

Golden West College

INSTRUCTIONAL PROGRAM REVIEW

Spring 2016

Program Name: Physical Science

Division Name: Math and Science

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PROGRAM INFORMATION:

Assume the reader does not know anything about your program. Briefly describe your program and how your program supports one or more of [Golden West College's mission and goals](#). **This description will likely be used on your department's website.**

The physical science department offers courses in astronomy, chemistry, geology, physical science and physics as well as associate degrees in chemistry, geology and physics. Some courses are designed to meet the physical science requirement for non-science majors while the remaining courses meet the science requirements for chemistry, engineering, biology, physics, geology, health profession and other majors. All courses provide a rigorous preparation for students' future course work and most courses include a hands-on laboratory component. As of the fall semester 2016, there will be 7 full-time faculty members, one classified support person, about 18 part-time faculty members and a number of part-time and student support employees.

At the present time, lecture classes for the physical science courses are taught across campus, while the lab courses are taught in two physics labs in the Technology building and one geology lab and four chemistry labs in the Math/Science building. A new Math/Science building, scheduled to be completed in late 2018, will replace the current outdated building, offer active learning classrooms, allow additional lab sections to be scheduled, and will contain an exciting new STEM Center.

College's mission (check all that apply)

- Basic Skills
- Career Technical Education
- Transfer
- Offer Degrees/Certificates

College goals(check all that apply):

- Institutional Mission & Effectiveness
- Instructional Programs
- Student Support Services
- Library and Learning Support Services
- Student Engagement
- Student Equity
- Human Resources
- Facilities & Campus Environment
- Technology
- Fiscal Resources
- Planning Processes

- District Collaboration
- Community Relations
- Business, Industry, Governmental Partnerships

Program Contributions: Describe how your department contributes to the campus. Consider areas such as diversity, campus climate, student success, campus processes, student support, and other college goals below.

The Physical Science department teaches courses required for associate degrees and transfer, both for science majors and non-science majors. Most students in our classes are not majoring in chemistry, physics or geology, but require these classes, as well as the general education classes in astronomy and physical science, to complete their educational goals. We feel that our rigorous courses provide an excellent foundation for our students to be successful in their chosen careers, be they health science, engineering or non-science majors. Students learn to work a variety of scientific instruments depending on the course(s) they take.

Faculty contribute to a healthy campus climate and to campus processes by participating actively in campus governance, hiring and other committees, sponsorships of campus clubs and engagement of students outside of class time for informal discussions and mentoring. We also contribute to community engagement with our annual Science Showtime event for middle school students and their families, participation in College Preview Day and the High School Counselor's Breakfast, and one of our faculty members is the campus representative on the City of Huntington Beach's Surf City Environmental Sustainability Committee. Several members of the faculty have written laboratory manuals for their courses which are sold to the students through the campus bookstore. The profits on these books are donated to the Chemistry and Geology Funds of the Golden West College Foundation, which are used to supplement the budgets of these departments.

External Requirements: Indicate any requirements that are imposed on your program by the state, federal regulations, or other external accrediting bodies (if applicable).

Not Applicable

REVIEW OF LAST CYCLE PROGRAM REVIEW

Provide assessment of your previous program review initiatives. Summarize any accomplishments that your program achieved. (2 pg limit)

The Physical Science Department completed the following program review initiatives: A full time geology faculty member was hired and the Geology AS-T degree is now available. This has allowed us to recruit new geology majors to GWC, and revitalized a core physical science program. The geology program has received several significant grants from the Massen-Greene Foundation to fund their efforts to grow and improve. The computers in the chemistry computer lab were updated, allowing

Chemistry 110 students to complete their work in a timelier manner. A new IR and NMR were purchased for the organic chemistry courses. An office space was successfully turned into an equipment room to support the organic courses' many instruments, and streamline student usage. Vernier spectrophotometers offering both UV/VIS and pH capabilities were purchased for the general chemistry series, helping to support the increased number of simultaneous sections offered. Through On-Course training, POGIL (Process Oriented Guided Inquiry Learning), and other active learning training modules, many core physical science classes have been updated as faculty continue to strive for improved student success.

