

PROGRAM REVIEW Fall 2018

Program: CHEMISTRY

Division: STEM

Date: October 22, 2018

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SLO/SAO Point-Person: MICHAEL ANSELL

Audience: Deans, Vice Presidents of Student Services and Academic Services, All Planning and Allocation Committees. This document will be available to the public.

Uses: This Program Review will be used to inform the campus and community about your program. It will also be used in the processes of creating Division Summaries, determining College Planning Priorities and allocating resources. A final use is to document fulfillment of accreditation requirements.

Time Frame: This Program Review should reflect on program status during the 2017-18 academic year. It should describe plans starting now and continuing through 2018-19. This document also provides the opportunity to describe more long-term plans (optional).

Sections: The first section of this Program Review focuses on general program reflection and planning. The second section has specific questions to be filled out by all programs this year. The third section is an SLO/SAO update. The fourth section is a review of curriculum. Only programs with curriculum need to complete Section 4.

Topics: A list of topics of particular interest to Program Review readers can be found here:

<https://goo.gl/23jrxt>

Help: Contact Karin Spirn: kspirn@laspositascollege.edu

Instructions:

- 1) Please respond to each question as completely as possible.
- 2) If the requested information does not apply to your program, write "Not Applicable."
- 3) Optional: Meet with your dean to review this document before _____.
- 4) Send an electronic copy of this form to Karin Spirn and your Dean by _____.

Links:

Program Review Home Page: <https://goo.gl/XATqjJ>

Fall 2017 Program Review Updates : <https://goo.gl/pkv76m>

Frequently Asked Questions: <https://goo.gl/ilhRtt>

Section One: Program Snapshot

No Significant Changes Option

Contact person: _____

By marking an X in the box above, the writers of this Program Review indicate that there have been no significant changes to their program or their program's needs in the past year. In this case, programs may opt not to complete Program Review Section One: Program Snapshot.

Programs must still complete all other sections (as applicable).

Please note: Choosing this option means that your program's information may not be included in the yearly Division Summary.

The No Significant Changes Option may only be used for two years in a row; after two years, programs must complete a full Program Review including the Program Snapshot. Our program's most recent Program Review was submitted in the following semester: Fall 20_____.

A. Program Description: Briefly describe your program, including any information or special features of your program that will provide helpful context for readers of this Program Review.

MISSION: The Chemistry Program's mission is to serve the three diverse groups of students at Las Positas College:

- Transfer students majoring in the sciences and engineering; preparing for careers in medicine, pharmacy, or dentistry; or following a teaching pathway at primary, secondary, or post-secondary level.
- AA/AS and Certificate students enrolled in programs requiring knowledge of chemistry, for example, nursing, dental hygiene, viticulture, etc
- Students completing general education course requirements

CURRICULUM: The Program offers two degrees: an AS - Chemistry (Transfer Preparation) and an AA – Chemistry Education (modified to AS Chemistry Education in Fall 2018). Seven courses are regularly offered in the program: Chemistry 30A and 30B (Introductory and Applied Chemistry I and II), Chemistry 31 (Introduction to College Chemistry), Chemistry 1A and 1B (General College Chemistry I and II), and Chemistry 12A and 12B (Organic Chemistry I and II). In addition, Chemistry faculty have also taught Environmental Studies and Wine Science for the first time in Spring 2019.

HUMAN RESOURCES: Three full-time, tenured faculty members maintain the program with assistance from up to 12 part-time faculty, the support of 1 science lab coordinator and safety officer and 4 full-time laboratory technicians shared with the Biology program, the Dean of STEM, and one full time senior administrative assistant.

FACILITIES: The Program is primarily housed in Building 1800 which has three chemistry laboratories. Lab 1802 is primarily used for General Chemistry Chem 1A and 1B students. It is fitted with individual fume hoods which are necessary for the level of chemical use in 1A and 1B and a conventional fume hood. Every week, up to 14 labs are held there with about 180 students. It is equipped with about 120 lockers. Lab 1805 is primarily used by Organic Chemistry 12A/12B

students and 30B students. This lab is also equipped with individual fume hoods and a conventional fume hood. Labs 1802 and 1805 share a weighing room. Lab 1807 is primarily used by students in the introductory courses (Chem 31 and Chem 30A). It is not equipped with individual fume hoods but has 3 conventional fume hoods. Attached to the lab is a weighing room. Lab 1806 is the instrumentation room housing the NMR, the IR, the GC-MS, the melting point apparatus, and the polarimeter. Lecture classes in chemistry are primarily scheduled in classrooms 1816 and 1814, 1850 classrooms, and classroom 1060 in the new Classroom Building.

EQUIPMENT: The Chemistry lab equipment can be categorized as:

- analytical chemistry instrumentation (NMR, IR, GC-MS, AA, Polarimeter, melting point apparatus)
- standard lab equipment (fume hoods, burets, hot plates, Bunsen burners, pipets, logger pro data collection systems, laptop computers, gas storage equipment, pH meters, etc.)
- student locker equipment

ENROLLMENT MANAGEMENT: For SU 2018, FA 2018, and SP 2019, the number of sections offered by the program has remained at 45 sections, some of which are double sections. There has been a steady increase in the total course enrollments for both fall and spring since 2013.

SERVICES TO STUDENTS: Chemistry students are provided the opportunity to participate in Honor's Projects or Independent Studies. To support student success, full-time faculty actively participate in science and engineering activities: e.g., planning for 4 science seminars every year, poster session, Chemistry Club, STEM-focused conferences (e.g., HSI-grant, Transforming STEM, Advanced Placement, ACS meetings, the Guided Pathways initiative, etc). Faculty also participate in partnership initiatives with companies (e.g. environmental monitoring and Form Factor) for potential internship positions, job prospects, and collaboration in developing curriculum.

LEARNING SUPPORT: The Chemistry Program provides many outside-the-classroom learning opportunities for students through full-time and part-time faculty tutorial hours in the Tutorial Center, participation in the Science and Engineering Seminar Series, internships, poster sessions, etc

TECHNOLOGY USE: Lab 1802 is equipped with individual student laptops that run many specialized software. The Organic Chemistry instrumentation also requires special software to run. All instructors use Canvas and the website is maintained and updated by full-time faculty.

A complete, full-color description of our program with pictures can be found at our website:

<http://www.laspositascollege.edu/chemistry/>

B. Changes to Program and Needs: Describe any significant changes to your program or your program's needs since the previous Program Review Update (Fall 2017).

