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Program Review - 2015-2016

Science - Physical Sciences

Module: Division Purpose

Question: Describe the purpose of the Discipline/Program/Service.

Answer: The Division's course offerings and programs equip students with the knowledge and skills they need to understand the world around them and prepare them for a variety of careers by earning certificates and degrees, or transferring to 4-year colleges and universities. In particular, the course offerings in the physical sciences (Astronomy, Chemistry, and Physics) permit students to fulfill requirements to enter engineering programs as well as other professional schools such as pharmacy, dental, and medical schools. In particular, the physical sciences are about learning the rules of the physical world -- a melding of physics, chemistry, earth sciences and astronomy from which students learn to view nature more perceptively

Question: Describe how the stated purpose aligns with the college mission statement.

Answer: In alignment with the College's vision and mission, the Division strives to educate and prepare students to realize their dreams through the completion of a variety of science based professional programs or pursuing and furthering their trainings and education at degree granting institutions. The physical sciences play important rolls in increasing the number of transferring students and AA obtaining students The offerings in these disciplines (physical sciences) help students develop their analytical and critical thinking abilities and methods of problem solving, that will help them to succeed and excel in their future careers and produce all rounded graduates who can contribute to the community in a significant way.

Module: Enrollment Trends

Question: Describe the trends in Enrollment and FTES. Given the data, what are the implications for your division? If relevant, discuss each discipline separately.

Answer: The data reflects the total enrollment in six different chemistry courses: chemistry 51, 60, 101, 102, 211, and 212. The total Enrollment in chemistry steadily increased between 2008 and 2012 from 218 to 332, and from 2012 to 2014 enrollment increased from 332 to 372. This is a 71% increase between 2008 and 2014, which is an indication that the rate of enrollment increase has also gone up. This could be as a result of the new facilities the division moved into . Starting spring 2016 semester chem. 221 (biochemistry) will be offered. Chem. 221 is a science majors course which is required by the life science majors, and medical, dental and pharmacy students. As a result enrollment in chemistry is anticipated to increase even more.

Six physics courses are listed in the catalog: 6, 7, 12, 37, 38 and 39, West offers an AA in Physics and only 37, 38 and 39 are part of that major. The other courses, physics 6, 7, and 12 are requirements in other programs. The overall enrollment trend for the college has shown a decline between 2009-2013. however, enrollment trend for physical science shows a 56.8% increase between 2009 and 2013. In the same way the FTES for the same period has increased 63.5% . In chemistry alone the enrollment has increased from 223 to 336, which is a more than 50% increase. The FTES has also increased by more than 55% This shows the demand for the sciences has increased perhaps because of better economy and job opportunities in the field of science.

EB In addition, Physics offers the associate for science degree for transfer. (AS-T) Enrollment for physics is anticipated to double, from an average of 50 students to 100 students enrolled per semester. Enrollment trends (student demand) has averaged at about 58.3 students per semester for the past three fall semesters. This semester, fall 2015, 53 students are enrolled after census. Student enrollment is anticipated to double in the spring of 2016.

Question: Given the data, describe the trend in section counts and average class size.

Answer: Section count in chemistry has increased from 10 to 11 in 2013 and the class size has grown to 33.2 in 2012. Section counts per semester have increased from 1 to 2 for physics and 1 -2 for astronomy depending on semester. Ave. class size for astronomy has remained consistent at about 53 students per semester. Number of class offerings has doubled (to two) since summer of 2013. In Chemistry despite the increase in enrollment the section count has remained unchanged. This is because ,in some of the chemistry classes are over enrolled. Because of the limitations we have in the chemistry labs, increase in enrollment per section can not be sustained. new additional sections have to be opened to accommodate the growth in enrollment. Retention rate in chemistry averages to higher than 75%. However, for the higher division chemistry courses it is significantly higher.

Retention rate (91% fall 2013 and 84% fall 2014) has increased significantly over all since fall of 2012 when there was a slight decline to 77%. Success rate, (38% fall 2013 and 57% fall 2014) took a downward dive but is moving upward again. Ave. class size for physics has remained consistent at about 50 students per semester increasing to 75 in the fall of 2013, and then leveling off at about 50 again for fall of 2014.

Number of class offerings per semester has remained consistent for the last three years (one for majors and one for non-majors). Retention rate (87% fall 2010 and 82% fall 2012) has declined slightly since 2010 when the class had been shifted from adjunct taught to full time instructor taught (note, there are two classes offered per semester now), and should be looked into.

Success rate, (67% fall 2013 and 74% fall 2014) has also been steadily on the rise.

Average class size for the astronomy class by census declined to 32 for fall of 2013, however, enrollment has increased significantly from fall of 2010 (57) to fall of 2013 (97), likely due to the addition of the hybrid and online section offered once a year in addition to the on campus section. (Note: over 25 students per class per semester show up to try to add astronomy, and dozens more email the instructor). For spring and fall of 2014, class sizes are near previous averages of 55. Retention rates for astronomy have improved to 92% as of fall 2013, yet there was a large drop of success rate in the on campus offering (38%). Instructor is working with tutoring center for the 2014 academic year to bridge this gap. Of all trends in astronomy over the last four semesters, data from fall of 2013 seems to be an outlier in the average data. Average class size for physics is increasing at around an average of 37 students per class (or 70 for the two class sections), where the cap for each section is 35 students. Enrollment trends jumped significantly from fall of 2010 (55) to fall of 2013 (75). Non-majors physics, and first semester majors level physics is ready for growth as is seen by the number of students trying to add the class and have to be turned away. Section counts have remained steady since fall of 2010 for physics. There has been no growth in the number of sections being offered. Retention is high in the physics classroom (84%),

A growth of 3% from last year, and success rate is has increased from 67% in the fall of 2013 to 74% in the fall of 2014.

The instructor has worked with the tutoring center and the number of physics tutors has been increased for the fall 2014 semester. There is still an unmet need for majors level physics instructors and a solution has not been reached with the tutoring center at this time. Instructor will revisit the impact this has on next year's numbers.

Module: Students and Student Success

Question: Based on the demographic trends in enrollment, what are the implications for your Discipline/Program/Service?

Answer: The data primarily reflects the demographics of the college's student population: Females consistently at 65% and older students constitute over 80% . This data has no apparent implication for the chemistry discipline. The gender data for physics doesn't seem to lend a pattern; one year it the males that are the higher percentage and then it is the reverse. However, the age distribution data primarily reflects the demographics of the college's student population: older students constitute over 70%. This data has no apparent implication for physics either. In Chemistry the male population has increased by 6% during the

period 2009-2013. The Female population has decreased a little, but it is still significantly high compared to the male population (63%:38%) There is a 5% decline in the African American population while there is a significant increase (14%) in the Hispanic population in chemistry. The white student population in chemistry is essentially unchanged at 24%. Though not reflected in the data listed for physics demographic trends, the instructor has noted that the population of female students in the majors level physics courses are much smaller than those of the male students.