In our current building, attempts were made to repair as much as possible the ventilation issues, broken faucets, leaky pipes, broken desks and lab benches, and ceiling leaks and drips that threaten our students, faculty and equipment. The decrepit state of our current building was duly recognized and a new Math-Science building is currently being designed, with a target completion date of fall 2018. The new building design is being planned to meet several long standing Physical Science program review goals:

1. Increased lab space to allow an increase in enrollment in the most critical science classes, where there are currently long waitlists.
2. Modern, clean lab facilities to attract more science students to GWC. Improved hoods and ventilation to improve the experience of chemistry students and staff.
3. Active learning classrooms to promote increased active learning techniques in lecture.
4. A new STEM center in the new building to allow for increased outreach activities to the community, as well as increased support, tutorial and active learning spaces for GWC students.
5. The Physical Science faculty offices will all be located on the same floor to facilitate faculty interaction. The notable exception will be the geology faculty office, which will be on the first floor so as to be near the rock collection and rock saws.

FOR CTE PROGRAMS ONLY

Labor Market Demand: How is your program meeting labor market demands? Should you expand, contract or stay the same? Is there competition from other programs in the area? If yes, from what institution? How is the competition affecting your program? Are there any other external factors about which you are concerned?

Not Applicable

VTEA Core Indicators: When reviewing the state VTEA core indicators, what are the trends that contribute to or impede student success? Why is this occurring?

Not Applicable

Advisory Council Input: What type of inputs have your program received from your industry advisory council in the last three years?

Not Applicable

SWOT ANALYSIS

Strengths:

- What does your program do well?
- What do you believe your students, potential employers, or transfer institutions see as your program's strengths?

The Physical Science department provides a range of courses, from those capable of meeting the needs of non-science majors to those required for students majoring in chemistry, geology and physics, plus required courses for engineering, biology, nursing and health career majors. We pride ourselves on our rigorous courses which prepare students well for the next course in the sequence or in their major. We reach all of these students with a limited number of full-time faculty and crowded, outdated laboratory facilities. The fill rates of most courses are near 100%. Many of our instructors, both full-time and part-time, use a variety of active learning strategies to improve student success and increase student engagement. Members of the faculty and staff work well in a collegial atmosphere, with full-time faculty mentoring and supporting the part-time faculty who teach the same course. With a limited budget, we provide a very complete laboratory experience for most courses and have added some new equipment and samples to both chemistry and geology laboratories. Our students consistently transfer to CSU and UC campuses, are awarded scholarships and internships, and continue on to professional or graduate programs in their fields. The geology program, with its new AD-T, has attracted outside funding from a foundation in recognition of the dynamic commitment of the geology faculty. In addition to our work with the students of Golden West College, the Physical Science department is active in the community, conducting outreach activities for local elementary, middle and high school students such as Science Showtime, National Chemistry Week and High School preview day.

Weaknesses:

- In what areas does your program need to improve?
- What are your program's immediate needs?
- What limitations or barriers is your program experiencing?

As the data analysis below shows, Hispanic students have lower success rates in the science major courses than other populations, and are also underrepresented in these classes compared to the overall campus population. Some gateway courses have low success rates, for various reasons, which will be discussed below. These are weaknesses we intend to address in the next few years. Some courses/programs have no full-time faculty teaching them which leads to varying success rates due to differing expectations from different part-time faculty members and no coordination between sections.

Another problem we have experienced is difficulty in purchasing necessary supplies for the laboratory courses, particularly in chemistry. The supply budget was significantly reduced a few years ago but the need for supplies and equipment is ever increasing. In the past, students were required to pay for glassware or equipment they broke or lost. This practice was disallowed a couple of years ago, but a new revenue source to pay for that lost or broken equipment was not provided. In addition, more sections of chemistry labs have been added to the schedule, but funding to pay for chemicals and equipment to support those students was not added.