CHANGES TO PROGRAM: Some changes in the Program are listed below.

ENROLLMENT MANAGEMENT

Our FTEF allocation increased from 18.75 FTEF in FA17 - SP18 to 18.93 in FA18 - SP19. The changes in course offerings include:

- We retained the 3rd section of 12A and 12B. All 3 sections filled in Fall 2018.

- We added a 5th section of Chem 1A in Fall 2018 which also filled. Even with this addition, there were enough students on the waitlist to fill one more section.
- We tried to offer a Chem 30B in Summer 2018 again but it did not fill and was cancelled.
- The new morning Chem 31 single section first offered in Spring 2018 is not being re-offered IN Spring 2019 even though it was a popular section which filled immediately and had a long waitlist.

HUMAN RESOURCES

Full-time faculty:

- For the 3rd year in a row, our request for a 4th full-time faculty was not ranked high enough to be included in the hiring despite ranking very high below the cutoff in the previous 2 years, the tremendous growth and complexity in our program, and falling well below 50% of FTEF taught by full-time faculty. We re-submitted the request for a new full-time faculty this semester. We also submitted a request for another new faculty (5th).
- The third full-time faculty in the program, Adeliza Flores, will be resigning in June 2019. A request to replace this position was also submitted this year to the FHPC.

Chemistry Coordinator:

- Richard Grow is the Program Coordinator for this academic year. The CAH allocation for this position has remained at 0.7 CAH.

Lab staff:

- One of our lab tech positions was extended from a 10-month position to a 12-month position. This has done much to support our increased lab offerings in the summer.
- A hiring committee was convened in October 2017 to hire the replacement for Shirley Ly who resigned in September 2017. Rhiannon Follenfant was hired in November 2017 as a replacement.
- A hiring committee was convened in September 2018 to hire the replacement for Miki Okada who was hired last year and resigned in July 2018. This vacancy is being filled in by 2 temporary lab techs.

FACILITIES

- The number of 1A and 1B lab sections using lab 1802 has increased from 15 to 16 sections annually due to the additional 1A section in Fall 2018.
- With the additional 1A section in Fall 2018, the number of students having to share lockers with students from other sections has doubled.
- Hex keys to allow locking of lab doors from inside have been distributed to all part-time faculty teaching courses last academic year.

SUPPLIES AND EQUIPMENT/SOFTWARE

- A new Infrared Spectrometer was purchased (through the IER process) and installed for use by the Organic Chemistry Students starting this academic year.
- Additional glassware for the third section of Organic Chemistry has also been purchased through the IER process. There are still Organic Chemistry equipment that needs to be purchased.
- The Atomic Absorption Spectrometer underwent maintenance servicing after 10 years of use. We hope to get another 10 years out of this valuable instrumentation.
- Many of our equipment, instrumentation, lab room infrastructure, and student locker materials are nearing the end of their functional life span. We continue to inventory our chemistry equipment and student locker materials for items that need repair, replacement, or augmentation.

EXTERNAL FACTORS

- The Chemistry Assessment Exam is still undergoing validation and is currently in provisional status. This process requires surveying Chemistry 31 students and faculty every semester and Chemistry

1A students and faculty every fall semester to collect data.

CURRICULUM COMMITTEE ITEMS

- The Program submitted program modifications for the AS in Chemistry degree and AA in Chemistry Education degree. These were approved in the October 15 meeting.

CHANGES TO PROGRAM NEEDS:

ENROLLMENT MANAGEMENT NEEDS

- We need to add at least one more section of Chem 1A. If added, it will have to be scheduled in the spring; lab 1802 is saturated with 7 sections of 1A and 1B in the fall.
- The daytime single section of Chem 31 offered in Spring 2018 filled with a long waitlist. We would like to offer this again. The long waitlists for the 4 sections offered in Fall 2018 indicate that offering this morning section again as a double section would help meet the demand.

HUMAN RESOURCES NEEDS

Full-time faculty:

- We resubmitted the request for a new (4th) full-time faculty this year because it was not included in the recommended list for the third time last year. We also submitted a request for another new faculty (5th).
- We submitted a request to replace the 3rd full-time faculty who is resigning in June 2019.

Coordinator Position:

- No change. We are still requesting an increase in CAH allocation from 0.7 CAH to at least 2.0 CAH. The Coordinator duties have increased in the last several years with more hiring of part-time faculty and classified personnel, SLO coordination, increased lab instrumentation, more students served with 60% increase in number of sections since 2012, requesting funds for maintaining, replacing, and acquiring new lab equipment, etc.

Lab staff:

- We will not be requesting a new lab tech position for this year. The number of sections offered by Chemistry did not change from last academic year.

STEM Coordinator:

- Chemistry faculty participate actively in the Science and Engineering Seminar Series. This is currently supported by a part-time grant-funded STEM coordinator who is also responsible for many other STEM initiatives and programs. To sustain this speaker series attended by 150-200 students at every event, Chemistry, along with other STEM, programs is helping complete a new classified position request for a full-time STEM coordinator.

FACILITIES NEEDS

- Lab 1802 is even more impacted this year. No changes in the needs as noted in the Fall 2017 program review. See Facilities plan in its own section below.

SUPPLIES AND EQUIPMENT/SOFTWARE NEEDS

More students in the program means more chemicals used, more glassware and other equipment needed, and higher frequency of use of equipment and instruments.

- With sections added and continued aging, wear-and-tear, and breakage due to more frequent use, the Program needs continued funding for standard laboratory equipment maintenance, repair,

replacement, and augmentation. Examples include (not exhaustive):

- The NMR may need to be replaced in the next 2-4 years, especially with the addition of a third section of 12A and 12B.
- The plastic protective covers for the individual fume hoods in the 1802 and 1805 labs will need to be replaced in the next 1-2 years.
- Mass balances to replace some that are more than 13 years old.
- A second acetylene tank to prevent wastage of acetylene when the pressure runs below the minimum required and disruption of 1A and 1B labs using the Atomic Absorption Spectrometer.
- IER forms were submitted Fall 2018 requesting more equipment for the Organic Chemistry classes, replacement glassware equipment, centigram balances, and a few replacement hood covers. As we continue to inventory our standard laboratory equipment, instrumentation, and student locker equipment, we will likely put in another IER in Spring 2019.
- The number of sections offered by the Program has increased by 10% since Fall 2016. This increase included the addition of third sections of 12A and 12B and a 5th section of 1A in the fall. Both of these courses require special and relatively more expensive chemicals. The Program will continue to need an augmentation in the supplies budget to cover the increase in chemical and glassware supplies needs.

