**INSTITUTIONAL PROGRAM REVIEW 2011-12**

**Program Efficacy**

**Purpose of Institutional Program Review**

Welcome to the Program Efficacy phase of the San Bernardino Valley College Program Review process.  Program Review is a systematic process for evaluating programs and services annually.  The major goal of the Program Review Committee is to evaluate the effectiveness of programs, (comma not needed here) and to make informed decisions about budget and other campus priorities.

The Institutional Program Review Committee is authorized by the Academic Senate to develop and monitor the college Program Review process, receive unit plans, utilize assessments as needed to evaluate programs, recommend program status to the college president, identify the need for faculty and instructional equipment, and interface with other college committees to ensure institutional priorities are met.

The purpose of Program Review is to:

  Provide a full examination of how effectively programs and services are meeting departmental, divisional, and institutional goals

  Aid in short-range planning and decision-making

  Improve performance, services, and programs

  Contribute to long-range planning

  Contribute information and recommendations to other college processes, as appropriate

  Serve as the campus’ conduit for decision-making by forwarding information to or requesting information from appropriate committees

Our Program Review process is two-fold.  It includes an annual campus-wide needs assessment in the fall, (comma not needed here)and an in-depth review of each program every three years that we call the Program Efficacy phase.  Instructional programs are evaluated the year after content review, and every three years thereafter, and other programs are placed on a three-year cycle by the appropriate Vice President.

An team of three disinterested committee members will meet with you to carefully review and discuss your document.  You will receive detailed feedback regarding the degree to which your program is perceived to meet institutional goals.  The rubric that the team will use to evaluate your program is included with this e-mail

When you are writing your program evaluation, you may contact efficacy team assigned to review your department or your division representatives for feedback and input.  The list of readers is being sent to you with these forms as a separate attachment.

Completed documents should be sent to, Program Review Co-Chairs and your Division Dean by November 2, 2011. *It is the writer’s responsibility to be sure the Committee receives the forms on time.*

In response to campus wide feedback that program review be a more interactive process, the committee piloted a new program efficacy process in Spring 2010 that included a review team who will interview and/or tour a program area during the efficacy process. Another campus concern focused on the duplication of information required for campus reports. The efficacy process now incorporates the Educational Master Plan One-Page Summary (EMP Summary) and strives to reduce duplication of information while maintaining a high quality efficacy process.

**Program Efficacy, 2011/2012 Final Draft**

Complete this cover sheet as the first page of your report.

**Program Being Evaluated**

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| Physics/Astronomy/Observatory |

**Name of Division**

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| --- |
| Science and Health |

**Name of Person Preparing this Report                                                  Extension**

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| --- |
| Michael Lysak X-8529 |

**Name of Department Members Consulted**

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| --- |
| Chris Clarke |

**Name of Reviewers**

|  |
| --- |
| Ed Millican, David Smith, Caleab Losee |

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| --- | --- | --- |
| **Work Flow** | **Due Date** | **Date Submitted** |
| Date of initial meeting with department | 9/15/11 |  |
| Rough Draft submitted to Program Review Team | 10/19/11 | 10/19/11 |
| Report submitted to Program Review Team | 11/02/11 | 11/2/11 |
|  |  |  |

**Staffing**

List the number of full and part-time employees in your area.

|  |  |  |  |
| --- | --- | --- | --- |
| **Classification** | **Number Full-Time** | **Number Part-time, Contract** | **Number adjunct, short-term, hourly** |
| Managers | 1 (Science Dean) | 0 | 0 |
| Faculty | 1 | 0 | 4 |
| Classified Staff | 1 | 1 | 0 |
| **Total** | 3 | 1 | 4 |

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|  |  FTES |  | Chart 1

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| 06-07 | 76.30 |  |  |  |  |  |  |  |  |
| 07-08 | 86.50 |  |  |  |  |  |  |  |  |
| 08-09 | 102.70 |  |  |  |  |  |  |  |  |
| 09-10 | 123.30 |  |  |  |  |  |  |  |  |
| 10-11 | 138.69 |  |  |  |  |  |  |  |  |
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| Chart 2 |  |  |  |  |  |  |  |  |  |
|   | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 | 09-10 | 10-11 |  |
| Duplicated Enrollment | 491 | 408 | 441 | 476 | 573 | 694 | 814 |  |
| FTEF | 4.15 | 4.46 | 4.96 | 5.02 | 5.99 | 6.05 | 6.08 |  |
| WSCH per FTEF | 616 | 478 | 461 | 517 | 514 | 611 | 684 |  |
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|  |  |  | Chart 3

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|  | Success  | Retention |  |  |  |  |  |  |
| 06-07 | 58% | 77% |  |  |  |  |  |  |  |
| 07-08 | 68% | 79% |  |   |  |  |  |  |  |
| 08-09 | 67% | 78% |  |  |  |  |  |  |  |
| 09-10 | 67% | 79% |  |  |  |  |  |  |  |
| 10-11 | 68% | 80% |  |  |  |  |  |  |  |
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| Chart 4 |  |  |  |  |  |  |  |  |  |
|   | 04-05 | 05-06 | 06-07 | 07-08 | 08-09 | 09-10 | 10-11 |  |
| Sections | 42 | 37 | 47 | 47 | 52 | 45 | 36 |  |
| % of online enrollment |   |   |   |   |   |   |   |  |
| Degrees awarded | 3 | 2 | 5 | 0 | 2 | 4 | 4 |  |
| Certificates awarded  |   |   |   |   |   |   |   |  |
|  |  |  |  |  |  |  |  |  |  |
| Data includes: SBVC, SOFF and SBBHS |  |  |  |  |  |  |

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**Part I.  Questions Related to Strategic Initiative: Access**

Use the demographic data provided to describe how well you are providing access to your program by answering the questions below.

