Program Review and Planning 2019-2020

OVERVIEW OF PROGRAM REVIEW AND PLANNING FOR INSTRUCTIONAL PROGRAMS

Program Review is about documenting the plans you have for improving student success in your program and sharing that information with the community. Through the review of and reflection on key program elements, program review and planning identifies program strengths as well as strategies necessary to improve the academic discipline, program, or service to support student success. With our new Guided Pathways plan, this review becomes even more crucial for the success of our students and college.

We are using the Strengths, Opportunities, Aspirations, Results (SOAR) strategic planning technique to help us focus on our current strengths and opportunities, create a vision of future aspirations, and consider the results of this approach.

BASIC PROGRAM INFORMATION

Academic Year
2019-2020

Are you completing a comprehensive or annual PRP?
Annual

Department Name
Chemistry

Discipline Name
Chemistry (CHEM)

Department Chair Name
Jennifer Zabzdyr

Division Name
Mathematics, Science and Engineering

Website address for your discipline
https://www2.palomar.edu/pages/chemistry/

Discipline Mission statement
The mission of the Palomar College Chemistry Department is to support student learning for success. Our primary goal is preparing our diverse student population for the pursuit of Bachelor degrees in Chemistry, as well as other Natural Science degrees with which they may enter the workplace. We provide students with the fundamental concepts, knowledge and laboratory techniques in a healthy and safe environment.

(click here for information on how to create a mission statement)

Does your discipline have at least one degree or certificate associated with it?
Yes

Are any of your programs vocational (CTE/CE)?
No

List all degrees and certificates offered within this discipline.
AS

Please list the names and positions of everyone who helped to complete this document.
Jennifer Zabzdyr, Chemistry Chair

Full-time faculty (FTEF)
5.80

Part-time faculty (FTEF)
11.67

Classified & other staff positions that support this discipline
Abby Corona (ADA)--12 months, 90%
Tsung Lee (ISA-IV for the San Marcos campus)--12 months, 100%
In the process of hiring (ISA-IV for the RB campus)--12 months, 100%
Donna Aviles (ISA-IV for the Fallbrook campus)--12 months, 100%

Additional hourly staff that support this discipline and/or department
Student workers for the chemical storeroom of the San Marcos campus.

2 students per hour for a total of 58.5 hours per week

PROGRAM INFORMATION

PROGRAM OUTCOMES

Begin this section by reviewing the Program Review reports for courses and programs in TracDat. All active course and program outcomes should be systematically assessed over a 3-year cycle.

- **Program** = Leads to a degree or certificate
- **Discipline** = A group of courses within a discipline

*Programs will be able to complete program completion and outcome questions.

How well do your program's learning outcomes communicate the scope and depth of the degree/certificate offered and align with employer and transfer expectations?
The program learning outcomes are

(1) Chemical Lab Technique: Successful students will be able to set up and execute general and intermediate chemical reactions in the lab using a chemical technique.
(2) Application of the Scientific Method: Successful students will be able to apply the scientific method by stating a question, performing experiments and/or analyzing a data presentation.

Problem solving using the scientific method and being capable of using chemical lab techniques are key requirements of a degree of any type in chemistry. They are necessary skills for transfer students to have,so that they are prepared for the more advanced upper division chemistry coursework.

Describe your program's plan for assessing program learning outcomes.
(1) Chemical Lab Technique: Laboratory Students will prepare specifically-selected, written lab reports for which a rubric will be followed. The instructor will observe student technique/performance and evaluate it against a standard protocol. Successful students will score 70% or higher.

(2) Scientific Method: In laboratory classes, students will prepare specifically-selected, written lab reports for which a rubric will be followed. The instructor will observe student technique/performance and evaluate it against a standard protocol. In lecture classes, students will be evaluated using embedded questions on final exams. Successful students will score 70% or higher. Students in the final course in the program (CHEM 221) will be given a comprehensive (national), final examination administered by the American Chemical Society and evaluate it against the national score results. Successful students will score in the 60th percentile or higher on the ACS exam.

Summarize the major findings of your program outcomes assessments.
(1) Chemical lab technique: At the last assessment, 79% of students scored 70% or higher.

(2) Scientific method: At the last assessment,79% of students scored in the 60th percentile or higher on the ACS exam.

