

EVERGREEN VALLEY COLLEGE

DIVISION OF MATH, SCIENCE & ENGINEERING

Physical Sciences

Program Review Self-Study

2010 – 2011

*...A mind once stretched by a
new idea never regains its
original dimensions.*

**EVERGREEN VALLEY COLLEGE
DIVISION OF MATH, SCIENCE AND ENGINEERING**

Physical Science Program Review Self-Study

CRITERIA 2010-11

DEPARTMENT/PROGRAM NAME: Physical Science

CURRENT YEAR: 2010-2011

AREA DEAN: Dr. Wei Zhou

Contributors:

Dr. Chui Hwang (Part A, Part B, Part F)

Dr. Jose Valentin (Part A, Part D, Part E, Part F)

Dr. Celso Batalha (Part A, Part B, Part C, Part F)

Dr. DP Vu (Part D, Part E)

Bonnie Brown (Part A)

Dr. Preeti Srinivasan (Part C)

Joyce Arimura (Part D, Part E)

Van Duong (Part D, Part E)

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Physical Science Program Review

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Evergreen Valley College Mission

With equity, opportunity and social justice as our guiding principles, Evergreen Valley College's mission is to empower and prepare students from diverse backgrounds to succeed academically and to be civically responsible global citizens.

We meet our mission through a wide spectrum of educational experiences, flexible methodologies, and support services for our students.

Physical Science Program Review

Summary of the Department/Program

Provide a brief summary of the department/program including brief history (impetus for department/program initiation if applicable, years of existence, progress made or not made over time, any other major factors that affected the program and current status)

Physical Science includes all fields of natural science that study non-living systems. Evergreen Valley College's Physical Science program has offered a comprehensive curriculum including astronomy, chemistry, earth science and physics since the start of the College in 1975. The course list includes introductory astronomy courses (Introduction to Astronomy, Introduction to Astronomy Lab), more in-depth astronomy lectures (Solar System and Stars, Galaxies, and the Origin of the Universe), foundational chemistry courses (Fundamental of Chemistry and the two-semester Introduction to Chemistry), chemistry majors sequence (the two-semester General Chemistry and two-semester Organic Chemistry), introductory physics course (Introductory Physics), algebra-based physics sequence (the two-semester General Physics), calculus-based physics sequence (the three-semester General Physics), and introductory earth science course.

The program primarily offers general education and university transfer courses. Some courses in the program also serve career technical education, such as the well-recognized Nursing program and the much-celebrated Surveying program. Taking advantage of the "monumental" development of the State of California's first Associate degree in secondary school teacher education, the program has developed partnership with California State University, East Bay to train more math and science secondary school teachers to meet the State's critical need in the area.

Guided by the college's Commitments to Action focusing on Student Centeredness, Community Engagement, and Organizational Transformation, the Physical Science program is committed to providing student-centered education to students of all ages and backgrounds, preparing them to succeed in a global and multicultural society. Specifically, the program has focused on student access and success by developing two Associate in Arts degrees, offering up-to-date curriculum with course schedule around student availability, providing state-of-the-art equipment and facilities, alternatively delivery methods and supplemental learning opportunities, textbook price reduction, etc. In addition, the program has committed to faculty and staff professional development, campus activities, and outreach functions.

To further enhance student learning, the Physical Science program requests one additional, highly qualified and dedicated full-time faculty and one additional lab tech to provide positive, individualized student learning experiences, one computer lab to expand hands-on student learning, resources to replace heavily-used, worn-out equipment, and more faculty and staff professional development opportunities.

PART A: Overview of Program

1. *Identify EVC's CTA for this year.*

Our college's Commitments to Actions (CTAs) are organized as follows:

A. Student Centered

1. Access
2. Curriculum and Program Development
3. Student Services Offerings

B. Community Engagement

1. Visibility
2. Strategic Partnerships
3. College to the Community

C. Organizational Transformation

1. Community Building
2. Employee Development
3. Transparent Infrastructure

See Appendix A -- EVC's CTAs for more details.

2. *Identify your program/department's CTA for this year.*

A. Student Centered

1. Access
 - 1) Help students enroll during first week of semester.
 - 2) Gradually modernize the laboratory equipment.
 - 3) Purchase models for show and tell in classroom.
2. Curriculum and Program Development
 - 1) Publicize AA degree.
 - 2) Complete the upgrade of laboratory work with equipment and manuals.
 - 3) Increase web-enhanced physics classes.
3. Student Services Offerings

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- 1) Expand choice of e-books along with hard copies throughout the curriculum for students for the following reasons:
 - a. Reduce costs for students;
 - b. Accessibility and flexibility;
 - c. Immediate feedback.
- 2) Actively participate in early alert process.

B. Community Engagement

1. Visibility
 - Participate in high school orientation at EVC to recruit students to science classes.
2. Strategic Partnerships
 - Develop relationship with industry.
3. College to the Community
 - Offer evening/weekend/summer classes.

C. Organizational Transformation

1. Community Building
 - 1) Participate in campus safety and facilities committee meetings to address responsiveness of the maintenance department to requests.
 - 2) Organize more Kicks-It Outside activities with different focus.
2. Employee Development
 - 1) Attend conferences, professional development activities and instructional innovation workshops.
 - 2) Attend pertinent conferences or workshops.
3. Transparent Infrastructure
 - 1) Work closely with the special programs.
 - 2) Periodically communicate issues concerning students with the department faculty and staff.

See Appendix B – Physical Science program CTAs for more details

3. ***How did your program/department meet the overall CTA of the College? Describe how your program/department met the overall CTA of the College. Describe areas where your program/department needs improvement to meet the overall CTA of the College. Describe specific plan to achieve this goal.***

As listed above, the program's CTAs were created based on the College's CTAs. Our goal in developing these CTAs was to better prepare our students in their Physical Science requirements to fulfill careers they have chosen to embrace. All three college

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CTA areas including Student Centeredness, Organizational Transformation and Community Engagement were addressed by the program CTAs. Each program CTA relates to a designated area of focus for the College. In order to reach our goals, we have developed outcome metrics and timetables and assigned appropriate individuals to serve as leaders.

4. Identify Unmet Goals, Accomplishments and New Initiatives

- **Analysis of unmet goals**

Gradually modernize the laboratory equipment and complete the upgrade of laboratory work with equipment and manuals.

Chemistry is an experimental science. The laboratory experiments conducted in these facilities are a very critical component that our students need to develop the scientific methodology they need to succeed in any 4-year institution or in any other technical field. Our facilities are more than 15 years old and they are in need to be upgraded with newer instruments that are a la par with the type of instruments and lab facilities they will use in either 4 year universities or any research facility.

Unfortunately, due to a lack of appropriate funding we have not been able to meet this goal.

Our classrooms are not completely modernized or expanded as we originally intended. Our Physics lecture hall cannot comfortably receive a top class size of 56 students, and exams must be done at another location. As of now, the complete installation of audio-video equipment and computers in our remaining Physical Science laboratories EM Lab and Earth Science Lab is only partially achieved.

Due to the lack of funding, we have been reutilizing outdated computers in our laboratories. These computers have been released from other departments that received new equipment as part of their overall upgrade program. So far, two of our labs: the Mechanics Lab (AE231) and the Optics lab (AE259) – have received 10 computers each. We are expecting more computers for the EM lab and the Earth Science lab. Our EM lab is on queue for the installation of a media projector that will facilitate PowerPoint presentations and projection of physics applets and other simulations.

The complete modernization of our labs requires:

1. purchase of computer-controlled equipment to replacement out-dated equipment, and

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2. purchase of computer-controlled equipment to accommodate the increasing number of students in our classes.

Our lab equipment is more than 20 years old, with many acquired in the 70's (See Equipment in Section E). Again, due to the lack of funding, their replacements have been slow.

Astronomy is a science attracting and engaging students at an early age. Our CTAs includes the development of a robust partnership with local high schools, with the purchasing of an inflated planetarium that would enable easy access to and from local high schools, and development of ongoing science projects. The idea was internally approved at all college levels but did not advance for the lacking of funds.

- **Accomplishments**

1. An Associate in Arts Degree in Chemistry was approved on April 27, 2006.
2. An Associate in Arts Degree in General Studies with Emphasis in Astronomy was approved on October 7, 2008.
3. Developed two new astronomy courses: Astronomy of the Solar System (ASTRO 014) and Stars and Galaxies (ASTRO 16).
4. Our students have been selected to participate in the prestigious National Science Foundation (NSF)-funded Research Experiences for Undergraduate program (REU Program).
5. Chemistry faculty has been working closely with the Counselors to diligently adhere to the prerequisites for Chem 1A and stop overriding. Moreover, the California Chemistry Diagnostic Test was used to identify underprepared and misplaced students, and redirect them to Chem 15, in which they have a realistic chance of success.
6. Reduced textbook costs by producing custom-made textbooks in collaboration with publishers.
7. Maintained the MSRC in our science area facilitating a much more efficient interaction between our Physical Science faculty and the staff and student tutors working in that facility.
8. Two chemistry laboratories have been remodeled to accommodate disable students in accordance with federal and state regulations.
9. Equip two physics labs (Mechanics Lab and Thermodynamics Lab) with compute that enable students to run experiments and to perform data analyses.
10. Replaced obsolete sensors and machines by new ones (see Section E below).
11. Organized new equipment according to subjects, facilitating their use by several instructors teaching the same course.
12. Developed new lab manuals and develop new experiments for all physics courses once new computer-controlled sensors and equipment were purchased.
13. Developed online offering modules for Astronomy 10 and Astronomy 14. Currently these are the only two courses in the program with sections offered online.

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14. Provided algebra-based general physics course in summer.
15. Successfully increased student enrollment and success rates in physics and astronomy courses in the last five years.
16. Expanded the outreach program of the Montgomery Hill Observatory, offering star gazing and children's workshops once a month during academic years. This program has enriched the lives of community members, and served as a first college experience for several young children.

- **New initiatives**

1. Develop a partnership between EVC and California State University, East Bay (CSUEB) with the purpose of identifying community college students interested in becoming future science and math teachers. This new partnership involves advertizing general education classes offered at EVC and required for transfer.
2. Increase the number of online science courses offered in our division, and create online enhancements for all face-to-face lecture courses using Moodle course management system. Our plan includes
 - a. modernizing our classes with development of web-enhanced and online astronomy courses,
 - b. adopting innovative strategies to develop problem-solving skills needed in most of our courses,
 - c. hands-on laboratory work, a fundamental part of Physical Science.

It's important to note that we started a slow process of modernization 4 years ago, but more funding is needed to achieve the modernization process of our laboratories, for a large fraction of our equipment is outdated and in need of replacement.

3. Use the California Chemistry Diagnostic Test (CCDT) as the Placement Test for Chem 1A.

Many students meet the prerequisites but they cannot complete the course successfully. Some of the reasons are:

- a) Chemistry and/or mathematics were taken more than three years ago
- b) Limited or no laboratory experience
- c) Underprepared English

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These students register, drop the course shortly, and repeat several times. They have priority to register, blocking out new but competent students. Since 1988, the California Chemistry Diagnostic Test (CCDT) has been used to diagnose student deficiencies that are critical to success in General Chemistry. There is an un-refutable correlation between the CCDT performance and General Chemistry success. Independently, our research/analysis has also confirmed the validity of the Diagnostic Test and it is a good predictor of success in General Chemistry. Many local community colleges (SFCC, De Anza, Chabot, and Ohlone) have adopted the Diagnostic test as the Placement Test for many years. However, our administrators have rejected our proposal, claiming that the Educational Code forbids the administration of Placement Test for Chem 1A. Furthermore, the Testing Center did not want to proctor the test and the Research and Institutional Effectiveness would not do the analysis of data collected in Fall 2008.

We should follow other neighboring community colleges to circumvent the Educational Code to initiate a Placement Test to assess students' preparation and readiness, to reduce waste of resources, and guarantee equity of education. Then we can negotiate with the Testing Center to proctor the test.

4. We have been offering Chem 12A in Fall semester and Chem 12B in Spring semester. We should expand our offering of this Organic Chemistry sequence to every semester to meet student need. The new and flexible schedule will also assure the students to complete the A.A. degree within two years.
5. Recruit adjunct faculty for tutoring and counseling. There is a lack of adequate numbers of qualified tutors, who contributes to higher students' success and retention rates. Recruiting adjunct faculty will remove this barrier.
6. Organize Science Day to promote science careers to high school students.
7. Establish partnerships with local high schools.
8. Establish partnership with local companies

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5. *State the goals and focus of this department/program and explain how the program contributes to the mission, comprehensive academic offerings, and priorities of the College and District.*

The Physical Science program develops and promotes instruction in the field of Astronomy, Chemistry, Physics, and Earth Science.

The Chemistry component provides a lower division science foundation for those interested in pursuing chemistry as a major field of study and related- areas.

The goals are to:

- Provide the lower division science course foundation needed for our graduating students to be adequately prepared to take upper division courses at the university level.
- Provide the opportunity to earn an Associates level degree in chemistry for those students transferring to universities.
- Provide technical training in chemistry/biochemistry/teaching for students interested in careers as diverse as health sciences, engineering, industrial chemistry, pharmacy, materials science, and teaching.
- Meet the needs of business and industry for employees who can apply scientific methodologies and math skills, communicate effectively, and think critically.
- Enhance college retention and success efforts, outlined in the College Educational Master Plan and Enrollment Management Plan, by providing greater flexibility in meeting individual student educational and employment objectives.

Physics is the most fundamental discipline in Physical Science without which Chemistry, Biology, Engineering, and Astronomy wouldn't exist in their present capacity. Physics attempts to identify the basic laws of nature governing natural phenomena and provides logical and consistent explanations about their causes and future outcomes. It is essentially quantitative and employs the precise language of Mathematics in its description of Nature. Physics courses are delivered with a laboratory component providing hands-on illustration of phenomena described in lectures. Students taking Physics courses are on track to earn Associate level degrees in any of the Physical Science programs and transfer to a 4-years institute. Instructions provided in Physics courses are expected to be mastered by pre-professional students on pace to become doctors, pharmaceutical scientists, engineers, computer scientists, astronomers, and physicists. The goals of Physics component are to:

- Provide a large range of lower division algebra-based and calculus-based courses fulfilling the academic needs of STEM majors.

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- Develop General Physics courses satisfying transfer requirements to 4-year institutions.
- Create courses to support the development of AA and AS degrees in STEM areas.
- Identify instructional materials and modern technologies that simulate models and illustrate physical quantities discussed in the lecture setting.

Astronomy area offers popular descriptive courses illustrating recent advancements in the field of Astronomy. It emphasizes methods astronomers employ to unveil the physical properties of objects too far to be collected and brought to a lab setting. It is an ideal course for non-science majors such as Marketing and Business, Arts and Language, Physical Education, and others. The main goals of the Astronomy area are to:

- Develop general education courses for non-science majors illustrating the latest advancement in the field of astronomy and space exploration.
- Provide a broad view of the Universe in large scale, its origins, and possible demise.
- Illustrate the techniques astronomers use to collect information about celestial bodies.

In keeping with the college's mission of equity, opportunity, and social justice while empowering the student with our guiding principles, the aforementioned goals prepare students from diverse backgrounds to succeed academically, and to be civically responsible global citizens.

6. *Identify current student demographics. If there are changes in student demographics, state how the program is addressing these changes.*

Ethnicity

The Physical Science program has observed a 30% overall enrollment growth in the last five years, although African-Americans, Asian-Chinese's, and Filipinos' ethnic groups have experienced an absolute decline in enrollment. Quite remarkable is the tremendous growth of Other/Unknown ethnic group from 46 to 234 students, equivalent to 18% of total student population. The majority of our students are in the 20-22 group age range, comprising more than 30 % of total enrolled students.

It is one of our greatest challenges to encourage students, especially, underrepresented students to pursue science- related careers. We will actively recruit students through efforts coordinated with guidance counselors, outreach services and publicize our program offerings at events like 'Day on the Green' and various orientations.

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The largest group of students participating in our chemistry courses is Asian followed by the Hispanic group. Hispanic numbers are about half that of Asian students. In addition, the Filipino group appears to be declining during this period. This decline may be due to changes in career choices or the overall employment situation. African American, Caucasian, Native American, Pacific Islander, and Other Non-White enrollments are low in chemistry courses during this six year period.

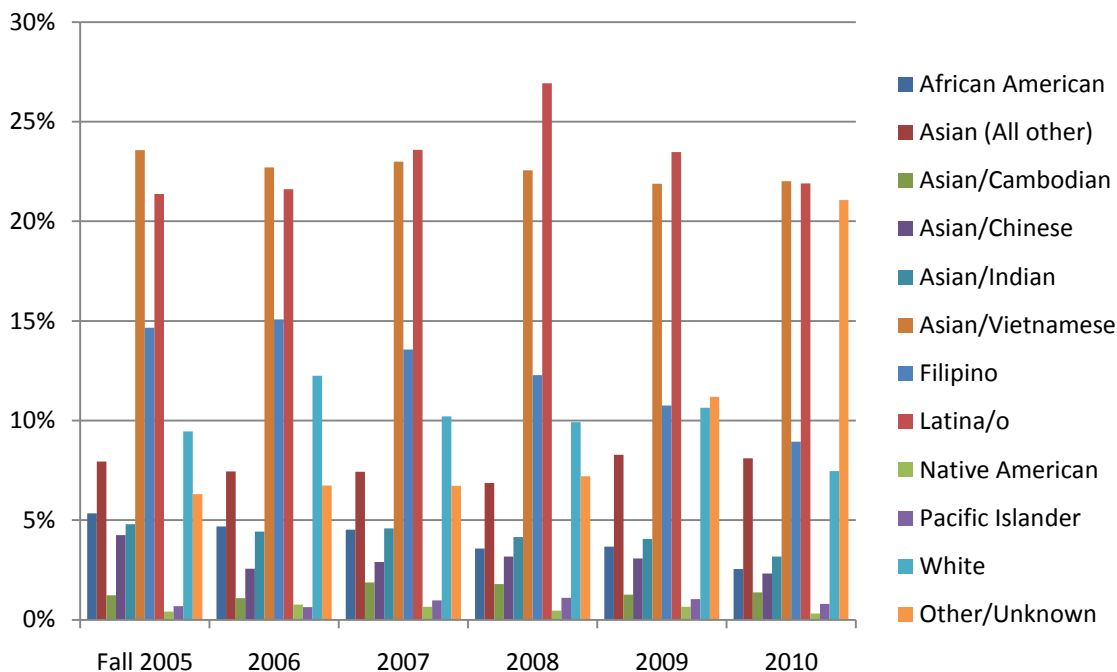


Figure 1. Ethnicity in Physical Science Classes 2005-2010. (Note: Data from RIE SJECCD unless otherwise notes. A "Year" is a reporting year as reported for apportionment on the 320 report. This would include all students in sections whose census date falls in the fiscal year or, if positive attendance, whose end date falls in the fiscal year.)

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Age

The majority of the students enrolled in a chemistry class are in the age brackets of 19 or less to 20-24. The largest group of students constitutes the 20-24 year group. These students are generally entering college for the first time and are recent high school graduates who are planning to matriculate to a four year institution. Enrollment for these groups has been constant for this six year period.