FINANCIAL/BUDGETARY NEEDS

- All the program needs specified for supplies and equipment and new lab sections require an increase in the budget allocated for the chemistry program.

SLO/SAO PROCESS NEEDS

- The Program needs to review the ACS standardized exams for assessing content knowledge in these courses or other alternatives and decide whether it is appropriate for assessing the course SLOs.
- The Program needs to keep collecting more assessment data for all of our courses so we can make more meaningful analysis based on statistically robust data.

PROFESSIONAL DEVELOPMENT NEEDS

- As last year, we would like additional professional development funding to increase the \$250 allocation per person to attend Chemistry-focused conferences.

PEDAGOGY NEEDS

- Some of our labs need updating. There is also a need to introduce newer, more modern labs that incorporate the use of our instrumentation. A 4th full-time faculty will be helpful in this endeavor.

Mark an X before each area that is addressed in your response.

Definitions of terms: <https://goo.gl/23jrxr>

	Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software		LPC Planning Priorities		Services to Students
	Curriculum committee items		Financial/Budgetary		LPC Collaborations		SLO/SAO Process
	Enrollment Management		Human Resources		Pedagogy		Technology Use
	External Factors		Learning Support		Professional Development		

C. Reflection: What plans from the [2017 Program Review](#) or any [previous Program Reviews/Updates](#) have been achieved and how? You may also describe achievements that were not planned in earlier Program Reviews.

SUPPLIES AND EQUIPMENT

- More student equipment were purchased for the 3rd section of 12A and 12B through IER funds.
- A new Infrared Spectrometer was purchased through IER funds.
- The 10-year old Atomic Absorption Spectrometer received a maintenance servicing for the first time in 10 years. The problem with the AA mentioned in the previous program review was also fixed by diagnosis of a full-time faculty and a part-time faculty and replacement of the broken part. A new part was also purchased.

HUMAN RESOURCES

- A 10-month, 60% lab tech position has been converted to a 12-month, 100% position. This has helped tremendously in supporting labs for fall, spring, and summer.

TECHNOLOGY USE

- The Chemistry website has been migrated to the new system OMNI. Two full-time faculty have been trained thanks to Tim Druley.

SLO/SAO PROCESS

- Professional copies of standardized ACS Exams for introductory General, Organic, and Biochemistry are being reviewed for use in the SLO assessments of Chemistry 30A and 30B classes.

ENROLLMENT MANAGEMENT

- We were able to add a 5th section of Chem 1A in the fall and retain the third sections of 12A and 12B in the fall and spring respectively.

Mark an X before each area that is addressed in your response.			Definitions of terms: https://goo.gl/23jrxr				
<input type="checkbox"/>	Community Partnerships/Outreach	<input type="checkbox"/>	Facilities, Supplies and Equipment, Software	<input type="checkbox"/>	LPC Planning Priorities	<input type="checkbox"/>	Services to Students
<input type="checkbox"/>	Curriculum committee items	<input type="checkbox"/>	Financial/Budgetary	<input type="checkbox"/>	LPC Collaborations	<input type="checkbox"/>	SLO/SAO Process
<input type="checkbox"/>	Enrollment Management	<input type="checkbox"/>	Human Resources	<input type="checkbox"/>	Pedagogy	<input type="checkbox"/>	Technology Use
<input type="checkbox"/>	External Factors	<input type="checkbox"/>	Learning Support	<input type="checkbox"/>	Professional Development	<input type="checkbox"/>	

D. IR Data Review: Describe any significant trends in your program's data from the office of Institutional Research and Planning. (Note: Not all Programs have IR data packets available; if your program does not have a data packet, you may note that in the response box). You may also discuss any other data generated for your program by the Office of Institutional Research and Planning.

IR Data packets are available here: <http://www.laspositascollege.edu/research/progrev.php>

Course Success Rates Dashboard can be found at the bottom of this page:
<http://www.laspositascollege.edu/research/outcomes.php>

Our success rate has been in the range of 75% - 79% and our goal is to have at least 73%. Our enrollments over the same 5-year period went from 702 to 924, which is an increase of about 32%. In

the last year of full data, we were at 77%. This shows even with the increase of students we are still in our normal range, which is $77\% \pm 2\%$.

In summarized the IR data obtained for the chemistry department, I would say the following: Our over-all data shows we have about a 77% success rate that fluctuates by about 2%. The male/female shows that on average the male does a little better than the females. This is about a 5% lower average in success rate and a 5% increase in the number of withdraws for females. When we look at the data on minorities, our main minorities are Asians and Latinos with other minorities so low that they are not very reliable. Asian on an average have about a 10% higher rate of success and a 10% lower amount of withdraws. The Latino data show about 10% lower success rate (compared to our department averages) and a 10% higher rate of withdraws. Looking at the results for younger students 24 or less compared to older students about 24, we find that most of our students fall into the younger group. The numbers for our older students are usually so small they are not very reliable. Our full-time students usually do better than our part-time student and the number of withdraws are higher for the part-time students than the full-time students. The difference is usually about 5% lower success rate and a 5% high withdraw rate for the part-time students.

In our full sequence from chem 1A through chem 12B, the data shows, a slight increase over the three-year period from 30 to 36 ending with 39 students. This is about 30% increase of students going from 1A through 12B with an increase of the number of students over the same period was an increase of 32%. There is little change based on the number of students. When looking at the data based on male or female, we found that we have slightly better results for male than female. F to M for 2015 was 25 to 39. We had 8% of the male were non-successful and women had a rate of 9%. We also had 30% of the women withdraw and only 25% of the male withdrawing. This set has the smallest number of students finishing 12B because many of the students in chem 1A only need chem 1A. Some students making it to the 1B class do not need to take the chem 12A and chem 12B.

When we look at the throughput for chem 1A to chem 1B We see that same trend the male success percentage to female was 79 to 75 or 79 to 73. If we compare the average success rate to the success of our two larger minority populations (Asian and Latino), we see the Asian a little higher at 92% and the Latino a little lower 64%.