Depending on the degree or transfer goals of our students, they have the choice of three different GE pathways:

- Associate Degree GE Requirements
- CSU GE Requirements
- IGETC Requirements

Palomar College has identified a set of General Education/Institutional Learning Outcomes, which represent the overall set of abilities and qualities a student graduating from Palomar should possess.Click here for a link to Palomar's GE/ILOs.

PROGRAM COMPLETIONS

Student success is at the core of what we do in assisting students in achieving their goals.

The Chancellor's Office Vision for Success stresses the importance of Program Completion as a major goal for our students. In addition, transfer and career readiness are key components of Palomar College's mission statement. This year, our funding formula has also changed reflecting this emphasis, providing additional funding as a function of the number of completions.

In this section we will identify a program standard and a stretch goal (what you would like to move toward) for program completions.

The standards represent the lowest number of program completions deemed acceptable by the College. In other words, if you were to notice a drop below the set standard, you would seek further information to examine why this occurred and strategies to increase completions.

In this section we will identify a program standard and a stretch goal (what you would like to move toward) for programs.

List the number of completions for each degree/certificate for the previous year.
two

Have your program completions Increased, decreased, or stayed the same over the last 5 years?
Increased

What factors have influenced your completion trends?
Most students who complete chemistry courses are not chemistry majors. As such, they have zero interest or need in obtaining an AS degree in chemistry. They would be more likely to obtain an AS degree in their designated major. Most chemistry majors will be focused on transferring with the goal of a BS in chemistry.

The Chancellor's Office Vision for Success stresses the importance of reducing equity gaps through faster

improvements of underrepresented groups.

ACCJC also requires that colleges establish institutional and program level standards in the area of success rates. These standards represent the lowest success rate deemed acceptable by the College. In other words, if you were to notice a drop below the rate, you would seek further information to examine why the drop occurred and strategies to address the rate.

Click on this link to review the course success rates (A, B, C, or Credit) for your discipline.

In this section we will identify a course success rate standards and a stretch goal (what you would like to move toward) for programs.

Course Success Rates by gender, age, ethnicity, special population, location, and modality (You can access the Student Equity Plan on the SSEC website https://www2.palomar.edu/pages/ssec/)

COURSE INFORMATION

COURSE SUCCESS AND RETENTION

What is your program's standard for Discipline COURSE Success Rate?
66.0%

Why did you choose this standard?
Chemistry is a very challenging subject so success rates are traditionally lower than the campus standard, as seen in our success rates over the past 5 years (66% to 68%). A more realistic success rate would be 2/3 of all students (66%).

What is your Stretch goal for COURSE success rates?
66.0%

How did you decide upon the goal?
66% success rate is already reasonable. It is vitally important to the department to maintain academic rigor so that our students are prepared to transfer as upper division chemistry students.

COURSE OUTCOMES

How have you improved course-level assessment methods since the last PRP?
Lab courses SLOs now require assessment of lab skills. Lab practical exams are given and students are assessed on how well they can perform lab skills without help from the instructor or other students.

Lecture courses now have more specific SLOs that can be more easily quantitatively assessed on a final exam across all sections.

Summarize the major findings of your course outcomes assessments.
Data was collected Spring 2019 using lab practical exams for CHEM 100 (lab) and CHEM 115L (lab). The average score for CHEM 100 lab across all sections was 36%, indicating improvement is needed. The average score for CHEM 115L across all sections was 70.76%, indicating students are achieving their lab SLOs.

Across all of our courses, between 75% and 90% of students are able to achieve the lecture SLOs.

This section is intentionally blank for annual PRPs. Please click "Next" to continue.

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CAREER AND LABOR MARKET DATA

The Chancellor's Office Vision for Success stresses the importance of increasing the percent of exiting students who report being employed in their field of study. It is important for us to consider how ***all*** of our programs connect to future careers.

Go to this website https://www.onetonline.org/ and enter your discipline in the bubble on the top right for ideas about potential occupations. Click on an example to see more detail.

What kinds of careers are available for people who complete your programs (and/or transfer)? (Refer to link above) Are there any new or emerging careers and if so how would the new or emerging careers impact your future planning?
Chemistry teachers, chemical technicians, chemists, professors, chemical engineers, biochemical engineers, soil/plant scientists, chemical equipment operators, medical/clinical lab technologists/technicians, biochemists, biophysicists, quality control/analysis. Careers with a bright outlook include medical/clinical lab technologists/technicians, biochemists, biophysicists, and quality control analysts.