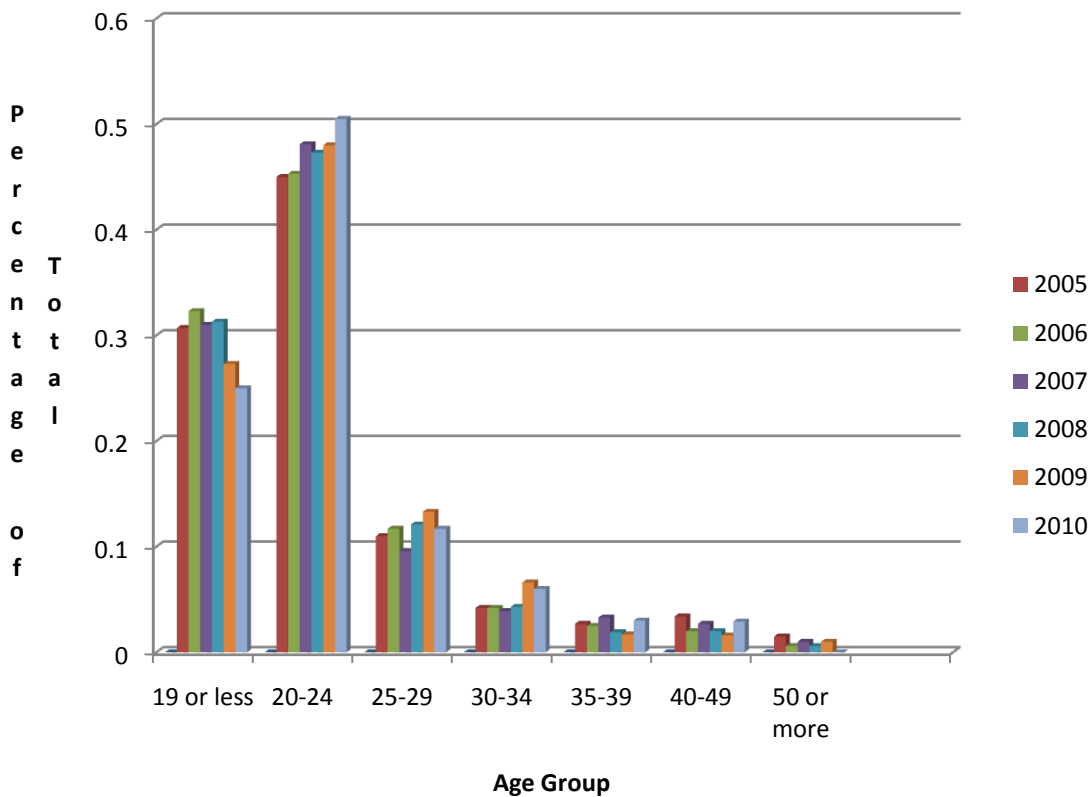


Figure 2. Age groups in Physical Science Classes 2005-2010.

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Gender

Gender data comparison is quite consistent for the year 2005 versus 2010. Female representation is virtually equal to its male counterpart in the department. This weighting of the female students in the introductory courses is due in part to their dominance in the entry health allied fields (Nursing and Dental Hygiene). As a note, chemistry also supports more traditionally male dominated fields like pharmacy, engineering and physics. In addition to students seeking fields such as medicine, chemistry, biochemistry and those students just seeking a laboratory course, the gender difference is equalized. Thus, our prerequisite courses generally attract about equal number of females as well as males.

The student enrollment growth has been kept positive both in Physics and Astronomy during the past 6 years after we replace the 2010 figures with extrapolated fall 2010 data. One might note a slightly larger number of males - both in Physics and Astronomy - with respect to female students. The economic downfall of the state of California hasn't impact enrollment trends. The Division of Math, Science, and Engineering has not closed sections in the regular spring and fall terms, and has strived to maintain lab supplies available to instructors, requiring the same high standards for lectures and lab settings as in previous years. The Figure below illustrates the positive enrollment growth in our Division.

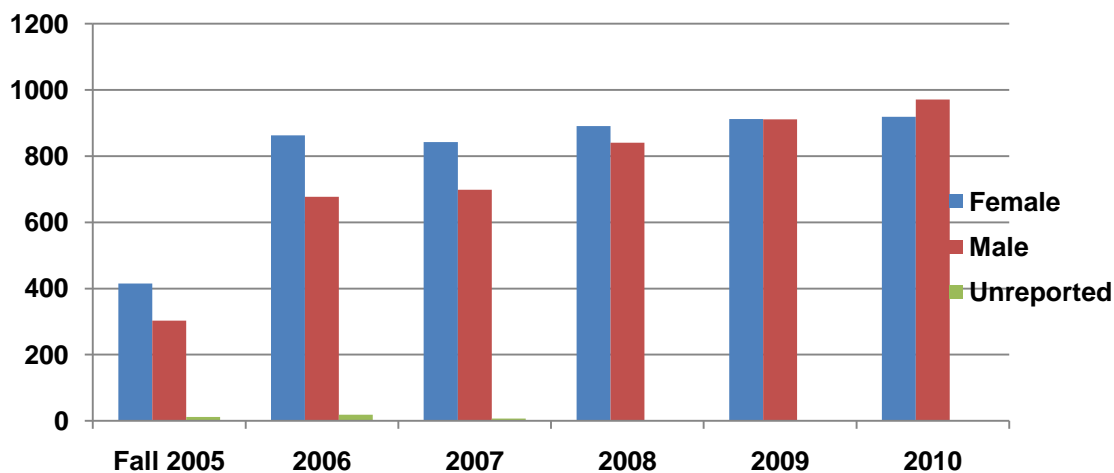


Figure 3. Gender groups in Physical Science Classes 2005-2010.

It is important to notice that while Chemistry and Physics courses share similar student demographics with an outstanding predominance of Asian students, Astronomy courses have a totally different student population, led by Hispanic and Asian students followed closely by Caucasians and Filipinos students. In fact, Astronomy course student ethnic enrollment pattern reflects EVC's overall student demographics. One might argue that Physics courses do not exist as standalone self existing structures, but constitute starting

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steps students must take in order to advance on any of the Physical Science disciplines such as Chemistry, Engineering, and Computer Science. Thus, the Physics program is entirely dependent on the success of other Physical Science program: the growing or waning enrollment tendencies in Chemistry, Engineering, and Computer Science will be reflected in the enrollment pattern of our Physics program. On the contrary, the Astronomy courses are taken by non-science majors seeking to fulfill general education requirements in the Physical Science area, and its enrollment pattern reflects the college enrollment pattern.

7. *Identify enrollment patterns of the department/program in the last 6 years and analyze the pattern.*

Enrollment patterns in Physical Science courses are fairly constant. The classes are typically filled to capacity, which is limited by state and federal regulations on lab class size. There have never been enough classes to meet student needs. As a result, classes are filled whenever they are offered. The Physical Science program has been very carefully in class scheduling to meet daytime and evening student needs.

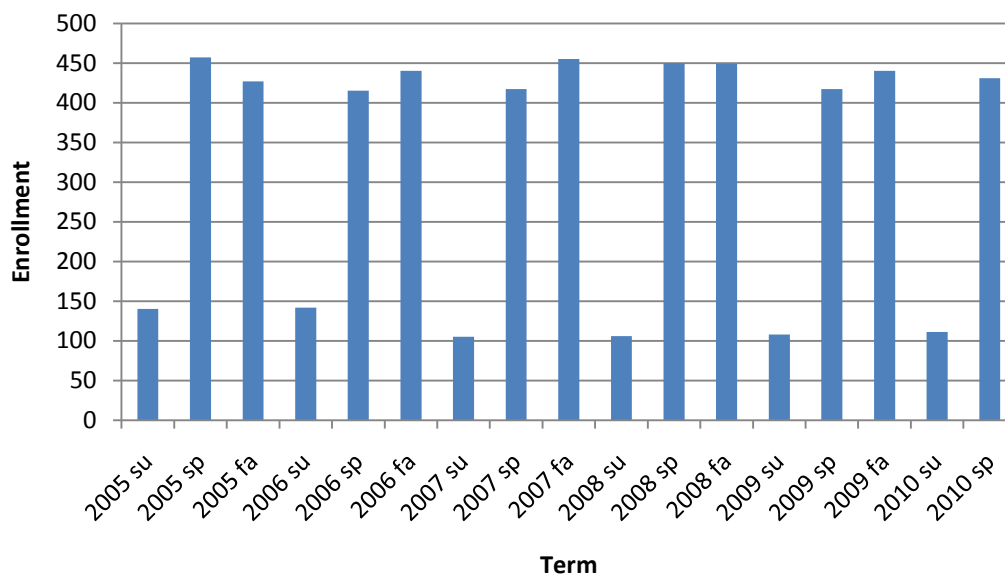


Figure 4. Total enrollment in Physical Science Classes 2005-2010. (Note: Data from California Community Colleges Chancellor's Office)

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8. *Identify department/program productivity.*

The Physical Science program's average productivity is in general above the 560 level, with a sensible growth during summer for the majority of courses: a combination of enrolled students with more clear transfer goals and a more efficient contact of these students with professors. This productivity is phenomenal considering Physical Science is an empirical science and the majority of courses have labs, which greatly limit the class size due to state and federal safety regulations. With the class size limit mentioned, it is important to notice that the lecture-only astronomy courses lead the productivity index of Physical Science program.

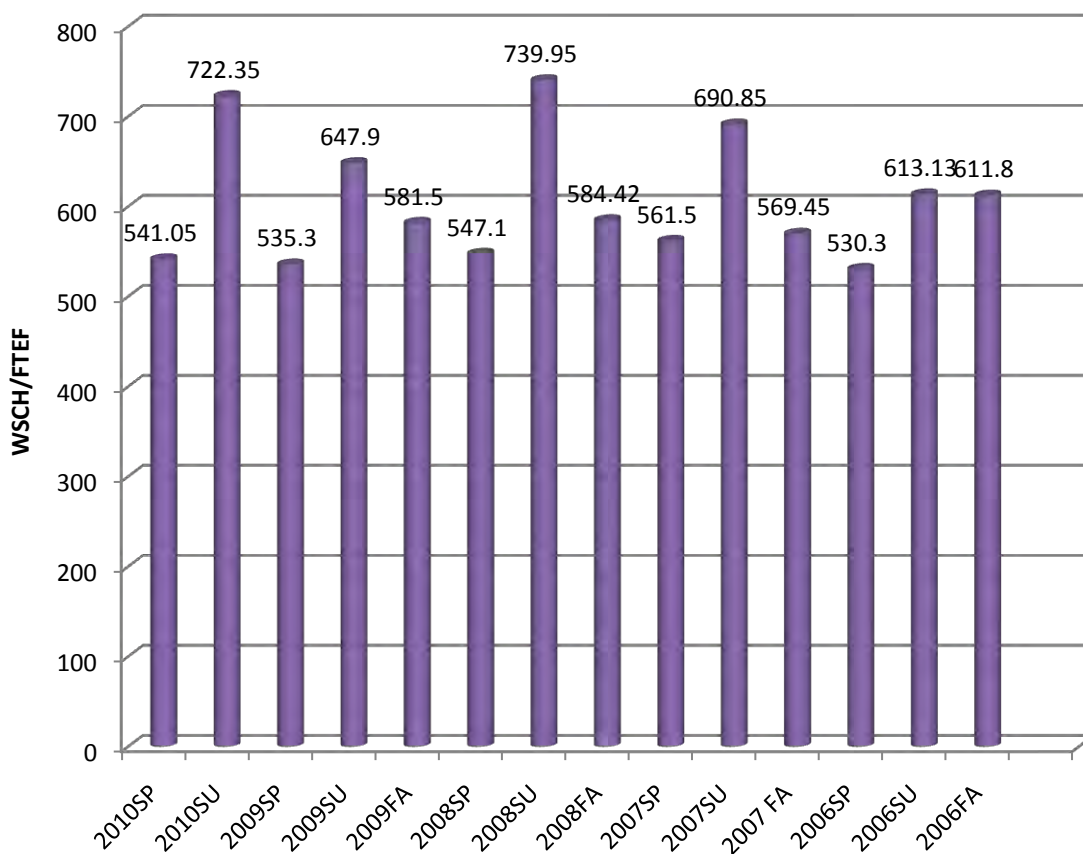


Figure 5. Productivity in Physical Science Classes in 2005-2010.

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9. *Identify student success rate and patterns within the department/program paying particular attention to our college's target groups.*

To better review the student retention and success data, we separate the program into three different areas: Chemistry, Physics and Astronomy. Further, we compared the retention and success rates for traditional face-to-face vs. online Astronomy lectures.

Chemistry

The average retention rate for all chemistry courses is consistently above 70% during the six year period, 2005-2010. This is a good indicator of student interest and perseverance in accomplishing their goals through the curriculum. Success rates for the average chemistry classes are high and climbing overall considering the nature of the topic materials and preparation of incoming students. Improved stringent prerequisites and varying pedagogical techniques are contributors to this achievement.

Comparison of retention rates and success rates for the individual chemistry classes offered by our department showed a gap of approximately 1-15% between retention and success rates. This gap may be a reflection of the level and science experience of students entering into the courses. Many of the students have no to little prior exposure to science in the lower introductory and fundamental classes in addition to lagging math preparation. New math prerequisites have been implemented for these courses in anticipation of a better prepared student coming to these classes. Incorporation of technology through computer usage is standard for all chemistry classes. Various techniques of delivery of subject matter are utilized including e-books. We expect this gap to close and retention, as well as, success rates to improve with exposure to innovative scientific inquiry.

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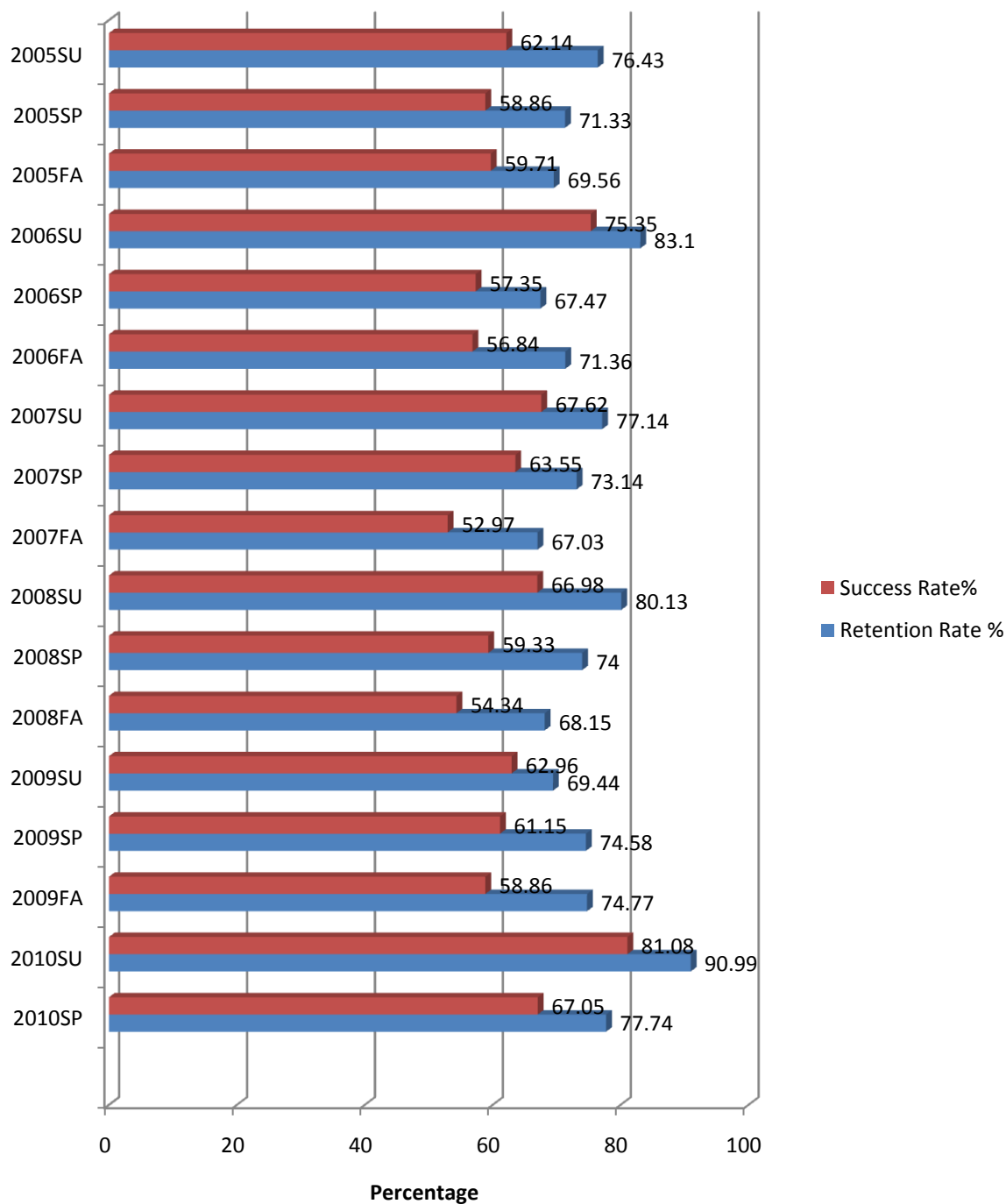


Figure 6. Student Retention and Success Rates in Chemistry Classes in 2005-2010. (Note: Data from California Community Colleges Chancellor's Office)

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Physics

The average retention and success rates for Physics courses are 80% and 70%, respectively. These rates are considered high in the Physical Science program. We explain this trend suggesting that students taking the Physics courses are generally committed to STEM career goals, having developed studying skills needed to achieve these goals. In fact, we note similar trends in the Surveying/Geomatics, and Chemistry programs performed by STEM transfer-level students.

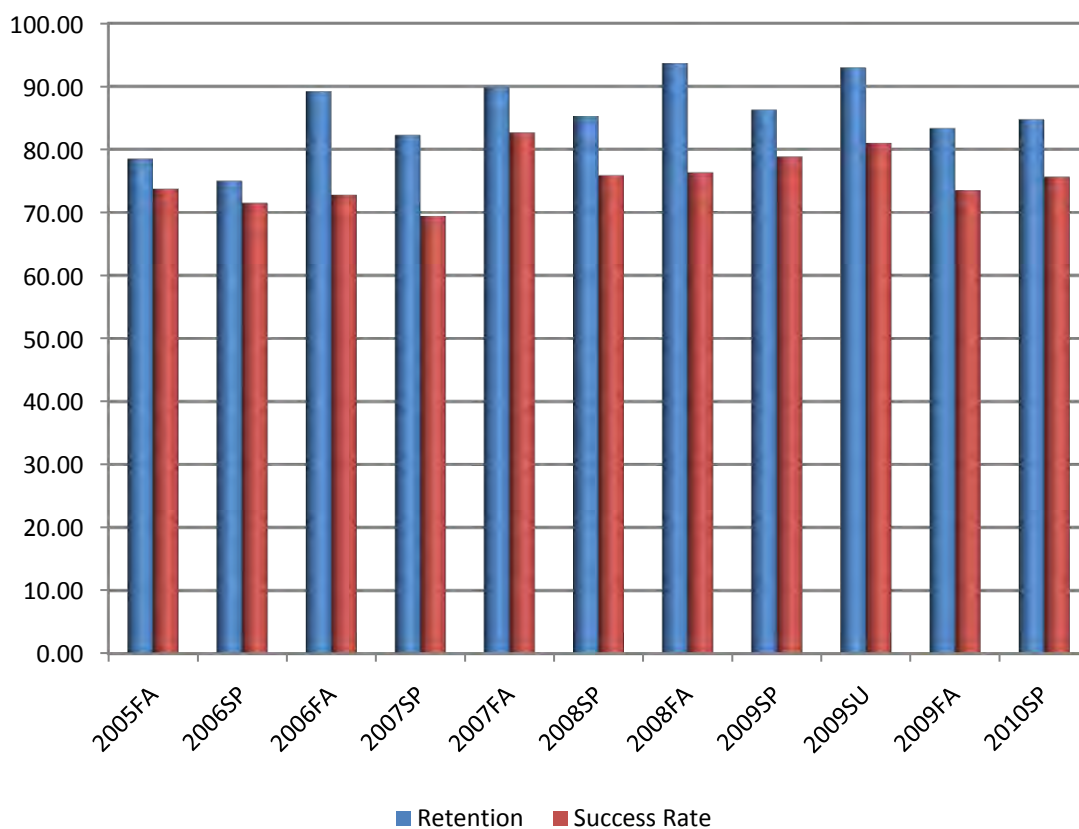


Figure 7. Student Retention and Success Rates in Physics Classes in 2005-2010.