Question: Given the data, describe the trends in Success Rates and Retention Rates. What are the implications for the Discipline/Program/Service?

Answer: While retention rates for chemistry remained steady, ~74% - 80%, the success rates fluctuate from ~51% in 2008 to 68%. The 68% for Fall 2009 came about because besides the chemistry tutoring services provided by HLRC, for that semester there was an in-house tutoring service for the students for extended hours. Developing; in-house tutors may prove to be the tool needed to narrow the gap between retention and success.

The retention rate for chemistry has increased to 75% in 2014 after a small decline to 73% in 2011 and 2012. The success rate has also increased to 66% from 61% in 2010. With implementation of prerequisites, the retention and the success rate in upper division chemistry classes is significantly higher. The retention and the success rates could be improved further by placing a mechanism to enroll students who are prepared and ready for the challenges they will be facing in the courses.

In physics, retention rates remained steady, ~82%, and the success rates were comparable at ~77%. This is primarily due to the fact students who take physics are probably more college ready than a typical West student. It is likely that the physics students have had to take college level mathematics courses as prerequisites prior to enrolling in physics.

Question: Compare the successful course completion rates of the Discipline(s) in the Division over time and with the college average. If the rate of any of the Discipline(s) is lower than the college average, what factors contribute to the low rate(s)? What strategies, current or planned, address this? If the rate is higher than the college average, what factors contribute to the higher rates?

Answer: The average success rate for chemistry is 66%, which is higher than the college wide success rate. The retention and the success rates could be improved by placing a mechanism to enroll students who are prepared and ready for the challenges they will be facing in the chemistry courses. College average successful course completion rates have held at around 63%. This is comparable to the college wide success rate. The retention and the success rates could be improved by placing a mechanism to enroll students who are prepared and ready for the challenges they will be facing in the courses. Physics successful course completion rates increased from 68% to 74%. These values are likely higher than college averages because of the rigorous nature of the subject matter and amount of high level classes physics students are required to take. Astronomy rates are currently slightly lower than college rates at 57% but saw a dramatic increase from the fall 2013 values. These students represent the general population as the astronomy class is a no prerequisite (usually elective or general science for non-scientist) class.

Question: Compare the equity gap in the successful course completion rate(s) in the Discipline(s) over time and with the equity gap of the college over-all. If the equity gap is higher than the college average, what factors contribute to the large gap? What strategies, current or planned, will address this? If the equity gap is lower, what factors contribute to the smaller gap?

Answer: The Division's successful course completion rate which is 65% is slightly more than that of the college's overall which is about 63%. The availability of tutors in HLRC and volunteer tutors of chemistry in the science division must have helped to keep the success rate high. However, this does not mean that there are enough tutors in the HLRC. There is the need for more chemistry tutors so that there will be help to students during most of the hours of the school day. Physics and Astronomy are continuously in need of more tutors (particularly for the majors level of Physics), both in the learning center or in the classroom.

Question: Given the data, describe the trends in Degrees and Certificates awarded. What are the implications for your Discipline/Program/Service? What does the Division do to encourage Certificate and Degree completion?

Answer: Generally the division has very few AA degree and certificate graduates. This is because most of the students who are taking science courses are transfer students or students who take it to satisfy a GE

requirement for other programs, most notably for Allied Health and Dental Hygiene vocational programs. In addition, physics and engineering majors tend to choose transfer for higher level terminal degrees often seeking those beyond the Bachelors degree. As such, many do not see the benefit of an Associates of Science degree in the field. It is hoped that the future TMC in Physics (in progress) will be a consideration and be of use to students wishing to transfer to a CSU. Many students are also taking the chemistry courses as prerequisites to join professional schools such as, pharmacy, dental school, medicine and PA. These schools accept students who have completed the required chemistry, physics and biology courses in addition to other requirements. AA degree is not required. The physics AS-T was approved last semester and West physics had its first AS-T graduate (who I believe was also valedictorian). Our science faculty have been running a very successful NSF-funded S-STEM program that challenges recruited students through supplemental courses, undergraduate research, faculty mentoring, summer research opportunities at JPL and Caltech, and exposure to working scientists through our Friday STEM Symposium series. This program has changed the face of Science at West, taking us from no graduates transferring to 11 in the last three years ----all to a University of California campus.

Module: Staffing Trends

Question: Describe the trends in FTEF. What are the implications for your program?

Answer: Chemistry has two full time tenured faculty. For regular faculty it should be 2.13 annually. Since Fall 2009 it should have been 1.3 FTEF, the Chair, a chemistry faculty, having a 0.7 FTEF release time. The ratio of adjunct to regular needs to be adjusted in the coming years. There is sufficient allocation of FTEF to manage the chemistry program adequately as it stands now. However, if expansion into ACT and Weekend College occurs, additional allocation of 0.4 FTEF would be needed. Currently there are 9 adjunct chemistry instructors. The ratio of current part time to full time instructors is 7:1.4 which is 83.4 % part time and 16.6 full time instructors. The addition of biochemistry into the chemistry program and its offering in spring 2016, the ratio will increase to 8:1.4 (85% to 15%) This is much higher than required 75% to 25% respectively. For physics and astronomy program growth, adjunct faculty (in conjunction with increase in class allotment and full time laboratory technician) need to be brought in to teach additional sections. All physics and astronomy classes have been taught by a single full-time instructor (who also serves as the physics and astronomy lab tech) for the last four years. Physics and astronomy does not currently support adjunct instructors. The doubling of the physics and astronomy offerings in the spring of 2016, has brought sudden changes in the ratio for part-time/full-time faculty classes taught. New adjuncts (three) have to be hired to cover the additional Astronomy and Physics sections that have been added to the curriculum, causing the reversal of the required 75% to 25% part time/full time ratio.

Question: Are staffing levels adequate to fulfill the purpose of the Discipline/Program/Service? Explain.

Answer: NO, THEY ARE NOT!

For the CHEMISTRY PROGRAM the ratio of full-time vs adjunct faculty staffing is way off base. That is why we are making a resource request to hire TWO chemistry instructors. Every semester many students are turned away because the classes are full, There are only two regular chemistry instructors one of whom is the Chair of the Science division and has a 0.7 release time. This leaves the department with only 1.3 FTEF. in particular, there is increasing demand for a biochemistry course, which will satisfy the requirement to go into pharmacy, dental and medical fields. During the spring semester of 2016 we are excited to start offering chem 221, a biochemistry course, thus taking a giant step into bringing biochemistry driven chemical and biological programs. Currently the department is seeking to fill this void that exists in the chemistry program-- a biochemist who can teach this course to fulfill the program. Our students after finishing their general chemistry and organic chemistry series, have been going to other colleges for this course. In many cases these students do not get priority registration at the other college and were often forced to extend their graduation or transfer period. Although no retirements are anticipated in this area during 2015-2016 academic year, the Division is nonetheless seeking a balance to this ratio through a hire of two tenure-track Chemistry Instructors; one with a specialty in Biochemistry and the other with a specialty in inorganic chemistry to complement our existing talent (Alemayehu is an Organic Chemist, while Bahta is a Physical Chemist). Thus, the part time to full time ratio must be tamed to bring in some sort of state compliance. It is dismal at the moment-- 83.4% to 16.6% now, and 85% to 15 % starting Spring 2016. Hiring two probationary chemistry faculty -a

biochemist and an inorganic chemist could really solidify West's chemical Sciences programs.