**Demographic Information**

| **Strategic Initiative** | **Institutional Expectations** |
| --- | --- |
| **Does Not Meet** | **Meets** |
| **Part I: Access** |
| Demographics | The program does not provide an appropriate analysis regarding identified differences in the program’s population compared to that of the general population  | The program provides an analysis of the demographic data and provides an interpretation in response to any identified variance.If warranted, discuss the plans or activities that are in place to recruit and retain underserved populations.  |
| Pattern of Service | The program’s pattern of service is not related to the needs of students. | The program provides evidence that the pattern of service or instruction meets student needs.If warranted, plans or activities are in place to meet a broader range of needs. |

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| Physics/Astronomy | Campus |
| 9.27% | **African-American** | 18.55 |
| 6.27% | **Asian** | 4.42 |
| 0.25% | **Native American** | 0.74 |
| 0.50% | **Pacific Islander** | 1.35 |
| 2.76% | **Filipino** | 1.91 |
| 54.14% | **Hispanic** | 48.62 |
| 20.30% | **White** | 20.32 |
| 3.76% | **Multi-Ethnicity** | 1.35 |
| 2.76% | **Unknown** | 3.48 |
| 52.88% | **% - Male** | 41.4 |
| 46.87% | **% - Female** | 58.4 |

Does the program population reflect the college’s population?  Is this an issue of concern?  If not, why not? If so, what steps are you taking to address the issue?

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|  The Physics/Astronomy program’s demographics are quite similar to the college’s demographics (to within 3 %) but with some small differences. With respect to gender, the program is slightly more disproportionate toward men than the college overall. This is perhaps reflective of the requirement of Physics for students planning to enter the field of engineering which has been traditionally a male-dominated field. We are not actively attempting to address this disparity on a large scale as it is a reflection of a much larger historical trend in engineering and the physical sciences. However, the department has participated in Math and Science Day and has made several presentations, through the Planetarium program, for organizations as the Girl Scouts, where both activities have the potential to strongly encourage and inspire both women and men to pursue careers in the physical sciences; further, we have supported and encouraged our female students to participate in activities as “Celebrating Women in Science and Math Day”, which has been sponsored by the Math department for the past few years. Finally, we strongly encourage women as well as men to enroll in our program, and we do provide information about all career options available in all levels of our Physics/Astronomy classes.  Another disparity in the data is in the level of service for African-Americans. Nearly all of the Physics classes have a mathematics pre-requisite equal to or nearly equal to the graduation requirement. The pre-requisite for Physics 101 is Math 090, Elementary Algebra. The prerequisite for Physics 150AB and above is Math 103, Plane Trigonometry. Basic skills data informs us that African-Americans, particularly men, are less likely to be successful in basic skills acquisition than the rest of the demographic profiles served by the institution. Our numbers are dependent upon the successful completions in the pre-requisite mathematics courses. Therefore, it is perhaps the classes in the program that have pre-requisites that brings our demographic data overall below the campus average.  To address issues of student success and basic skills preparation, the Physics/Astronomy department, in concert with the Math Division as well as with all the other departments within the Science Division, has actively supported the Math and Science Student Success Center. In the design of the new Physical Science Building, every program had sacrificed square footage to create a sufficiently sized space to house support services in the building that now encompasses the entire range of course offerings from the lowest level of mathematics to the highest level of lower-division preparation courses. The Physics/Astronomy department is in full support of the services provided by the Student Success Center, and the department presently has approximately three to four students working there as Physics tutors; further, the Student Success Center is a tremendous aid in helping students in basic skills mathematics preparation. Such academic assistance and preparation by the Student Success Center at the basic skills level in both Physics and Mathematics, together with additional assistance provided by the Center at the more advanced levels of these disciplines, significantly contribute to ensuring that more under-represented groups as African-Americans and women will enroll and be successful in the Physics/Astronomy program. Finally, in light of the most recently awarded Science, Technology, Engineering and Mathematics (STEM) grant, it is hoped that communities as African-Americans and women, who seem to be under-represented in the Physics/Astronomy program, will have the opportunity to enroll and succeed in more of the sciences and mathematics, and that the demographics will shift in the future accordingly. |

**Pattern of Service**

How does the pattern of service and/or instruction provided by your department serve the needs of the community? Include, as appropriate, hours of operation/pattern of scheduling, alternate delivery methods, weekend instruction/service.