Astronomy

Astronomy shows retention rates slightly larger than Physics but with success rates 20% less. The discrepancy between the Physics and Astronomy figures can be understood if one realizes that Astronomy courses are taken by a large variety of non-science majors or undecided students who are not yet established on a definite career track, or lack the science background and language. Examination of summer and intersession data allows predicting retention and success rates for students signing up Astronomy courses fully committed to a major and with pressing transfer goals. A quick inspection in the retention and success rate trends of summer and intersession shows consistent figures above the 90% level with less separation between retention and success rate. ~~Intersession~~ and ~~summer~~ students are giving up holiday time for the greater good of a quicker transfer process. These students are fully committed and willing to work above and beyond their ~~non-science~~ skills in order to achieve their goals.

Retention and Success Rate Astronomy

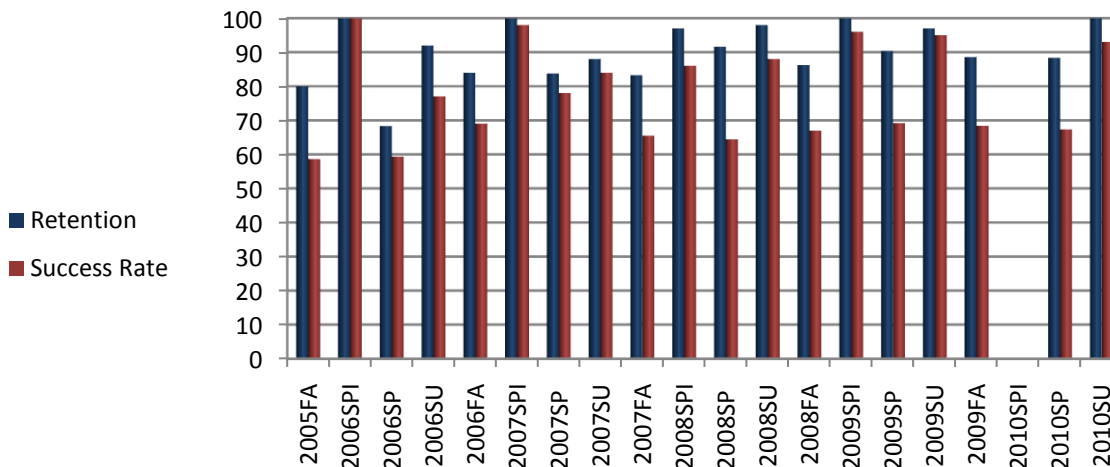


Figure 8. Student Retention and Success Rates in Astronomy Classes in 2005-2010.

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Online Astronomy Sections

Astronomy sections have gone online to facilitate access to education of working and remote students. The Division strives to provide quality education, and online courses should be no exception. In the following figures we examine the retention and success rate of face to face versus online courses that have been delivered by the same instructor. The efficiency of face to face settings compared with its online counterpart is consistently demonstrated during the years 2008 and 2009, but not in 2010. One wonders if the break in trend is a positive response to the continuous efforts made to improving quality of our astronomy online courses or just a random statistic fluctuation. Changes, such as the adoption of Moodle course management system, implementation of early alert system in the first two weeks of class, and periodical messages addressed to target students who were not submitting required work might have contributed to the improving efficiency. We will follow this trend in the terms to come.

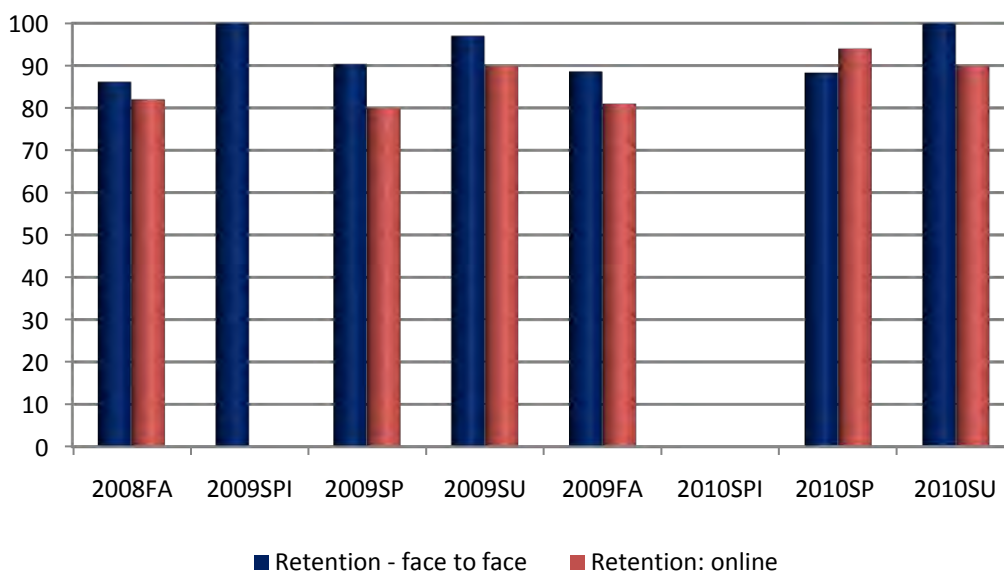


Figure 9. Student Retention Rates in Face-to-Face vs. Online Astronomy Classes in 2005-2010.

Physical Science Program Review

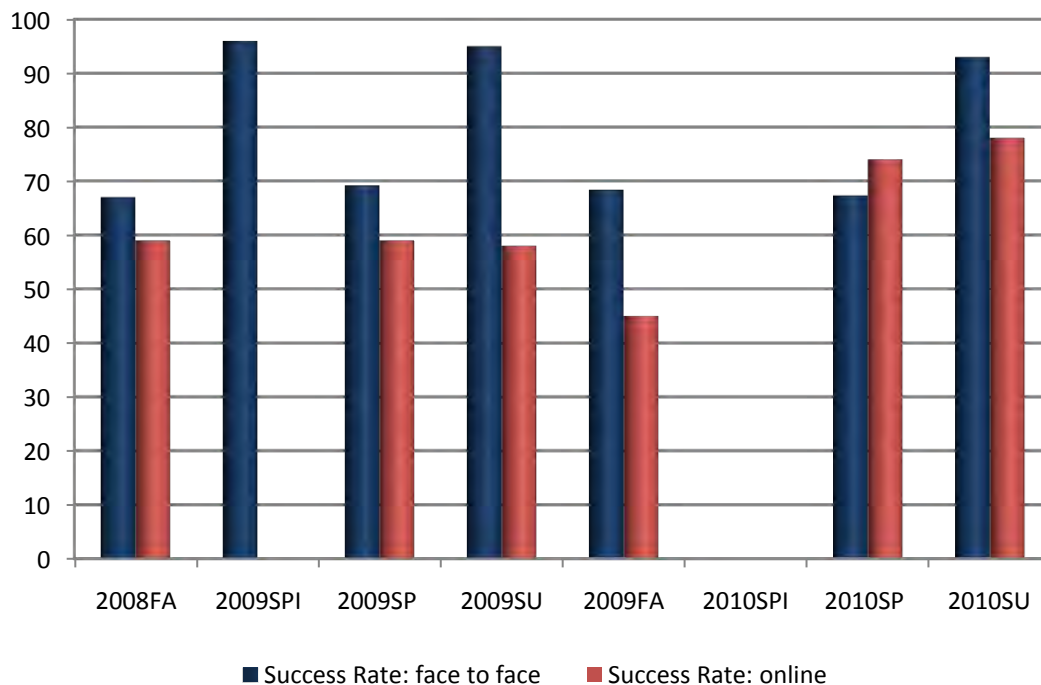


Figure 10. Student Success Rates in Face-to-Face vs. Online Astronomy Classes in 2005-2010.

10. If the program utilizes advisory boards and/or professional organizations, describe their roles.

The Chemistry department does not utilize any advisory board but adheres to the guidelines of the American Chemical Society (ACS) and its affiliates.

Physical Science Program Review

PART B: Curriculum

1. Identify all courses offered in the program and describe how the courses offered in the program meet the needs of the students and the relevant discipline(s).

Our Physical Science program is a component of our school mission to “empower and prepare students from diverse backgrounds to succeed academically, and to be civically responsible global citizens.” Moreover, our program meets the needs of business and industry for employees who can apply scientific methodologies and math skills, communicate effectively, and think critically. We accomplish this with a team of very dedicated, engaging, intellectually excited and enriched faculty and staff to address needs and foster excellence; and tutoring services provided in the Math and Science Resource Center.

The Physical Science program offers first-rate comprehensive lower-division curricula in the following areas:

- 1) Introductory Chemistry courses. Both Chem 30A and 30B are for students who, with no background in chemistry, need beginning chemistry for pre-Nursing in order to go on into Microbiology and Physiology, or for other technical career, or to satisfy the General Education transfer requirement for a laboratory science. Chemistry 15 is the prerequisite for Chemistry 1A and 1B, but it also satisfies the General Education transfer requirement for a laboratory science.

		Semester Units
Chem 30A	Introduction to Chemistry	3.0
Chem 30B	Introduction to Chemistry	3.0
Chem 15	Fundamental of Chemistry	4.0

- 2) There are four courses required for the Associate in Arts (A.A.) degree and they are recommended by the American Chemical Society (ACS) Guidelines for Chemistry in Two-Year College Programs:

		Semester Units
Chem 1A	General Chemistry	5.0
Chem 1B	General Chemistry	5.0
Chem 12A	Organic Chemistry	5.0
Chem 12B	Organic Chemistry	5.0
Total		20.0

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- 3) The Astronomy courses Astro 014 and Astro 016 attend students seeking an AA degree on General Studies with Areas of Emphasis in Astronomy, and together with Astro 10 constitute one of the most seek General Education courses offered in the Division for non-science majors.

	Semester Units
ASTRO 010 Introduction to Astronomy	3.0
ASTRO 014 Solar System Astronomy	3.0
ASTRO 016 Stars, Galaxies, and the Origin of the Universe	3.0
ASTRO 010L Introduction to Astronomy Lab	1.0

- 4) The General Physics courses are designed to attend physics, chemistry, biology, engineering, mathematics, or other Physical Science majors. The Introductory Physics course - PHYS 0001, is equiped with a hands on lab component complementing weekly conceptual lecture sections. This course stands as a gateway to more quantitative courses such as those of the Phys 002 and Phys 004 series. Business, Automotive, and Communication majors are encouraged to take PHYS 0001 as part of their GE requirements. The Physics 002 series, is an Algebra based sequence covering classical and modern Physics and attending primarily biological or chemical students. The Physics 004 series is a Calculus based sequence required to all engineering, medical, or computer science majors. The Physc 012 provides an overview of Earth Sciences and is specially recommended to future science teachers.

	Semester Units
PHYS 0001 Introductory Physics	3.0
PHYS 002A General Physics	4.0
PHYS 002B General Physics	4.0
PHYS 004A General Physics	5.0
PHYS 004B General Physics	5.0
PHYS 004C General Physics	5.0
PHYSC 012 Earth Science	3.0

Physical Science is everywhere and in everything we do. They allow us to have a better understanding of all the diversity and use of every substance present in nature. In fact, they are essential in understanding many fields, including agriculture, astronomy, animal science, geology, medicine, applied health technology, fire science, biology, molecular biology, environmental science, materials science, and teaching. Studying Physical Science allows the students to learn to solve problems (critical thinking) and develop effective study habits that will be helpful in their future academic as well as professional endeavors, and gain a deep appreciation for the powerful role of Physical Science in contemporary societal and global issues.

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2. State how the program has remained current in the discipline(s).

Our faculty took classes and sabbaticals; attended workshops/conferences; and studied scientific journals to keep abreast of the latest scientific advances. The seamless integration of the new information and technology into our instruction has created a rigorous, relevant, and challenging curriculum.

All courses supporting the program have been subject to periodical curriculum updating, and improved with acquisition of new lab material and computers. Efforts have been made in the last two years to integrate state of art equipment with current lab modules.

In Astronomy, two new courses were created to attend student demand and to facilitate delivery of information contained in the Astro 010 course content. Astro 014 Solar System Astronomy and Astro 016 Stars, Galaxies, and Cosmology have each about half of the course content of Astro 010 but when combined excel this traditional course in breadth and depth. Students on track to achieve a General Studies degree with Area of Emphasis in Astronomy are required to take these two courses.

The Division has invested heavily in providing faculty members with the necessary training to organize and deliver an online component to their courses. The traditional face-to-face lecture setting has been complemented by online enhanced courses where instructors make use of virtual online tutoring homework's, chat rooms managed by instructors, and online assignments. Current course management has allowed instructors to send and receive messages nearly instantaneously, creating an atmosphere of mutual respect, comradeship, and common enterprise. Astronomy courses have gone fully online in response to this advanced pedagogical tool, and superb production of animations, pictures, and the amazing NASA exploration program and its achievements.

Faculty members have received grants and/or invitation to participate in international assembly, symposia, and local workshop.

3. All course outlines in this program should be reviewed and, if appropriate revised every six years. If this has not occurred, list the courses and present a plan for completing the process. (Curriculum currency.)

All course outlines have been updated in the last six years.

ASTRO 010	Introduction to Astronomy	2007
ASTRO 010L	Introduction to Astronomy Lab	2010
ASTRO 014	Solar System Astronomy	2007
ASTRO 016	Stars, Galaxies, and the Origin of the Universe	2007
Chem 1A	General Chemistry	2007

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Chem 1B	General Chemistry	2007
Chem 12A	Organic Chemistry	2007
Chem 12B	Organic Chemistry	2007
Chem 15	Fundamental of Chemistry	2007
Chem 30A	Introduction to Chemistry	2007
Chem 30B	Introduction to Chemistry	2007
PHYS 0001	Introductory Physics	2008
PHYS 002A	General Physics	2009
PHYS 002B	General Physics	2005
PHYS 004A	General Physics	2010
PHYS 004B	General Physics	2008
PHYS 004C	General Physics	2008
PHYSC 012	Earth Science	2007

Source: \\Do_data_whse\R&P\Curriculum\Course Outlines\6-Final

4. Identify and describe innovative pedagogy your department/program developed/offered to maximize student learning and success. How did they impact student learning and success?

Our students are empowered by the first-rate academic preparation we provide. Visits and communications from former students now at UC's and other four-year schools attest that the Physical Science courses at EVC are superior, typically surpassing those of their –straight-through–UC” peers. Many alumni (a) including Ph.D.s, physicians, pharmacists, professors, engineers thank us for our high standard and training for life-long skills that allow them to become successful professionals.

Here are some examples of our innovative strategies:

- a. Cultivate critical thinking skills.
Many students depict chemistry as a burden, a necessary evil, rather than a process of thinking and reasoning. Students often do not have the basic tools to survive chemistry because they cannot make the leap from rote memorization to critical thinking. The pedagogies of lecturing, construction of quizzes, the inquiry-based experiments and investigations, and the Calibrated Peer Review (CPR) all aim to help the students to develop and practice critical thinking skills, empowering them to solve problems creatively and logically.
- b. Perform inquiry-based small group investigations
Students engage in online discussion groups; plan, performed hands-on activities, and give class presentations. This small-group format has enhanced deep learning, cultivated positive interdependence, promoted members' learning, reduced gender

Physical Science Program Review

and racial bias, and improved leadership and conflict management skills. Surveys, reflection, student self-ratings of accomplishment, and anecdotal evidences have been very positive. To maximize student learning we apply problem-solving pedagogy with half of the lecture time dedicated to applying the concept just learned with examples taken from everyday life.

c. Learn chemistry by writing

Writing is an essential skill of practicing chemists. Chemists convey ideas in persuasive research proposals, describe original research, and write peer reviews. Writing is also an important component to learn chemistry and foster critical thinking skills.

- Use Calibrated Peer Review (CPR), a network tool to help them master chemistry through thinking and writing. CPR assignments involve three stages: read and understand source materials and write an essay; peer review other students' essays; and finally own essay.
- Enhance student learning by writing and discussing important topics in chemistry by using small-group cooperative learning activities via the web.
- Submit research-style lab reports and expository writing.

d. Use technology, including computers and the web.

- Become information literate and know how to find, analyze, and use effectively the needed information.
- Pass weekly online (WebCT, Blackboard, and Moodle) prelab quizzes prior to each experiment. The quizzes are designed to help the students understand the experiments and the important safety measures, and as an incentive to study the experiment in advance.
- Use Excel to create line graphs, column and pie charts. Interpret graphs, trendline, formulas, tables, and draw inferences from them.
- The classical classroom setting has been incremented with the use of clickers – hand held class enhancement devices – that invites students to participate more actively in lecture hours. Lectures have also been incremented with the use of animations and simulations available free of charge in sites such as PHET-Colorado for Physics and Earth Sciences or NAAP Astronomy Labs for Astronomy.
- Faculty members are also making use of virtual office hour capabilities provided by CCC Confer products, creating a sense of community and engagement outside the normal lecture and office hours.
- The innovative pedagogy we developed is based on the use of new technologies. Our courses are on-line assisted using Moodle. Our laboratory courses are retooled with the introduction of computer-controlled equipment. Data analyses are performed with computers using Excel.

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- e. Implement the California Chemistry Diagnostic Test to evaluate knowledge, skills, and abilities students need for success in General Chemistry. The underprepared students are advised and redirect to Chem 15, the prerequisite course. Many of our students have expressed thanks for having had Chem 15 preparation for Chem 1A
- f. All Physical Science courses contain lab component where group learning is strongly re-enforced. Groups of three or four students receive specific guidelines on how to perform lab experiments and achieve certain goals. Group members are encouraged to share ideas outside lab hours, complete lab reports on a timely manner, and work together to improve lab grades. Subjects addressed by the course's Student Learning Outcomes are incorporated into the Lab hand-outs improving student learning. In lab works, we have adopted hands-on group learning pedagogy. Students form groups of three members. They work together on the same subject from setting up the equipment to writing the final lab report. This teamwork helps with not only learning but also simulate today's work environment.
- g. Instructors are applying Collaborative Learning techniques inviting Physics 004 students who achieved a certain level of proficiency in their courses, to perform the duties of a "Physics tutor" in the Math and Science Tutoring center. They help entry level Phys 002 or Phys 001 students enrolled in the tutoring program, and are supervised by their respective professors who offer guidance as needed. Tutor students build self-confidence while consolidating learning. At the same time, freshman physics students profit from working with peers, helping to increase numbers of tutors available in the Center.
- h. A large percentage of our Faculty members have used the Math and Science Tutoring Center during contracted office hours, reducing considerable the student-professor barrier, and helping to make shared governance a reality in our campus.
- i. A new format for testing is implemented with regular quizzes and exams. The quizzes are simple exercises based on examples taking from everyday life followed by exams where realistic questions from everyday life are proposed. These questions require some logic thinking.

Our new approach to teaching has an impact on the success rate. Transfer students are better prepared and their success rate has improved. Success in the workplace should also be improved.

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- 5. Discuss plans for future curricular development and/or programs (degree & certificates included) modifications. Use the Curriculum Mapping form to lay out your plan.**

Associate in Arts Degree in Chemistry

An Associate in Science degree program in Chemistry was approved by the San Jose/ Evergreen Community College District Board in 1998. After discussions with the Counseling Department and All-College Curriculum Committee in late 2001, the Chemistry Department made changes to the program requirements to make it fit those of the Associates in Arts Degree instead, to be a true transfer-type degree.