What are the associated knowledge, skills, abilities (KSA's) needed for the occupations listed above? (click examples in the link above to get ideas)
Most require a minimum of a B.S. degree in chemistry or biochemistry. Some occupations require a graduate degree in chemistry or biochemistry. Knowledge, skills, and abilities will vary, but will include:

KNOWLEDGE
Chemistry — Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.
Mathematics — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

SKILLS
Science — Using scientific rules and methods to solve problems.
Critical Thinking — Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
Reading Comprehension — Understanding written sentences and paragraphs in work related documents.
Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
Mathematics — Using mathematics to solve problems.

ABILITIES
Deductive Reasoning — The ability to apply general rules to specific problems to produce answers that make sense.
Inductive Reasoning — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).
Oral Comprehension — The ability to listen to and understand information and ideas presented through spoken words and sentences.
Written Comprehension — The ability to read and understand information and ideas presented in writing.
Mathematical Reasoning — The ability to choose the right mathematical methods or formulas to solve a problem.

How does your program help students build these KSA's?
KNOWLEDGE: Our program teaches students the chemistry knowledge they will need in order to transfer

and pursue a more advanced degree in chemistry or biochemistry.

SKILLS: Critical thinking is a key component of all our courses and one of our program SLOs. Problem solving, using the scientific method, is emphasized in all of our classes.

ABILITIES: Oral and written communication skills are learned in the lab, through the writing of lab reports and giving oral presentations.

Work Based Learning

Applied and work-based learning (WBL) allows students to apply classroom content in professional settings while gaining real-word experience. WBL exists on a continuum that reflects the progress of experiences from awareness-building to training. Students often cycle back through the continuum many times throughout college and throughout their career. Faculty play a critical role in ensuring these experiences are embedded into curriculum and support learning.

Have you incorporated work based learning (work experience, internships, and/or service learning) into your program?
No

Do you want more information about or need assistance integrating work-based learning into your program?
No

How do you engage with the community to keep them apprised of opportunities in your program?
Outreach activities to local middle schools (Woodland Park Middle and San Marcos Middle).
STEM Conference: The chemistry department hosts workshops and shows to engage middle and high school students and their parents as a part of a wider conference in STEM education.
Other service learning activities that are hosted by the Chemistry Club.

Program Goals

In the previous sections, you identified opportunities for improvement. Using these opportunities, develop 3-year SMART goals for your department. Goals should be Specific, Measurable, Attainable, Relevant, Time-Specific. Ensure your goals align with the mission of your department and/or the College's strategic plan.

Please list all discipline goals for this three-year planning cycle. Click here for previous PRPs and goal information.

Goals

Goal 1

Brief Description
To increase retention and persistence rates for low-income students in CHEM 110 and CHEM 115.

Is this a new or existing goal?
New

How will you complete this goal?
Dr. Heri Rivera and Shannon Andrews are applying for an NSF S-STEM grant (reference NSF 17-527) which will be used to fund scholarships and interventions for 16 academically talented, low-income

students per year over a 5 year period. 60% of the grant money would be used to provide scholarships, 23% for research costs, 11% for interventions, and 6% for faculty compensation. Evidence-based interventions could include (but are not limited to):

1. Cohort Welcome Day
2. Extended hours of the STEM Center to include some evenings and Saturday mornings
3. Specialized counseling
4. Mandatory learning sessions for cohort members
5. Community service requirement for cohort members
6. Educational sessions and involvement of the students' family and community

Due to the limited budget for interventions, assistance from Palomar College would be required.

Outcome(s) expected (qualitative/quantitative)
Quantitative. With higher persistence and retention, students would complete their program earlier. This could translate into a higher number of completions for the college. The number of repeat students should also decrease, opening up more space for new students to enroll.

How does this goal align with your department mission statement, the college strategic plan, and /or Guided Pathways?
Strategic Goal 1, Objective 1.2: Encourage and promote innovative instructional and student support practices and strategies focused on strengthening teaching and learning.

Faculty will serve as dedicated mentors to scholarship recipients to help ensure that they successfully complete the CHEM110/115 sequence. Faculty will work with an R1 researcher (Dr. Frankie Santos Laanan) to implement practices to improve student learning outcomes. Faculty will work to establish sustainable community events and to create a culture of community and family involvement at the college. Cohort students will participate in the events to encourage service learning.