For the PHYSICS/ASTRONOMY PROGRAMS to-date classes have been taught by a single full-time instructor (who also serves as the physics and astronomy lab tech) for the last five years. Despite the demands, we simply have only been offering just enough to cover a full load for the regular instructor, pushing away students to take their astronomy and physics courses in neighboring community colleges. The loss of these students was also for Chemistry and Math departments, as physics students also need to enroll in chemistry and mathematics classes. successful students do indeed prefer to stay in one college to fulfill their transfer requirements. Our division was not offering adequate amount of courses.

However, that is now changing; starting spring 2016 the Division has doubled its course offerings in both physics and astronomy, immediately necessitating us to hire three adjuncts our course offerings for spring 2016! Further, we have also re-worked our majors physics road-map to allow our students to be able to transfer in two years. That means there is going to be enough work to support another full-time Physics/Astronomy instructor.

Both college level Physics and Astronomy have grown beyond capacity and are ready to add sections, including the addition of at least one astronomy laboratory course for every two lecture course. In order for the single instructor in physics and astronomy to focus more on teaching related duties and service on committees, the division is recommending the hiring a full time laboratory technician, and requesting the hiring of a full time instructor, as there will be enough contact hours available to warrant such a request, and this will allow the division to add to the subject matter expertise in physics and astronomy. The resident tenured-instructor has a degree in physics with an emphasis in astrophysics. Adding an additional instructor in physics and astronomy with an emphasis in engineering, would be the desired outcome of the recruitment the division undertakes. Such an acquisition would bring about a greater breath of knowledge areas and pave the way for a future engineering program in addition to the growth planned in astronomy.

TO MEET THE STAFFING LEVELS SCIENCE DIVISION NEEDS TO ITS EVER EXPANDING PROGRAMS (SERVING 14 DISCIPLINES), IT IS SUBMITTING SEVERAL RESOURCE REQUESTS:

A. To adequately staff and meet the needs of our chemistry programs, the Division is preparing resource requests to hire two probationary chemistry faculty for the AY 2015-16. They are:

1. BIO-CHEMISTRY POSITION, under General Education and Transfer Category. The individual submitting this application is ABRAHA BAHTA, Chair of the Science Division. This application is supported by all nine regular science faculty of the Division. Their signatures of support were obtained at the divisional meeting of November 3, 2015.

At present the Division has only two full-time Chemistry Professors (Alemayehu and Bahta). Dr. Abraha Bahta, also Chair of the Science Division, and with 0.7 reassigned time, his regular assignment has been reduced to less than 5 STD hours. That means he can't even teach an entire course since all our chemistry courses are structured to have 7 or 9 STD hours of instruction (With any two-course assignment, a regular chemistry faculty overloads by 1 to 3 STD hours!

Additionally, both Professors Alemayehu and Bahta routinely take 9 STD hours of adjunct assignments every semester. Professor Alemayehu is also the Vice-Chair for the Physical Science disciplines of the Division and devotes a considerable amount of time recruiting and staffing the adjunct assignments. This semester the Division is offering eleven (11) chemistry sections and more than 85% of them are taught by adjunct faculty. This puts the part time to full time ratio at 8:1.3 (86% : 14%). In terms of Standard Hours of Instructions, this translates into 83 to 21!

The Division is seeking a balance to this ratio through a hire of a tenure-track Chemistry Instructors, with a specialty in Biochemistry and Inorganic Chemistry to complement our existing talent. Thus, the Division has now scheduled chemistry 221 for spring 2016, for the first time ever. This will have an immediate positive impact on our science students. Chem 221 is the last course in the organic chemistry series on campus and reduce the part time to full time ratio at the same time. Most importantly, this course is ushering in a new era in science here at West.

Evidently, this Probationary Biochemist would be a benefit to both the Life Science and Physical Science divisions. In addition, to teaching Biochemistry, this faculty member would also be able to teach lower division Biology 3A and 3B signature courses that many West students take to begin their road-map to a Life Sciences AA degree or to complete their Life Science pre-requisites

Securing tenure-track BIO-CHEMISTRY POSITION for fall 2016, is the number one request of the Science

Division. Our course offerings can create several versions of assignment for this instructor. The most desirable Fall-Spring assignment can be charted as (16 units each semester): FALL 2016, CHEM 060 LEC & LAB, CHEM 221 LEC & LAB; SPRING 2017, CHEM 060 LEC & LAB Chem. 221 LEC & LAB. The credentials of a Biochemist instructor would also allow the Division to create assignments that would include courses in other disciplines within the Division such as in our Biology, and outside the Division, such as Dental Hygiene. Here are some possibilities: Fall semester could include Organic chemistry 211 with 9 STD hours, Bio 3A and 3B, with 3 STD hours each totaling a 15 STD hour load. Spring semester could include Biochemistry 221 and a Chemistry 51, providing a 16 unit assignment.

We could also collaborate with our colleagues in the Dental Hygiene Division, and thus, this instructor could have a joint appointment in both Divisions: several scenarios are possible. Here is one: Fall semester could include Organic Chemistry 211 or 212, Biology 3A, and Biochemical Nutrition (DH 256), for a 15 unit load Spring semester could include Biochemistry 221, Biology 3B and Pharmacology (DH 208).

The Division plans to create a new AA degree program that would allow students to get their AA in Biology with an emphasis on Biotechnology. The potential first step in this endeavor would be to start offering Chemistry 221 (Biochemistry). Thus, the hiring of a Biochemist is central to the mission of starting the biotechnology program.

The emergence of such a program within the Science Division would increase our enrollment levels and the number of awarded degrees by virtue of the fact that students would enroll in Biological Science courses with the purpose of obtaining this Biology/Biotech AA degree.

Additionally, West Los Angeles College's Science Division has created a successful STEM program that continues to enroll an increasing number of students each year. To keep up with the increasing demand for students with STEM training, the Science Division will need to expand its course offerings to include more upper level science courses such as molecular and cell biology, biochemistry and biotechnology. Hiring a Biochemist, would be a giant step towards achieving these goals. At present, there are few community colleges that have courses to train their students in the many STEM fields in demand today. However, many community colleges are recognizing the increasing importance of training in STEM and are redesigning courses to give their students this training.