The purpose of the A.A. Degree in Chemistry is to provide a lower-division science foundation for those interested in pursuing chemistry or biochemistry as a major field of study. This major prepares students to transfer to any California State University, University of California campus, and accredited University. Students considering careers in research, teaching, scientific consulting, or medicine, and the chemical, pharmaceutical, or biotechnology industries, find the Chemistry major an ideal academic preparation for entry into these professions

The A.A. degree in Chemistry was approved on April 27, 2006, consisting of the following courses:

All four (4) of the following courses are mandatory for the degree; for the transfer of these courses to a four-year school, a letter grade "C" or better is needed in each.

Chemistry 1A (General Chemistry)	5 units
Chemistry 1B (General Chemistry)	5 units
Chemistry 12A (Organic Chemistry)	5 units
Chemistry 12B (Organic Chemistry)	5 units
Total	20 units

Required Math Electives: Math 71 & 72 (10 units)

These courses in Calculus, with five hours of lecture per week for two semesters, are required for Chemistry majors.

District General Education Unit Requirements for A.A. Degree

	Units
<u>AREA A:</u> English Communication	9
<u>AREA B:</u> Science*	3
Math**	0

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<u>AREA C:</u>	Arts and Humanities	6
<u>AREA D:</u>	Social and Behavioral Sciences	9
<u>AREA E:</u>	Lifelong Understanding	3
	General Education units	30
(Dist. Req.)	Physical Activity	1
	Core Chemistry Requirements *	20
	<u>Math Elective units**</u>	<u>10</u>
	TOTAL UNITS	61

*Chemistry 1A counts as 5 units of GE for Area B—Science.

**Math 71 & 72 can partially count towards GE.

Sample sequence for students with a strong high school math and science background:

<u>First Semester</u>	Units	<u>Second Semester</u>	Units	<u>Summer</u>	Units
Chem 1A	5	Chem 1B	5	A Life Science	3
Com S 20	3	English 1A	3		
Fine Arts	3	Physical Activity	1		
Math 71	5	Math 72	5		

<u>Third Semester</u>	Units	<u>Fourth Semester</u>	Units
Chem 12A	5	Chem 12B	5
Hist 17A	3	Hist 17B	3
Psych 60	3	English 1C	3
English 1B	3	Soc Sci 28-30-40-42	3

Sample preparation for those with weak Chem and English skills and only H.S. Algebra

II:

<u>Prep Semester I</u>	Units	<u>Prep Semester II</u>	Units
Guidance 95	2	Chem 15	4
Math 21	3	Math 22	3
English 322	3	English 102	3
English 330	3	English 104	4

There is no plan for future curriculum development in Chemistry because we already offer a complete lower-division curriculum.

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Associate in Arts Degree in General Studies with Emphasis in Astronomy

An Associate in Arts Degree in General Studies with Emphasis in Astronomy was approved on October 7, 2008. The AA Degree provides a lower division science foundation for those interested in the field of astronomy. Astronomy amateurs, planetarium operator, science teachers, and future astronomy baccalaureate majors are potential students in this program. It incorporates courses in physics, requiring familiarity with the laws of physics to describe and predict astronomical events. The program outlines a course of study that emphasizes breadth in the Physical Science. This program also provides a good focus for students interested in obtaining a credential in elementary science education. Students must complete each required area of emphasis course with a grade of "C" or better. The approved program includes the following courses:

Area of Emphasis Requirements	Units
ASTRO 010 Introduction to Astronomy	3.0
ASTRO 010L Introductory Astronomy Lab	1.0
ASTRO 014 Solar System Astronomy	3.0
ASTRO 016 Stars Galaxies and the Origin of the Universe	3.0
PHYS 004B General Physics	5.0
PHYS 004C General Physics	5.0
	<u>20.0</u>

General Education

Complete the entire 39 unit (minimum) CSU Lower Division General Education requirements (see back). Students should see a counselor in order to select the best method to meet their academic goals.

Area A: English Communication & Critical Thinking *(One course from each area)*

9.0

- A1 Oral Communications
- A2 Written Communication (English 001A)
- A3 Critical Thinking

Area B: Physical and Biological Sciences *(One course from B1, B2, B4; one with lab)*

9.0

- B1 Physical Science (*Phys 4A General Physics)
- B2 Life Forms
- B4 Math

Area C: Arts & Humanities *(Minimum one course from each area)*

9.0

- C1 Arts

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C2 Humanities

Area D: Social & Behavioral Sciences (*3 courses in at least 2 categories*)

9.0

(2 of these courses may be used to satisfy the American Institutions requirement:
HIST 017A and 017B **OR** POLSC 001 and HIST 001)

Area E: Lifelong Understanding and Self Development

3.0

Area of Emphasis Requirements

20.0

General Education Requirements

39.0

Physical Activity

1.0

TOTAL UNITS

60.0

*Recommended

Curriculum Development Plan in Physics

The Physics courses need constant update and revision to keep up with technological advancements, especially in our laboratory settings. In addition, we plan on increasing our academic offerings in the following fronts:

1. Physics 004D - The Physics program offers complete lower division courses in classical Physics except in modern physics for engineers: - we do offer an algebra-based modern physics course for bio majors (Phys 002B). Our students are completing the calculus-based general physics sequence at a 4-years institute. We plan on updating the modern physics course outline (Phys 004D) and offer this section in a near future.
2. We plan on expanding the course offers of the Astronomy program, including a lab for Astronomy of the Solar System (Astro 14) and Stars and Cosmology (Astro 16).
3. Develop Physics for nursing/biotechnology students – EVC has two important departments, the Nursing Department and the Biology Department with large number of students attending their classes. These students need a physical science class with laboratory to fulfill their curricula. The Physics department is in the process of creating a course specifically designed for these students. The emphasis of such a course is on methods and equipment used in these fields.
4. Create an AS degree in Physics. The Associate degrees are important landmarks in the lives of students experiencing a community college environment. This new degree will help student to establish goals and work with our professors to achieve them.

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6. *Describe how your program is articulated with High School districts, CCOC (if applicable), and/or other four year institutions. (Include articulation agreements common course numbering, etc.)*

Our Astronomy, Chemistry, Physics, and Physics Science courses have been articulated with four-year institutions, such as UC and CSU campuses.

Moreover, a partnership between Evergreen Valley College (EVC) and California State University, East Bay (CSUEB) has been developed between our Physical Science Programs and the Physical Science and Math departments at CSUEB. This partnership involves training new science and math students or teachers to become elementary, middle, and high school math and science teachers.

The partnership involves the following actions:

1. identify transferable courses EVC students should take in order to complete minimum undergraduate course load required to become future math or science teachers;
2. promote awareness of these courses and of the partnership with CSUEB, as well as of the grants and scholarships dispersed through the CSUEB program.

During the first 5 months of 2010, monthly meetings were held between CSUEB faculty members and EVC faculty members from the Physics, Astronomy, and Chemistry departments. As a result of those very cordial meetings, strong professional relationships were developed enabling a smooth transfer of our EVC students into the CSUEB science-training program.

Evergreen Valley College CSU East Bay Transfer Sheet B. A. Chemistry – Chemistry Teaching Option

Major Preparation					
Subject	Number	Title	Units	Semester Taken	Grade
CHEM	001A	General Chemistry	5		
CHEM	001B	General Chemistry	5		
CHEM	012A	Organic Chemistry	5		
CHEM	012B	Organic Chemistry	5		
MATH	0071	Calculus I	5		
MATH	0072	Calculus II	5		
MATH	0073	Multivariable Calculus	5		
MATH	0079	Linear Algebra	3		
BIOL	001	General Biology	4		
BIOL	002	General Biology	4		
BIOL	003	General Biology	4		
BIOL	074	General Microbiology	4		
			54		

General Transfer Information

To Transfer as a Junior to CSUEB you must:

- 1) Complete GE areas A1, A2, A3, and B4 with a C (CR) or better.
- 2) Complete an additional 18 units from CSU/GE areas A-E for a total of 30 GE units.
- 3) Complete a total of 60 transferable units with an overall GPA of 2.0 or higher

CSUEB Physics Contact

Jason Singley
jason.singley@csueastbay.edu
510-885-3482

EVC physics contact

Jose Valentin
Jose.valentin@evc.edu
408-274-7900x6580

Evergreen Valley College CSU East Bay Transfer Sheet B.A. Physics - Physics Teaching Option

Major Preparation					
Subject	Number	Title	Units	Semester Taken	Grade
PHYS	4A	General Physics	5		
PHYS	4B	General Physics	5		
PHYS	4C	General Physics	5		
MATH	71	Calculus I	5		
MATH	72	Calculus II	5		
MATH	73	Multivariable Calculus	5		
MATH	79	Linear Algebra	3		
CHEM	15	Fundamentals of Chemistry	4		
BIOL	021	General Biology	4		
PHYSC	12	Earth Sciences	3		
			44		

General Transfer Information

To Transfer as a Junior to CSUEB you must:

- 1) Complete GE areas A1, A2, A3, and B4 with a C (CR) or better.
- 2) Complete additional units from CSU/GE areas A-E* for a total of 30 GE units.
- 3) Complete a total of 60 transferable units with an overall GPA of 2.0 or higher

*GE areas B1-4 (Physical & Life Sciences and Mathematics) of GE are satisfied in the major preparation outlined above. 9 units may be counted towards the 30 unit requirement listed in (2).

CSUEB Physics Contact

Jason Singley
jason.singley@csueastbay.edu
510-885-3482

EVC physics contact

Celso Batalha
-celso.batalha@evc.edu
408-274-7900x6580

7. *If external accreditation or certification is required, please state the certifying agency and status of the program.*

N/A

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PART C: Student Outcomes

- 1. On the course level, list all the courses that have current student learning outcomes (included in the course outline) and provide link to the course outlines for review purpose. Provide a plan and timeline to include student outcomes for the courses that do not have one.*

All the following courses have updated student learning outcomes.

ASTRO 010	Introduction to Astronomy	2007
ASTRO 010L	Introduction to Astronomy Lab	2010
ASTRO 014	Solar System Astronomy	2007
ASTRO 016	Stars, Galaxies, and the Origin of the Universe	2007
Chem 1A	General Chemistry	2007
Chem 1B	General Chemistry	2007
Chem 12A	Organic Chemistry	2007
Chem 12B	Organic Chemistry	2007
Chem 15	Fundamental of Chemistry	2007
Chem 30A	Introduction to Chemistry	2007
Chem 30B	Introduction to Chemistry	2007
PHYS 0001	Introductory Physics	2008
PHYS 002A	General Physics	2009
PHYS 002B	General Physics	2005
PHYS 004A	General Physics	2010
PHYS 004B	General Physics	2008
PHYS 004C	General Physics	2008
PHYSC 012	Earth Science	2007

Course outlines and student learning objectives for all of these courses can be found at the following link:

[\\Do_data_whse\r&p\Curriculum\Course Outlines\6 - Final](#)

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2. *On the program level, list all programs (and degrees) that have current student learning outcomes and provide the culture of evidence.*

Program Learning Outcomes AA in Chemistry

General Student Learning Outcomes

1. Study effectively.
2. Use technology wisely, including computer and the web.
3. Design and perform open-ended investigations, promoting independent thinking, reasoning, and discovery.
4. Use software such as SPARTAN for molecular modeling, PASCO for computer interfaced experiments, Excel for computing and graphing, MS-Words to prepare research-style lab reports, and PowerPoint for class presentation.
5. Implement green chemistry in the laboratory to reduce chemical wastes, produce less hazardous products and by-products, prevent pollution, and improve safety.
6. Become competent in lab skills, including use of electronic balances and volumetric glassware (macro-scale and micro-scale level), preparation of solutions, chemical measurement using pH electrodes and spectrophotometers, laboratory safety, keeping accurate and complete experimental records in a notebook, and data analysis.
7. Improve personal management characterized by discipline, goal setting, motivation, using time efficiently, and career development.
8. Master a variety of life-long skills that will allow the students to become successful professionals:
 - a. Problem-solving skills
 - Solve word math problems.
 - Interpret experimental results and drawing reasonable conclusions.
 - Analyze data statistically.
 - Assess the reliability of experimental results.
 - Appraise the sources of systemic and random error in experiments.
 - Develop testable hypothesis.
 - b. Chemical literature skills
 - Retrieve and use peer-reviewed scientific periodicals and references.
 - Evaluate scientific articles critically.
 - c. Laboratory safety skills
 - Understand and apply safety practices.
 - Handle laboratory emergencies.

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d. Team skills

- Develop organizational effectiveness and leadership.
- Foster competence and confidence.

e. Communication skills

- Sharpen listening and oral communication.

f. Ethics

- Explain and practice the copyright- and fair use-laws.

Gain a powerful appreciation for the role of chemistry in contemporary societal and global issues.

Content-based Learning Outcomes

1. Apply significant figures, scientific notation, and statistics in calculating and analyzing lab data.
2. Classify chemical compounds, distinguish ionic vs. covalent compounds, and write and name chemical formulas.
3. Recognize quantitative relationships from balanced chemical equations and apply the concepts to solve chemical problems encountered in lab.
4. Interpret chemical reactions occurring in the macroscopic world using microscopic molecules and atoms or vice versa.
5. Predict if chemical reactions will occur, using thermodynamic terms such as enthalpy, entropy, and Gibbs free energy.
6. Correlate the properties of gas, liquid, solid, and solution with intermolecular attraction.
7. Describe how chemical bonds form, the underlying principle of bond formation, and how the shape of molecules affects their properties and reactivities.
8. Contrast multiple atomic theories and apply quantum mechanics to explain the electronic structures of atoms.
9. Apply the explanatory power of quantum mechanics to analyze periodic behavior of elements.
10. Apply kinetic molecular theory and gas laws to reactions involving gases.
11. Explain colligative properties and their use in determining the properties of solutions.
12. Apply Le Chatelier's Principle to predict qualitatively and quantitatively the position of equilibrium and apply this principle to aqueous systems such as acid-base, precipitation and complex ions reactions.
13. Express the rate law using kinetics concepts to study and extract activation energy from the rate vs. temperature data; recognize the relationship between the rate law and reaction mechanisms.

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14. Explain why and how batteries (voltaic cells) and electrolytic cells work and relate each to the chemical equilibrium concept learned earlier.
15. Explain why many transition compounds are colored and paramagnetic and explain the phenomena using the coordination bonding theories.
16. Classify organic chemical compounds according to their functional groups and develop some appreciation of their chemical relativities.
17. Correlate, for the different functional groups studied, molecular structure with common chemical and physical properties (such as solubility, reactivity, boiling and melting points.)
18. Design schemes and mechanisms for the synthesis and retrosynthesis of a wide array of organic compounds and their derivatives.
19. Use analytical instruments such as GC/MS, FTIR, GC, Uv-Vis spectrometer, etc. to identify, to elucidate structures, and characterize organic compounds.

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Program Learning Outcomes

AA in General Studies with Emphasis in Astronomy

Evergreen Valley College offers Associate in Arts degree in General Studies with Emphasis in Astronomy. The associate degree provides a lower division science foundation for those interested in the field of astronomy. Astronomy amateurs, planetarium operator, science teachers, and future astronomy baccalaureate majors are potential students in this program. It incorporates courses in physics, requiring familiarity with the laws of physics to describe and predict astronomical events. The program outlines a course of study that emphasizes breadth in the Physical Science. This program also provides a good focus for students interested in obtaining a credential in elementary science education.

The program learning outcomes consists of two components – subject specific and supporting subjects' outcomes. The outcomes for the supporting subjects are broader in nature and are realized and emphasized by the strategic mission of Evergreen Valley College. The subject specific outcomes are realized through training, theoretical and experimental, offered by the program.

Outcomes for General Supporting Subjects:

Any graduate of the program should be able to:

1. Identify, define and solve problems.
2. Make ethical choices and act responsibly.
3. Critically evaluate information.
4. Function effectively in a team, exercise initiative, and perform in a leadership role.
5. Recognize broad societal issues and concerns.
6. Serve clients and society with sensitivity and accountability.
7. Interact effectively with diverse cultures.
8. Adapt to change, recognize the value of life-long learning.
9. Write, speak, and listen effectively.

Outcomes for Core Specific Subjects:

Any graduate of the program should be able to:

1. Use critical thinking skills in solving problems in Astronomy.
2. Apply significant figures, scientific notation, and statistics in calculating and analyzing lab data.

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3. Use modern technology, including computers, and network, to communicate with peers and update information.
4. Obtain final velocities of colliding masses if their initial velocities are known.
5. Predict trajectories of satellites in orbit about the Earth or another planet using the principle of gravitational force and potential energy.
6. Explain how light behaves in space.
7. Describe Maxwell's equations.
8. Explain the phenomena of interference and diffraction in optics.
9. Explain the differences in chemical abundances of terrestrial and jovian planets.
10. Describe phases and motions of the Moon.
11. Describe the similarities and differences among impact craters of Mercury, Moon, Venus and Mars.
12. Describe the atmosphere of terrestrial and jovian planets.
13. Describe the development of astronomy.
14. Apply the fundamentals of spectroscopy to estimate chemical abundances in stars.
15. Apply the fundamentals of photometry to estimate surface temperature in stars.
16. Describe energy production in stars.
17. Describe the main phases in stellar evolution.
18. Formulate the basic principles of nucleosynthesis.
19. Compare the major types of galaxies in the Universe.
20. Identify the candidates for dark matter.
21. Describe the structure and evolution of the Milky Way and other galaxies.
22. Describe the Big Bang theory and relate it to hydrogen and helium abundances, and the Hubble flow.

3. *List or describe all assessment mechanisms you are using to evaluate SLOs. Provide results of analysis.*

SLO's are evaluated with three periodical formal exams and a comprehensive final exam. In addition, short quizzes, lab reports, and weekly assignments are used to measure student learning. (don't have data to back up results of analysis like how well are they performing in 4-years college)

Physical Science Program Review

PART D: Faculty and Staff

1. List current faculty and staff members in the program, areas of expertise, and how positions contribute to the program success.

Chui Kwong Hwang, Ph.D.

I. Education

1. Post-graduate study in the School of Education at Stanford University. A total of twenty eight graduate quarter units were successfully completed and the GPA is 4.0/4.0
2. Ph.D., the Ohio State University

II Area of Expertise

I am a self-starter and self-learner, dedicated to life-long learning to nurture a rich and vibrant intellectual life as a scholar and teacher. My expertise includes:

1. Best practices in pedagogy and theories of learning and cognition
2. Curriculum development to meet new demands of chemistry education
3. Online learning pedagogies such as WebCT, Blackboard, Moodle, and Calibrated Peer Review (CPR)
4. Theories and best practices of green Chemistry
5. Computer-interfaced experiments with PASCO probeware
6. Molecular modeling with SPARTAN
7. Information, computer, communication, and media literacy
8. Chemical instrumentations

III. How Does My Position Contribute to Program Success

My teaching is student-centered and my role is the facilitator, not the dispenser of knowledge. I always maintain high standards; provide the motivation and support necessary to succeed. I continue to provide top-flight preparation to empower our students with a competitive edge by cultivating “skills in demand,” such as critical thinking, problem solving, information literacy, technical expertise, and interpersonal skills. I have created lab manuals for Chem 1A, 12A, and 12B. These inquiry-based manuals integrate green chemistry; computer interface; information and computer literacy including Internet research, Moodle prelab quizzes, Excel, PowerPoint and MS Publisher; instrumentation; molecular modeling; and interactive demonstration. The implementation of green chemistry in the laboratories of General Chemistry and Organic Chemistry has reduced chemical wastes; produced less hazardous products and byproducts; prevented pollution; and improved safety.