Strategic Goal 2, Objective 2.6: To address opportunity gaps among the college's diverse student body.

The project with help alter the status quo by addressing issues of equity and access. The grant will target low income students, providing scholarship assistance which can be used to invest in technology and personal laptops.

Expected Goal Completion Date
8/17/2026

Goal 2

Brief Description
To update technology (computers, chemical instruments) in order to remain current with chemical education pedagogy.

Is this a new or existing goal?
New

How will you complete this goal?
We would need an increase in our budget to allow purchase of new laptop computers, associated software, and chemical instruments for use in CHEM 100, 110L, 115L, 220, and 221.

Outcome(s) expected (qualitative/quantitative)
Quantitative and qualitative.

Computer Updates
All of our courses require the use of computers for graphing. In CHEM 110L and CHEM 115L, students use the computers in conjunction with other instruments, such as a spectrophotometer, for chemical analysis. CHEM 220 and 221 students need access to Chem Draw, a program for drawing molecules. Our current issues are three-fold: (a) We do not have enough computers to allow use in all of our labs at the same time. (b) Our current computers are outdated and take about 20 minutes to fully boot (and for students to login). (c) The battery life of our current computers is non-existent and we don't have access to enough chargers to permit students to check out a charger with the computer.

Chemical Instrumentation (CHEM 115L)
Learning to calibrate and use pH meters is one of the SLOs for CHEM 115L. We need to have enough meters for students to work individually if they are going to attain this SLO by the end of the semester. pH meters are used in about half of our lab curricula and we need to replace them as they quit working.

Chemical Instrumentation (CHEM 220/221)
Organic chemistry relies heavily on chemical instrumentation (GC, NMR, etc). The instruments are expensive to purchase and expensive to maintain. However, for our students to transfer and be competitive with their university peers, they need experience using these instruments.

Across the board, updating our computers and chemical instrumentation would allow us to offer lab curricula that is current with current chemical education pedagogy. This will ensure that our students are fully prepared to begin their upper division coursework and are not at a disadvantage compared to their university peers. We would also be able to offer more undergraduate research opportunities to our students. This will give them the hands-on experience that they will need to be competitive with their peers and ready them to participate in undergraduate research at their 4-year institution.

How does this goal align with your department mission statement, the college strategic plan, and /or Guided Pathways?
Strategic Goal 1, Objective 1.2: Encourage and promote innovative instructional and student support practices and strategies focused on strengthening teaching and learning.

The ability to offer updated lab curricula and opportunities for research projects is in line with Goal 1, Objective 1.2.

Strategic Goal 2, Objective 2.6: To address opportunity gaps among the college's diverse student body.

Having computers available for all students to check out, rather than expect that all students can provide their own computers, will help to address the opportunity gap between higher income and lower income students, while ensuring that all students can benefit from our updated curriculum.

This goal is also aligns with our department mission to prepare students for transfer as an upper division chemistry major. Ensuring that we are offering curriculum that is consistent with that offered at universities will ensure that our students transfer and be on equal footing with their university peers.

Expected Goal Completion Date
8/21/2023

Goal 3

Brief Description
To increase our presence in the community through outreach.

Is this a new or existing goal?
Existing

Goal Status

Ongoing

How will you complete this goal?
With institutional support from Palomar College and an increase in our budget, we can host events, such as the STEM conference, more often. We can also participate in more events outside of Palomar, such as Science Night at San Marcos Middle School. Hosting and attending events such as these cost money, including but not limited to chemicals and other materials for demos, transportation costs, and compensation for time spent prepping for the events.

Outcome(s) expected (qualitative/quantitative)
Qualitative

How does this goal align with your department mission statement, the college strategic plan, and /or Guided Pathways?
One of Palomar College's values that is shared by the department is "physical presence and participation in the community". This is exactly what we would like to accomplish with this goal.

Expected Goal Completion Date
8/21/2023

STAFFING AND RESOURCE NEEDS

Instructions

1. Refer to Strategic Plan.
2. See Data.
3. See career info (In PRP)

Are you requesting additional full-time faculty?
Yes

Are you requesting additional Staff, CAST or AA?
Yes

% of FTEF for on-going reassigned time (department chair, program director, coordinator, etc.)

NOTE: If you are requesting full-time faculty, you must go back to the Labor Market section of the form to complete that section. It is required when requesting additional faculty positions.