The astronomy course needs new telescopes, as the current ones are missing parts or are broken along with other materials to conduct suitable astronomy labs. The physics department does not have enough working equipment to conduct some important laboratory experiments. Our current building is too small, outdated and unsafe; the new building will not be ready for occupancy for another three years, so we will have to cope with the space we have for that time. There is no Wi-Fi available in the building, which limits the ability of faculty and students to use portable devices to support learning. Cleanliness, maintenance and upkeep of the building are insufficient, leading to student complaints about the building and their decision to take science courses at OCC or Coastline instead. The STEM center needs a stable source of funding and a permanent full-time director.

Opportunities

- What opportunities exist for your program?
- What trends are happening in the field or subject area that may allow your program to expand?
- What external funding opportunities are available for your program?
- What potential industry, high school, college/university or other external partnerships can be established or expanded to benefit your program?

There are many opportunities to improve and expand the physical science program. One approach that might improve the success rates of students in General Chemistry A is the implementation of a required placement test, as is done at OCC and other colleges in the county. This would guide underprepared students to the preparatory chemistry course, which will provide them the skills they need to be successful in General Chemistry A. Another opportunity to improve success rates in gatekeeper courses is supplemental instruction for students in those courses. Grant funding is being explored to provide these

additional support services with the goal of improving student success, especially among underrepresented populations.

One area of growth could be the addition of a biochemistry course to our existing curriculum. Other new courses we are considering are geology field courses, which could perhaps be offered in summer or intersession, environmental science courses, and a chemistry course for non-science majors. Our new STEM center, and the much larger one that will be present in our new building, provide opportunities for increasing student success and engagement, as well as a place for students to study together, access resources, and take workshops. We hope to implement supplemental instruction and perhaps a MESA program through the STEM center to address some of the equity issues identified in the math and science departments, and are applying for a five-year federal STEM grant directed at Hispanic-serving institutions (HSI). The new STEM Center will also increase our opportunities for outreach. We hope to partner with nearby high schools and universities to increase the participation of underserved populations in STEM majors and their ability to transfer successfully to university. We will continue to offer our popular Science Showtime outreach event for middle school students and their families and hope to augment that with a Summer Science Camp experience for those students.

Threats/Challenges

- What challenges exist for your program?
- What budgetary constraints is your program facing?
- What kind of competitive disadvantages is your program facing?
- Are there upcoming changes to state and federal regulations that will impact your program? If so, please explain.

As discussed above under weaknesses, two of our main challenges are our building and insufficient funding for supplies and equipment. There isn't much we can do about our current building – that is why a new one is being built. Meanwhile, we will do our best to schedule classes back to back to increase the number of sections for courses with unmet demand. Cleaning and painting of stairwells and walkways would improve the appearance of the building, and perhaps with the opening of the new Swap Meet bathrooms, the Math/Science building will have fewer people defacing, dirtying, or otherwise negatively impacting it each weekend. Students have told us that they choose to take science courses at other campuses because our building is so unattractive.

As previously mentioned, the elimination of breakage fees has made replacement of chemistry equipment difficult. Sometimes there is lottery money or state equipment money, but both seem to show up at unpredictable intervals and with specific restrictions, making it difficult to plan purchases in advance. The process of acquiring quotes for materials, placing requests under different funding mechanisms, getting approvals months later when the quotes are no longer valid and having to repeat the process has made purchasing a huge part of the job of our physical science department stockroom manager. A reliable, predictable budget sufficient to cover the increased number of

course sections added is necessary. In addition, the increasing duties of the stockroom manager warrant this position being increased to a twelve-month position at the level of Instructional Associate.

CURRICULUM REVIEW

Course Outlines of Record: It is expected that all Course Outlines of Record (CORs) will be reviewed every three years. Starting in summer 2016, courses featured in the College Catalog will directly link to the courses' official CORs. It is crucial for all CORs to be reviewed to ensure their accuracy. Upon reviewing the courses in your disciplines through [CurricUNET](#), please provide a 3 year timeline of when all of the CORs under your disciplines will be reviewed. Please follow the table format below.