Physical Science Program Review

I continue to participate in curriculum development, articulation, student advising, outreach, evaluating full-time and adjunct faculty, tenure reviews, and serving in committees.

IV. Recent Grants

1. USDA's E. (Kika) de la Garza Science Fellowship, Summer 2008
2. Carnegie Scholar Project: Developing Critical Thinking and Writing skills in General Chemistry Using Calibrated Peer Review (CPR) (2006-2007)

V. Learning Activities/Workshops

1. Hazardous Communication Training & Hazardous Waste Handling Training at Evergreen Valley College, April 30, 2010
2. 2YC3 Workshop at City College of San Francisco. March 19, 2010
3. Moodle Bootcamp—@ONE San Jose Summer Institute. Evergreen Valley College, June 8-10, 2009
4. Introduction to Teaching with Moodle—@ONE Winter Institute Newark. Ohlone College, Newark, January 6-8, 2009
5. Probeware: Technology with DataStudio and PASSPORT—PASCO Summer Institute. PASCO Training Center, Roseville, CA, August 20-22, 2008
6. Blackboard CE6 Mentor. Spring 2008
7. WebCT CE6 (Blackboard Learning System, CE)—@CCONE online course. February 25-March 28, 2008
8. Calibrated Peer Review (CPR) Focus Group at City College of San Francisco. February 29, 2008.
9. The Great Online Teachers Seminar—Improve Learning for Community College Students in the Online Environment. Lake San Marcos, CA. April 26-28, 2007
10. Introduction to Online Teaching with WebCT6—@ONE Winter Institute. Evergreen Valley College, January 17-10, 2007
11. User's Task Force Group to Evaluate WebCT and Angle LMS 7.1. Evergreen Valley College, October 24 to November 21 2006
12. Classroom Assessment Techniques (CAT). Evergreen Valley College, September 22 and November 3, 2006
13. Podcasting: Creating and Publishing Audio Content Online—@ONE Northern California Summer Institute. Evergreen Valley College, May 31-June 2, 2006
14. Teachers as Graders, Teachers as Assessors: Integrating Roles—Teaching and Learning Center. Evergreen Valley College, March 15, 2006
15. PowerPoint at Lawrence Livermore National Laboratory. July 25, 2005
16. Multimedia—Video Capture & Editing. Lawrence Livermore National Laboratory, July 22, 2005
17. Photoshop II at Lawrence Livermore National Laboratory. July 20, 2005

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18. Photoshop I at Lawrence Livermore National Laboratory. July 19, 2005
19. EDIT010 Computers in Education, an online course (three units) at Evergreen Valley College. Spring semester 2005.
20. Sabbatical projects focused on improving Organic Chemistry lectures and General Chemistry laboratories. September 2004-May 2005
21. Monthly American Chemical Society (ACS) meetings in Santa Clara.

VI. Presentations

1. Presenter at USDA Fellows Conference, Washington, D.C., 2008.
2. Presenter in PDD Workshop on Calibrated Peer Review at City College of San Jose, March 23, 2007.
3. Panelist for Innovative Curriculum Panel Discussions at EVC, April 24, 2006.

VII. Recent Publications

1. *Chemistry 1A Lecture Notes*, Evergreen Valley College, San Jose, California, 2010
2. *Chemistry 1A Laboratory Experiments*, Evergreen Valley College, San Jose, California, 2010
3. Casey C. Grimm, Elaine T. Champagne, Chui K. Hwang, & Steven W. Lloyd, *Automated Analytical Techniques for Analyzing Volatile Compounds from Rice*. USDA-ARS-SRRC, New Orleans, LA, 2008.
4. *Developing Critical Thinking and Writing Skills in General Chemistry Using Calibrated Peer Review (CPR)*, Teaching and Learning Center (TLC) Monograph, Evergreen Valley College, San Jose, California, 2007
5. *Organic Chemistry Lecture Notes*, Evergreen Valley College, San Jose, California, 2007

VIII. Proposed Professional Development Activities and Reasons for Such Activities

To be an effective and progressive educator, I must continue to strive for excellence and polish my skills. It is also my responsibility to train the students to be more skilled seekers of knowledge; to use their heads to think critically, their hearts to care about the environment, and their hands to perform experiments. I will continue to engage in the following activities:

1. Gather the latest development and innovation in chemistry and chemical education from journals and professional meetings.
2. Update and refine Chem 1A lecture materials.
3. Create and integrate more microscale experiments. Also use them in lecture and laboratory as interactive demonstrations.
4. Update laboratory experiments by creating more open-ended experiments to allow students to plan, observe record, analyze, and interpret results.

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5. Use varying teaching activities, anecdotes, simulations, and humor delicately.
6. Incorporate scientific discoveries and advancements from many cultures including China, Egypt, and indigenous Indian tribes in lectures and lab.
7. Apply the exciting and expanding field of green chemistry to secure a healthy Earth.
8. Learn new internet-based instructional tools as needed.
9. Take classes, attend workshops and conferences, and apply grants.
10. Attend the monthly American Chemical Society (ACS) meetings.

IX. Academic Honors and Professional Memberships

1. US National Institute of Health Fellowship
2. Membership:
 - 1) The American Chemical Society
 - 2) California Association of Chemistry Teachers.
 - 3) 2YC3 (Two Year College Chemistry Conference)

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Jose R. Valentin, Ph. D., Chemistry Instructor

I. Education

Ph.D., Southern Illinois University

Area of Expertise:

1. Theoretical and experimental chemistry specifically in the fields of Organic Physical Chemistry and Analytical Chemistry.
2. Research experience (15 years at NASA) in the development of analytical instrumentation for the analysis of gas samples in planetary atmospheres and using mathematical methods for the interpretation of data collected from those instruments.
3. Online learning pedagogies such as WebCT, Blackboard, Moodle
4. Computer-interfaced experiments with PASCO interface.

II. Learning Activities/Workshops

1. Hazardous Communication Training & Hazardous Waste Handling Training at Evergreen Valley College, April 30, 2010
2. California State University workshops for students interested in becoming science teachers
3. Update laboratory experiments by creating more open-ended experiments to allow students to plan, observe record, analyze, and interpret results.
4. Use varying teaching activities, anecdotes, related to my trips to foreign countries so my students learned how to study and collaborate together.

III. Learning Philosophy

My learning philosophy includes providing my students an environment that allows the sharing of new ideas and opinions on the very challenging subjects discussed during my lectures.

I make sure my students know that I am aware that learning involves hard work but there are many life rewards to be gained. During my lectures I try, as much as possible, to bring real life applications so the students feel the connection with their own daily experiences

Physical Science Program Review

Bonnie C. Brown

Areas of Expertise: Physical Chemistry with a Master's of Science in Chemistry and emphasis in Teaching in the Community College. Also, taught chemistry at Evergreen Valley College and several other Bay area institutions as a lecturer to promote excellence and equity for all students.

How does the position contribute to the program's success?

1. Provides a positive impact to foster education and encourage students in investigating scientific query while improving their lives and the greater society.
2. Provides service to working students and students unable to attend day classes for Chemistry 030A, 015 and 01A with evening offerings.
3. Provides a more diverse community by participation as an Affirm instructor.
4. Fosters a respect for cultural diversity through collaborative research project which promotes and develops writing skills.

Professional Development for past six years.

1. Attended American Chemical Society National Meeting, San Francisco, CA, Fall 2006
2. Participated in Classroom Assessment Technique (CAT), 2006
3. Participated in On Line Teaching Conference virtually, June 2007
4. Participated in division's CTA Progress report and attended campus wide workshop, 2008.
5. Received Diversity training for screening committees, 2008.
6. Completed Equivalency Training for screening faculty.
7. Participated in equivalency screening committee, 2008.
8. Participated in department's screening hiring committee, 2008.
9. Received a Certificate of Completion from @One for completing the Using Multimedia Tools for Online Courses Workshop, 2005.
10. Completion of ~~Introduction to Teaching with WebCT CE 6 (Blackboard Learning system, CE)~~ offered by @ONE Project, 2007.
11. Completion of Enhanced Podcasting for Teaching offered by @ONE Project, 2010

Workshops/Other Activities

1. Participated in numerous workshops provided at PDD ,such as Safety and Emergency Preparedness; Sexual Harassment/Hostile Workplace/how we treat one another and interface with students; Academic Senate policies, procedures, process, equivalency, and guidelines; Program Review; Salas-move to the rhythm; Ring in the Fall-Learn the application and characteristics of metals in jewelry.
2. Implemented Green Chemistry laboratory for Chemistry 015 for environmental as well as budgetary reasons.

Physical Science Program Review

3. Implemented safer and newer equipment for student use in laboratory.
4. Help students with textbook cost by selecting a custom-book and implementing an alternative optional e-book, 2010.
5. Revitalized and implemented laboratory experiment with microscopes techniques for Chemistry 030A to reduce chemical usage and learn modernize skills.
6. Updated chemistry courses 030A, 030B, and 015, with new math requirement and revitalize student learning outcomes.
7. Attended brief orientation to PASCO probeware at division workshop, 2008.
8. Assisted in orientation of new adjunct and faculty members with certain course procedures (arranged or set-up Wiley, WebCT, Syllabus and lab Schedules).
9. Participation in outreach and exposure of young students to higher education through KinderCaminata.
10. Publicize the program by participation in the annual Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) Outreach Conference.
11. Participated with group in demonstration exhibit of course management system during change from WebCt to Blackboard or Angel 2007.
12. Participated in Day on the Green to promote the chemistry program and encourage students to become interested in the area of chemistry.

Professional Memberships

1. Membership in American Chemical Society(ACS)
2. ACS Two-Year College Chemistry Consortium (2YC3)

Physical Science Program Review

Preeti Srinivasan, Ph.D.

Area of Expertise

Medicinal Chemistry, Organic Chemistry and Synthesis, Analytical Chemistry, Physical and Physical Organic Chemistry, Biochemistry, Drug Design, Spectroscopy and Instrumentation, Laboratory Techniques, Radiation Safety Protocols, and Online learning pedagogies such as WebCT, Blackboard, and Moodle.

I worked for over 5 years in the biotechnology and pharmaceutical industry on research in drug design, discovery, and development, before starting my career in teaching. The courses I have taught include Introductory Chemistry, General Chemistry, Organic Chemistry, and Chemistry for Biotechnology majors.

How Does My Position Contribute to Program Success?

My role as an educator at the College and in this Program encompass the following areas:

1. In the classroom, I focus on my students' content learning and technical expertise, critical thinking and problem-solving, to ensure that they are competent with their peers, across the board. In addition to imparting them content knowledge, I work on the development of the whole person and help students build their core abilities, identify personal, educational, and career goals as well as make satisfying decisions for transition to the workforce as productive members of society.
2. Assist in student guidance and tutoring in the Math Science Resource Center.
3. Assist in the operation and safety in laboratories, help in laboratory equipment set up and data acquisition and analysis.
4. Participate in the Evergreen Valley College Chapter's yearly Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) Outreach Conference. The purpose of this conference is to familiarize high school students with college life, and expose them to the different career options in math, science, and engineering.
5. Participate in the College's annual —~~D~~y of the Green: Freshman Orientation" for new, first-time in college students matriculating from local area high schools. This event is designed to introduce students and their parents to the College campus and provide opportunities for them to learn about resources for academic and personal success.
6. Participated in a screening committee for hiring science laboratory personnel.

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Professional Development Activities in my last 2 years in this College:

1. Beyond Benign, Green Chemistry Workshop, Mission College, Santa Clara, August 19-20, 2010
2. Quality Education for Minorities (QEM)/National Science Foundation (NSF)-Supported Workshop for Women Faculty in Science, Technology, Engineering, and Math (STEM) at Hispanic-serving Institutions (HSI), Las Vegas, July 30-31, 2010
3. Hazardous Communication Training & Hazardous Waste Handling Training at Evergreen Valley College, April 30, 2010
4. QEM Network Outreach Forum on Building STEM Research and Education Capacity at HSI, Albuquerque, October 25-26, 2009
5. Moodle Bootcamp—@ONE San Jose Summer Institute, Evergreen Valley College, June 8-10, 2009
6. EDIT010 Computers in Education, an online course (three units) at Evergreen Valley College, Spring 2009

Proposed Professional Development Activities and Reasons for Such Activities

Teaching is a complex task and emerging educational standards in math and science, across local, state, and national levels, requires teachers to, not only, study, implement, and assess learning outcomes, but also to provide meaningful, engaged learning (cognitively, socially, and culturally) for a very diverse student population. My focus in this respect will be on the following activities:

1. Learn new internet-based pedagogical tools as needed, to enhance student learning.
2. Gather exciting new research findings from regional and national Chemistry meetings and journals, and keep students abreast with new developments in science.
3. Incorporate inquiry-based learning in the classroom, focus on core concepts and encourage a deep understanding of the course material while developing higher-order thinking skills.
4. Update and revise chemistry laboratory experiments, to incorporate more green chemistry techniques. This will allow a cleaner, safer environment, for the students to work in, as well as, will keep up with the changing times.
5. Take classes, attend workshops and conferences, and apply grants, with the goal to achieving students' success.

Physical Science Program Review

Celso Batalha, Ph.D.

Area of Expertise: Observational Astronomy, spectroscopy, photometry, and spectral synthesis. Skills developed in this area are being applied to improve student learning in the area of Astronomy.

How Does My Position Contribute to Program Success?

I am a full time faculty hired primarily to integrate Montgomery Hill Observatory into existing astronomy courses, create astronomy laboratories, and plan community outreach activities capable of attracting and engaging local residents into programs that support our EVC mission and goals. We have contributed to:

1. Creation of Astro 010L - Astronomy Lab - incorporating observations of night sky objects done with portable telescopes by students. We are offering two sections every term, each with full student capacity.
2. Creation of Astro 014 – Solar System Astronomy, and Astro 016 – Stars, Galaxies, and Origins of the Universe. These courses are organized on classical face-to-face and online settings.
3. Establishment of bi-monthly public star gazing with the following activities:
Astronomy Workshop for Kids: Identification of Moon's surface features;
Astronomy Workshop: Identification of stars, constellations, and asterisms; and
Public Viewing Nights.
4. Host group visits to the observatory by students from City College San Jose, Hartnell College, and San Jose State University.
5. Host several groups of Boys and Girls Scouts of America, and supervise merit badge projects.
6. Participate in the high school counselor's day, organizing visits to the observatory with observations of sunspots.
7. Support the EVC science club activities, making the observatory available for their outreach programs with local high schools. The program includes visit of several high school students who might choose EVC as the next step on their college goals.
8. Incorporate new technologies into the Physics and Astronomy curricula to increase student participation and retention. It includes the use of CCC Confer to provide virtual office hours to Physics and Astronomy students.

Professional Development, Grants Received, and Publications in the last 5 years:

1. Co-authorship in the following papers:
 - 1) Analysis of the Pico Dos Dias Survey Herbig Ae/Be Candidates: *Sartori, Marília J.; Gregorio-Hetem, Jane; Rodrigues, Claudia V.; Hetem, Annibal; Batalha, Celso, The Astronomical Journal, Volume 139, Issue 1, pp. 27-38 (2010)*

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- 2) Spectrophotometric analysis of the T Tauri star GQ Lupi A *Seperuelo Duarte, E.; Alencar, S.H.P.; Batalha, C.; Lopes, D. 2008, Astronomy & Astrophysics, 489, 349*
2. Invited participant in the IAU General Assembly 2009 Special Session - The International Year of Astronomy 2009, in Rio de Janeiro – Brazil, with grants from AAS and IAU to cover travel and registration expenses.
3. Grants to participate in the workshop “Cosmos in the Classroom – 2010”, Boulder – CO, from Astronomic Society of the Pacific/Geological Society of America

Physical Science Program Review

Duy-Phach Vu, Ph.D.

Area of Expertise:

I worked over 20 years in research in the industry before joining the Evergreen Valley College. My expertise was in the following areas: *Solid-state physics, Laser spectroscopy, solid-state devices, Integrated-circuit technology.*

At EVC I have taught the following classes:

*All Physics courses,
Astronomy (Introduction to Astronomy)*

How Does My Position Contribute to Program Success:

- 1. Help in curriculum development*
- 2. Help in student guidance, tutoring in the MSRC*
- 3. Help in laboratory equipment set up and data acquisition and analysis*
- 4. Help in outreach activities*
- 5. Help with operation of laboratories*
- 6. Participate in the school's yearly high school counselor's day to disseminate the program information*
- 7. Help with articulating program curriculum between Evergreen Valley College and Independence High, Yerba Buena High, and San Jose Union School District (SJUSD).*
- 8. Helped with the workshops offered through the NSF grants*

Professional Development in the Past Six Years:

- 1. Attended workshops on the use of the Internet for Teaching (BlackBoard, Moodle)*
- 2. Attended the yearly Hazmat Trainings and hold certificates.*
- 3. Attended conferences on silicon technology and solar-cell technology. Recently, I have a US Patent allowed (to be issued) on a new silicon solar-cell fabrication method.*

Proposed Professional Development Activities and reason for Such Activities:

- 1. Develop new laboratories on green technologies: fuel cells and solar-cells.*
- 2. Develop a course on solar cell fabrication and applications.*

The reasons for such activity are:

- i. The current worldwide push for green energy as a substitute for fossil fuel. Many local CC have programs on solar cells.*
- ii. I have some knowledge in solar cell physics and fabrication. This course would be a good addition to our curriculum.*
- 3. Investigate use of on-line textbooks in order to save money for students*
- 4. Attend conferences in solar cells and related technology.*

Physical Science Program Review

Joyce Arimura

B.S. Chemistry, Santa Clara University
Instructional Laboratory Technician
August 1975 –Present

I was involved with unpacking and setting up EVC Chemistry lab area when the campus first opened. In 1996 the EVC Welding area was converted into EVC Chemistry Lab area AC-160/AD-161. 2003's Acacia remodel created Labs AC-252 and AC-264, and Instrument Room A8-232 from former EVC Biology area. I helped plan and furnish these newer facilities.

How my position contributes to program success:

1. Primary responsibility is to see that Chemistry labs run smoothly and safely.
2. Determine, prepare, and provide materials for laboratory experiments and instructor demonstrations.
3. Oversee lab safety and security; manage hazardous waste disposal.
4. Help maintain instrumentation.
5. Procure materials, supplies, and equipment; deal closely with Purchasing and EVC Chemistry's budget.
6. Assist instructors as problems arise. Familiarize new instructors with our facilities and procedures.
7. Support EVC Chemistry faculty with promoting our program. ie., Demonstrations for Kindercaminata, visiting high school students, Open House.

Physical Science Program Review

Duong, Van

Area of Expertise: (Physics and Chemistry)

How Does My Position Contribute to Program Success:

2. Help in curriculum development
3. Help in student laboratory sessions
4. Help in laboratory equipment set up and acquisition
5. Help in outreach activities
6. Help with orientation activities
7. Help with operation of laboratories
8. Help in equipment purchasing and maintenance
9. Publicize the program through outdoor bulletin postings
10. Participate in the school's yearly high school counselor's day to disseminate the program information
11. Member of the Safety and Facilities Committee

Professional Development in the Past Six Years:

- *Attend the yearly Hazmat Trainings and hold certificates*

2. ***List major professional development activities completed by faculty and staff in this department/program in the last six years and state proposed development and reasoning by faculty in this program.***

Professional development activities include membership in scientific organizations like the American Chemical Society (ACS; both local and national) and the American Geophysical Union (AGU). Membership in these organizations provides an unique opportunity to keep up with the latest trends/discoveries in Chemistry and related fields of real life chemical applications. Sharing these up to date developments in chemistry with our students broaden our students view and understanding of the importance and impact our chemistry program has in their future educational as well as professional lifetime goals.

Other professional activities include attending training workshops in the subjects of safety and handling hazardous wastes in a chemistry laboratory (–Hazardous Communication Training & Hazardous Waste Handling Training.”)