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|  The Physics/Astronomy department determines its schedule by analyzing the number of sections offered in the past and the percentage fill, and weighing that against the number of laboratories that could be offered with limited laboratory space. We also consider, by collaboration with other departments, what major’s classes need to be offered such that student progress is continuous each semester. Then a proposed schedule is produced that will potentially fill to 80%, per the direction of the Instruction Office, before any faculty are assigned to any section. We then examine what time-blocks or innovative offering schedules might serve student needs and where they may fit into our schedule. With only one full-time faculty, our ability to offer many sections over the many different time slots is limited. Further, the decline in interest in engineering as a career path since about 1980 has resulted in fewer students enrolling in Physics/Astronomy classes, as engineers must have Physics as part of their core courses. Also, in order to keep Physics 150AB as a viable class, with more recent low enrollments over the past few years, we have retained the combined both Physics 150AB and Physics 200/201 as one lecture, but with separate and staggered problem-solving lab structures, and with different requirements with regard to testing and lab experiments. However, more recently, interest in engineering has shown an upsurge, and this is reflected in the larger enrollments in the engineering-based Physics 200/201/210 classes and in the Introductory Physics 101 classes. In response to this, we have continued to offer night sections of Physics 101, and we have expanded our offerings for Physics 200/201 to include evening lecture and lab sections. Presently, we offer Physics 101 during Fall, Spring and (budget considerations allowing) occasionally Summer, Astronomy classes during Fall and Spring, Physics 200/150A in the Fall, Physics 150B/201 in the Spring, and Physics 210 in the Summer. The Astronomy lectures have been offered all week, in the mornings, (but with budget considerations, now TTh only) the Astronomy labs presently have had an afternoon and an evening offering, (but with budget considerations, now afternoon only) the Physics 101 and the Physics 150A/200 and Physics 150B/201 classes are offered all week, in the mornings, with labs from late morning to late afternoon, and Physics 101 also has an evening lecture/lab section in Fall and Spring. Presently, to try to give the students as much flexibility as possible in scheduling their courses, the Physics 101 students in the TTh morning lectures are able to enroll in either the T or Th labs, and the Physics 150AB/Physics 200-201 students are able to enroll in either the M or W lab sections; further, the Physics 101 MW lecture class’ lab and the Physics 150AB/Physics 200-201 M labs are offered in nearly adjacent lab rooms, which exposes the introductory students to more advanced lab work to generate interest in future coursework in Physics. The lack of students in the Physics 150AB/Physics 200-201 courses over the years, and the department having only one full-time faculty has limited us to offering only Physics 150A/200 in the Fall, and Physics 150B/201 in the Spring. However, recent interest in Physics and engineering has allowed us to successfully offer Modern Physics 210 in the Summer session for the past six years, and to increase our night offerings for Physics 101 and Physics 150AB/200-201. We are also working within the Science division to support a possible Engineering Statics course next Spring. The Physics/Astronomy department offers an Astronomy Hybrid course, in which the students view an on-line-streamed Astronomy video telecourse, and where the students have an opportunity to enroll in one of the two Astronomy labs sections (budget considerations allowing) that are offered, one in the day, and one in the evening. The department is considering re-offering Physics 101 on-line as it had done in the past, but with requiring its students attend the Physics labs once weekly; the department does not believe it is pedagogically sound or feasible to offer laboratory instruction on-line.  The Astronomy Hybrid course meets on Saturdays several times a semester to have the students discuss the related material, to answer questions, and to take the mid-semester tests and exams. On occasion, the Planetarium specialist is asked to present to these classes brief Astronomy-related shows. The Planetarium offers presentations for the public about two times a month, on Fridays; this is not only available as a valuable service for our students, but as a most valuable outreach and public relations vehicle for the Physics/Astronomy department and for the College, in general. The Planetarium presentations can foster new or continuing interest not only in the sciences, but in furthering one’s education as well. |

**Part II: Questions Related to Strategic Initiative: Student Success**

| **Strategic Initiative** | **Institutional Expectations** |
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| **Does Not Meet** | **Meets** |
| **Part II: Student Success - Rubric** |
| Data demonstrating achievement of instructional or service success | Program does not provide an adequate *analysis* of the data provided with respect to relevant program data. | Program provides an analysis of the data which indicates progress on departmental goals. If applicable, supplemental data is analyzed.  |
| Student Learning Outcomes and/or Student Achievement Outcomes | Program has not demonstrated that they have made progress on Student Learning Outcomes (SLOs) and/or Service Area Outcomes (SAOs) based on the plans of the college since their last program efficacy. | Program has demonstrated that they have made progress on Student Learning Outcomes (SLOs) and/or Service Area Outcomes (SAOs) based on the plans of the college since their last program efficacy. |

Provide an analysis of the data and narrative from the program’s EMP Summary and discuss what it reveals about your program. (Use data from the Charts 3 & 4 that address Success & Retention and Degrees and Certificates Awarded” on page 3 of this form.)