When we look at students starting with chem 1A through to Bio 1C we get similar results. The male is a little higher than the female success rate (67% to 61%) or (79% to 75%). The success rate for Asian and Latino in the same two years would be (55% to 57%) and (92% to 64%). In the Fall of 2015 the Asian percentage was rather low (55%) with the Latino percentage at (57%). If we look at Fall 2014, we have the Asian percentage at (92%) and the Latino at (64%). Looking over the years of 2014, 2015 and 2016, we see the Asian population has a little higher success rate and the Latino at a little lower success rate.

Looking at the data for chem 31 through 1A and chem 31 through chem 1B we have the same results. The variation between male and female is smaller than seen with the 1A results. The variation between male and female is less than 5% and some years the females did better and in other years the males did better. When averaged out the variation from the average is about 3 – 4%. The minority results are also closer. The Asian results are about 5% higher than the average and the Latino are about 5% lower. The younger students did about 10% better than the older students did. The full-time students did about 10 – 15% better than the part-time students.

Looking at the data for the 30A – 30B sequence we find that the difference between male and female seems to be about 2% difference with the male results just a little higher than the average. The number of Asian results are zero data and in one year we had a larger number of Filipinos but that was only one year. In this data, we see that the older students do better than the younger students do by about 10%. We also see that the part-time students and the full-time students are about the same.

In summary, I would say we see about a 2% variation in our over-all success rate over the last 3 years.

We see a slightly higher variation (about 5%) difference between male and female (male being a little higher). In the 30A sequence, this difference between male and female almost disappears. We usually see the Asian doing a little better than the average (about 5%) and the Latino average a little lower than the average. In chem 31 this race difference almost disappears. In chem 30 sequence, there are too few Asians to show up and the difference between the average and the Latino average is almost gone. The younger students do better in the data except for the 30 sequence, which has the older students doing better than the younger students do. In the 30 sequence, the difference between the part-time and full-time students almost disappears.

Mark an X before each area that is addressed in your response.				Definitions of terms: https://goo.gl/23jrxt			
	Community Partnerships/Outreach		Facilities, Supplies and Equipment, Software		LPC Planning Priorities		Services to Students
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E. Other Data Review (Optional): Describe any significant findings based on other data regarding your program. Possible sources of relevant information might include, but are not limited to, the following:

- Data generated by your program
- CEMC Data
- Labor Market Data

N/A							
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F. Impacts to Students (Optional): Discuss at least one example of how students have been impacted by the work of your program since the last Program Review Update (only if you did not already answer this in Questions B-E).

Continued from last year:

- The additional sections of Organic Chemistry, Chem 30A, and Chem 31 for this year will improve student access to courses to help timely completion and transfer.
- Faculty serve as advisors to student clubs.
- Faculty support honor's projects and independent studies.
- Faculty provide opportunities for students to participate in seminars, poster sessions, and internships. Chemistry students have also participated in the poster sessions organized in partnership with the LPC Library, the Biology Program, and the Livermore City Library.
- Former students now work as biology and chemistry lab support staff.
- The Program continues to award high-scoring students in the ACS General Chemistry and ACS Organic Chemistry National Exams with new current editions of the CRC Handbook and the Merck Index. The Chemistry Club and the local ACS chapter have sponsored some of these awards in the past.
- Students completing General Chemistry and Organic Chemistry continue to match their national college and university peers in their performance in the American Chemical Society National Exams.
- All full-time faculty and almost all part-time faculty continue to hold at least one office hour each at the Tutorial Center.
- Full-time faculty actively participate in science and engineering activities in support of student success: e.g., planning for 4 science seminars every year, poster session, Chemistry Club, STEM-focused conferences , ACS meetings, etc.

New this year:

- A full-time faculty participated in the August 2018 Fall Preview Day to inform students about the Chemistry Program at LPC.
- The AS Chemistry and AS (formerly AA) Chemistry Education programs were modified to reduce the number of units students need to complete each degree.
- Full-time faculty attended a Math workshop on changes brought on by AB705 to start exploring how to implement these changes in Chemistry courses that require Math 55.
- A full-time faculty attended the STEM Success Summit at CSU Stanislaus to find ways to better support our STEM transfer students.

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G. Obstacles: What obstacles has your program faced in achieving plans and goals?

Unfortunately, while the Program has had many positive outcomes this past year, it continues to face many of the same obstacles as listed in the Fall 2017 Program Review (some are cut and pasted directly from last year's program review with some annotations):

Lack of lab space and lockers: To meet the high demand for Chem 1A, we managed to squeeze in a 5th

section in Fall 2018 in 1802. This required moving the other sections to make room in the lab. Due to insufficient number of lockers, the 2 1B sections and 2 1A sections have to share lockers which have been problematic due to the level of use of locker equipment for these courses. The lack of lab space continues to impact our ability to offer classes that are optimal for students (e.g. afternoons and evenings). We will be unable to add more Chemistry 12A/B and Chemistry 30B classes due to lack of lockers in 1805.

High turn-over rate of lab support staff: High turnover of lab support staff has resulted in many hours spent in hiring and loss of continuity and stability in the lab prep area. This fall, another hiring committee has to be convened due to the resignation of a lab tech hired last fall. Fortunately, we were able to find two competent former students as temporary lab techs but this required yet again hours of paperwork filed by the Dean's office.

Aging instruments and equipment: The Chemistry Program uses many instrumentations and equipment that require constant maintenance, repair, and replacement. All of these require many hours from both full-time faculty and lab technicians. In addition, full-time faculty and the lab coordinator have to spend many hours every semester completing 3-4 IER forms to simply replace standard equipment. With the exception of the new GC-MS and polarimeter, all of our major instrumentation are 10 years or older. As they age, they require more maintenance and frequent repair. The individual student fume hoods in both 1802 and 1805 replaced about 5 – 6 years ago are starting show wear and tear. At the very least, many of the plastic hood covers will need to be replaced soon. The entire fume hood system for the three labs have failed in the last year. When fume hoods are not operating, lab classes will need to be cancelled.