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3. *Identify current schedule for tenure review, regular faculty evaluation, adjunct faculty evaluation, and classified staff evaluation.*

A. Current schedule for tenure review

Non-tenured faculty members in the past six years have been evaluated by following very closely the procedure described in Article 20 of the *FACBA*. During the first year of employment with the District, a non-tenured faculty member will have a tenured member as his/her mentor, who shall assist the new non-tenured member to successful performance of his/her assignment. At the beginning of the non-tenured member's first semester a Tenure Review Committee (TRC) is formed according to the selection procedure delineated in section 20.2.2 of the *FACBA*.

In the first three years of service for non-tenured faculty, a Pre-evaluation Conference is convened by the end of the ninth week of the non-tenured faculty member's first semester, and by the end of the fifth week of the non-tenured member's third and fifth semesters. The faculty member's classes are then visited and student evaluations are conducted and collected by the TRC members. The non-tenured faculty member also designs a *Growth and Development Plan* according to *FACBA* 20.8.2. A Progress Review Conference is convened by the end of the fourteenth week of the non-tenured faculty member's first, third and fifth semesters to review the information from the TRC members, student evaluations and the faculty's *Growth and Development Plan*. A Post-Evaluation Conference is convened by the fourth week of the non-tenured faculty member's second, fourth, and sixth semesters to review and finalize the non-tenured faculty member's *Growth and Development Plan*.

In the fourth year, the Pre-Evaluation, Progress Review Evaluation, and the Post-Evaluation Conferences are all completed by the end of the non-tenured faculty member's seventh semester. At the fourth year, the TRC chair drafts a *Summary Evaluation Report* based on the classroom observations, administrator and student evaluations, job description and the non-tenured faculty member's *Growth and Development Plan* and a tenure recommendation is submitted to the College President.

B. Regular faculty evaluation

The department tries to evaluate tenured faculty members in the spirit of *FACBA*. Each term the Dean sends an email to all the tenured faculty members and urges them to have at least one of their classes visited by another faculty member who will collect the student evaluations. The student evaluations are then summarized

Physical Science Program Review

and kept on file in the dean's office. If the dean detects a problem, a conference will then be convened by the dean with the faculty member. If the dean does not detect any problems, a regular conference with the faculty member and the dean will still take place at least once every three years to go over the student evaluations and to discuss issues and concerns related to the faculty members' teaching.

C. Adjunct faculty evaluation

Adjunct faculty have been evaluated according to the procedure as spelled out in Article 19 of the *Faculty Association Collective Bargaining Agreement (FACBA)*. An evaluation committee is formed, which usually consists of the Dean of the Division and two peer faculty members. At least one, and usually all, of the committee members observe the performance of the adjunct faculty member. During the observation, student evaluations are conducted and collected by the committee member. The adjunct faculty member is given a written summary of these evaluations and a post evaluation conference is held with the adjunct faculty and the evaluation committee.

D. Classified staff evaluation

Classified staff are periodically evaluated in accordance with the schedule set forth in Article 16.2 of the CSEA contract, as follows:

Probationary New-Hire Classified Employees

Probationary new-hire classified employees are evaluated three times during the first year (twelve months) of employment. The first two evaluations take place after the third and sixth months of employment, and a final evaluation after eleven months, using the full progress report form.

Probationary Promotional Classified Employees

Classified employees promoted to a higher classification (pursuant to Article 15.4 of the CSEA contract) serve a probationary period of at least six months. Probationary promotional classified employees are evaluated at the end of the third and fifth months of employment in the new classification.

Permanent Classified Employees

After the probationary period, all classified employees are evaluated annually, on the employee's anniversary date of hire.

4. *Describe the departmental orientation process (or mentoring) for new full-time and adjunct faculty and staff (please include student workers such as tutors and aides).*

A. The Departmental Orientation Process for New Faculty

In addition to the orientation process given by the school, the department also has a mentor program. For each of the new faculty members, in his/her first semester of service, the Department appoints a tenured faculty member as the mentor for the new faculty member. The mentor serves as a guide and supporting person, assisting the new member in the school environment and answering questions related both to students (such as admission and registration procedures, adding and dropping classes, etc.) and faculty (such as tenure procedure, teaching assignments, and committee work).

B. The Departmental Orientation Process for Adjunct Faculty

Most of our adjunct faculty members have been teaching for us for several years. For new adjunct faculty, when he or she is hired to teach a particular class, we provide the learning objectives for the class and the syllabus used by our current faculty members, and describe in detail how our classes are conducted, together with student matters such as adding and dropping students, attendance policy, etc.

C. The Departmental Orientation Process for Staff (including student workers such as tutors and aides)

New lab tech was oriented by the Dean on college mission, vision, policies and procedures and by faculty members and the other lab tech on the facilities, equipment and safety issues related to the Physical Science program.

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PART E: Facilities, Equipment, Materials and Maintenance

1. *Identify facilities allocated to the program (including the facilities often used by the department/program). Discuss the quality and accessibility of the facilities, equipment, equipment maintenance, and materials available to the program. faculty and staff can use the Instructional Equipment request form and process here as part of the information. identify facility needs and its rationale.*

Chemistry is 100% an experimental science. In order to have a chemistry program that would enable our students achieve all the student learning outcomes (SLO), laboratory facilities with the appropriate equipments and materials are a critical component needed to maintain a program that will prepare our students in the pursuit of their academic goals upon transferring into any 4 year institutions.

Our chemistry laboratory facilities support the following courses:

Chem 15 (Fundamentals of Chemistry; a pre-req for Chem 1 A)
Chem 1 A (1st Semester of General Chemistry for Science Majors)
Chem 1 B (1^{2nd} Semester of General Chemistry for Science Majors)
Chem 12 A (1st Semester of Organic Chemistry for Science Majors)
Chem 12 B (2nd Semester of Organic Chemistry for Science Majors)
Chem 30 A (1st Semester of Intro. to Chemistry for Nursing Majors)
Chem 30 B (2nd Semester of Intro. to Chemistry for Nursing Majors)

These chemistry laboratory facilities can be divided into three main areas:

I Inorganic Chemistry

(Chemistry 15, Chemistry 30 A, Chemistry 1 A, and Chemistry 1B),

1. Standard Chemistry Laboratory Glassware (i.e., burets, pipettes, beakers, etc..)
2. Inorganic Chemistry reagents (i.e, Acids and Bases, solids and liquid reagents)

II Organic Chemistry

(Chemistry 30 B, Chemistry 12 A, and Chemistry 12 B)\

1. Standard Chemistry Laboratory Glassware (i.e., micro distillation, micro burners, etc..)
2. Organic Chemistry reagents (i.e., Organic Acids and Bases, solids and liquid organic reagents, ultra high pure helium for use as a carrier gas in Gas Chromatography and Gas Chromatography Mass Spectrometry etc..)

III Analytical Instrumentation

1. One Atomic Absorption Spectrometer (AAS) (Chem 1 B)
2. 30 Analytical Balances (All Chemistry Courses)
3. One Varian Gas Chromatograph (GC) (Chem 12 A/12B)

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4. One Varian Gas Chromatograph Mass Spectrometer (GC/MS) (Chem 12 A/12B)
- 5 Two Perkin Elmer Fourier Transform Infrared Spectrometers (FTIR) including solid sample dyes and liquid sample sodium chloride (NaCl) plates) (Chem 12 A/12B)
6. Melting/Boiling measuring instruments) (Chem 12 A/12B)
7. Hot/stirring plates (All Chemistry Courses)
8. High precision thermometers (All Chemistry Courses)

All of these courses are supported by individual facilities that are unique for each these courses requirements. For instance, due to EPA as well as OSHA requirements, organic chemistry experiments cannot be done in the same laboratory facilities where inorganic types of experiments are performed.

Below are a list of the main tools/instruments used to support our students activities/experiments:

- 1 ea GC/MS Gas Chromatograph/Mass Spectrometer, Varian, Saturn 2000, (1996)
- 1 ea GC Gas Chromatograph, Varian, CP 3800, (2000)
- 1 ea FTIR Spectrometer, Perkin Elmer, Paragon 1000, (1996)
- 1 ea FTIR Spectrometer, Perkin Elmer, Spectrum RX 1, (2009)
- 1 ea AA Atomic Absorption Spectrometer, Unicam 969, (2000)
- 4 ea Balance, Top-Loading, Digital, Mettler PM2000, (1992)
- 3 ea Balance, Top-Loading, Digital, Fisher
- 1 ea Balance, Top-Loading, Mettler P1200, (1975)
- 3 ea Balance, Top-Loading, Sartorius, (1975)
- 4 ea Balance, Analytical, Mechanical, Torbal EA-1, (1975)
- 4 ea Balance, Analytical, Mechanical, Mettler, (1975)
- 4 ea Balance, Analytical, Digital, Ohaus, (2005)
- 4 ea Balance, Analytical, Digital, Mettler AE-169, (1988)
- 6 ea Balance, Digital, Ohaus, (2001, 2004)
- 4 ea Balance, Analytical, Digital, Ohaus, (2005)
- 4 ea Balance, Analytical, Digital, Mettler, (2003)
- 2 ea Spectrophotometer, Analog, Spectronic 21, (1978)
- 4 ea Spectrophotometer, Analog, Spectronic 20, (1975)
- 2 ea Spectrophotometer, Analog, Spectronic 70, (1975)
- 9 ea Spectrophotometer, Digital, Spectronic 20-D, (2001)
- 2 ea pH Meter, Digital, Orion 611, (1992)
- 15 ea pH Meter, Digital, Portable, Orion, (2007)
- 5 ea pH Meter, Analog, Corning Model 5, (1975)
- 3 ea pH Meter, Analog, Coleman 38A, (1975)
- 6 ea pH Meter, Analog, Coleman 28C, (1975)
- 3 ea pH Meter, Analog, Beckman SS-1, (1975)
- 34 ea Thermometer, Digital, (2007)
- 13 ea Hotplates, Corning, (1975)

Physical Science Program Review

- 14 ea Magnetic Stirrers, Corning, (1975)
- 32 ea Hotplate/Stirrers, Corning, (1993, 2003, 2005)
- 7 ea Heat Lamps, (1975, 1992)
- 14 ea PASCO, Chem Bundle, #C1-6411, (2006)
- 20 ea Centrifuges, Clay Adams, (1975, 1989, 2001, 2005, 2007)
- 8 ea Spectroscopes with Exciters, (1975, 1996, 2003)
- 1 ea Polarimeter, (2001)
- 2 ea Ice Machine, Hoshizaki, (2005, 2007)
- 3 ea Explosion-Proof Refrigerator, (1992, 1996, 2003)
- 9 ea Safety Cabinet, For Acids/Corrosives
- 6 ea Safety Cabinet, For Flammables
- 1 ea Safety Cabinet, For Health Hazards
- 3 ea Mercury Barometer, (1975, 1992)
- 1 ea Electrolytic Analyzer, Sargent Welch, (1975)
- 14 ea Heating Mantles with Power Controls, (1975)
- 2 ea Vacuum Pump with Cart, 1975, 1992)
- 1 ea Radiochemistry Demonstration, (1989)
- 6 ea Power Supply, (1975)
- 5 ea Oven, Blue M, (1975, 1992, 2001, 2009)
- 14 ea Melting Point Apparatus, MEL-TEMP, (2001, 2005, 2010)
- 1 ea Melting Point Apparatus, Electrothermal, (1975)
- 1 ea Melting Point Apparatus, Thomas, (1975)

The major types of equipment (i.e., GC, GC/MS, and FTIR) are more than 15 years old and do need to be upgraded (replaced) with modern (updated) equipments.

Unfortunately, due to lack of funding we haven't been able to replace them. These equipments are needed to maintain our chemistry SLO. Without them, we wouldn't be able to have a chemistry AA degree.

The facilities identified above are used by our students in performing chemistry experiments types of activities. These instruments are a critical component needed to support our chemistry program.

Physics utilizes all the equipment/instruments and software we acquire through the years. The program utilizes the facilities used by the Physics Department. Classrooms and labs are in Acadia building. The room AF231 is equipped with audio-video and projector and screen

Our labs are:

- a. Mechanics Lab (AE251) equipped with projectors/screen and 10 desktop computers;
- b. Optics/Thermo Lab (AE 259) equipped projector/screen and 7 computers;
- c. Electromagnetic Lab (A4231) no projector, no computer;
- d. Earth Science Lab (AF241), projector, no computer.

Physical Science Program Review

Our labs are being constantly updated with the new software Data Studio, used to acquire data and run several lab modules.

Equipment and Hardware

Quantity	Description	Manufacturer	Model
8	Digital Multimeter	TEKTRONIX	CDM250
11	Hand-held Digital Multimeter	CircuitSpecialist.com	9303
7	Hand-held Digital Multimeter	WAVETEK	DM15XL
2	RLC meter	BK PRECISION	875A
3	RLC Circuit board	PASCO	CI-6512
6	e/m Apparatus	KENT	TG-13
5	DC Ammeter	EMD	844191
3	Electrometer	PASCO	9035
5	Electrometer	PASCO	524C
1	Hi Precision Balance (Sen.0.01 g)	METTLER TOLEDO	PR2003DR
4	Balance (Sensitivity 0.1 g)	OHAUS	Scout Pro SPE6000
4	Balance (Sensitivity 0.1 g)	AND	EK-1200
1	Balance (Sensitivity 0.1 g)	ACCULAB	VI-1200
12	Circuit Experiment Breadboard	PASCO	EM-6622
12	Oscilloscope	BK PRECISION	2522B
7	Function Generator	TEKTRONIX	CFG253
13	Pith Ball Electroscopes		
10	Electroscopes		
5	PASCO Thermal Expansion App.	PASCO	TD-8558A
10	Steam Generator		
10	Scientific optical bench	PASCO	9120
6	Photometer	PASCO	8020
2	Spectrum Tube Power Supply	ELECTRO-TECH	SP200
13	Digital Thermometer	EXTECH	39240
12	Calorimeter		
6	Gunn Diode Transmitter & Receiver	PASCO	
6	Radiation Cube	PASCO	TD-8554
6	Radiation Sensor	PASCO	TD-8553
1	Van de Graaff Generator	WINSCO	SE-8691
4	Sonometer	PASCO	WA-9611
5	Density set	PASCO	ME-8569
4	Hydro -car	Horizon	FCJJ-20
1	Hydro-car	THAMES & KOSMOS	
1	Velocity speed gun	BUSHNELL	SB44701M
9	Electrometer	PASCO	524C
14	Motion Sensor	PASCO	CI-6742

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6	Motion Sensor	PASCO	CI-6529
21	Voltage Sensor	PASCO	CI-6503
9	Light sensor	PASCO	CI-6504
10	Force sensor	PASCO	CI-6537
9	Acceleration sensor	PASCO	CI-6558
10	Sound sensor	PASCO	CI-6506B
7	Charge sensor	PASCO	CI-6555
3	Magnetic field sensor	PASCO	CI-6520A
5	Heat Engine/Gas Law Apparatus	PASCO	TD-8572
10	Low Pressure Sensor	PASCO	CI-6534A
10	High Pressure Sensor (absolute)	PASCO	CI-6532A
25	Temperature Sensor	PASCO	CI-6605 & CI-6505A
9	Rotary Motion Sensor	PASCO	CI-6538
1	Stirling Engine	PASCO	SE-8576
1	Hand Crank Generator	PASCO	EM-8090
1	Ring Launcher	PASCO	EM-8661
1	Projectile Launcher	PASCO	ME-6800
2	Explorer GLX	PASCO	PS-2002
12	Rotary Tumbler	LORTON	3A
6	Reflectance Spectrometer	VERNIER	ALTA II
4	Microscope (white)		
1	Microscope	OMANO	0746378
3	Microscope	CENCO	60913-44

Due to the large population of students we serve, our equipment requires constant maintenance and repair. Particularly, our electric equipment that contains electronic circuitries can only be fixed by an outside service.
Our lab technician works half-time for the Physics-Astronomy Department.

2. Describe the use and currency of technology used to enhance the department/program. Identify projected needs and rationale.

In the Chemistry department, all students in the college-level courses receive intensive training in computer (MS Words, Excel, and Publisher); Internet research; molecular modeling using SPARTAN; interfaced experiments using PASCO probes; Calibrated Peer Review (CPR) and Moodle to cultivate critical thinking and writing skills.

We also encourage students to use instructional technology to enhance learning, supplement lecture and laboratory materials, and enable students to review the basics on their own time. Some current technologies are:

Physical Science Program Review

1. Facebook and YouTube apps that provide tutorials and self-assessment
2. Websites where students can view answers/solutions to textbook questions posted by other students (Course Hero)
3. Websites where students can view lecture and course notes posted by other students (GradeGuru)
4. Open courseware sites (Carnegie Mellon's OLI, MERLOT, MIT OpenCourseWare, University of Colorado quantum zone, and Khanacademy,)

3. *If applicable, describe the support the program receives from industry. If the support is not adequate, what is necessary to improve that support?*

Not applicable.

Physical Science Program Review

PART F: Future Needs

1. *What faculty positions will be needed in the next six years in order to maintain or build the department?*

Currently Physical Science program has a total teaching load of 9.5FTEF. But we only have 6 full-time faculty. In order to be able to keep up with our students needs and future growth of our programs we will need at least one (1) more full time faculty to meet the state required 75% rule.

2. *What staff positions will be needed in the next six years in order to maintain or build the department? (staff, facilities, equipment and/or supplies) will be needed in the next six years? Provide rationale.*

One additional chemistry lab tech position will be needed to support the growth and the normal operations of the chemistry program with laboratory experiments.. A chemistry laboratory technician is responsible for preparing all the chemical reagents and equipment used in the performance of the large number and diverse types of experiments the students do on a weekly basis. Moreover a lab tech is responsible for the disposal of all the chemical waste that is generated in every single experiment and in generating all the paper records that all mandated by the EPA.

At present we offer a total of 16 laboratory sections every semester. We should be offering additional lab sections to accommodate the demand we have for those courses, We will need one more chemistry lab tech to be able to handle these additional sections.

Furthermore, the offering of any additional sections will require additional funding to purchase all the expendables we use in the chemical experiments. Chemical reagents and any equipment that we need for the normal operation of these facilities are expensive and we have being doing our best during the last 10 years without any increase in our supply budget.

Physics and Astronomy program are being supported by a lab technician, on shared bases with the Chemistry Department. Expansion of the program in near future – especially in the Astronomy front – will require a full time technician to assist our program. The use of telescopes requires constant lenses cleaning, fixing up of back slashing, and equipment preparation for public program.

Physical Science Program Review

Funding support is badly needed to replace the equipment used in the organic chemistry laboratory. These instruments (gas chromatograph, gas chromatograph/mass spectrometer, Fourier transform spectrometer) are more than 14 years old and do need to be replace. To complement these instruments and increases the quality of this course, we will need an ultraviolet spectrometer (UV) and a nuclear magnetic resonance (NMR) spectrometer.

Find below the list of equipment for Physics and Astronomy. It is important to notice that large fraction of the Physics lab equipment has been in operation for more than 20 years. No major purchase has been made for the Astronomy Department to replace instruments or software.

1. Ten (10) desk top computers in addition to the existing 20 – Several applications in physics are better demonstrated with the use of computers (Colorado - PHET). The Physics and Astronomy Department don't have an exclusive computer lab, and students of several courses are not being exposed to the use of these applications – especially in rush morning hours.
2. Media Projector for EM Lab with computer controlled capabilities. Power point instructions and other quick media demonstrations are expected for all college level courses. Our students are being exposed to these innovative techniques during lecture but not during lab hours.
3. Replacement of more than 20 years equipment with newer ones (see argumentation in section E).
4. Purchase of 10 portable telescopes to improve learning experience of Astronomy Lab students - Astronomy class size is of 30 students, and we have 10 telescopes operating. The ideal setting is one telescope per student, but 2 students per telescope is a major reachable upgrade.
5. Purchase of a site license of Starry Night Software, replacing the 2003's that is operating anymore. Computer and software upgrade were performed in the computer lab AD143, and the current site license became corrupted.