One emerging trend in community colleges has been to develop programs or courses in Biotechnology. These courses are designed to give students direct training in many areas of biology, chemistry and biochemistry so that students completing these courses can apply for jobs as lab technicians within a wide variety of STEM labs. Within our own LACCD system, LA Trade Tech offers 2 bio-manufacturing courses called Biotechnology 010 and 012. LA Valley College offers 6 Biotechnology courses that range from lecture only theory courses to ones with laboratories demonstrating key lab skills. We can move forward with all these plans upon the hiring of a Biochemist to be a member of the Science Division faculty.

The new hire, will teach a mixed load of lower and upper division courses and will have day and evening class schedules. This instructor is expected to develop additional biochemistry-accented courses for the Division and College, thus attracting more students into our science programs. One example would be the development of a pharmacology course for a desired Biotechnology program

Students do indeed prefer to take all their science classes at a college where they get all their science classes (chemistry, biochemistry, biology, physics etc.) Thus, having this new instructor will help increase enrollment in the Science Division in particular and the College, in general. Furthermore, studies have shown full-time faculty do indeed enhance student success in science programs through retention, graduation and transfer. As part of their professional responsibilities and obligation, full time faculty participate in activities outside the classroom that would promote and contribute to student success--- through office hours, tutoring, advising and establishing a caring mentoring support, for the college's students. This new full-time hire would also collaborate with the existing STEM faculty to establish a vibrant undergraduate research program.

2. INORGANIC CHEMISTRY POSITION, also under General Education and Transfer Category

The individual submitting this application is ABRAHA BAHTA, Chair of the Science Division. This application is supported by all nine regular science faculty of the Division. Their signatures of support were

obtained at the divisional meeting of November 3, 2015.!

The two-paragraph argument that was presented about the nature of the assignments of Alemayehu and Bahta in making the case for the hiring of a biochemist (faculty I position) equally applies for the second faculty II post the division is requesting to hire, an inorganic chemist. An inorganic chemist who would have a different area of specialization than that of either the resident chemists (organic and physical) or the would-be hire biochemist! The Again the Chemistry Department's request for a second tenure-track faculty position with a specialty in INORGANIC CHEMISTRY is an acknowledgement of the vast growth of specializations and sub-specializations within the chemical sciences. Further, our chemistry program can very easily create several versions of teaching assignments for this instructor. The most desirable Fall-Spring assignment is charted below (16 units each semester): FALL 2016, CHEM 060 LEC & LAB, CHEM 101 LEC & LAB; SPRING 2017, CHEM 060 LEC & LAB, CHEM 101 LEC & LAB. Here is some other possibility: Fall semester could include the evening General Chemistry 101 with 9 STD hours, plus chemistry 51, allowing for a 16 unit assignment, repeating same schedule for Spring semester. We could also generate another assignment by assigning chem101 in tandem with Chem 60, that produces a 16 STD HRs of work load.

Indeed, our chemistry courses are in very high demand, as all science students must take courses in the chemical sciences if they aspire careers in health related fields. As is the case with most of our biological sections, the chemistry courses, particularly chem 51 and 60, are filled within a few days after enrollment begins, and we have dozens of students "running for the classes at the start of the semester. Often, in many cases the class sizes are over what is recommended by American Chemical Society (ACS) for chemistry classes. Many of our students are preparing to enter clinical programs such as nursing, respiratory therapy, physical therapy, and other professional programs, including those in medicine, dentistry, pharmacy. They need chemistry courses as prerequisites to the courses they need to take in pursuit of their goals. And many more take chemistry to merely satisfy their GE requirements. Further, the College needs to offer more sections to meet the needs of students requiring the major ▲ courses, which includes Pre-Med, Pre-Dental, Pre-Pharmacy, as well as Biology majors. In addition, more of the allied health* majors, including Nursing and Dental Hygiene are now required to take the major ▲ Chemistry (101, 102, 211, 212, 221) and Biology (including the USC Dental Hygiene Program). It is true that the number of AA degree awarded in chemistry is indeed very small. But chemistry plays a significant role in any student ▼'s desire to graduate with an AA degree in a host of disciplines or simply transfer to a four year university or pursue a career by enrolling in a professional school.

Course offerings of General College Chemistry 101 and 102, Organic chemistry sequence of 211, and 212, and now the addition of Biochemistry, chem 221, in our curriculum, and in conjunction with Biology 6 and 7 (majors Biology) every semester are indeed ushering in a new era for the campus: increase the number of students at WLAC enrolling in advanced college courses. Adding two highly specialized chemistry faculty to the existing talent would bring about the fulfillment of many of the colleg* s ILO and PL★ s including providing students with critical thinking skills, quantitative reasoning and technological competence.

B) HIRE PROBATIONARY PHYSICS FACULTY, under General Education and Transfer Category. The individual submitting this application is ELIZABETH BELL, Associate Professor of Astronomy and Physics and this application is supported by the Chair and the other eight regular science faculty of the Division. Their signatures of support were obtained at the divisional meeting of November 3, 2015. The only full-time Physics and Astronomy Professor is Elizabeth Bell. Her duties (without any memorandum of understandings (MOs) for pay by the College) also include serving as the full tim* laboratory technician to run her physics and astronomy laboratory classes. She also has been serving as the WLAC PHASE (Physics, Astronomy, and Engineering) adviser, and advises many students in West's S-STEM Program.

Next semester, the Division will be offering 4 physics, and 3 astronomy sections (one physics 006, one physics 007, one physics 037, one physics 039, one astronomy 001 on campus, one astronomy 001 online, and one astronomy 005). There will be 35 contact hours per week, 20 of which (57%) will be taught by the full time instructor. This puts the ideal ratio of 75% full time to 25% part time short by 18%. Thus, the Spring 2016 semester will require the Division to hire 3 new adjunct instructors to teach the additional classes to meet the growing programs' needs. It is with this back-drop that the Division is seeking a balance to this ratio through a hire of a tenure-track Physics Instructor, with a specialty in engineering to complement our existing talent (Bell is a theoretical astrophysicist).

The addition of a probationary Physics faculty with an engineering background would make the program more robust. Some continuity in instruction, especially for the courses with multiple sequence section, is desired in lieu of multiple instructors in a multi-sequence course! With a new hire in place it is possible to have several versions of assignment for this instructor. The most desirable Fall-Spring assignment is charted below: ASTRO 001, PHYS 006, PHYS 007 for FALL SEMESTER; same cycle for SPRING SEMESTER Other possible additions are online and hybrid astronomy classes. In addition, with two instructors, if agreed upon, the two instructors could take AB and BC shifts in order not to be assigned AC shifts.