Lack of a fourth full-time faculty: This the fourth year that we have requested a new 4th full-time faculty. Approximately 40 full time faculty have been hired during this period, but this position has been overlooked. Chemistry is the 5th largest department on campus in terms of FTEF, but we are already tied for 8th in terms of the number of full time faculty with 3 of us. The lack of a fourth full-time chemistry faculty has affected the program in many ways. A 4th faculty will barely put us over 50% full-time FTEF ratio. The number of sections offered by the Program has grown by 67% since the last full-time hiring was done in 2006 (from 27 to 45 sections annually). We have had to spend more personnel hours on interviewing and hiring part-time faculty to cover additional classes. The previous summer, we have had to cancel a class due to lack of faculty to teach it. In 2016 – 2017, 4 new part-time faculty had to be hired to cover classes. A fourth faculty is necessary to lend some stability to the department when another faculty takes a leave. The Program has not had an infusion of fresh talent, enthusiasm, and outside ideas that are vitally important for growth of the Program and for Student Success. With a fourth faculty, more time can be devoted to modernizing our lab curriculum and creating exciting courses accessible to all students such as "Chemistry and Society," "Environmental Chemistry," and "Wine Chemistry". There is a particular need for a full-time faculty who can dedicate their energy, enthusiasm, and creativity to revitalizing and strengthening our introductory chemistry curriculum (31, 30A, and 30B). Many courses, including biology, rely heavily on a strong introductory chemistry preparation of students to support their success in these courses. The Program has acquired excellent instrumentation through Measure B including Carbon and Hydrogen NMR, FT-Infrared Spectroscopy, GC-MS (Gas Chromatography-Mass Spectroscopy), AA (Atomic Absorption Spectroscopy), Polarimeter, and Vernier Logger-Pro Interfaced sensors for temperature, UV-Visible Spectroscopy, radiation detection, pH measurements, etc. Each of these instruments requires a different expertise to operate, maintain, keep updated, develop curriculum for and, most importantly, teach! A fourth full-time faculty is badly needed to help spend hours learning, developing, and training others on these instruments. A fourth full-time faculty with experience using and teaching with each of these instruments would make the investments in instrumentation significantly more valuable. Student success in chemistry impacts all other science and engineering programs. A fourth full-time faculty will also help the Program provide more assistance to important initiatives that support success in STEM fields: collaborations with industry and national laboratories (e.g. SVLG), seminar speaker series, internship programs, mentoring programs, HSI-STEM activities, Transforming STEM program, Guided Pathways, etc.

Lack of lecture classrooms: It has become more difficult to find more optimal scheduling for our classes due to lack of classroom availability in proximity of the science building.

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H. Short Term Planning: What are your most important plans (either new or continuing) for next year? Describe plans starting now and continuing through AY 2018-19.

Based on the Program Needs and Obstacles identified in Sections B and G. above, our short-term plans include those listed below.

FOR 2018 - 2019

HUMAN RESOURCES:

Request to hire 2 new full-time faculty and a replacement for a full-time faculty resigning at the end of Spring 2019. If new faculty is/are hired, the 2 remaining full-time faculty will need to spend time to mentor the new faculty and get them up to speed which presents an opportunity and a challenge while they continue to maintain and develop the program.

ENROLLMENT MANAGEMENT

- Request to retain the third section of the 12A in the fall and the 12B in the spring in the discipline plan for 2019-2020.
- Request additional FTEF for another section of Chem 1A. This might require us to move the times for the current 1A labs to squeeze in the new section which will disrupt their placement in the STEM matrix of courses.
- Request additional sections of Chem 31. In Spring 2018, a new morning single section of 31 was offered for the first time. It filled right away with a long waitlist. We were not able to offer this again in Spring 2019 but we will request it again (a morning double section this time) in the discipline plan for the SU2019 – SP2020 academic year.

SLO PROCESS:

- Review using an ACS exam for SLO assessments for the 30A and the 30B courses.
- Purchase new updated ACS exams for 1A for SLO assessment.
- Assist part-time faculty in SLO assessment and analysis and continue to collect more SLO assessment data.

CURRICULUM:

- Continue data collection for the chemistry assessment exam validation process.
- Submit program modifications for the 2 Chemistry degrees.
- Work with math faculty to implement potential changes to our math prerequisites due to AB705.

FACILITIES AND EQUIPMENT:

- Explore how we can add another section of 1A and 1B to meet the demand while waiting for new

chemistry labs to be built.

- Contribute to the facilities master plan for a new STEM building. See facilities plan below.
- Request funding for any needed replacement and/or repair of instruments and equipment.

PROFESSIONAL DEVELOPMENT:

Continue to attend professional development activities such as the LLNL-LPC speaker series, local ACS meetings, STEM Success Summit at CSU Stanislaus, Guided Pathways Workshops, etc.

BEYOND 2018 – 2019:

- Mentor at least 1 new faculty.
- Both the Chem 31 and Chem 1A courses continue to experience long waitlists despite an additional section of 1A. We will continue to brainstorm ways to add more sections of these 2 courses despite the limited lab rooms and to request FTEF to cover additional sections.
- If additional sections are granted, look into hiring another full-time lab tech position.
- Many of our equipment and instrumentation are nearing the end of their functional lifespan. We plan to keep requesting funding to repair and/or replace many of these.
- Submit course outlines for review and updates in Spring 2020.

Mark an X before each area that is addressed in your response.			Definitions of terms: https://goo.gl/23jrxt				
<input type="checkbox"/>	Community Partnerships/Outreach	<input type="checkbox"/>	Facilities, Supplies and Equipment, Software	<input type="checkbox"/>	LPC Planning Priorities	<input type="checkbox"/>	Services to Students
<input type="checkbox"/>	Curriculum committee items	<input type="checkbox"/>	Financial/Budgetary	<input type="checkbox"/>	LPC Collaborations	<input type="checkbox"/>	SLO/SAO Process
<input type="checkbox"/>	Enrollment Management	<input type="checkbox"/>	Human Resources	<input type="checkbox"/>	Pedagogy	<input type="checkbox"/>	Technology Use
<input type="checkbox"/>	External Factors	<input type="checkbox"/>	Learning Support	<input type="checkbox"/>	Professional Development	<input type="checkbox"/>	

I. Long Term Planning (Optional): Please detail any long-term plans for the next 3-5 years. (Only if you have significant plans, such as implementation of a grant project, creation of long-term initiatives including those using restricted funds such as Equity or SSSP, construction and outfitting of a new building).

- We will continue to advocate for entirely new facilities for the Chemistry Program. See facilities section below.
- If new facilities are built for the program, look into having a Chemistry-dedicated crew of lab coordinator and lab techs to support the program and its students.
- Create non-majors chemistry courses to support science GE requirements for students.