3. ***Identify budget allocated for the department/program through the division budget (fund 10). Discuss its adequacy and needs if applicable along with rationale. Identify any external (fund 17) funding the department/program receives and describe its primary use.***

The operating budget for Physical Science program comes from Fund 10. EVC has supported the program by allocating the State Instructional Equipment and Library Materials in Fund 17 to approved instructional equipment items every year. However, this fund was suspended since 2009 due to the State of California budget crisis.

Physical Science Program Review

4. What equipment will be needed in the next six years in order to maintain or build the department? Provide specific purpose and rationale.

The chemistry program needs to replace the 15 years old instruments used in the organic chemistry laboratory. These instruments are indispensable to conduct most of the experiments in an organic chemistry lab and needed to meet the minimum requirements of the SLOs of this course.

Instruments, such as FT-IR, GC, and GC/MS, are the work-horses of Organic Chemistry. The students use them every lab after the isolation and synthesis of organic compounds. Currently, we have one each of FT-IR, GC, and GC/MS. However, students have to wait on line, usually more than thirty minutes, to use these instruments. It is not an efficient mode of instruction and a total waste of valuable class time. Besides, the existing FT-IR and GC/MS are about thirteen years old and new parts need to be installed due to routine wear and tear. Soon, the parts for all three instruments will become obsolete and we have to junk the instruments, causing havoc in lab instructions. Instruments are at the heart of Organic Chemistry. Without these tools our students will not be ready to take other courses when they transfer to a four-year institution.

The Physics and Astronomy program will greatly improve its reach if a dedicated computer lab is allocated for the program.

5. What facilities will be needed in the next six years in order to maintain or build the department? Provide specific purpose and rationale.

Chemistry area needs a computer classroom to teach graphing with Excel, molecular modeling with SPARTAN, and interfaced experiments with PASCO probes. For the last ten plus years, it has been an insurmountable task to schedule our classes in AD-143. The reservation practice is not first come first serve. The Math department has first priority to use this room.

Currently, we are using S-204. Once again, we can only reserve this room after the Nursing and Biology faculties do their choosing. Often time, we are forced to change our lab schedule to use this room. The lab schedule for Chem 1A is closely integrated with the lecture schedule. Deviation in the lab schedule adversely interrupts the seamless progression of the lecture materials.

Furthermore, faculties from other departments have tried to bump our students even with confirmed reservation. We urgently need a dedicated computer classroom for chemistry students.

PART G: Additional Information

1. *Describe any other pertinent information about the program that these questions did not address?*

Physical Science Program Review

PART H: Annual Assessment (Program Faculty and PR Committee)

APPENDICES

Appendix 1: Evergreen Valley College Commitments to Action

Student Centered Transformation Initiative

Vision	Area of Focus	Success Metrics* <small>* All success metrics to be completed by Spring '08.</small>	Commitments to Action
<i>Provide access to quality and efficient programs and services to ensure student success.</i>	Access	<ul style="list-style-type: none"> • Grow enrollment by 5% 	<ul style="list-style-type: none"> • Aggressive marketing and outreach to prospective student populations. • Strengthen high school collaboration by articulating programs, developing programs that help students with their educational goals. • Collect data on students from immigrant, low-income, and other underrepresented groups by June, 2007.
	Curriculum and Programs	<ul style="list-style-type: none"> • Develop one new occupational/vocational program • Clearly defined mini-certificate programs • Increase distance education by 10% by the end of spring 2008 (online, hybrid, telecourse, and web-enhanced) • Develop non-credit and community education programs 	<ul style="list-style-type: none"> • Review established timeline and conduct comprehensive program reviews in every academic discipline and student services area according to the prescribed timeline. • Develop a long range plan for the development of additional vocational/workforce programs, seek grant opportunities to support programs (i.e. SB 70) • Analyze existing mini-certificate programs and link with student success. • Streamline curriculum committee process by incorporating more electronic procedures, conduct proactive workshops and training on course outline development, and state regulations. • Review and revise campus technology plans and train faculty in distance education technology such as WebCT • Develop and implement an evaluation tool for distance education program, as well as its hiring criteria
	Services	<ul style="list-style-type: none"> • Increase retention/course completion rate by 10% • Increase degree completion/transfer rate by 5% • Decrease number of students on probation by 10% 	<ul style="list-style-type: none"> • Improve current and develop new intervention programs designed to help students succeed. • Provide students with opportunities to engage in a vibrant and active campus life. • Develop comprehensive Learning Resource Center to assist student needs. • Create 1 new transfer agreements and launch promotional campaign on transfer agreements • CTC and College Administration ensures that faculty and staff have accessible data tracking tools.



Organizational Transformation

Vision	Area of Focus	Success Metric	Commitment to Action
Create an environment where people feel empowered	Build Community	<ol style="list-style-type: none"> Employee participation in college-wide activities will increase by 50% Successful resolution of complaints will increase by 50% 	<ol style="list-style-type: none"> Expand the schedule of college events during work hours including multicultural events as well as events that emphasize commonalities. Introduce Diversity Action Council communication guidelines to all campus organizations, employees, and students. Identify options that might include a Campus Conciliation Team to support employees in resolving issues before proceeding to grievance and formal complaints. Provide an annual employee satisfaction survey
	Employee Development	Participation and opportunities for professional growth will both increase by 50%	<ol style="list-style-type: none"> Ongoing training will continue to be offered, and new training needs to be evaluated and initiated. Institutionalize staff development funding Provide incentives and access to employees to participate in staff development opportunities Expand employee recognition program. Implement a leadership program open to all employees who wish to participate.
	Transparent Communication and Effective Infrastructure	<ol style="list-style-type: none"> All employees will have access to clearly written policies and procedures Communication outlets will increase by 50% 	<ol style="list-style-type: none"> Conduct a comprehensive audit of policies and procedures to evaluate and prioritize areas for development. Develop organizational communications standards that will lead to improving communication outlets including the student newspaper, college web site, and employee portal, handbooks and manuals. Implement open resource allocation process.



Community Engagement

Vision	Area of Focus	Success Metrics	Commitments to Action
<i>Recreate college image and enhance partnerships with community, business, and educational institutions.</i>	Increase Visibility	Increase community Participation (outreach activities, community events, organizations, industry internships, advisory boards)	<ol style="list-style-type: none"> 1. Establish baseline data for degree of community participation 2. Develop and support fully integrated marketing plan that includes full time webmaster and multimedia promotion 3. Create an EVC information area in the Evergreen Times and reinstate school paper 4. Increase community participation in monthly campus events and advisory boards
	Develop Strategic Partnerships	Create 8-10 new joint ventures (major business/industry clusters, K-12 vocational programs, transfer agreements, transportation, and childcare agencies)	<ol style="list-style-type: none"> 1. Conduct an industry needs assessment and create 2 new ventures 2. Initiate 3 new K-12 vocational education partnerships 3. Negotiate with VTA regarding adequate/improved bus service and direct routes for EVC students 4. Explore partnerships with childcare agencies to expand services during public school breaks 5. Identify partners for University center at EVC
	Bring College to the Community	<p>Add 5 off-site services and programs by spring 2008</p> <p>Add 2-3 off-site services and programs specifically to address immigrant population</p>	<ol style="list-style-type: none"> 1. Launch offsite class offerings (H.S. community center etc.) 2. Establish offsite registration and services locations 3. Conduct community needs assessment survey by segments



***Appendix 2: Evergreen Valley College Commitments to Action
Progress Report***

Student Centered

Vision	Area of Focus	Success Metrics* <small>* All success metrics to be completed by Spring '08.</small>	Commitments to Action	Status
<i>Provide access to quality and efficient programs and services to ensure student success.</i>	Access	<ul style="list-style-type: none"> Grow enrollment by 5% 	<ul style="list-style-type: none"> Aggressively market/outreach to prospective students. Strengthen high school collaboration by articulating & developing programs to support students educational goals. Collect data on students from immigrant, low-income, and other underrepresented groups by August, 2007. 	<ul style="list-style-type: none"> Completed In Progress In Progress
	Curriculum and Programs	<ul style="list-style-type: none"> Expand curriculum & programs by 10%. Increase certificate/degree distance ed. courses by 25% Develop non-credit/community ed. programs 	<ul style="list-style-type: none"> Review established timeline and conduct comprehensive program reviews in every academic discipline and student services area according to the prescribed timeline. Streamline curriculum committee process by incorporating more electronic procedures, proactive workshops & training on course outline development, and state regulations. Create plan to develop additional vocational /workforce programs, seek grants to support programs (i.e. SB 70) Analyze and clearly define existing mini-certificate programs and link with student success. Assess current distance education courses leading to a full certificate/degree program. Develop plans for expansion. Review and revise campus technology plans and train faculty in distance education technology such as WebCT 	<ul style="list-style-type: none"> In Progress In Progress Completed In Progress In Progress In Progress
	Services	<ul style="list-style-type: none"> Increase degree completion /transfers by 5% Increase retention /completion rate 10% Decrease students on probation by 10%) 	<ul style="list-style-type: none"> Provide students with opportunities to engage in a vibrant and active campus life. Improve current and develop new intervention programs designed to help students succeed. Develop comprehensive Learning Resource Center to assist student needs. Create 1 new transfer agreement and launch promotional campaign on transfer agreements Ensure faculty and staff have accessible data tracking tools. 	<ul style="list-style-type: none"> In Progress In Progress Completed In Progress In Progress

Community Engagement

Vision	Area of Focus	Success Metrics	Commitments to Action	Status
<i>Transform college image and enhance Partnerships with community, business, and educational institutions.</i>	Increase Visibility	Increase community participation by 25%.	<ul style="list-style-type: none"> Establish baseline data for community participation. Conduct faculty & staff survey to assess degree of community involvement. Develop and support a comprehensive and fully integrated marketing plan. Hire and provide support to a full time webmaster. Create an EVC information section in the <u>Evergreen Times</u>, The Villager & local high school newspapers. Increase community participation in (regularly scheduled) campus events and advisory boards 	<ul style="list-style-type: none"> No Progress No Progress Completed Completed Completed Completed
	Develop Strategic Partnerships	Create 8-10 new joint partnerships	<ul style="list-style-type: none"> Expand strategic partnerships with major industry clusters, Economic Development Agencies and the region's Small Business Development Center. Initiate 3 new K-12 vocational ed. partnerships Identify partners for University Center at EVC Partner with religious & community organizations to develop offsite educational programs and services. Negotiate with VTA regarding adequate/improved bus service and direct routes for EVC students . 	<ul style="list-style-type: none"> In Progress In Progress In Progress In Progress In Progress In Progress
	Bring College to the Community	Establish 3-5 new off-site services & programs <i>(2-3 targeted to immigrant population)</i>	<ul style="list-style-type: none"> Conduct community needs assessment survey by population segments to include senior homes, churches, 40+, immigrant groups, lifelong learners. Launch offsite classes - credit/no credit offerings (@senior centers, high schools, community centers, churches, etc.) and establish locations to offer offsite registration and college services. 	<ul style="list-style-type: none"> No Progress In Progress

Organizational Transformation

Vision	Area of Focus	Success Metric	Commitment to Action	Status
<p><i>Create a trusting environment where everyone is valued and empowered.</i></p>	Build Community	<p>Increase employee participation in college-wide activities 50%</p> <p>Increase successful resolution of complaints 50%</p> <p>Communication outlets will increase by 50%</p>	<ul style="list-style-type: none"> • Provide an annual employee survey to measure satisfaction, needs, and climate in order to have a baseline and measure progress. • Expand schedule of events during work hours including multicultural & community building events. • Create regular employee/family campus event. • Identify options to support employees resolving issues before grievance & formal complaints (example: Campus Conciliation Team). • Develop communications tools to increase outlets, such as student newspaper, website, IM, employee/student portal, handbooks/manuals. • Adopt Diversity Action Council guidelines as Campus Communications Guidelines and introduce them to all campus organizations, employees, and students. 	<ul style="list-style-type: none"> • No Progress • In Progress • In Progress • No Progress • In Progress • In Progress
	Employee Development	<p>Increase employee participation 50%</p> <p>Increase opportunities for employee professional growth & recognition 50%</p>	<ul style="list-style-type: none"> • Establish employee participation/opportunity baseline • Continue offering ongoing training and evaluate and initiate new training. • Secure & allocate staff development funding within the college budget. • Provide incentives and access to employees to participate in staff development opportunities. • Expand employee recognition program to include professional and community awards. • Implement a leadership program open to all employees who wish to participate. 	<ul style="list-style-type: none"> • No Progress • In Progress • In Progress • In Progress • Completed • No Progress
	Transparent Infra-structure	<p>Increase access to clearly written policies & procedures 25% (Employee survey)</p>	<ul style="list-style-type: none"> • Conduct audit of policies and procedures to evaluate and prioritize areas for development. • College wide communication at all points of decision making process. • Implement open resource allocation process. 	<ul style="list-style-type: none"> • In Progress • In Progress • Completed

Appendix 3: Physical Science Program 2007-2009 Commitments to Action



**Evergreen
Valley
College**

2007-09 Individual Commitments to Action

Name:

Department: Chemistry

Initiative

Area of Focus

Student Centered

1.

Access

2.

Curriculum and Programs

3.

Services

Area of Focus

Individual Commitments to Action

Point Person

Metrics

1

- Help students enroll during first week of semester.

- Hwang, Valentin, Brown

- Increased student seat count.

2

- Publicize AA degree.
- Offer another Chem 15/30 Friday lecture & lab to reduce waitlist.

- Hwang, Valentin, Brown
- Valentin

- Student survey results.
- Student seat count increased.

3

- Improve student retention by making sure that students have completed the prerequisites.
- Encourage tutoring/services.
- Experiment with homework and office hours on-line.

- Hwang, Valentin, Brown
- Hwang, Valentin, Brown
- Hwang, Valentin, Brown

- Worked with A&R to address this issue.
- Increased positive attendance in tutoring lab.
- Increased student satisfaction.



**Evergreen
Valley
College**

2007-09 Individual Commitments to Action

Name:

Department: Physics & Physical Sciences

Initiative

Area of Focus

Student Centered

1.

Access

2.

Curriculum and Programs

3.

Services

Area of Focus

Individual Commitments to Action

Point Person

Metrics

1

- Gradually modernize the laboratory equipment.
- Purchase models for show and tell in classroom.
- Increase number of physics tutors in MSRC.

- Vu
- Vu
- Vu

- Purchased equipment.
- Purchased items.
- Number of students served.

2

- Create 1 online course in Astronomy.
- Increase web-enhanced physics classes.
- Develop an Associate degree program in Astronomy.

- Batalha
- Batalha
- Batalha

- Approved ACCC course.
- 2 web-enhanced classes developed.
- Program proposed.

3

- Initiate some strategies to improve student retention.
- Open one summer Physics section.
- Actively participate in early alert process.

- Vu
- Vu, Batalha
- Vu, Batalha

- Increased student head count after drop period.
- Student head count increased.
- Number of students contacted.



**Evergreen
Valley
College**

2007-09 Individual Commitments to Action

Name:

Department: Chemistry

Initiative

Area of Focus

Organizational Transformation

1. Build Community
2. Employee Development
3. Transparency and Communication

Area of Focus

Individual Commitments to Action

Point Person

Metrics

1

- Participate in campus facilities committee meetings to address responsiveness of the maintenance department to requests.
- Participate in creating an annual employee satisfaction survey.

- Hwang, Valentin, Brown
- Hwang, Valentin, Brown

- Maintenance department notified of the committee's recommendation.
- A survey form developed.

2

- Attend conferences.
- Organize workshops on laboratory safety.

- Hwang, Valentin, Brown
- Hwang, Valentin, Brown

- Number of conferences attended.
- Number of workshops conducted.

3

- Work closely with the counseling department to share departmental concerns and needs.
- Work closely with the special programs.

- Hwang, Valentin, Brown
- Hwang, Valentin, Brown

- Two meetings attended.
- Two meetings attended.



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Valley
College**

2007-09 Individual Commitments to Action

Name:

Department: Physics & Physical Sciences

Initiative

Area of Focus

Organizational Transformation

- | | |
|----|--------------------------------|
| 1. | Build Community |
| 2. | Employee Development |
| 3. | Transparency and Communication |

Area of Focus

Individual Commitments to Action

Point Person

Metrics

1

- Organize more Kicks-It Outside events with different focus.
- Increase public outreach in the Observatory
- Earth Science Rocks
- Train students to help organize public outreach for the Observatory.

- Vu
- Batalha
- Batalha
- Batalha

- 1 additional event organized. Open lab with physics dept.
- 1 more public event per month
- 2 display of polished rocks
- 16 hour training conducted.

2

- Technology training including hard ware and software.

- Vu, Batalha

- 2 additional training received.

3

- Periodically communicate issues concerning students with the department faculty and staff.

- Vu, Batalha

- 5 communiqués are done.



**Evergreen
Valley
College**

2007-09 Individual Commitments to Action

Name:

Department: Chemistry

Initiative

Area of Focus

Community Engagement

1. Increase Visibility
2. Develop Strategic Partnerships
3. Bring the College to the Community

Area of Focus

Individual Commitments to Action

Point Person

Metrics

1

- Offer Chemistry classes at industry locations, i.e. Lockheed, NASA-Ames, etc.
- Offer Saturday Chemistry classes at EVC for industry.
- Offer scholarships to attract good students.

- Hwang, Valentin, Brown
- Hwang, Valentin, Brown
- Hwang, Valentin, Brown

- Initiated contact with two companies and made recommendations.
- 3 local industry contacted and recommendations made.
- Contacted 5 local industry to secure funding.

2

- Develop relationship with industry.
- Provide orientation to Jr. high and high school students similar to KinderCaminata.
- Hold an open house for the public for recruitment. Pass out literature.

- Hwang, Valentin, Brown
- Hwang, Valentin, Brown
- Hwang, Valentin, Brown

- 2 partnership established.
- 2 orientations conducted.
- Helped college to plan and conduct an open house.

3

- Become a science advisor for honor organizations.

- Valentin

- Initial contacts made.



**Evergreen
Valley
College**

2007-09 Individual Commitments to Action

Name:

Department: Physics & Physical Sciences

Initiative

Area of Focus

Community Engagement

- | | |
|----|------------------------------------|
| 1. | Increase Visibility |
| 2. | Develop Strategic Partnerships |
| 3. | Bring the College to the Community |

**Are
a of
Focus**

Individual Commitments to Action

Point Person

Metrics

1

•Explore possibility of a partnership with local industry to develop a product.

•Vu

•1 industry contacted and recommendation made.

2

•Explore partnership with local high schools.

•Batalha

•2 schools contacted.

3

•Offer evening/weekend/summer classes

•Vu

•1 class planned.

Appendix 4: Physical Science Program 2009-2010 Commitments to Action



**Evergreen
Valley
College**

2009-10 Individual Commitments to Action

Name:

Department: Chemistry

Initiative

Area of Focus

Student Centered

1.

Access

2.

Curriculum and Programs

3.

Services

**Area
of
Focus**

Individual Commitments to Action

Metrics

**Time
Frame**

1

•Help students enroll during first week of semester.

•Increased student seat count.

•June 2010

2

•Publicize AA degree.

•AA in Chemistry brochure distributed.

•June 2010

3

•Expand choice of e-books along with hard copies throughout the curriculum for students for the following reasons:

- 1) Reduce costs for students;
- 2) Accessibility and flexibility;
- 3) Immediate feedback.