Six physics courses are listed in the catalog: 6, 7, 12, 37, 38 and 39, West offers an AA and AS-T in Physics and only 37, 38 and 39 are part of that major. The other courses, physics 6, 7, and 12 are requirements in other programs. Enrollment for physics is anticipated to double, from an average of 50 students to 100 students enrolled per semester increasing to 75 in the fall of 2013, and then leveling off at about 50 again for fall of 2014. Success rate, (67% fall 2013 and 74% fall 2014) has also been steadily on the rise. Non-majors physics, and first semester majors level physics is ready for growth as is seen by the number of students trying to add the class and have to be turned away. Section counts have remained steady since fall of 2010 for physics. There has been no growth in the number of sections being offered. Retention is high in the physics classroom (84%), a growth of 3% from last year, and success rate is has increased from 67% in the fall of 2013 to 74% in the fall of 2014.

The Discipline of PHYSICS is indeed a key part of the transfer preparation for transfer in all STEM fields. It is the fundamental science on which all others are built. Physics is a broad and multi-leveled discipline. Typically it is taught at 4 different introductory levels.

1. Calculus based for physicists, chemists, and engineers
2. Calculus based for life science and medical fields
3. Algebra based for life science and medical fields
4. Conceptual with little math.

West currently only offers the first and third type from the list above. It is desired that all levels be offered, with level 4 contributing to a future physical science area of classes providing a conceptual introduction to all the physical sciences for non majors.

All four levels meet the general education B1 requirement for a physical science and levels 1-3 meet the B3 requirement as well. Currently, the sole full time instructor Bell, is doing the available levels plus astronomy, causing the workload to exceed 15 STD HRS of instruction per week. As the program grows, however, even at the highest level, Professor Bell will not be able to sustain growing overload assignments and those additional responsibilities would have to be passed down to part time instructors. Thus, the division must act to support the hiring of new tenure-track physics faculty and continue to build a robust Physics and Astronomy program that would attract students from throughout the area.

C.HIRE A PHYSICAL SCIENCE LABORATORY TECHNICIAN (classified staff, class code: 5274) to facilitate a smooth operation of the expanding Astronomy, Physics and the Earth sciences programs. Full-time Professors, Elizabeth Bell and Beraki Woldehaimanot, who essentially teach all of the physics, astronomy, the earth sciences courses (environmental, geography, geology and oceanography) have been doubling as lab techs for their respective disciplines. We need to end that practice. For example, during the Spring semester of 2016, the division must run and operate eight laboratory classes without giving the faculty that teach them any lab tech support, nor do we compensate the instructors for doing their own lab tech work.

We need to hire a career physical science laboratory technician that is trained to apply knowledge of the physical sciences and scientific laboratory procedure and techniques to performing a broad range of duties related to the day-to-day operations of science laboratories. The day-to-day operations of the earth Sciences (geography, Geology, Earth Science and Oceanography) laboratories on the one hand and that of physics/engineering and astronomy on the other include weekly storage/maintenance of equipment, setting-up/breaking down.

Our expanding programs for these disciplines require the help of an experienced lab tech to establish modern laboratories, through procurement of new laboratory materials -lab and field equipment, and maintain budgetary log for work order for the purchasing of new lab equipment and/or parts as well as for consumables/perishables. The lab tech runs the prep rooms in different floors. stockrooms field preparations, essentially performing curatorial tasks for the laboratory and field equipment for the faculty

and their students and perform other additional tasks as needed, such as to maintain display-windows in the corridors outside of the Science laboratories. With this kind of support, the instructors can devote their time to run their laboratory sessions, instructing, mentoring and leading scholarly discussions with their students. The continuous testing of equipment for reliability and safety for an orderly operation of these labs, should be the job a lab tech

D. HIRE OFFICE AIDE FOR SCIENCE DIVISION (CLASS CODE 2679)

Hire an Office Aide to perform a variety of entry-level, routine clerical duties related to the daily operation of the Science Division Office in support of its staff and faculty. The Aide will be involved in managing the administrative and secretarial tasks typically found in an academic setting, providing student and instructional support services.

The college is now in a growth mode; and in response to this directive, not only has our division added more sections to the existing courses, but we have expanded our curriculum by adding three new courses- Bio 110, Bio 10, and Biochemistry 221. The addition of new courses has increased the Sciences enrollment levels and placed an additional administrative burden on the Chair of the Science Division and the faculty. An Office Aide would greatly decrease this burden. The Division has grown to 9 full-time faculty members this past year and employs 22 adjunct instructors. This means that the Science Division has an instructional staff of 31 and a complete staff of 35, with 4 technicians. In 2014, Science Division had 2,163 students or 8% of the total enrollment at West. Currently, the Division office does not have any office support, and we anticipate, of hiring additional 5 full-time faculty by fall of 2016.

Question: release/reassigned time. Describe the Reassigned and Release time assigned to faculty in the division. Include the faculty name, amount of release/reassigned time, length of time the assignment will last (one semester, one year, if it's renewable, etc.), and the purpose of the r

Answer: After 6 years of 0.6 FTE release time to serve as Chair of reassigned time, it just became 0.7 release time to oversee the science Division programs, further reducing the number of full time instructors in chemistry to 1.3. With 30 faculty (regular and adjunct) plus 4 lab techs to manage, the increase of the FTE to the chair post is reasonable.

Module: Functions and Services, Academic Divisions

Question: List the functions and services provided by the Office / Program / Service.

Answer: Chemistry courses and programs serve multiple other programs: (1) Chemistry 51, and 60 satisfy the natural science general education requirements for an AA degree and for entry into dental hygiene and nursing programs (2) Chemistry 101, 102, 211, and 212 satisfy for AA degrees in biology and chemistry; (3) Transfer preparation for UCLA Life Science major; (4) Transfer preparation for UCLA chemistry major and (5) Transfer preparation for UCLA for engineering major. Physics courses and programs serve multiple other programs, chief among them: (1) Students transferring as Biology, Chemistry, Engineering, Geology majors; (2) AA degree in Chemistry and Physics Also transfer preparation for medical, dental, PA and pharmacy schools.

Our physics program is now showing phenomenon promise in that West students have begun transferring as physics majors as our Physics curriculum has now added physics 039 (since 2012). Further, we have introduced creative scheduling of the calculus-based physics courses (37, 38, and 38), thus establishing a two-year transfer program in the discipline, consistent with other AA science programs.

Starting Spring 2016 the division will start offering a laboratory class in astronomy. This step has added to student's success, allowing non-science majors to meet their IGETC science requirement for transfer when they take the lecture and laboratory courses in astronomy.

Question: What are the emerging trends in technology that affect the program?

Answer: Chemistry and physics classrooms meet modern standards of lighting, ventilation, and comfort. They should have adequate provisions for using: computers, CD ROM, laser disk, document cameras and internet access and other equipment as needed. To give students the opportunity to do more exercises and assigned homework problems related to lecture materials, the college (library or IT) can buy licenses and install the software so that students can access them at their convenience online. Chemistry and physics and astronomy extensively use instruments in the laboratories. These instruments need upgrading and servicing periodically. As the laboratories and the programs grow there is also the need to acquire new and advanced laboratory equipment. A resource request shall be submitted for upgrade of our physical sciences laboratory facilities to meet OSHA standards.