REQUEST FOR ADDITIONAL FULL-TIME FACULTY

Faculty Request 1

Title of Full-Time Faculty position you are requesting
Assistant Professor, General Chemistry

How will this faculty position help meet district (Guided Pathways, Strategic Enrollment Management etc.), department and/or discipline goals?
Our general chemistry courses are among our largest and most difficult. Having additional full time faculty to staff the classes will provide a better quality of education to our students. It would increase the odds of students having the same lecture and lab instructor, which provides a higher level of consistency.

Both of these are aligned with the strategic plan value of "excellence in teaching,learning,and service". Furthermore, full time faculty are more likely to participate in outreach activities, such as the STEM conference, to bring chemistry into the wider world. This aligns with the college strategic plan value of "physical presence and participation in the community".

Is there a scarcity of qualified Part-Time Faculty (for example: Specialized degree/experience, emerging/rapidly changing technology, high demand)
Yes. It is next to impossible to find good PT faculty to teach CHEM 115/115L, and to a lesser degree, CHEM 110/110L. This is due, in large part, to the fact that part time faculty are rarely assigned to teach these courses (especially CHEM 115/115L). As such, they have little to no experience in teaching a course that is challenging to teach and ranked by students as one of the most difficult to master. With the opening of the Fallbrook and RB campuses, our general chemistry offerings are ever increasing, including CHEM 115/115L.

Are you requesting this position for accreditation, regulatory, legislative, health and safety requirements? Please explain.
No.

Please summarize the discipline productivity, efficiency, and any regional career education needs for this discipline.
N/A

Is your department affected by faculty on reassigned time. If so, please discuss.
Department Chair (40% reduced load)

In the last ten years, what is the net change in number of Staff in the department? (loss vs. gain)
0

REQUEST FOR ADDITIONAL STAFF, CAST, AA

Staff, CAST, AA request 1

Title of Staff position you are requesting
ISA-IV for San Marcos Campus

How will this Staff position help meet district (Guided Pathways, Strategic Enrollment Management etc.), department and/or discipline goals?
SLOs for all of our lab classes require demonstration of lab skills (lab practical exams). The prep necessary for these exams almost doubles the workload of the ISA. The chemical storeroom at the San Marcos campus has been understaffed since the retirement of Corazon Cordova. We now have only one ISA who works from 8am to 5pm. However, we offer labs from 8am to 9pm. This means that we have no staff member on duty to support our evening labs. The chemical storeroom is staffed by unsupervised student workers. This is a safety hazard, and safety must come first. For the department to continue offering evening lab sections (to maximize enrollment) we need a second ISA.

Is there a scarcity of qualified Part-Time Staff (for example: Specialized degree/experience, emerging/rapidly changing technology, high demand)
Yes. Qualified candidates need a BS (minimum) in chemistry, experience prepping solutions in a safe manner, experience dealing with chemical waste, purchasing chemicals, etc. Based on past searches, we struggle to attract a large candidate pool with these qualifications for a FT position, so it is unlikely that we would be able to find qualified candidates willing to work PT.

Are you requesting this position for accreditation, regulatory, legislative, health and safety

requirements? Please explain.
No

Review

Chair Review

Chair Comments

Chair Name
Jennifer Zabzdyr

Chair Sign Date
10/24/2019

Dean Review

Strengths and successes of the discipline as evidenced by the data and analysis:
I think there is a lot of opportunity in this department and appreciate your goals for outreach to the community. I appreciate your willingness to partner with the STEM Center and recommend working with the new MSE outreach specialist to highlight your program.

Areas of Concern, if any:

Recommendations for improvement:
Faculty mention that there are few students in need of a AS in chemistry since most students transfer. I wonder if there is opportunity here for a transfer "package" or maybe just marketing the benefits of the AS to students. I also think there is opportunity for collaboration among departments to schedule in blocks that help students accelerate their completion.

Dean Name
Nichol Roe

Dean Sign Date
11/13/2019

IPC Review

Strengths and successes of the discipline as evidenced by the data and analysis:

Areas of Concern, if any:

Recommendations for improvement:

IPC Reviewer(s)

IPC Review Date

Vice President Review

Strengths and successes of the discipline as evidenced by the data and analysis:
Appreciated learning about lab changes and program goals. Solid review.

Areas of Concern, if any:

Recommendations for improvement:

Vice President Name
Jack S. Kahn, Ph.D.

Vice President Sign Date
1/28/2020