CORs needing review/ revision	Timeline to complete review	Person responsible
Chemistry 110/110L	December 2016	Dutz
Chemistry 130/130L	December 2016	Wilcox
Chemistry 180/180L	December 2016	Almy
Chemistry 185/185L	December 2016	Green
Chemistry 220/220L	December 2016	Speakman
Chemistry 225/225L	December 2016	Speakman
Astronomy 100/100L	December 2017	Speakman/Stein
Physical Science 100/100L	December 2017	Speakman
Geology 105	December 2017	Benneman
Geology 106	December 2017	Benneman
Geology 110/110L	December 2017	Benneman
Geology 120	December 2017	Benneman
Physics 110	December 2018	Stein
Physics 111	December 2018	Stein
Physics 120/120L	December 2018	Stein
Physics 125/125L	December 2018	Stein
Physics 185/185L	December 2018	Stein
Physics 280/280L	December 2018	Stein
Physics 285/285L	December 2018	Stein

C-ID Designation: In 2006, the Academic Senate for California Community Colleges developed the [Course Identification Numbering System \(C-ID\)](#). This system improves curricular consistency for courses throughout the state and provides many articulation/transfer benefits to our students. Many courses at Golden West College have been approved for C-ID alignment. Please review the list provided by Office of Research, Planning, and Institutional Effectiveness and discuss the following:

1. Does your department plan to submit more courses for C-ID designation? If yes, which ones? (These courses may or may not be part of an ADT. See C-ID.net for more information regarding courses, descriptors, and ADTs.)

The only physical science courses which do not have C-ID designations are general education courses.

Dual-listed courses: Review the list of dual listed courses in your area and complete the following chart.

Dual Listed Courses	Date of Faculty Discussion and Review	Recommendations
None		

Curriculum Offering: Review the list of active courses in your programs that were offered and not offered in the last three years. Based on your review, what courses could you add, suspend, or retire to improve your overall program to ensure student success? (Data provided by ORPIE)

Course Name	Recommended Action (add/suspend/retire)
	All active course have been offered
	Courses such as biochemistry, geology field courses, chemistry for non-science majors, etc. could be added

PROGRAM DATA AND ANALYSIS (Items in black font are provided by ORPIE)

SLO Assessments

List of courses with ongoing assessment:

Astronomy 100/100L; Chemistry 110/110L, 130/130L, 180/180L, 185/185L, 220/220L, 225/225L; Geology 105, 106, 110/110L, 120; Physical Science 100/100L; Physics 110, 111, 120/120L, 125/125L, 185/185L, 280/280L, 285/285L.

List of courses offered in the last 3 years that have not been assessed:

None

Question:

- Looking at all assessments of your programs and courses, describe proposed plans for improvement.

First of all, the SLOs for all courses will be reviewed and revised. When they were written several years ago, faculty had no experience with writing or assessing SLOs and as time has passed, it has become clear that some SLOs are too specific while others are too vague or difficult to assess. The list of assessed SLOs supplied does not match with the assessments our department has submitted to our SLO coordinator, so the records need to be updated.

Several astronomy SLO assessments mention the need for students to have access to telescopes as part of the class. The telescopes the college owns are very old and don't work very well, so one of the resource requests attached is for funds to update the telescopes. Other improvements to the astronomy lecture course that have been recommended are more models, visual aids and demonstrations.

The geology SLO assessments mention poorer performance of evening students compared to day students in the same course but don't address a means of improving this problem. Other plans include the addition of some fossils to the collection and changing some of the lab activities to improve performance. Plans for chemistry courses include additional practice opportunities for the students, breaking down topics on each exam into smaller portions, greater coordination between the lecture instructors of the same course and improvements to laboratory experiments.

Student Demographics (Headcount by Discipline)

- Gender
- Age
- Ethnicity
- Disability
- Economic Disadvantage
- Veteran
- Foster Youth

Comparison to GWC

Questions:

- **How does your student population compare to GWC's general student population?**

Astronomy:

Fewer astronomy students are female than the general population and they are younger on average; there are more Hispanic and fewer Asian students than the general population; there are more economically disadvantaged students than the general population; there are about twice as many veterans in astronomy classes as the general population; and foster youth and students with disabilities are about the same as the general population.