The physics classroom (and science program in general) would benefit greatly from a dedicated computer stations section (and computers) in the laboratory, as many of the physics labs are done virtually.

Question: Describe the technological advances that have been implemented to improve and streamline the Discipline/Program/Service.

Answer: During the fall semester of 2010, Science Division moved into a new modern building. It houses all of our laboratories, each equipped with the appropriate instruments and accessories (physics has been working on this). The chemistry discipline has two inorganic and organic laboratories. Each lab has essential equipment, such as top-load and electronic balances, volumetric glassware, pH meters, etc. The organic laboratories have specialized equipment, such as precision ovens, rotator evaporation, etc. These labs are also supported by a host of modern analytical instrumentation, such as Spec-20, GCs, FTIR, 60 MHz FT-NMR, polarimeter, and AA. Each lecture/laboratory classroom is also supported by a smart board-projection system with CD-ROM, laser disk, document camera and internet access. To meet relevant technological equipment needs and training, physics and astronomy needs a modernization of equipment and curriculum, as well as increase the amount of current equipment stock to increase the number of small groups that can be served. The groups are too large, with 6-8 students per group, where 2-4 would be closer to ideal for student learning and success.

EB This will prove to be an even much larger issue when the physics and astronomy offerings double next semester. In addition, in order to meet the needs for the scheduled growth, another lecture classroom must be identified in order to meet needs for both physics and chemistry.

Module: Survey Results

Question: Describe the results of relevant surveys (point-of-service surveys, student surveys, staff surveys).

Answer: The data collected on the various surveys over the years, convey that ~70% of respondents say as students their mission is to transfer and 53.1 % have expressed interest in getting AA degrees. Such surveys are relevant for chemistry department, as part of the college family. Of course some of these students would have interests in the sciences, and therefore would get opportunities to participate in chemistry, physics and astronomy programs and develop fulfilling careers in the physical sciences. Some others will enroll in physical science courses for their GE requirement for an AA degree and yet others will enroll in these classes for their physical science IGETC requirement. Students going into the medical fields has increased over the years. As result the demand for requirement courses such as chemistry, biochemistry and physics has also increased. Many physics students have been involved in STEM and opportunities through JPL and CalTech. A few have gone off to such prestigious schools such as USC, UCLA, and UC Berkeley.

Question: Discuss the implications of the survey results for the program.

Answer: The large percentage of respondents expressing a desire to transfer to universities, because these students believe Community Colleges' function is primarily to prepare them to make the leap. The chemistry program at West has vested interest in the success of our students and does its best to inspire, motivate and mentor all students. They are counseled and motivated towards pursuing a career in their chosen fields. The survey explains why the number of AA degree awards in science are fewer. Most of these science students take these classes to prepare them to transfer to four year universities and satisfy their

GE requirements. The members of the physical sciences work tirelessly to motivate and ensure successful preparation for our students desiring to transfer to programs in their chosen fields. The increased demand for chemistry has impacted the labs. For safety reasons, the enrollment for chemistry classes is limited by the lab space. Every semester instructors have to turn away students because of this limitation. Students who need to take Biochemistry are also forced to look for other colleges that are offering it and have space to add them. These problems can be solved if a chemist and a biochemist are hired and the existing lab space is utilized more efficiently.

Along the same lines, the division has reduced the wait time needed to enter the three semester calculus-based majors level physics sequence from 1.5 years to 1 year. This will effectively double the class offerings in physics overall and require either maintaining a large pool of adjuncts, or the hiring of a second full time instructor in physics. The division feels that a dedicated full time instructor will better serve the students overall in terms of consistency and availability. It will also allow the program to pull in another instructor with an additional set of specialized skills differing from those of the current full time instructor, enhancing the program overall.

In order to meet demands in the growing physics and astronomy programs (double the sections offered in the spring of 2016), and to add a greater breadth of knowledge in the engineering area of physics, the physics and astronomy program are also applying for a dedicated full time instructor to be added to the program.

Module: Curriculum

Question: I assistance that may be needed to resolve the problem. Missing course outlines of record: Refer to the report of courses with missing CORs, which is posted at the link in the Instructions section. Please describe the steps the division has taken or plans to take to correct the problem. Describe the additiona

Answer: All Division courses that we currently offer are updated on ECD.

Question: Out-of-date course outlines of record: Refer to the report of courses with CORs that are out-of-date. Please describe the steps the division has taken or plans to take to correct the problem.

Answer: There are no out-of-date COR's.

Question: How does the department determine that classes are taught consistently with the official course outline of record?

Answer: Through monthly divisional meetings, classroom visits, examination of course syllabus handed to students and through primate meeting with the Chair. Additionally, instructors of different sections of the same course meet together to discuss their syllabus.

Physics and astronomy currently meets with other instructors throughout the division to discuss general information in regards to the course outline, but at the current time, must communicate with other physics and astronomy instructors outside the school to discuss topics specific to the programs.

Question: Are required courses scheduled in appropriate sequence to permit students to complete the program in the prescribed program length?

If yes, describe the rationale upon which the sequence is based.
If no, what is the plan for alleviating these problems? Explain.

Answer: It only has been a few years since we started rebuilding West's physics and Astronomy program; we are still continuously in the re-building mode. It is thus natural for some growing pains and challenges to present themselves. Physics is finally offering all courses required for the AA major. And despite the fact that we only have one instructor, and no lab tech, the program has been limited in the amount of sections that can be offered each semester. The non majors level courses have held steady at near capacity (though this semester the course is holding over capacity), and the majors level courses are now at capacity. Further, we have removed student concerns by introducing creative scheduling, and students are now able to transfer as we have aligned the physics program with other sciences courses-- a two-year transfer capability.

Science division has taken steps to remedy one of the issues, in particular, student demand for growth. It has doubled the sections of physics and astronomy; starting spring 2016 (two physics and two astronomy) new sections were added into the curriculum. The need to re-vamp these programs has now begun in earnest.

Question: How does your division assure the relevance, appropriateness and currency of each of its programs?

Cite each program (degree/certificate program or meaningful grouping of courses) and the student data and environmental scan data that support the assertions.