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|  According to the census data, the number of students listed as duplicated enrollment has grown significantly from an average of 408 students (2005-2006 academic year) to 814 (2010-2011), an increase overall of nearly 99.5%; this trend has been strongly influenced by the faltering economy, and by other local four-year institutions and universities decreasing their enrollments. While we have not increased our full time faculty (one) since Fall of 2002 with the retirement of the previous department chair, we expected our success rates and retention rates to remain relatively constant, and they have. While, semester to semester, the retention and success rate varies as we turn over our numbers of part-time faculty, overall the rate has been fairly consistent. This is evidenced by calculating the slope of the best-fit line to the data: the resulting slope is nearly equal to zero, (success rate: absolute slope of 0.260% per academic year; retention rate: absolute slope of 1.15% per academic year; all data from the 2006-07 through the 2010-11 academic years). Since Fall of 2006, the Physics/Astronomy retention rate average is 78.6% and the success rate is 65.6%; It may seem contradictory to be satisfied with a consistent rate for retention and success, but, given the turn-over in adjunct faculty, the reduction of full time faculty to one, and having our full-time Physics laboratory technician who retired at the end of 2005 being replaced only by half-time lab assistance, we are pleased that a drop in retention and success did not occur. The Physics/Astronomy department is supportive of the Math and Science Student Success Center (MSSSC); for the students who participated in the activities provided by the MSSSC such as tutoring, workshops, and help through course facilitators, in Physics, the retention rate was 100%, and the success rate was 96.0%; whereas the students who did not participate in the MSSSC activities had a lower retention rate of 82.7%, and a lower success rate of 78.7%. In response to the other data solicited, although the number of sections offered has decreased for the past three years, the number of degrees awarded has not changed much at all; further, we do not track the number of degrees or transfers empirically, but assume all students completing the Physics 150AB sequence, or the Physics 200/201/210 sequence will transfer. This is approximately 5-10 students per semester. This is misleading as many students transfer during every point during major’s preparation for a variety of reasons. Students also choose to transfer uncertified, meaning they have completed their lower division major’s preparation but not their general education requirements, without earning a degree. The nature of the traditional four-year education plan for a science major requires a large number of units on major’s preparation during the first two years, and much fewer major’s units during the last two years of a Bachelor’s degree program. It is typical at four-year institutions for junior and senior status science majors to be enrolled in several general education classes to complete breadth requirements.  |

**Supplemental Data**

Provide any additional information, such as job market indicators, standards in the field or licensure rates that would help the committee to better understand how your program contributes to the success of your students.

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| There is a national concern that there are too few physical sciences and engineering majors at the baccalaureate and graduate levels. Most professional schools, for example, medical schools, have a recency requirement for applicants such that they have successfully completed their science classes within the last five years. Some of our students are returning students working to meet these requirements. According to the labor market information obtained from the website [www.labormarketinfo.edd.ca.gov](http://www.labormarketinfo.edd.ca.gov), the following are some sample projected growth rates for jobs in California, for 2008-2018, in the following fields: Biochemists and Biophysicists, 47.9%; Physician assistants, 42.0%; Registered Nurses, 25.7%; Post-secondary Physics Instructors, 21.4%; Geoscientists, 17.8%; Physicists, 15.8%; Civil Engineers, 15.8%; Physical Scientists, 14.9%; Nuclear Engineers, 12.0%; Aerospace Engineers, 11.7%. Further, Clearly there is a strong demand for physics instructors, engineers, and other professions which need Physics as part of the core course requirements for students entering such fields in the physical sciences and the health professions, and the Physics/Astronomy program provides these core requirements. |

**Student Learning Outcomes and/or Student Area Outcomes**

**Demonstrate that your program has continued to make progress on Student Learning Outcomes (SLOs) and/or Service Area Outcome (SAOs) based on the plans of the college since the program’s last efficacy report.**

**See** [**Strategic Initiative 5.1**](http://www.valleycollege.edu/~/media/Files/SBCCD/SBVC/president/College%20Planning%20Documents/StrategicInitiativesandBenchmarksMasterFormFinal.ashx)

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| --- |
|  Every semester, the Physics/Astronomy program has collected data in each of our Physics and Astronomy courses, in both lecture and lab sections, and for all the sections of each course as well, for the purpose of examining student learning outcomes (SLOs) in each course. This data is then analyzed, and the results are used to develop strategies for improving instruction, to consider ways of possibly needing to alter the method of testing that determine whether or not the student learning outcomes have been adequately met, or to perhaps evaluate the student learning outcomes themselves and see if they need to be modified. For the past three years, the program has assessed all of our active courses: Physics 101, Physics 200, Physics 150A, Physics 201, Physics 150B, Physics 210, Astronomy 120, and Astronomy 125, and we have done so for all sections of each course, taught by both the full-time and adjunct faculty. We are beginning the second cycle of the SLO evaluation, and plan to use the data collected in the first evaluation cycle to help improve instruction and/or alter the testing methods or the SLOs themselves, as outlined above. The courses Astronomy 222, Astronomy 223, Physics 222, and Physics 223 are guided, independent study courses whose SLOs have not been assessed; for the past three years, there has been no student interest/enrollment in these courses, and hence no means for the department to evaluate any student learning outcomes. Also, Physics 010, a CR/NC course designed to offer workshops to develop and strengthen basic skills needed to succeed in physics and other science courses, has never been offered, and never assessed. This academic year, the program will evaluate the daytime lecture/lab sections of Physics 101, and of Astronomy 120.    |

**Part III. Questions Related to Strategic Initiative: Institutional Effectiveness**

| **Strategic Initiative** | **Institutional Expectations** |
| --- | --- |
| **Does Not Meet** | **Meets** |
| **Part III: Institutional Effectiveness - Rubric** |
| Mission and Purpose | The program does not have a mission, or it does not clearly link with the institutional mission. | The program has a mission, and it links clearly with the institutional mission. |
| Productivity | The data does not show an acceptable level of productivity for the program, or the issue of productivity is not adequately addressed. | The data shows the program is productive at an acceptable level. |
| Relevance, Currency, Articulation | The program does not provide evidence that it is relevant, current, and that courses articulate with CSU/UC, if appropriate. | The program provides evidence that the curriculum review process is up to date. Courses are relevant and current to the mission of the program. Appropriate courses have been articulated or (?) transfer with UC/CSU or plans are in place to articulate appropriate courses. |

**Mission and Purpose:**

*SBVC Mission: San Bernardino Valley College provides quality education and services that support a diverse community of learners.*

What is the mission statement of the program?