Mark an X before to each area that is addressed in your response.			Definitions of terms: https://goo.gl/23jrxt				
<input type="checkbox"/>	Community Partnerships/Outreach	<input type="checkbox"/>	Facilities, Supplies and Equipment, Software	<input type="checkbox"/>	LPC Planning Priorities	<input type="checkbox"/>	Services to Students
<input type="checkbox"/>	Curriculum committee items	<input type="checkbox"/>	Financial/Budgetary	<input type="checkbox"/>	LPC Collaborations	<input type="checkbox"/>	SLO/SAO Process
<input type="checkbox"/>	Enrollment Management	<input type="checkbox"/>	Human Resources	<input type="checkbox"/>	Pedagogy	<input type="checkbox"/>	Technology Use
<input type="checkbox"/>	External Factors	<input type="checkbox"/>	Learning Support	<input type="checkbox"/>	Professional Development	<input type="checkbox"/>	

Section Two: Current Topics (Required for All Programs)

Educational Master Plan: A list of goals and strategies appears on page ii of the Educational Master Plan, which can be accessed here:

http://www.laspositacollege.edu/about/assets/docs/LasPositas_Ed_Master_Plan.pdf

If applicable, describe how your program's upcoming plans reflect the goals described in the college's Educational Master Plan (your plans are described in Section 1, Questions H-I, or on a previous program review if you did not complete this year's Program Snapshot).

A. *EDUCATIONAL EXCELLENCE* Ensure excellence in student learning by providing quality teaching, learning support, and student support services.

All our plans noted above support this goal.

B. *COMMUNITY COLLABORATION* Ensure excellence in student learning by collaborating with community partners to provide educational opportunities that best serve the needs of our students and our community.

Full-time faculty actively participate in science and engineering activities: e.g., planning for 4 science seminars every year, poster session, Chemistry Club, STEM-focused conferences (e.g., STEM Success Summit at CSU Stanislaus, HSI-grant, Transforming STEM, Advanced Placement, ACS meetings, the Guided Pathways initiative, etc). Faculty also participate in partnership initiatives with companies (e.g. environmental monitoring and Form Factor) for potential internship positions, job prospects, and collaboration in developing curriculum.

Both full-time and part-time faculty participate in the Amador Valley High School Health Fair. On October 2017, Hispanic high school students through the HACU HSI Grant Program will be visiting the three chemistry labs to observe experiments going on and tour the lab facilities.

C. *SUPPORTIVE ORGANIZATIONAL RESOURCES* Ensure excellence in student learning by strengthening fiscal stability, providing appropriate staffing levels, meeting evolving technology needs, and expanding or updating facilities.

All of our plans noted above and outcomes from the last several years support this goal.

D. *ORGANIZATIONAL EFFECTIVENESS* Ensure excellence in student learning by improving organizational processes and fostering professional development.

All Chemistry faculty collaborate with the lab coordinator and the lab techs to align their lab schedules as closely and as pedagogically meaningful as they can to ensure that lab preparations are of high quality. Full-time faculty also work closely with the lab coordinator to address IER funding requests for supplies, new and replacement equipment, and/or repair, submit classified position requests, and hire replacement staff. A collaborative process between the lab coordinator and faculty also helps facilitate supporting independent and honors' projects.

As noted above, Chemistry faculty participate in professional development opportunities through participation in mandatory flex-day activities and variable flex activities. In addition, when funding is available, they participate in local STEM initiatives and ACS meetings.

A. Program-Set Standard (Instructional Programs Only): Did your program meet its program-set standard for successful course completion? yes no

Program-set standard data can be found on this page:

<http://www.laspositascollege.edu/research/outcomes.php>

If your program did not meet your program-set standard, discuss possible reasons and how this may affect program planning or resource requests.

N/A

B. Facilities: Do you have any facilities needs that are currently unmet? If yes, please describe.

The Chemistry Program has outgrown its current lab infrastructure. A third, renovated biology lab was added to the program in 2012, but this renovated design was constrained by the insufficient dimensions of the older science building (1800). Biology designed their new labs in 1850 with significantly larger square footage in order to alleviate overcrowding and safety concerns that we have all had in building 1800. It has become challenging and in many cases impossible to find time slots in all three labs to add more sections of our classes. We do not have the flexibility to adjust class times to remove barriers for students who have conflicts with biology, math, physics or engineering and therefore students end up taking longer to finish their degree or transfer pathways.

- Despite strong demand, we are no longer able to add sections of 1A or 1B. The General Chemistry Lab (1802) is at full capacity in terms of both scheduling and locker use.
- We are unable to offer more 30A sections and 31 sections at an optimal time that works with student schedules for timely completion because these two classes are sharing a lab. In some cases, up to three students have to share a locker.
- The Organic Chemistry Lab (1805) has had three sections of Organic Chemistry since fall 2017 for a total of 18 hours of lab every week. This lab is currently being shared with 2 sections of 30B that are sharing lockers. Our program is growing quickly with three Organic sections currently full. For reference, Chabot College currently offers 5 sections of Chemistry 12A and all of them are at capacity. At LPC, there is no way that we can grow beyond 3 sections with the current facilities.

Building 1800 was built in the mid-1990's using state bond funding. During the design phase in 1994, there were a series of major earthquakes in southern California near Northridge. Bond funds had to be diverted from building 1800 for earthquake damage and 1800 had to be cut to the bone. Classrooms and a green-house were removed and corners were cut wherever possible. As a result, we have had to replace substandard locks, countertops, and even the elevator. The next thing in line will be the massive ventilation system in the building used to safely evacuate toxic fumes from the labs. We have already experienced failures in the

ventilation system that have required us to cancel classes. Floors and finishes have also not aged well. While renovating the current chemistry labs in Building 1800 may seem like a less costly solution, it is not necessarily more cost-effective and is not the best solution to accommodate our expanding program for the following reasons:

- Our growing program will need six Chemistry labs (as Chabot College constructed a dozen years ago).
 - 1) General Chemistry I (Chemistry) Laboratory
 - 2) General Chemistry II (Chem 1B) Laboratory
 - 3) Organic Chemistry (Chem 12A/B Laboratory
 - 4) Introductory Chemistry (Chem 31) Laboratory
 - 5) Allied Health Laboratory (Chemistry 30A)
 - 6) Non-Majors and Overflow Laboratory (Chem 30B, GE Chemistry, Environmental Chem, Wine Chem, etc).
- There is no capacity to add the 3 additional labs in the current 1800 building. If 3 new chemistry labs are built in a new building, it will require its own stockroom, instrument room, lab techs, and fume hood system because they will not be adjacent to the old labs.
- Building 1800 was designed before seismic codes changed in the mid-1990's, so major retrofitting would be cost prohibitive (>\$10M).
- Fume hoods in building 1800 already do not support the capacity of the extra hood installed in room 1803 and cannot be expanded. They have been breaking down frequently with classes cancelled. The whole system will need to be replaced.
- Flooring, paint, plumbing, and electrical wiring are becoming more expensive to maintain.
- The current 1800 labs need to be expanded in size to improve safety. There is a national standard of at least 50 square feet per student. The previous labs were only designed for 20.8 students, although we often have from 24 up to even 29 students in each lab. There is no way to increase the size of these labs without triggering massive seismic retrofits which will cost more than a new building.
- The current stockroom was badly designed with no natural light, although having a central stockroom is critical for lab support.
- Office space and classrooms are minimal in building 1800 and there are no conference/break rooms. There is only one place for faculty to have a cup of coffee or meet with students, 1804. This is a 90 square foot office shared with at least 35 Chemistry and Biology faculty.

The Program would like to propose instead to build a set of 6 new chemistry labs as part of a new science building with a central stockroom/preparation room and balance rooms adjacent to each lab. Chemical storage rooms and hazardous materials rooms will also need to be included. We are requesting to build new labs so that there is one lab dedicated to every course (12A/B, 1A, 1B, 31, 30A and one dedicated to non-majors courses and to 30B. The new labs should have a larger footprint of at least 50 square feet per student than the current labs as recommended by the American Chemical Society. The labs should be about 1400 square feet each with 300 square feet for the adjacent balance rooms. The Organic Chemistry lab needs to have additional space for larger student experiments and will need an instrumentation room (about 1200 sq. ft.) adjacent for the instrumentation currently housed in 1806. An additional 2000 sq ft for preparation, storage, and hazardous waste will be needed. There should also be the required waste storage room, storage drawers and cabinets for bulk chemical supplies and equipment, and explosion-proof volatiles/flammables room.

For the 1A and 1B General Chemistry labs, the number of lockers should be maximized and individual fume hoods should be installed in addition to at least 2 conventional wall fume hoods and a dedicated fume hood for the AA machine. Each of these labs should have a weighing room adjacent to it.

For the 12A/B Organic Chemistry lab, the number of lockers should be maximized and individual fume hoods should be installed in addition to at least 2 conventional wall fume hoods. Connected to this lab room should be the instrument room to contain all the instrumentation including weighing scales. There should be a big window between the instrument room and the Organic Chemistry Lab.

For the 30A and 31 Introductory Chemistry labs, the number of lockers should be maximized and individual fume hoods should be installed in addition to at least 2 conventional wall fume hoods. Each of these 2 labs should have a weighing room adjacent to it.

There should teaching classrooms nearby to these lab rooms so that chemicals and equipment used for demonstration can be transported safely. There needs to be faculty offices nearby for both full and part-time faculty to use.

D. Professional Development

Section 87153 of California Education Code specifies the type of Professional Development activities that may be funded by the Community College Professional Development Program. You can review these activities here: <https://goo.gl/w8sqBM>

D1. Summarize the aspects of professional development that have been working well for your program. This might include the process of obtaining funds, the types of training your program members have been attending, etc.

Last Fall, Chemistry faculty were fortunate enough to get funding support to attend an HSI-STEM Conference and a Transforming STEM conference. This fall, there is funding for faculty to attend the STEM Success Summit at CSU Stanislaus.

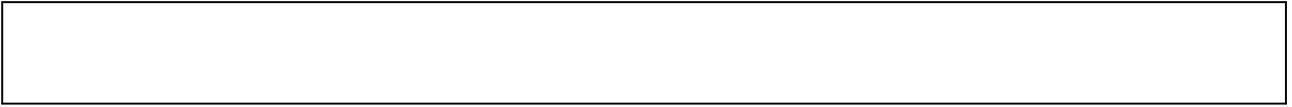
The Chemistry faculty are grateful for many opportunities for variable flex activities on campus including the Science and Engineering Seminar series and other speaker events that count as variable flex.

Chemistry faculty appreciate the various activities offered during mandatory flex day including the one hour dedicated to discipline meetings. These discipline meetings allow full-time faculty have a face-to-face meetings with part-time faculty, update them about the program and other initiatives, offer assistance, and discuss changes and issues important to the program and their participation.

D2. Summarize any needs, desires and visions your program has regarding professional development, as well as any challenges.

As noted above in the needs section, we are requesting additional professional development funding to increase the \$250 allocation per person to attend Chemistry-focused conferences.

- E.**
- F. Program Review Suggestions (optional): What questions or suggestions do you have regarding the Program Review forms or process?**



Section Three: SLOs/SAOs (Required for All Programs)

A. In the box below, copy and paste your “Plans for Analysis of SLO/SAO Data” from last year's Program Review. This plan can be found in the [2017 Program Review](#) Section 1 Question L.

(If discussing multiple PSLO/SAOs copy the box below as needed.)

Circle One: <input checked="" type="radio"/> CSLO <input type="radio"/> PSLO <input type="radio"/> SAO
Course, Program Name, or Student Service Area: Chemistry
Text of CSLO/PSLO/SAO: We plan to continue to assess the SLO's for all of our courses. Now that part-time faculty are supported in their participation in SLO assessment, we expect to see an increase in the data collected. Text of CSLO/PSLO/SAO: CHEM 1A - General College Chemistry I • Students completing Chemistry 1A should be able to demonstrate proficiency in solving complex problems and conceptual understanding of content listed in the course outline as measured by the American Chemical Society General College Chemistry First Term Exam. CHEM 1B - General College Chemistry II • Students completing Chemistry 1B should be able to demonstrate proficiency in solving complex problems and conceptual understanding of content listed in the course outline as measured by the American Chemical Society General College Chemistry Full Year Exam. CHEM 12A - Organic Chemistry I • Students should be able to write detailed reaction mechanisms. CHEM 12B - Organic Chemistry II • Students completing 12B should be able to demonstrate proficiency in solving complex problems and conceptual understanding of content listed in the course outline as measured by the American Chemical Society Organic Chemistry series exam (beginning SP2015). CHEM 30A - Intro and Applied Chemistry I • Students should be able to define concentration units of solutions (e.g., molarity and % concentration) and use these definitions in problem solving. CHEM 30B - Intro and Applied Chemistry II • Students should be able to describe the functions of different types of biological molecules. CHEM 31 - Intro to College Chemistry • Students completing Chemistry 31 should be able to demonstrate proficiency in solving complex problems and conceptual understanding of content listed in the course outline as measured by the American Chemical Society 2006 California Chemistry Diagnostic Test.
If you plan to analyze a PSLO, identify the courses that are mapped to the PSLO.