Chemistry:

Chemistry students have the same gender distribution, number of veterans and foster youth as the general population; are younger on average; there are more Asian students (47.4% vs 29.2%) and fewer African-American (0.9% vs. 2.3%), Hispanic

(21.2% vs 30.0%) and white (25.7% vs 29.2%) students in chemistry courses compared to the general population, although the percentage of Hispanic students has increased from 12.6% in 2010; more chemistry students are economically disadvantaged than the general population; and there are fewer students with disabilities in chemistry classes than in the general population.

Geology:

The gender distribution of geology students is about the same as the general population; the number of economically disadvantaged students, students with disabilities, veterans, and foster youth are all higher in geology classes than in the general population; geology students are slightly younger than the campus average; the number of white and Hispanic students is higher than the campus population while the number of Asian students is lower.

Physical Science:

The physical science course only holds 32 students per semester, so the data on the enrolled students varies quite widely from semester to semester. It is difficult to determine any trends, although the percentage of students with disabilities is significantly higher than the campus average during all the years data was presented.

Physics:

Physics students are much more likely to be male than the campus population (74% vs 46%); are younger than the campus average; are significantly more likely to be Asian (43% vs 29%) and less likely to be Hispanic (20% vs 30%) or black (1.1% vs 2.4%), although the percentage of Hispanic students has increased from 11% in 2012; the number of economically disadvantaged students, veterans and foster youth is about the same as the campus population while disabled students are underrepresented in physics classes.

- **Based on the trend that you're seeing, what type of adjustments would you make to your program?**

Outreach efforts should be made to increase the number of Hispanic students in chemistry and physics courses, with appropriate support including tutoring and supplemental instruction to ensure their adequate preparation for and success in the courses they need to graduate or transfer.

Program Enrollment (Filter by: Discipline, Session Type, Large Lecture Factor)

Enrollment at Census

Sections Offered (by CRN)

Fill Rate at Census

FTES/FTEF

Astronomy: Average enrollment ~ 60/section – the lectures are LCF at 100 students, labs are 25 students/section. 2 lectures (1 day and 1 night section) and 3-4 labs are offered per semester, with fill rates consistently around 100%. FTES/FTEF currently 56.5 (campus average is 35.8)

Chemistry: Average enrollment ~ 50/section – lectures are usually 50 or 75 students, all labs are 25 students/section. 12 lecture sections with many more associated labs are offered each spring and fall semester, with 2-3 lecture sections offered in summer. Fill rates are consistently around 100%. Each course is offered at least once per year at night with most being offered at night every semester. FTES/FTEF = 39.1 (slightly above campus average)

Geology: Average enrollment ~40-50/section – lectures either 32 or 64 students and labs are 32 students/section. 4 lecture sections with associated labs are offered each spring and fall with at least one course offered at night each semester. Fill rates have been consistently close to 100%. FTES/FTEF = 35.4 (same as campus average).

Physical Science: Enrollment ~ 30/section – 1 lecture of 32 seats with an associated lab per semester; no night or summer class. Fill rates 80-90%. FTES/FTEF = 29.4

Physics: Enrollment average 43-50/section – most lectures 32 or 64 students and labs of 32 students/section. Usually 5 courses are offered per semester with associated labs. Physics 120 and 285 are only taught in the fall and Physics 125 and 280 are only taught in the spring at this time. Most courses are taught only during the day and there have not been summer physics classes for a number of years. Fill rates in the fall are 95-100+%, while those in the spring are usually around 90%. FTES/FTEF = 40.1.

Questions:

Consider sections offered, session type, and your current PT faculty pool as part of your analysis.

- What factors have contributed to your trends in enrollment, sections offered, and fill rate?

The number of sections offered for chemistry courses is limited by the available lab space. During spring 2016 we have expanded chemistry course offerings by scheduling lab sections on Friday and even Saturday, although this is not ideal. Geology has added a new class (Geology 120) in order to offer a Geology ADT; enrollment in this class has initially been low as geology majors are recruited but is somewhat higher in Spring 2016. All other courses have consistently high fill rates, although some have softened slightly this year, as has the campus in general. UC campuses are expecting more students to have completed their physics requirements before transfer, which will lead to an increase in enrollment in those classes. Finding quality part-time instructors is an ongoing challenge, as those who do well are then hired away for full-time positions at other colleges.