•Increased choice of e-books.

•June 2010



**Evergreen
Valley
College**

2009-10 Individual Commitments to Action

Name:

Department: Physics & Physical Sciences

Initiative

Area of Focus

Student Centered

1.

Access

2.

Curriculum and Programs

3.

Services

**Area
of
Focus**

Individual Commitments to Action

Metrics

**Time
Frame**

1

- Gradually modernize the laboratory equipment.
- Purchase models for show and tell in classroom.

- Purchased equipment.
- Purchased items.

- June 2010
- June 2010

2

- Complete the upgrade of laboratory work with equipment and manuals.
- Increase web-enhanced physics classes.

- Documents developed.
- Web-enhanced classes developed.

- June 2010
- June 2010

3

- Actively participate in early alert process.

- Number of students contacted.

- June 2010



**Evergreen
Valley
College**

2009-10 Individual Commitments to Action

Name:

Department: Chemistry

Initiative

Area of Focus

Organizational Transformation

1.

Build Community

2.

Employee Development

3.

Transparency and Communication

**Area
of
Focus**

Individual Commitments to Action

Metrics

**Time
Frame**

1

- Participate in campus safety and facilities committee meetings to address responsiveness of the maintenance department to requests.

- Maintenance department notified of the committee's recommendation.

- June 2010

2

- Attend conferences, professional development activities and instructional innovation workshops.

- Number of conferences, professional development activities and workshops attended.

- June 2010

3

- Work closely with the special programs.

- Number of meetings attended.

- June 2010



**Evergreen
Valley
College**

2009-10 Individual Commitments to Action

Name:

Department: Physics & Physical Sciences

Initiative

Area of Focus

Organizational Transformation

1.

Build Community

2.

Employee Development

3.

Transparency and Communication

**Area
of
Focus**

Individual Commitments to Action

Metrics

**Time
Frame**

1

•Organize more Kicks-It Outside activities with different focus.

•Number of activities organized.

•June 2010

2

•Attend pertinent conferences or workshops.

•Number of conference or workshop attended.

•June 2010

3

•Periodically communicate issues concerning students with the department faculty and staff.

•Number of Communiqués done.

•June 2010



**Evergreen
Valley
College**

2009-10 Individual Commitments to Action

Name:

Department: Chemistry

Initiative

Area of Focus

Community Engagement

1.

Increase Visibility

2.

Develop Strategic Partnerships

3.

Bring the College to the Community

**Area
of
Focus**

Individual Commitments to Action

Metrics

**Time
Frame**

1

•Participate in high school orientation at EVC to recruit students to science classes.

•Orientation and related activities attended.

•June 2010

2

•Develop relationship with industry.

•Partnership explored.

•June 2010



**Evergreen
Valley
College**

2009-10 Individual Commitments to Action

Name:

Department: Physics & Physical Sciences

Initiative

Area of Focus

Community Engagement

1.

Increase Visibility

2.

Develop Strategic Partnerships

3.

Bring the College to the Community

**Area
of
Focus**

Individual Commitments to Action

Metrics

**Time
Frame**

1

•Offer evening/weekend/summer classes.

•Number of summer class planned.

•June 2010

Appendix 5: Physical Science Program Student Success and Retention by Course

Table 5.1: Astronomy 010 Introduction to Astronomy

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA	109	81	46	926
2006SPI	60	100	100	975
2006SP	64	55	47	1088
2006SU				
2006FA	58	80	37	986
2007SPI				
2007SP				
2007SU				
2007FA				
2008SPI				
2008SP	112	89	55	964
2008SU	61	98	88	995
2008FA	189	86	64	1079
2009SPI	59	100	96	953
2009SP	129	89	54	1096
2009SU	48	98	95	783
2009FA	194	84	57	1108
2010SPI				
2010SP	242	87	59	1036
2010SU	55	100	93	897
2010FA	184	83	46	1033

Table 5.2: Astronomy 010-IE Introduction to Astronomy

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA	59	88	75	1003
2006SPI				
2006SP	119	68	56	1024
2006SU	65	92	77	1048
2006FA	109	83	74	940
2007SPI	52	100	98	845
2007SP	166	80	73	940
2007SU	53	88	84	856
2007FA	193	83	61	1103
2008SPI	67	97	86	1088
2008SP	60	89	57	1020
2008SU				
2008FA				
2009SPI				
2009SP				
2009SU				
2009FA				
2010SPI				
2010SP				
2010SU				
2010FA				

Table 5.3: Astronomy 010-IO Introduction to Astronomy

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA				
2006SPI				
2006SP				
2006SU				
2006FA				
2007SPI				
2007SP				
2007SU				
2007FA				
2008SPI				
2008SP				
2008SU				
2008FA	71	82	59	1164
2009SPI				
2009SP	51	81	60	836
2009SU	72	90	58	1181
2009FA	70	81	45	1148
2010SPI				
2010SP	54	94	74	885
2010SU	52	90	78	877
2010FA	59	78	69	995

Table 5.4: Astronomy 010-TV Introduction to Astronomy

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA				
2006SPI				
2006SP	42	77	23	689
2006SU				
2006FA	52	53	31	853
2007SPI				
2007SP	31	59	34	508
2007SU				
2007FA	49	87	49	803
2008SPI				
2008SP	52	73	48	853
2008SU				
2008FA				
2009SPI				
2009SP	38	44	34	623
2009SU				
2009FA				
2010SPI				
2010SP				
2010SU				
2010FA				

Table 5.5: Astronomy 010L Introduction to Astronomy Lab

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA	29	69	69	638
2006SPI				
2006SP	31	83	80	682
2006SU				
2006FA	32	91	91	704
2007SPI				
2007SP	30	96	93	660
2007SU				
2007FA				
2008SPI				
2008SP	55	96	78	605
2008SU				
2008FA	60	86	72	660
2009SPI				
2009SP	59	95	91	649
2009SU				
2009FA	56	96	86	616
2010SPI				
2010SP	48	91	84	528
2010SU				
2010FA	59	84	79	649

Table 5.6: Astronomy 014 Solar System Astronomy

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA				
2006SPI				
2006SP				
2006SU				
2006FA				
2007SPI				
2007SP				
2007SU				
2007FA				
2008SPI				
2008SP				
2008SU				
2008FA				
2009SPI				
2009SP	36	83	57	612
2009SU				
2009FA				
2010SPI				
2010SP				
2010SU				
2010FA	52	83	55	877

Table 5.7: Physics 001 Introductory Physics

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA				
2006SP	18	83	83	336
2006FA	22	95	57	411
2007SP	13	92	92	243
2007FA	20	95	85	395
2008SP	17	94	76	336
2008FA	17	100	93	336
2009SP	26	92	81	486
2009FA	26	92	67	513
2010SP	27	92	76	505
2010FA	28	82	71	523

Table 5.8: Physics 002A General Physics

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA	53	74	70	750
2006SP	47	80	73	446
2006FA	32	100	88	676
2007SP	41	64	44	388
2007FA	23	85	75	446
2008SP				
2008SU	31	86	79	611
2008FA	57	83	65	553
2009SP	42	85	80	396
2009SU	29	93	81	497
2009FA	65	77	70	631
2010SP	48	75	61	452
2010SU	30	100	100	566
2010FA	60	81	73	573

Table 5.9: Physics 002A-IE General Physics

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA				
2006SP				
2006FA	17	88	88	320
2007SP				
2007FA	24	75	67	466
2008SP	34	69	59	320
2008FA				
2009SP				
2009SU				
2009FA				
2010SP				
2010SU				
2010FA				

Table 5.10: Physics 002B General Physics

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA				
2006SP				
2006FA				
2007SP	27	88	88	524
2007FA	14	91	91	272
2008SP	28	84	80	528
2008FA	15	100	100	291
2009SP	26	96	92	490
2009FA	21	89	84	408
2010SP	15	80	80	282
2010FA	17	88	81	330

Table 5.11: Physics 004A General Physics

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA	25	76	76	474
2006SP	26	50	46	492
2006FA	19	72	67	360
2007SP	16	69	44	303
2007FA	23	93	78	530
2008SP	26	84	72	498
2008FA	31	94	87	587
2009SP	33	94	88	633
2009FA	30	89	86	576
2010SP	54	81	73	518
2010FA	45	79	71	634

Table 5.12: Physics 004B General Physics

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA	15	93	80	298
2006SP	31	68	65	565
2006FA	21	91	64	437
2007SP	17	100	83	326
2007FA	17	100	100	309
2008SP	30	97	90	568
2008FA	23	100	48	419
2009SP	28	85	73	537
2009FA	24	74	61	437
2010SP	30	100	100	576
2010FA	28	65	58	537

Table 5.13: Physics 004C General Physics

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA				
2006SP	11	90	90	208
2006FA				
2007SP	14	93	93	268
2007FA				
2008SP	21	100	94	402
2008FA				
2009SP	24	67	58	460
2009FA				
2010SP	31	90	80	594
2010FA				

Table 5.14: Physical Science 012 Earth Science

Term	Total enrollment	Retention Rate%	Success Rate %	WSCH/FTEF
2005FA	27	88	88	505
2006SP	26	81	81	486
2006FA	21	80	80	392
2007SP	25	78	78	467
2007FA	24	92	88	449
2008SP	25	84	76	485
2008FA	29	96	73	573
2009SP	25	92	92	467
2009FA	29	88	88	593
2010SP	26	92	92	486
2010FA	29	93	86	543

Physical Science Program Review

Table 5.15: Chemistry 001A General Chemistry

Term	Enrollment Census date	Enrollment end date	Retention rate	Success rate	Load	FTES	WSCH/FTEF
2010SP	72	55	86%	66%	130	21.4	553.8
2010SU							
2009FA	74	47	68%	48%	130	22.4	569.2
2009SP	64	45	76%	57%	130	19.6	492
2009SU							
2008FA	74	32	49%	40%	130	22.5	587
2008SP	60	39	65%	49%	130	17.7	458
2008SU							
2007FA	75	45	68%	53%	130	22.4	576.9
2007SP	70	51	72%	66%	130	21.4	537
2007SU							
2006FA	79	62	85%	59%	130	23.6	607.7
2006SP	57	30	59%	45%	130	17.7	438
2006SU							
2005FA	73	52	78%	70%	150	21.8	487
2005SP*							
2005SU							
Total/Av.	698	458	71%	55%	132	21.1	530

*Data from RIE SJECCD **not available for 2005 term individual course.**

Physical Science Program Review

Table 5.16: Chemistry 001B General Chemistry

Term	Enrollment	Enrollment	Retention rate	Success rate		FTES	WSCH/FTEF
	Census date	end date					
					Load		
2010SP	27	17	63%	52%	50	8.1	540
2010SU							
2009FA	27	18	69%	46%	50	8.4	540
2009SP	25	24	92.31%	92.31%	50	7.1	500
2009SU							
2008FA	26	16	67%	42%	50	7.1	520
2008SP	27	24	92%	81%	50	8.1	540
2008SU							
2007FA	28	23	85%	67%	50	8.7	560
2007SP	28	26	100%	73%	50	8.4	560
2007SU							
2006FA	25	21	84%	60%	50	7.1	500
2006SP	30	18	64%	64%	50	8.7	600
2006SU							
2005FA	22	15	75%	65%	50	6.5	440
2005SP*							
2005SU							
Total/Av.	265	202	79%	64%	50	7.82	530

*Data from RIE SJECCD **not available for 2005 term individual course.**

Physical Science Program Review

Table 5.17: Chemistry 012A Organic Chemistry

Term	Enrollment	Enrollment	Retention rate	Success rate	Load		WSCH/FTEF
	Census date	End date					
						FTEF	
2010SP							
2010SU							
2009FA	21	12	57%	57%	50	5.9	420
2009SP							
2009SU							
2008FA	23	20	91%	86%	50	7.1	460
2008SP							
2008SU							
2007FA	23	18	78%	74%	50	6.5	460
2007SP							
2007SU							
2006FA	23	19	86%	82%	50	6.5	460
2006SP							
2006SU							
2005FA	19	17	94%	89%	50	5	380
*2005SP							
*2005SU							
Total/AV.	109	86	av.81%	av. 78%	av.50	av.6.2	436

*Data from RIE SJECCD **not available for 2005 term individual course.**

Physical Science Program Review

Table 5.18: Chemistry 012B Organic Chemistry

Term	Enrollment	Enrollment	Retention rate	Success rate		FTES	WSCH/FTEF
	Census date	End date					
					Load		
2010SP	18	17	89%	89%	50	5.3	360
2010SU							
2009FA							
2009SP	21	17	85%	85%	50	6.5	420
2009SU							
2008FA							
2008SP	15	14	93%	93%	50	4.3	300
2008SU							
2007FA							
2007SP	21	19	100%	100%	50	5.9	420
2007SU							
2006FA							
2006SP	21	19	95%	90%	50	5.3	420
2006SU							
2005FA							
2005SP*							
2005SU							
Total/Av.	96	86	92%	91%	50	5.46	384

*Data from RIE SJECCD **not available for 2005 term individual course.**

Physical Science Program Review

Table 5.19: Chemistry 015 Fundamental of Chemistry

Term	Enrollment	Enrollment	Retention	Success	Load	FTES	WSCH/FTEF
	Census date	End date	rate	rate			
2010SP	114	74	65%	60%	120	23.6	578.2
2010SU	53	49	91%	81%	50	10.7	700.9
2009FA	101	68	67%	56%	120	20.4	511.8
2009SP	112	72	64%	51%	120	22.6	577.1
2009SU	56	39	80%	78%	50	10.2	672
2008FA	117	80	70%	55.2	120	24.2	674.4
2008SP	118	77	65%	59%	120	24.0	583.9
2008SU	51	39	83%	72%	50	10.7	703.8
2007FA	117	70	64%	43%	120	23.2	628.5
2007SP	105	62	60%	54%	100	21.6	700.8
2007SU	53	33	63%	48%	50	10.7	700.9
2006FA	113	65	65%	60%	100	23.4	754.6
2006SP	109	66	68%	59%	129.99	22.0	728
2006SU	52	40	80%	62%	70	10.4	491.2
2005FA	113	58	53%	46%	100	23.2	754.2
2005SP*							
2005SU*							
Total/Av.	1384	892	69%	59%	94.66	18.7	av.650

*Data from RIE SJECCD **not available for 2005 term individual course**

Physical Science Program Review

Table 5.20: Chemistry 030A Introduction to Chemistry

Term	Enrollment	Enrollment	Retention rate	Success rate		FTES	WSCH/FTEF
	Census date	end date					
					Load		
2010SP	174	153	92%	78%	130.03	27.6	709.2
2010SU	59	53	91%	81%	43.33	9.8	743.8
2009FA	183	162	89%	70%	129.99	30.1	763.4
2009SP	166	127	78%	62%	130	27	676.8
2009SU	53	36	68%	57%	43.33	8.1	623.8
2008FA	177	137	80.50%	64.50%	129.99	29.7	821.1
2008SP	204	159	78%	58.5	158.32	34.1	713.9
2008SU	59	46	90%	73%	43.33	10.2	776.1
2007FA	195	138	80%	67%	171.66	33.2	608.2
2007SP	172	127	76%	68%	129.99	28.2	540
2007SU	54	49	96%	92%	43.33	9	680.8
2006FA	175	124	74%	58%	129.99	28.3	694.2
2006SP	174	131	78%	65%	129.99	28.5	656.4
2006SU	90	78	91.18	89%	71.66	14.8	755.5
2005FA	176	135	77%	66%	129.99	28.8	664.6
2005SP*							
2005SU*							
Total/Av.	2111	1655	83%	70%	107.6	23.16	695

*Data from RIE SJECCD **not available for 2005 term individual course**

Physical Science Program Review

Table 5.21: Chemistry 030B Introduction to Chemistry

Term	Enrollment	Enrollment	Retention rate	Success rate		FTES	WSCH/FTEF
	Census date	End date					
					Load		
2010SP	27	20	91%	91%	28.33	4.4	505.1
2010SU							
2009FA	34	22	73%	67%	28.33	6	684.8
2009SP	30	26	87%	80%	28.33	4.7	561.2
2009SU							
2008FA	33	21	70%	63%	28.33	5.6	640.4
2008SP	29	20	77%	73%	28.33	4.8	542.5
2008SU							
2007FA	25	14	78%	61%	28.33	4.3	485.4
2007SP	22	20	95%	90%	28.33	3.6	411.6
2007SU							
2006FA	27	23	88%	62%	28.33	5	571.8
2006SP	25	16	64%	52%	28.33	4.1	467.7
2006SU							
2005FA	27	20	77%	65%	28.33	5	571.8
2005SP*							
2005SU							
Total/Av.	279	202	80%	70%	28.33	4.75	544

*Data from RIE SJECCD *not available for 2005 term individual course.*

Appendix 6: Physical Science Program Enrollment Patterns and Program Productivity

Physical Science Program Review

Table 6.1: Ethnicity in Years 2005-2010

	2005	2006	2007	2008	2009	2010
ETHNICITY	2005	2006	2007	2008	2009	2010
*African American	*4.48%	4.70%	3.80%	2.60%	2.80%	1.60%
Asian	48%	49.20%	46%	44.40%	49.10%	43.10%
Caucasian/Non-Hispanic	7.50%	6.90%	7.50%	8.80%	6.10%	4.30%
Decline to State	3.30%	2.90%	2.60%	6.10%	9.10%	13.20%
Filipino	19.90%	17.20%	15.60%	13.20%	11.10%	10%
Hispanic	17.60%	20%	24.80%	23%	19%	19.30%
Native American	0.50%	0.20%	0.20%	0.30%	0.20%	0.20%
Other Non-White	0.80%	1.20%	1.70%	1%	0.60%	0.20%
Pacific Islander	0.70%	0.80%	0.90%	1.60%	1%	0.70%
Unknown	1.80%	1.50%	0.90%	1.60%	3.70%	9.10%

Table 6.2: Age Group Years 2005-2010

Age Group	2005	2006	2007	2008	2009	2010
19 or less	30.70%	32.30%	31.00%	31.30%	27.30%	25.00%
20-24	45%	45.30%	48.10%	47.30%	48.00%	50.50%
25-29	11%	11.70%	9.60%	12.10%	13.30%	11.70%
30-34	4.20%	4.20%	3.90%	4.30%	6.61%	6.00%
35-39	2.70%	2.50%	3.30%	1.90%	1.70%	3.00%
40-49	3.40%	2.00%	2.70%	2.00%	1.60%	2.90%
50 or more	1.50%	0.60%	1.00%	0.60%	1.00%	0.00%

Physical Science Program Review

Table 6.3: Enrollment, Average Load, FTES, WSCH/FTEF

		Enrollment Census date	Enrollment End date	Load	FTES	WSCH/FTEF
		Total	Total	Average	Average	Average
Chemistry	30B	279	202	28.33	4.75	544
Chemistry	30A	2111	1660	107.6	23.16	695
Chemistry	15	1384	892	94.66	18.70	650
Chemistry	1B	265	202	50.00	7.82	530
Chemistry	1A	698	458	132.00	21.05	530
Chemistry	12A	109	86	50.00	6.2	436
Chemistry	12B	96	86	50.00	5.46	384
Astronomy	10	3200	2670	80	55.07	951.4
Astronomy	10L	459	407	24	7.9	639.1
Astronomy	14	88	73	20	1.51	744.5
Physics	1	214	196	28.33	3.68	408.4
Physics	2A	633	520	42.5	10.78	505.7
Physics	2B	163	146	35	2.78	390.6
Physics	4A	328	262	44.4	5.58	509.5
Physics	4B	264	234	41.7	4.49	455.4
Physics	4C	101	89	41.7	1.64	386.4
Physical Science	12	286	252	28.33	4.87	495