Answer: Physics now offers all courses for the AA degree in Physics. Astronomy is in the process of offering a laboratory class for non majors that will transfer with the lecture class in astronomy to fulfill the science class with laboratory requirement for transfer. The chemistry courses are articulated with UC/CSU and other four year universities and classes are taught to keep those high standards. ---current (latest editions) textbooks are used. Laboratory work is supported with state-of-the art lab equipment. In some cases students are assigned to read current articles. To complete the science series in junior college, student need to take Biochemistry. There is enough demand and the decision is in a position to include it in its course offerings. The demand for this course is high among students who are planning to go into the medical field and other biological sciences. at present after completing the chemistry series we are offering, students go to other colleges to take biochemistry Plans for offeringan astronomy laboratory course are still in progress. Allotment for a one unit class, as well the addition of four more telescopes, are required for this to happen. In addition, it is recommended that each class, physics 037 and 038 and 039, be offered once per year instead of once every three semesters (as they must be taken in order and have prerequisites in advanced mathematics) in order to serve the needs of the physics and engineering major in offering courses in a timely manner. It is also recommended to update and populate types and numbers of relevant curricular equipment to keep our students competitive with their four year counterparts upon transfer

Question: ybrid classes?
How can the outreach, online and hybrid classes be improved?What outreach, online and hybrid classes has your department offered?
How many courses are offered via Distance Education, and for how many has a COR addendum for DE been prepared?
What are the benefits and problems associated with outreach, online and h

Answer: Astronomy now offers a hybrid course for those students who are unable to attend the on campus section because of scheduling or capacity. At this time No chemistry course is offered on line. There is discussion about which course would be a better candidate to offer in a hybrid format. Astronomy also offers a fully online section (typically in winter and summer sessions).

Question: Describe any long term changes or additions to the curriculum that you are exploring, planning or developing.
Changes that you plan to initiate in the coming year should be reflected in the Planning Section.

Answer: The Physical Sciences Program now offer 14 different courses (2 astronomy, 5 physics and 7 chemistry) and each has a laboratory component. To-date, they are all taught in classrooms. Astronomy 1 is an exception which has been delivered in all formats --classroom, hybrid and completely on line. Conversations are on going among the faculty to develop hybrid courses in physics 6, and 7 as well as chemistry 51 and 60.,

Question: List new or changed degrees and certificates that have been approved by the Curriculum Committee during the previous year, or are in the planning stages.

Program Name	Award Type	Curr Comm Action	Date of CC of Action	Type of CC Action
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Module: Student Learning Outcomes

Question: Describe how course SLOs were assessed and how faculty were involved in the process in the prior year.

Answer: All faculty include SLOs in their syllabus of the course. Samples of SLO assessing questions from the exams/tests are taken and the students' responses are analyzed by the faculty to get ideas about out comes. The SLO report of the faculty includes what improvements need to be done to better SLO.

Question: Based on course SLO assessments in the prior year, what changes to the course were implemented? List the changes to each course that were made based on SLO assessments.

Answer: The division has finalized and published on the college website Course SLO assessment Calendar for the Fall 2013 through Spring 2017 Cycle for all courses offered under our programs. These Calendars display the four phases: *Phase 1 -Course is administered and assessed *Phase 2 -assessment results discussed and may generate data driven recommendations *Phase 3 -recommendations (from phase 2), if any, are implemented and re-assessed *Phase 4 - Re-assement results are discussed to close the loop. The science faculty are working to finish up work on phases 1 and 2. The results will be made available on the

college website. With the exception of the physics SLOs which are on an extended calendar due to majors level classes being offered in one section, only once every three semesters. Physics will complete all four phases by 2017.

There has been some policy upheavals in the SLO leadership and the division members are in the process of scheduling a conference on SLO matters, on late November or early December.

Upon reviewing SLOs in physics and astronomy, I recommend NO changes at this time. They were all updated and approved less than two years ago and having been working well. There is no need at this time to change the number or content.

Question: Based on any of the following assessment methods:
 a. course SLO assessment;
 b. analysis of course sequencing;
 c. indirect assessment indicators such as state exams or employer surveys;
 d. student success data such as retention, success rates, degrees/certificates awarded
 what changes to the program are planned or being implemented?

Answer: The S-STEM program administered by science division has started with a Grant from the NSF. The division is advertising and recruiting students who are science majors. This will help to increase students who will graduate with AA degrees in science. Increasing the availability of tutors and better scheduling will also help to increase retention and success rate. Offering a biochemistry course as part of the chemistry series is being planned. This will increase retention and student success.
 The tutoring center needs to look into alternate solutions (tutor availability and budget) in order to meet the needs of a majors level physics tutor. The students have been without a tutor for many semesters. There was a significant increase in success rate when majors tutors were available for these students.

Question: Will these planned changes based on Program SLO assessment necessitate a resource request?

Answer: It has and will continue to do so every academic year, particularly, for physics and astronomy. Physics and Astronomy have been starting to receive much needed support in the way more sophisticated laboratory equipment, but it still has a fair distance to go to meet the needs of the planned astronomy laboratory course, and modern physics lab.
 Nearly 1/3 of the physics labs are being done virtually vs. in the classroom as to supplement the students' skills in hands-on use of setting up, calibrating, and using modern equipment.
 Astronomy will be offering a laboratory course next semester and will likely need to run all outdoor observation activities with only a couple of telescopes and one pair of binoculars. This will require the first class to primarily run as a 'dry' lab rather than give students hand-on experience using modern astronomy observing equipment. It is also requested that a funding source be identified to revisit the planetarium which was planned, but scrapped prior to the completion of MSA.
 To meet the increased student demand for chemistry and biochemistry classes, there is the need to hire one chemist and one biochemist. the biochemist will be involved in teaching dental hygiene students and help in structuring and teaching in a biotech program. There is the need for Biochemistry lab supplies and basic equipment.

Question: How has faculty dialogue regarding assessment results and improvement plans been conducted and documented?

Answer: During divisional meetings faculty discuss SLO results and exchange/share their ideas/experience with each other

Module: Departmental Engagement

Question: What interdepartmental collaboration has your Discipline/Program/Service been involved in during the past six years?

Answer: "Science Division runs efficient interdepartmental programs: we meet regularly on matters academic (course scheduling, course prerequisites, curriculum development, etc) and administrative (supply budget, student classroom conduct policy etc.) The laboratory technicians from chemistry and the biological sciences work in unison to run the science laboratories, relieving science faculty members of the routine chores that detract from academic responsibilities. A full time laboratory tech for physics and astronomy is being requested to serve in the same manner for the physics program When we start offering biochemistry

class, in collaborations between Chemistry and biology departments, science and dental hygiene divisions. This may lead to the creation of a biotech program.

Physics and Biology are in the preliminary phases of starting discussions on a bio-physics course for pre-med students.

Chemistry courses are prerequisites to other disciplines (Biology, to cite one example) and are part of the required courses to satisfy the preparatory course work to transfer to professional schools such as medical, dental and pharmacy schools and other four year universities. Chem. 51 and chem. 60 are taken by non science majors to fulfill their GE requirements. Students who plan to join the dental hygiene and nursing programs are required to take chem. 60 or chem. 51.

Question: What has your Division/ Department/ Program done since the last review to establish connections with schools, institutions, organizations, businesses, and corporations in the community?