B. Below, report on your program's progress on the plan described in Question (A) above.

Text of CSLO

CHEM 1A - General College Chemistry I • Students completing Chemistry 1A should be able to demonstrate proficiency in solving complex problems and conceptual understanding of content listed in the course outline as measured by the American Chemical Society General College Chemistry First Term Exam.

CHEM 1B - General College Chemistry II • Students completing Chemistry 1B should be able to demonstrate proficiency in solving complex problems and conceptual understanding of content listed in the course outline as measured by the American Chemical Society General College Chemistry Full Year Exam.

CHEM 12A - Organic Chemistry I • Students should be able to write detailed reaction mechanisms.

CHEM 12B - Organic Chemistry II • Students completing 12B should be able to demonstrate proficiency in solving complex problems and conceptual understanding of content listed in the course outline as measured by the American Chemical Society Organic Chemistry series exam (beginning SP2015).

CHEM 30A - Intro and Applied Chemistry I • Students should be able to define concentration units of solutions (e.g., molarity and % concentration) and use these definitions in problem solving.

CHEM 30B - Intro and Applied Chemistry II • Students should be able to describe the functions of different types of biological molecules.

CHEM 31 - Intro to College Chemistry • Students completing Chemistry 31 should be able to demonstrate proficiency in solving complex problems and conceptual understanding of content listed in the course outline as measured by the American Chemical Society 2006 California Chemistry Diagnostic Test.

SLOs: Assessment data collected from 58 sections over 8 semesters.

SAOs: Assessment data collected from _____ students over _____ semesters.

Describe the quantitative or qualitative results:

Qualitatively, we are often scoring above the national average for the ACS exams. Quantitatively, this is lost in the 0-4 scale that is forced on us. Data from a 1-100 is reduced to large blocks and all detail is lost. You cannot make any conclusions on this basis.

Discuss and reflect upon student achievement for this CSLO/PSLO/SAO. Discuss any actions taken so far (and results, if known) and your action plan for the future:

Individual instructors will continue to assess and reflect on their own results and we hope to have a higher participation rate among faculty some faculty who have not participated.

What changes in student achievement are evident across the semesters you analyzed? What are some possible explanations for these changes?

We cannot statistically analyze the pixelated data reliably.

DO you plan to continue tracking this SLO in the next year? Explain. We will continue to have faculty enter and assess SLO data in elumen.

C. Planning: What are your future plans (either new or continuing) for SLO/SAO analysis for next year? Identify the PSLOs, CSLOs, or SAOs that your program plans to focus on the upcoming year with subsequent analysis (next year's program review). (Copy the box below as needed.)

Circle One: <input checked="" type="radio"/> CSLO <input type="radio"/> PSLO <input type="radio"/> SAO
Course, Program Name, or Student Service Area: Chemistry
Text of CSLO/PSLO/SAO: CHEM 1A - General College Chemistry I • Students completing Chemistry 1A should be able to demonstrate proficiency in solving complex problems and conceptual understanding of content listed in the course outline as measured by the American Chemical Society General College Chemistry First Term Exam. CHEM 1B - General College Chemistry II • Students completing Chemistry 1B should be able to demonstrate proficiency in solving complex problems and conceptual understanding of content listed in the course outline as measured by the American Chemical Society General College Chemistry Full Year Exam. CHEM 12A - Organic Chemistry I • Students should be able to write detailed reaction mechanisms. CHEM 12B - Organic Chemistry II • Students completing 12B should be able to demonstrate proficiency in solving complex problems and conceptual understanding of content listed in the course outline as measured by the American Chemical Society Organic Chemistry series exam (beginning SP2015). CHEM 30A - Intro and Applied Chemistry I • Students should be able to define concentration units of solutions (e.g., molarity and % concentration) and use these definitions in problem solving. CHEM 30B - Intro and Applied Chemistry II • Students should be able to describe the functions of different types of biological molecules. CHEM 31 - Intro to College Chemistry • Students completing Chemistry 31 should be able to demonstrate proficiency in solving complex problems and conceptual understanding of content listed in the course outline as measured by the American Chemical Society 2006 California Chemistry Diagnostic Test. We plan to continue to have individual instructors assess these SLO's, enter them in elumen, and reflect on their results.

If you plan to analyze a PSLO, identify the courses that are mapped to the PSLO.

D. SLO/SAO Suggestions (optional): What questions or suggestions do you have regarding SLO/SAO planning, assessment and reporting?

**Section Four: Curriculum Review
(Programs with Courses Only)**

The following questions ask you to review your program's curriculum. To see the last outline revision date and revision due date:

1. Log in to CurricUNET
2. Select "Course Outline Report" under "Reports/Interfaces"
3. Select the report as an Excel file or as HTML

Curriculum Updates

A. Title V Updates: Are any of your courses requiring an update to stay within the 5 year cycle? List courses needing updates below.

No. All of our courses are current having been updated in May 2015. The next review and update process is May 2020.

The course outline for Chemistry 29 - Independent Study was just reviewed, updated, and approved in May 2017.

B. Degree/Certificate Updates: Are any degrees/certificates requiring an update to do changes to courses (title, units) or addition/deactivation of courses? List needed changes below.

Program modifications for the AS Chemistry and AA (now AS) Chemistry Education were submitted in mid-September, presented at the October 1 committee meeting, and approved by the Committee in the October 15 meeting.

C. DE Courses/Degrees/Certificates: Detail your department's plans, if any, for adding DE courses, degrees, and/or certificates. For new DE degrees and/or certificates (those offered completely online), please include a brief rationale as to why the degree/certificate will be offered online.