- Based on your review of the data, should you increase, decrease, or keep the same number of sections offered?

Once the new Math/Science building opens, additional chemistry sections and new chemistry courses will be added. Geology hopes to add field courses. Other courses should maintain the number of sections, unless the physics demand necessitates adding sections of those courses.

- How does your department average FTES/FTEF compare to college-wide average FTES/FTEF?

Astronomy is considerably above average due to the lecture size of 100. Chemistry and physics are slightly above the campus average while physical science is slightly below.

Course Retention and Success

Overall

By Ethnicity, Age, Gender

By Large Lecture

By Session Type (Day, Evening, Hybrid, Online)

Astronomy: Overall retention is about 90% with success rates between 75-80%. This is a general education course, not required for any transfer majors offered by GWC. Success rates did not vary significantly by ethnicity or gender. All lectures are large class factors, but no data was provided for success rates in large classes or by age of students. The success rates for day students was fairly consistent, as that class has been taught consistently by one of two part-time instructors for the past 6 years. The evening class has been taught by a number of part-time instructors with much more variability in success rates, probably due to the variation of instructor, not due to the time of the class. There has been no full-time faculty member to coordinate this class over the past four years or more.

Chemistry: Overall retention rates for chemistry are currently at about 74%, down from 80% a few years earlier; the overall success rates are at 63%, down from around 70%. Asian students have the highest success rates while Hispanic students the lowest. There are no significant differences in success rates based on gender, day vs night classes or special populations except for disabled students who have lower success rates consistently.

Geology: Retention rates for geology classes are 90-95% while success rates are usually above 80%. Evening classes have a slightly higher success rate, while gender and special population status do not seem to have significant differences. Hispanic students have slightly lower success rates during some semesters.

Physical Science: Since spring 2011, the physical science course has been taught by part-time instructors and has only offered one section of 32 students per semester. Retention

and success rates were extremely low during the 2012-2013 semester due to the differing expectations of a new part-time instructor who did not return the following year. Other years, the retention rate has been 80-95% with success rates from 70-85%. This class is only taught during the day and due to the small population, there is not enough data to draw conclusions about the success rates of different populations.

Physics: Overall retention in physics classes is about 70-75% with success rates of 60-70%. Fall success rates are lower due to the high enrollment of students in first semester physics courses during that semester while the spring semester has a higher percentage of students in subsequent courses in their required series. Evening courses have significantly higher success rates than day time courses, although the percentages differ more widely in the night classes. Success rates don't seem to differ among genders or special populations and the different rates among ethnic groups change from semester to semester, with no definite trends noted.

Questions:

- Looking at success rates for different demographic groups (age, gender, ethnicity), which groups are experiencing disproportionate impact (success rates for those groups are lower than the average success rates) in student success?

No data for age was provided and there are not significant differences based on gender for any physical science discipline. The only definite trend based on ethnicity was the lower success rates for Hispanic students in chemistry courses. The chemistry course with the lowest success rate is Chemistry 180, first semester general chemistry, which is required of all science majors. We were not provided with success data broken down by course and ethnicity, but given the lower success rates for Hispanic students over all chemistry courses, this is probably also a significant problem in Chemistry 180.

- If there are student groups experiencing disproportionate impact, what's your department's plan to address the disproportionate impact?

This course does not currently have a placement test for chemistry and many students enrolled in Chemistry 180 are underprepared, resulting in lack of success. The chemistry department plans to implement a placement test, as is currently done at OCC, which will guide those students needing additional preparation to Chemistry 130 and will hopefully improve the success rates of all students, and Hispanic students in particular. We also hope to be able to implement supplemental instruction through the STEM center.

Degrees and Certificates

Number of degrees and certificates conferred in the last 6 years
Completers are defined

Astronomy: No degrees or certificates are offered.