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| The Physics/Astronomy department provides quality education to students interested in fulfilling general education requirements in the physical sciences and to physics, math, engineering, chemistry, pre-health, pre med, and other science majors at the lower division level. The Physics/Astronomy department endeavors to provide appropriately rigorous coursework in addition to instilling the skills and habits required for students to successfully major in their chosen field.  |

How does this purpose relate to the college mission?

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| The mission of the college is to provide quality education to a diverse community of learners. This is consistent with the mission of the Physics/Astronomy department.  |

**Productivity**

Provide additional analysis and explanation of the productivity data and narrative in the EMP Summary, if needed. (Use data from charts 1 and 2 (FTEs; Enrollment; FTFE and WSCH per FTFE) on page 3 of this form). Explain any unique aspects of the program that impact productivity data for example; Federal Guidelines, Perkins, number of workstations, licenses etc…

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| --- |
|  The Physics/Astronomy program’s EMP summary reflects not only the time period in which we were attempting to increase FTES, but also, most recently, the time period in which class sections have been reduced, and the goal has been to increase efficiency, while keeping the number of sections low. To that end, the program has attempted to offer mostly double sections of Physics 101, and to continue to offer both Physics 150A/Physics 200, and Physics 150B/Physics 201 as effectively double lecture sections. Accordingly, between the 2006-07 and 2010-11 academic years, the FTES of the program has steadily risen, from 76.3 to 138.69, respectively, the duplicated enrollments have increased from 441 to 814 respectively, and the WSCH per FTEF has grown from 461 to 684, respectively. The program is very satisfied with this efficiency. Further, budget considerations allowing, when the program will be permitted to offer more sections of all of our courses, both lectures and labs, to maintain and/or to increase efficiency, the use of double lecture sections will be continued and encouraged.  |

**Relevance and Currency, Articulation of Curriculum**

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| **Science** |
|         **Physics & Astronomy** |
|   | **Course** | **Status** | **Last Content Review** | **Next Review Date** |
|   | PHYSIC101 Introductory Physics | Active | 12/07/2009 | 12/07/2015 |
|   | ASTRON120 Introduction to Astronomy | Active | 12/07/2009 | 12/07/2015 |
|   | ASTRON125 Astronomy Laboratory | Active | 12/07/2009 | 12/07/2015 |
|   | PHYSIC150A General Physics for the Life Sciences I | Active | 12/07/2009 | 12/07/2015 |
|   | PHYSIC150B General Physics for the Life Sciences II | Active | 12/07/2009 | 12/07/2015 |
|   | PHYSIC200 Physics I | Active | 12/07/2009 | 12/07/2015 |
|   | PHYSIC201 Physics II | Active | 12/07/2009 | 12/07/2015 |
|   | PHYSIC210 Modern Physics | Active | 12/07/2009 | 12/07/2015 |
|   | PHYSIC222 Special Problems in Physics I | Active | 08/17/2000 | 08/17/2006 |
|   | PHYSIC223 Special Problems in Physics II | Active | 08/17/2000 | 08/17/2006 |
|   | PHYSIC101 Basic Physics | Historical |  |  |
|   | ASTRON120 Introduction to Astronomy | Historical |  |  |
|   | ASTRON123 Introduction to Astronomy | Historical |  |  |
|   | ASTRON123 Introduction to Astronomy | Historical |  |  |
|   | ASTRON125 Astronomy Laboratory | Historical |  |  |
|   | PHYSIC150A General Physics for the Life Sciences I | Historical |  |  |
|   | PHYSIC150B General Physics for the Life Sciences II | Historical |  |  |
|   | PHYSIC200 Physics I | Historical |  |  |
|   | PHYSIC201 Physics II | Historical |  |  |
|   | PHYSIC210 Modern Physics | Historical |  |  |

If applicable to your area, describe your curriculum by answering the following questions.

The Content Review Summary from Curricunet indicates the program’s current curriculum status. If curriculum is out of date, explain the circumstances surrounding the error and plans to remedy the discrepancy.

 All Physics and Astronomy courses are current, save the independent studies courses Physics 222, Physics 223, as well as Astronomy 222, and Astronomy 223. In 2009, the Physics/Astronomy department had reviewed most of its courses, and the department had not completed the reviews of these independent studies courses due partially to the department’s confusion of knowing how to handle such independent study courses in the context of normal program review with respect to matters such as the units, hours, course content, or relevant texts, and partially due to not meeting the appropriate timelines simultaneously with those courses which were successfully reviewed. The department recognizes the error, it will seek guidance from the program review committee on how to correctly review such independent studies courses, and it will complete the reviews of these courses within this academic year.

Articulation and Transfer

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| List Courses above 100 where articulation or transfer is **not** occurring | With CSU | With UC |
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Describe your plans to make course qualify for articulation or transfer.