Answer: The astronomy program has reached out to Focus, a community astronomy outreach group, based Agoura Hills, California. They provide free astronomy programs for the public, schools and other educational groups. Our goal is to bring astronomy to the masses and bring new people to this amazing hobby and science. The WLAC astronomy program is in the process of requesting telescopes to be able to hold its own community star parties, support the future astronomy laboratory class, and support the S-STEM directed study courses in astronomy. Lessons, research, and ideas are currently being shared between WLAC and the outreach group. Future public speakers are being planned to come speak to the WLAC Star Fire astronomy club. The astronomy club is now PHASE (Physics, Astronomy, and Engineering) club. The club will continue community outreach events such as star parties and is in preparations for its first volunteer project through Think Together is a non-profit organization, "...whose mission is to create opportunities for all kids to discover their passions and reach their full potential. Since its inception in 1994, THINK (Teaching, Helping, Inspiring and Nurturing Kids) Together has been committed to improving academic outcomes for children and youth living in under-resourced communities." STEM students have also been invited to participate in tutoring for the Upward Bound program. Students in the physical sciences programs give poster presentations to the college community. Through the STEM program, they participate in our monthly seminars that we have been able to invite practitioners of STEM fields to share their research experiences with our students. Hiring three more STEM faculty with specialty in Bio-chemistry, Inorganic Chemistry and Physics, would be a major boost to our physical sciences programs at West. It will bring a trans-formative change to the kind of science education west has been able to offer to our students.

Module: Professional Development

Question: In order to keep current with new developments in your field, are there areas of unmet professional development needs among faculty in this program? If yes, please describe.

Answer: Yes. The College allocates funds for: (1) Professional Society membership and to attend and participate in their conferences and workshops. (2) Enrolling in Short Courses sponsored by Professional Organizations. (3) Subscription of relevant Journals and Magazines. (4) The Division participates in mentoring programs to foster academic growth on new tenure-track faculty. Speakers are invited by S-STEM to give seminars where professors and students attend. Funds are not enough to encourage faculties to participate in professional meetings outside Los Angeles and/or subscribe scientific journals.

Question: For each regular full-time faculty member in your program, provide the committees in which each person is active, and list the 2 most significant professional development activities engaged in over the last 2 years. Activities may include workshop and conference attendance, courses taken, FTLA, Leadership Institute, etc. Committee roles may include chair, secretary, member, etc.

1 Faculty Name	4 First Prof Dev Activity	5 Year First PD Activity	6 Second Prof Dev Activity	7 Year Second PD Activity
Abraha Bahta	Divisional council	member	retreat	2010
Mesfin Alemay	FPIP			
Elizabeth Bell	ATD	co-chair	retreat	2010

Module: Facilities

Question: List and describe any current facilities challenges (e.g., location, quantity, quality) affecting your division/ department's ability to achieve its goals and meet instructional needs.

Answer: As it was planned, there is only one room currently available for holding large scale physics labs. This will inhibit growth of the program. Smaller rooms from the lower levels of MSA can be modified for specialty labs (i.e., dark room labs that cannot be performed in the physics labs as there is no way to get the room completely dark day or night). The room itself was poorly designed and difficult to work in. The student tables do not move, are too narrow, and have sinks and faucets which get in the way during exams and labs. There is not enough floor room to set up large labs, and students are not able to group themselves around the table and must work in lines. Storage in the classroom in the lecture and lab prep room are too small to store standard physics equipment. Few cabinets have locks. Many cabinets do not close all the way and many locks are not working. The rest of the cabinets require locks to protect valuable equipment that should be in the classroom but is currently being stored and hauled from down the hallway in the non-attached lab prep room. There is currently unsatisfactory levels of security for the valuable laboratory

equipment. In the classroom, the multimedia desk is too close to the whiteboard, and the projector cannot be angled high enough to keep the light out of the eyes of the instructor sitting or standing at the desk. Physics requires large laboratory tables in wide berth of electronics and sensitive equipment as many demonstrations and labs, are large and messy and dynamic. The current lab benches' design do not serve the needs of physics and engineering students. A resource request will be made to bring in the appropriate lab settings that meet/exceed a standard modern physics laboratory, In MSA building the chemistry labs are in the fourth floor while the stock room is on the third floor. There is no a separate elevator for the lab tech to transport chemicals back and forth between the third and fourth floors. It is not safe to transport hazardous chemicals using the same elevator that is used by people. A separate freight elevator (or weight elevator) will solve this problem. A locked cabinet has been secured for temporary items in the physics lab so that the instructor is not walking equipment back and forth from the office. Locks still need to be installed on cabinets in the physics classroom and laboratory cupboards. The desks still require the removal of sinks and faucets so that students have adequate space in which to perform rather large and dynamic experiments.

Question: Specify the division/ department's short term goals (1 year) for facilities improvement and functionality.

Answer: Planning is underway to remove the sinks and faucets from the tops of the student desks in the physics classroom (403). Short terms (unsustainable) solutions have been found for the storage of highly valuable physics equipment such as computers. Replacing the projector lamps often times takes a long time. The reason seems to be that the purchasing process takes a long time. If the IT or the multimedia department keeps spare lamps this problem will be easily solved and classes will be taught without disruption

Question: Specify the division/ department's long term goals (2-6 years) for facilities improvement and functionality.

Answer: Planning is underway for reconfiguring storage in the physics prep room. In addition, planning for room 012 has been initiated to use it as the physics laser optics lab as it can become completely dark unlike the classroom. Fully funded and equipped astronomy lab (including planetarium) would help to facilitate growth and student success in the astronomy program as well as support the physics program.

Module: CTE Programs

Question: Does this Division offer any CTE programs? IF THE ANSWER IS 'NO' SKIP THE SECTION ABOUT CTE PROGRAMS, AND GO ON TO THE PLANNING SECTIONS.

Answer: No

Question: Review labor market demand. How does your program meet labor market demand? Cite specific examples and sources.

Answer:

Question: Advisory Board Membership. List the member name, company name, title and CTE program for each member.

Answer:

Question: Advisory Board Meetings. List the following information for each meeting held in the last year:

AB Name	Dates	Number Attendees	Minutes
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Question: What have been the major outcomes of your advisory board meetings? Of those outcomes, which have been acted upon, and what is your plan of action with regard to other outcomes discussed?

Answer:

Question: Describe and assess the evidence of students' attainment of intended learning outcomes, as measured by the employment and completion success of its students. [Ed Code 78016(a)(3)]

Answer:

Question: Is this program subject to approval/accreditation by specialized state, regional, or national accrediting

agencies?

Answer:

Question: Indicate recommendation of the most recent accreditation evaluation of the program and corrective actions taken or planned. The most recent accreditation report and all additional pertinent documentation and explanations should be available on site for consultation.

Answer:

Question: Describe how you have assessed the appropriate improvements in student achievement and learning that have occurred as a result of the improved program practice.

Answer:

Question: Based on survey results, provide a brief analysis of employer satisfaction with program graduates.

Answer:

Question: Provide a brief analysis of student performance on licensure or board exams on first attempt for each program in the Division.

Answer:

Module: Completion

Question: Division Chair/ Program Manager: Fill out your name and date of final approval, save, and submit the program review.

Answer:

Question: List the people who participated in this Program Review.

Name	Role
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