Chemistry: No certificates are offered. Degrees have increased from 1 in 2011-2012 to 15 in 2013-2014 and 10 in 2014-2015.

Geology: No certificates are offered. An ADT for Geology was recently approved and the first few degree recipients are expected during Spring 2016.

Physical Science: No degrees or certificates are offered.

Physics: No certificates are offered. 2-3 degrees/year have been conferred in recent years.

Questions:

- Based on the number of degrees/certificates you are awarding, discuss any differences between your expectations and actual numbers.

As mentioned, the geology degree program is new, and the department hopes to increase the number of degree recipients in the future. Some students in science majors transfer without applying for a degree. Efforts should be made to encourage those who meet the requirements to apply for the appropriate degree.

- Please answer this question for programs that have fewer than 10 completers in the last 6 years: What strategies will you implement within your department to increase/attract completers or majors?

Not applicable.

Faculty Staffing

Percentage of courses taught by full-time versus part-time faculty

Astronomy: 100% Part-time

Chemistry: About 50% Full-time

Geology: 83% Full-time 2014-2015 with hiring of new full-time faculty member; previous four years, 100% Part-time

Physical Science: 100% Part-time

Physics: 65-80% Full-time

- In recent years, what successes/challenges have you had in hiring and retaining qualified part-time faculty?

It is difficult to find and retain highly-qualified and effective part-time instructors. Those who are dedicated to teaching usually find full-time positions within a year or two, particularly recently with an improved economy. In chemistry and geology, many qualified people can also find employment in industry.

- Based on your department discussion, what do you see as your ideal number of full-time faculty to promote student success?

Our ideal full-time faculty number is 6 Chemistry, 1 geology, and 2 physics/astronomy/physical science. Throughout this past program review cycle, we have had 4 chemistry, 0-1 geology, and 1 physics faculty members. One full-time faculty member for chemistry was just hired and will begin teaching during the fall 2016 semester. Once the new building is completed, an additional chemistry faculty

member would be needed to handle the increased number and diversity of courses which will be possible with more laboratory space.

PROGRAM PLANNING

Based on your analysis of previous program review and current data:

- **What does your program want to accomplish in the next three years?**

The physical science program is very excited about our move to a new and modern building within the next three years. We will need to both maintain our current rigorous class offerings under increasingly challenging physical facilities, while simultaneously preparing for new courses and the expanded lab capabilities of our new building. We plan to add lab sections where demand is not currently being met and update our experiments to take advantage of the new facilities. Meanwhile, we will continue to fit as many classes into the existing lab space as can be safely managed. We would like to plan to increase our course offerings, expanding into exciting new fields of study to inspire our students— possibilities are geology field classes, biochemistry, environmental science, and chemistry in context: chemistry for non-science majors exploring current hot topics. We intend to encourage more students to apply for AD-T and other associates degrees before they leave Golden West College. Additionally, we would like to investigate instituting a service learning program. Service learning is an educational program that integrates community service with classroom instruction to enhance learning, teach civic responsibility and strengthen communities. Within our community outreach programs, we hope to expand our highly successful Science Night to a follow on Science Summer Camp, targeting underserved local middle school students. Increased high school outreach with the local MERITS STEM magnet program will be investigated.

- **What areas does your program plan to improve?**

We would like to increase the enrollment of underrepresented populations in chemistry and physics students as well as increase the success rates of Hispanic students in chemistry courses. We would also like to improve the laboratories, especially in physics and astronomy, by acquiring new equipment to replace broken or outdated equipment. By increasing our course offerings, we hope to pull in more of the underrepresented student population into the sciences. We would also like to have an ADT approved for chemistry. Identifying a reliable budget sufficient to purchase needed supplies and replace equipment as it breaks or wears out is critical to continued success in our laboratory courses.