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| All current Physics and Astronomy courses offered by the Physics/Astronomy department articulate for transfer. |

**Currency**

Follow the link below and review the last college catalog data.
http://www.valleycollege.edu/academic-career-programs/college-catalog.aspx

Is the information given accurate? Which courses are no longer being offered? (Include Course # and Title of the Course). If not, how does the program plan to remedy the discrepancy?

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| The information in the college catalog is accurate. We have not yet offered Physics 010, a course designed to offer workshops to develop and strengthen basic skills needed to succeed in physics and other science courses. This course had been placed in the catalog, in concert with other departments, in order to try and improve basic skills of incoming science students and thus improve their success and retention rates. Particularly due to budget considerations, this course has not been a high priority, especially with the continuing success and expansion of the Math and Science Student Success Center services. The department wishes to maintain this course, so that in the future, as necessary, the course may be offered to aid incoming physics/science students in succeeding in their respective science programs. |
|  |

**Part IV. Planning**

| **Strategic Initiative** | **Institutional Expectations** |
| --- | --- |
| **Does Not Meet** | **Meets** |
| **Part IV: Planning - Rubric** |
| Trends | The program does not identify major trends, or the plans are not supported by the data and information provided. | The program identifies and describes major trends in the field. Program addresses how trends will affect enrollment and planning. Provide data or research from the field for support.  |
| Accomplishments | The program does not incorporate accomplishments and strengths into planning. | The program incorporates substantial accomplishments and strengths into planning. |
| Challenges | The program does not incorporate weaknesses and challenges into planning. | The program incorporates weaknesses and challenges into planning. |

What are the trends, in the field or discipline, impacting your student enrollment/service utilization? How will these trends impact program planning?

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| There is a national concern that there are too few physical sciences and engineering majors at the baccalaureate and graduate levels. Most professional schools, for example, medical schools, have a recency requirement for applicants such that they have successfully completed their science classes within the last five years. Some of our students are returning students working to meet these requirements. According to the labor market information obtained from the website [www.labormarketinfo.edd.ca.gov](http://www.labormarketinfo.edd.ca.gov), the following are some sample projected growth rates for jobs in California, for 2008-2018, in the following fields: Biochemists and Biophysicists, 47.9%; Physician assistants, 42.0%; Registered Nurses, 25.7%; Post-secondary Physics Instructors, 21.4%; Geoscientists, 17.8%; Physicists, 15.8%; Civil Engineers, 15.8%; Physical Scientists, 14.9%; Nuclear Engineers, 12.0%; Aerospace Engineers, 11.7%. Further, Clearly there is a strong demand for physics instructors, engineers, and other professions which need Physics as part of the core course requirements for students entering such fields in the physical sciences and the health professions, and the Physics/Astronomy program provides these core requirements. The labor market information website cited above gives projected job growth rates in California, for 2008-2018, in the fields of Biochemists, Biophysicists, Registered Nurses, Physician’s Assistants, all of which are directly linked to the present lack of individuals working in these fields. The chronic shortage of health care professionals, both locally and nationally, in addition to the completion of the yet-to-be-opened new medical school at UC-Riverside, will increase the demand and interest for major’s preparation classes required of students interested in medical sciences. We predict an increase in enrollment in response to these trends. There is also a national trend to emphasize Science, Technology, Engineering, and Mathematics (STEM) education in order to address the problem of a national lack of individuals who are qualified to work in fields involving science, engineering, mathematics, and technology. (Office of the President, <http://www.whitehouse.gov/the-press-office/president-obama-launches-educate-innovate-campaign-excellence-science-technology-en>). This trend directly affects the Physics/Astronomy department since all science students are required to complete at least Physics 150A/150B, or Physics 200/201. Presently, both our day and evening sections of Physics 150A and Physics 200 are full, and we also have filled two single sections and one double section of Physics 101, which is a prerequisite for the higher level Physics courses. If enrollments continue to be high, with long waiting lists, budget considerations allowing, we will need to add more sections of all Physics sections to meet the increased demand. The present budget crisis has caused our local universities (University of California system) and state colleges (California State University system) to cut back on their enrollments and class offerings, which pushes more students to attend SBVC and increase enrollments at this college; but budget problems have also caused SBVC’s offerings to be cut as well; as a result, all our classes are full to capacity, with many desperate students on waiting lists. Clearly, if we had more sections available for all our science classes, they would easily fill; so budget considerations allowing, we look toward increasing our all of our Physics and Astronomy sections, whenever possible. The present budget crisis in state funding also results in a decrease in student support services. Part of our growth in the department and the Science and Math divisions is directly attributable to the peer-led community fostered by the Math and Science Student Success Center. A decrease in service may result in a decrease in enrollment, and, more importantly, a decrease in success rates.  |

Accomplishments and Strengths

Referencing the narratives in the EMP Summary, provide any additional data or new information regarding the accomplishments of the program, if applicable. In what way does your planning address accomplishments and strengths in the program?

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|  The Physics/Astronomy program has successfully moved into the new Physical Science building, and continues to maintain a strong program of courses to students interested in fulfilling general education requirements in the physical sciences and to physics, math, engineering, chemistry, pre-health, pre med, and other science majors at the lower division level. The Physics/Astronomy department also plans to maintain and increase, if possible, the number of STEM majors, with the able assistance of the tutors and facilitators at the new Student Success Center. The department has successfully begun an on-line hybrid Astronomy course, and will continue offering this course as well as exploring the possibility of an on-line Physics 101 course. If budget considerations allow our increasing our number of section offerings, the department will explore the possibility of having the Physics 150A/B and Physics 200/201 sequences begin in the Spring as well as in the Fall. Again, budget allowing, the department will strive to update the Physics labs and their related equipment needs, as well as updating and improving the lecture-demonstration needs.  Recent interest in Physics and engineering has allowed us to successfully offer Modern Physics 210 in the Summer session for the past six years, and to increase our night offerings for Physics 101 in both Fall and Spring semesters, and for Physics 150AB/200-201; the department plans to continue these increased section offerings to provide students with more access to our program. We are also working within the Science division to support a possible Engineering Statics course next Spring. The department has supported, and plans to continue supporting the past Math and Science Student Success Center, as well as the present Student Success Center, and has collaborated with UC Riverside and Cal Poly Pomona in providing our Physics students with very effective tutors who are/were advanced students and were recently Physics students at SBVC. Planetarium shows have been presented throughout each academic year for the general public, for elementary and secondary school programs, and for special groups/programs. For the past three years, from September 2008-May 2011, the average combined yearly audience of the Planetarium shows has been approximately 3646 with an average yearly income of $3763; the department plans to continue this most valuable outreach program. Following the public shows, the N.A.Richardson Observatory has also been opened to provide views of the Moon and planets, with an average yearly total of approximately 400 people attending the viewings. This is the oldest observatory in the valley and contains a very historic telescope. The planetarium has participated in and presented shows for any of the “Science and Math Day” activities, and will continue to do so. The planetarium instrument was professionally serviced this past summer to ensure its successful, continued operation for both academic and public outreach purposes. Physics courses were offered using multiple lab sections in order to allow students more flexibility in scheduling and to provide viability for low-enrolled courses; further, as initiated by and in coordination with the Chemistry department chair, courses were offered in a way not to conflict with other science major lecture and/or lab offerings to allow the students to more easily construct and complete their individual major programs; this very effective practice will continue. The use of an automated student response system linked with the presentation software developed by the Astronomy text publishers was initiated and successfully implemented by our Astronomy Adjunct Professor in his Astronomy lecture course. |

Challenges

Referencing the narratives in the EMP Summary, provide any additional data or new information regarding planning for the program. In what way does your planning address trends and weaknesses in the program?

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|  Since the former Physics department chair retired at the end of Fall of 2002, this full-time faculty position has not been replaced, leaving the Physics/Astronomy department with only one full-time faculty. Because the Physics/Astronomy course load that is filled by adjunct faculty and by overload taken on by the one full-time faculty has, since Fall 2003, exceeded 2.0 (with the exception of Spring 2005, with a load of 1.97), the department has needed to use several adjunct faculty. However, it is very difficult to find instructors who are well-qualified to teach physics and/or astronomy, and with such a small pool of adjuncts, the program has suffered. Occasionally, for lack of instructors and/or adjunct scheduling conflicts, classes needed to be cancelled, or the full time faculty needed to get special permission to take extra overload to cover all the courses that were offered. Furthermore, with only one full-time faculty, opportunity for innovation is quite limited, and continuity of instruction in the courses handled by adjuncts is sporadic, at best. An unstable workforce greatly increases the difficulty in providing quality, consistent service at the appropriate level of rigor.  The Physics Laboratory Technician retired at the end of 2005. This full-time position has been replaced by a half-time position, and the Physics/Astronomy laboratory and lecture programs have been negatively impacted by having only part-time laboratory assistance; this is still less than what was available in Physics/Astronomy before the previous lab technician retired; thus, the level of student service the department can provide with respect to the assistance provided by the lab technician in both lecture and lab has not quite reached pre-2005 levels. The present layout of the large lecture rooms and labs is not well-suited for physics lecture demonstrations, as the physics lab tech area, where most of the lab and lecture/demonstration equipment is kept, is physically located far from the large lecture rooms, and ready and quick access to these rooms is difficult, at best. The department is thus planning to modify its lecture/demonstration procedures, as well as planning to purchase equipment for lecture/demonstrations and labs that are better suited to the present, more limited, and more restricted conditions; as budget considerations allow. Our level of permanent funding is often not consistent with what is required to run this program by way of lab equipment, lecture demonstration equipment, supplies, and what is used and/or consumed on a regular basis in lecture and lab. Until budget allows proper funding, the department will continue to seek ways to increase the lifespan and efficiency of the equipment we have available and of the lecture/lab consumables without compromising the curriculum.  If the program expands significantly, and budget allowing, the department may consider trying to have the Physics lab technician position be restored to full-time status. Due to budget considerations, the instability in student support services through the Math and Science Student Success Center creates an inconsistent level of service that directly impacts student success. The department is committed to strongly encouraging students to take advantage of the various services provided. Strong empirical data shows a huge increase in student success for those students who make use of tutoring opportunities, workshops, and the peer-led model offered through the Math and Science Student Success Center. All faculty in the department will announce activities in their respective classes and provide incentives for student participation, such as extra credit.  |

**V. Questions Related to Strategic Initiative: Technology, Campus Climate and Partnerships.**

| **Part V: Technology, Partnerships & Campus Climate** |
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|  | Program does not demonstrate that it incorporates the strategic initiatives of Technology, Partnerships or Campus Climate. Program does not have plans to implement the strategic initiatives of Technology, Partnerships or Campus Climate | Program demonstrates that it incorporates the strategic initiatives of Technology, Partnerships and/or Campus Climate. Program has plans to further implement the strategic initiatives of Technology, Partnerships and/or Campus Climate. |

Describe how your program has addressed the strategic initiatives of technology, campus climate and/or partnerships. What plans does your program have to further implement these initiatives.

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| **Technology:** The department will continue to offer an Astronomy 120 hybrid/on-line course. The content is continuously updated and improved with new video material.  The department also operates and maintains the George F. Beattie Planetarium and the N. A. Richardson Astronomical Observatory, but the Planetarium is officially under the direction of the Science Division Dean. The Planetarium provides visual demonstrations that support the Astronomy classes offered by the department, and it also offers a series of programs for public school classes and for the general public. These programs provide an introduction to the current night sky and multimedia presentations of topics in Astronomy. Also, following a Planetarium presentation, the Planetarium specialist often encourages those interested to become aware of the opportunities available at SBVC to further their education and/or personal knowledge in Astronomy, Physics, or other science-related courses. The department occasionally uses video presentations in Physics, and very often uses physical demonstrations to clarify and/or augment topics discussed in Physics/Astronomy lecture and lab. In our Physics/Astronomy labs, the department has begun to incorporate digital scales and digital electric multimeters to improve accuracy and facilitate learning; more equipment and lab updates are planned, budget considerations allowing. In one of our Astronomy lectures, the instructor is using the “clicker” class management technology to enhance student response and performance, to provide immediate feedback to the instructor relative to class discussions, to ease the process of test/quiz taking, and to provide quick access to data to evaluate student performance. Also, this same instructor uses a power-point like format to present his Astronomy lectures. Students in our Astronomy labs have successfully performed several on-line lab exercises in Astronomy through CLEA. The lab students also work with Astronomy software and newly-acquired laptops to simulate a planetarium environment. All Physics/Astronomy students are encouraged to use the computer labs available either in the Physical Sciences building, or elsewhere on campus, in order to better organize, graph, and analyze their lab data as well as to generally their lab reports. Both the texts in Astronomy and in Physics 150AB/200-201 have associated on-line student help sources available for the students to improve their performance, and the department encourages use of these resources; further, the new Astronomy textbooks also include pre-packaged planetarium software, which students can use to augment the Planetarium presentations made in the lectures. The department is continuing the exploration of the use of Fourier Systems Data Logging Kits in the Physics and Astronomy labs if funding becomes available.**Campus Climate/Partnerships** Planetarium shows have been presented throughout each academic year for the general public, for elementary and secondary school programs, and for special groups/programs. For the past three years, from September 2008-May 2011, the average combined yearly audience of the Planetarium shows has been approximately 3646 with an average yearly income of $3763; the department plans to continue this most valuable outreach program. Following the public shows, the N.A.Richardson Observatory has also been opened to provide views of the Moon and planets, with an average yearly total of approximately 400 people attending the viewings. This is the oldest observatory in the valley and contains a very historic telescope. The planetarium has participated in and presented shows for any of the “Science and Math Day” activities taking place at SBVC, and will continue to do so. The Planetarium specialist is continually making presentations and conducting activities that involve the general public, or other schools/organizations outside of SBVC; these all contribute tremendously and in a most positive way to the reputation of SBVC and is supportive of its mission; this most valuable outreach effort will continue. The Planetarium specialist also provides special astronomy presentations for various classes associated with various departments at SBVC both within and outside of the Science Division, and will continue these efforts. In coordination with the CSUSB Department of Health Science and Human Ecology, Environmental Health Science Program, the Physics/Astronomy department has been and supporting efforts to develop a certificate program in vector control at CSUSB which would include SBVC; this partnership will continue. The Physics/Astronomy department, in collaboration with SBVC’s Financial Aid office and the Outreach Department, has participated for the last six years in Science and Math Day. This program brings approximately 300 local high school students to the campus to explore topics in science and math and to learn about the application and financial aid processes. This activity increases not only a college-wide appreciation of diversity, but also encourages diversity in the population of our future students. Physics courses are offered using several lab sections in order to allow students more flexibility in scheduling and to provide viability for low-enrolled courses; further, as initiated by and in coordination with the Chemistry department chair, courses were offered in a way not to conflict with other science major lecture and/or lab offerings to allow the students to more easily construct and complete their individual major programs. The department is committed to strongly encouraging students to take advantage of the various services provided, and has worked with other departments within the Science Division and also with the Math Division to encourage an increase in student success by encouraging students to make use of tutoring opportunities, workshops, and the peer-led model offered through the Math and Science Student Success Center. All faculty in the department announce activities in their respective classes and provide incentives for student participation, such as extra credit. The department actively continues to work with Counseling and with the Articulation officer to enhance student success. The Physics/Astronomy department, together with other departments within the Science Division, is also participating in beginning outreach efforts to partner with local elementary and/or middle schools, such as Richardson Middle School. |
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