Program Review?

Faculty are the members of the campus community who best understand the intricacies of the courses and the body of work within programs. Faculty work each day with students and staff within these programs and are best suited to understand the strengths and needs of specific programs. Because Program Review is also used for budget and planning, it is imperative that faculty perspective is included in that process.

2. How do I know that all the work I put into this document will have any impact?

A well thought through and completed Program Review will have its greatest impact on the program and its faculty/staff. Evaluation of practices, procedures and student outcomes is the hallmark of successful educational programs and institutions. A thoughtful analysis of the results and findings of the Program Review should be used to improve student outcomes. The Curriculum Committee and College Council have developed a process which requires the Program Review to impact the College planning, budget, SLOAC and resource allocation processes.

3. Why the oral presentation to curriculum committee?

The oral presentation of your Program Review serves two purposes. Primarily, it will allow the program exposure to a cross-section of the campus community. Many members of this community are not aware of the accomplishments of programs or their needs. It allows each program to shine! Secondly, it allows the Program Review process to become more personal. Committee members and program personnel will have the opportunity to interact, question each other, and respond to the Program Review. Finally, it will help the College do systematic planning and coordinate our efforts.

4. I am a one-person department – I don't have the capability or time to perform this review.

Each Division Dean is available to assist you in gathering information and preparation of the self-study. Please utilize him or her. Also, keep track of the amount of time spent on the self-study. When submitting your evaluation of the Program Review process, please include the total hours involved in the process. This will help with future planning and modifications to the review process.

5. How will the self-study questions be kept current and useful?

The Curriculum Committee, through the Academic Senate, will have that responsibility.

Appendix D

Program: Chemistry **Semester**: Spring 2017

COURSE OUTLINE AND PREREQUISITE CHECKLIST TABLE

1	2	3	4		5	6	7
Prefix & Number	**Course Title**	**Curric -UNET Review Date (Month /Year)**	**Transfer**			**Prerequisites, Co-requisites, and/or Recommended Preparations**	**Reviewed**
			CSU	**UC**	**G.E.**		
CHEM 112	Chemistry in Action	3/17	x	x	x	No prerequisite	Yes
CHEM 192	Elementary Chemistry	3/17	x	x		Satisfactory completion (grade "C" or better) of MATH 110 Eligibility for ENGL 836 or ESOL 400	Yes
CHEM 210	General Chemistry I	3/17	x	x	x	Satisfactory completion (grade "C" or better) of MATH 120 or MATH 123 Recommendation: CHEM 192	Yes
CHEM 220	General Chemistry II	3/17	x	x	x	Satisfactory completion (grade "C" or better) of CHEM 210	Yes
CHEM 234	Organic Chemistry I	3/17	x	x	x	Satisfactory completion (grade "C" or better) of CHEM 220. Prerequisite CHEM 237 (completion or concurrent enrolment in).	Yes
CHEM 235	Organic Chemistry II	3/17	x	x	x	Satisfactory completion (grade "C" or better) of CHEM 234. Prerequisite CHEM 238 (completion or concurrent enrolment in).	Yes
CHEM 237	Organic Chemistry Laboratory I	3/17	x	x	x	Satisfactory completion (grade "C" or better) or concurrent enrollment in CHEM 234	Yes
CHEM 238	Organic Chemistry Laboratory II	3/17	x	x	x	Satisfactory completion (grade "C" or better) of CHEM 237 and satisfactory completion (grade "C" or better) or concurrent enrollment in CHEM 235	Yes

CHEM 410	Chemistry for Health Science	3/17	x	x	x	Satisfactory completion (grade “C” or better) of MATH 110 Rec. Eligibility for ENGL 836 or ESOL 400	Yes
CHEM 114	Survey of Chemistry and Physics	3/17	x	x	x	MATH 110 or MATH 111 or MATH 112 Eligibility for ENGL 846 or ESOL 400	Yes

APPENDIX E
SKYLINE COLLEGE

INSTRUCTIONAL AND STUDENT SERVICES PROGRAM REVIEW

RESPONSE SHEET

Program: Chemistry

Thank you for your time and effort in preparing this Program Review. Your Resource Needs Summary has been shared with the College Budget Committee and the Resource Needs Summary and Executive Summary, with recommendations, has been shared with the College Council.

College President

Comments:

_____
Signature

Separate boxes for each

College Vice President(s)

Comments:

_____
Signature

Curriculum Committee

Comments:

_____
Signature

Appendix F
Skyline
College

Evaluation of the Program Review Process

To improve the Program Review process your help and suggestions are instrumental. We ask that all parties responsible for preparation of this review have input into the evaluation. After completion of the Program Review process, please take a few moments to complete and return this evaluation to the chair of the Curriculum Committee.

Estimate the total number of hours to complete your Program Review:

1. Was the time frame for completion of Program Review adequate? If not, explain.
   Yes

2. Was the instrument clear and understandable? Was it easy to use? If not, explain and offer suggestions for improvement.
   Yes

3. Were the questions relevant? If not, please explain and offer suggestions.
   Most of them.

4. Did you find the Program Review process to have value? If not, please explain and offer suggestions.
   Yes.

5. Was the data you received from the Office of Planning, Research and Institutional Effectiveness complete and presented in a clear format? Would you like additional data?

   Yes. Additional subsequent success data could be useful in identifying how well each course prepares students for the next.

6. Please offer any comments that could improve and/or streamline Program Review.

Appendix G
Skyline College

Program Review Completion Check off Sheet

Before submitting your self-study report, please make sure that all forms are submitted by using the checklist below:

		Checked if Completed
1.	Executive Summary	√
2.	Program Review Self-Study (including TracDat PSLO report)	√
3.	Resource Needs Summary Table	√
4.	Course Outline and Prerequisite Checklist Table (Appendix D)	√
5.	Response Sheet (Appendix E)	√
6.	Evaluation of the Program Review Process (Appendix F)	√

Approved by Curriculum Committee 11/6/13
Revised 10/26/16