- **What specific actions will you take to improve upon those areas?**

Increased outreach to underrepresented populations both on campus and in high school may be possible if the college is awarded the HSI STEM grant currently being

written. With or without that funding, we hope to improve success rates by implementing a placement exam for Chemistry 180, adding supplemental instruction, tutoring and support for students through the STEM center and supporting faculty members in professional development in active learning and other research-based science education. If funding for equipment is identified, through the campus budget process, lottery funds, state equipment funds, or other means, the equipment specified in the resource requests will be ordered. New courses will be designed and planned, but will not be implemented until new facilities and faculty are available, as we are currently space and faculty constrained.

- **How will you assess whether your program has accomplished those goals?**

Enrollment and success rate data will be available to assess the first two goals. Students can be surveyed to assess the success of adding new equipment to the laboratory courses. An ADT for chemistry will be approved and on record.

RESOURCE ALLOCATION

In order to accomplish those goals, what resources do you need? You will need to fill out the resource request forms and include them with your Program Review Report.

- Staffing
One additional faculty member each in chemistry and physics will be needed over the three-year period of this Program Review. In addition, the physical Science Stockroom Manager will be retiring soon. This position is critical to the campus and should be filled with a 12-month position at the Instructional Associate level.
- Facilities
The new Math/Science building will provide the improved facilities which are needed by the department.
- Technology
The current Math/Science building needs reliable Wi-Fi.
- Equipment
Requests are attached for equipment needed by the chemistry, physics and astronomy programs as well as for a budget increase for the department as a whole.
- Funding for Professional Development

Department Chair and Dean Review

Complete this section after reviewing all program review information provided. The Department Chair and Dean are to separately indicate the level of concern for the program that exists regarding the following Program Vitality Review (PVR) criteria. Add comments for any item marked with a 1 or 2. Identify whether the comment is made by the IUA or the Dean.

(Scale: 0 – No concern at all, 1 – Some concern, 2 – Serious Concern)

Chair/Dean

(0) (0) a. Significant declines in enrollment and/or FTES over multiple years

(2) (2) b. Significant change in facility and/or availability and cost of required or necessary equipment

(1) (1) c. Scarcity of qualified faculty

(0) (0) d. Incongruence of program with college mission and goals, state mandates, etc

(0) (0) e. Significant decline in labor market

(0) (0) f. Continued inability to make load for full-time faculty in the program

(0) (0) g. An over-saturation of similar programs in the district and/or region

() () h. Other

Program Review Check-list

(x) Department Contact Information is up to date: Department Chairs, full-time faculty, classified

(x) Organization Chart: Verify that it is up to date: (q:\college information\org charts)
Report necessary changes to the Director of Personnel

The most recent one posted is from 2011 and is definitely not up to date. An updated one for our department is attached to the Classified Request Form.

(x) Both the Dean and Department Chair have completed the Dean and Department Chair Review section.

Signatures, Individual Comments

Date of Department Discussion: April 27 – May 2, 2016

Discussion Modality

Department Meeting

Emails

Online/Skype

Other : Phone calls

Summary of Discussion Outcome: Faculty Members all supported the document

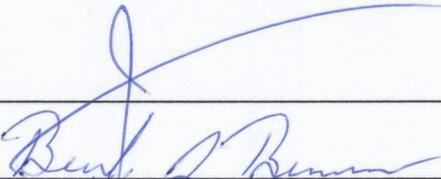
Departmental Recommendation

(X) No further review necessary

() We recommend this program for Program Vitality Review

I have read the preceding report and accept the conclusions as an accurate portrayal of the current status of the program. Signatures are on file in the division office. Type the names of the faculty.

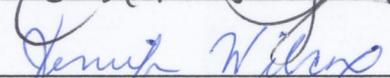
Almy, James _____

Benneman, Bud  _____

Green, Katherine  _____

Speakman, Teresa  _____

Stein, Konrad  _____

Wilcox, Jennifer  _____

I have read the preceding report and wish to add signed comments to the appendices. Signatures are on file in the division office.

Almy, James _____

Benneman, Bud _____

Green, Katherine _____

Speakman, Teresa _____

Stein, Konrad _____

Wilcox, Jennifer _____

Department Chair: Speakman, Teresa Teresa Speakman Date: 5/2/16
Comments:

Division Dean: Courchaine, Jeff Jeff Courchaine Date: 5/2/16
Comments: