

## APRU 2012 PSME Deans Summary

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There are remarkably similar themes in each of the individual PSME department program review reports and for the PSME Division as a whole; namely

- 1) Enrollment in individual departments and in the overall Division is almost identical from the last report year (2009-10) to the current one (2010-11), with the overall Division enrollment showing a tiny (+.07%) increase. This follows an 18% enrollment growth for the previous three years. Preliminary data for the “next” (2011-12) year show a small rise in enrollment again. Division productivity overall is one of the highest in the College with geology (665), physics (840), meteorology (904), and astronomy (1123) especially productive.

Despite a continued high demand in almost all courses (with significant wait lists in astronomy, chemistry, mathematics, and physics), the limiting factors of faculty and room availability were responsible for capping our enrollment. In the mathematics department, which accounts for roughly  $\frac{1}{2}$  of total Division enrollment, every faculty member (both full and part time) was “maxed” out in the number of classes they could (by contract or desire) teach, and similar situations occurred in chemistry, meteorology, and physics. Additionally, the death, retirement, and other loss of faculty (especially in mathematics and chemistry) added to the difficulty of meeting student demand. Recruiting, hiring, training, and evaluating new instructors to meet the enrollment demands placed an onerous burden on existing faculty and the Division Office staff and limited the number of sections that could be offered.

In addition to enrollment limitations due to the lack of additional qualified instructors, classroom availability, especially for the very large (70 – 140) student classes in astronomy, meteorology, and physics prevented offering additional sections of those highly productive courses even though in several cases there was sufficient demand to warrant added sections.

The situation continues into the current year. In order to maximize fall and winter sections, part time faculty were offered opportunities to complete their total yearly load during fall and winter quarters. In order to compensate, the Division hired twenty three *brand new* part time faculty members to teach in spring quarter. We look forward to current full time replacement hiring in mathematics and chemistry – however, the addition of a few new full time faculty will not make a significant dent in our need for additional full time instructors. Overall, our Division has a 41%/59% full time to part time ratio, and in such a large Division, very significant numbers of sections are taught as part time assignments. The large numbers of part time faculty and full time faculty teaching multiple overloads has a serious impact on our ability to carry out the many non-teaching duties required for a smoothly functioning Division (including such tasks as committee membership and SLO and program review obligations).

In order to address the limitations on enrollment caused by lack of room availability I would recommend a college wide comprehensive review of room utilization that would address the efficient allocation of scarce room resources. This need is even more critical in times during which campus remodeling is further reducing classroom space. I would also recommend that a large lecture space (perhaps in the new classroom building) be allocated to the astronomy department so that at least once a week, each large (140+ student) astronomy lecture can be held outside the planetarium. This will provide additional time for Community Education's use of the planetarium and the enhanced College revenues that will result. Finally, I would recommend we review our chemistry laboratory usage patterns to see if we are able to make greater use of the relatively scarce laboratory resources. We currently only offer chemistry laboratories four days a week – however, to extend the lab usage to a fifth day would require additional laboratory technical support.

- 2) Retention and success rates are up by 1% over the whole division, with a few departments (chemistry and engineering) showing even greater gains. Although these rates have risen, their absolute values vary greatly by department, from meteorology (95% /85%) to mathematics (83%/62%) and engineering (81%/55%). Although the departments with lower overall success rates still far exceed state and national averages in their disciplines, we need to continue our efforts to improve student success. Particular attention has been focused on providing tutorial, advising, and counseling support in STEM areas. Programs such as Math Performance Success (MPS) that have been demonstrated to be especially effective in improving student success are being slowly expanded, but again are limited by the need for qualified instructors and room facilities. Efforts are being made in the area of engineering education to revamp the curriculum and provide additional support for students interested in pursuing studies in engineering (see discussion below). The recent reorganization of the Student Success Division has greatly enhanced our ability to provide tutorial, advising, and counseling services to struggling students, and we believe that the results are beginning to pay off. Our Division has made a concerted effort to closely integrate our activities and curriculum with the Math and Science Tutorial Center – many of our faculty have volunteered to hold office hours in the tutorial center and provide additional support to all students while there. We have also worked closely with both the Assessment Office and Tutorial Center to provide improved advising and preparation for placement testing and to provide review modules to supplement classroom instruction and worked with the Disability Support Services office to improve success rates for students with disabilities. The science faculty have also been active in recruiting tutors and have enhanced non-math tutorial services significantly. We have a grave concern that as funding resources become more and more stressed, that reductions in “secondary” student support services such as tutoring, advising, counseling, and assessment will reverse the difficult progress we have made in the area of student success.

- 3) The numbers of students in “targeted” populations has increased a small amount, as has their success relative to the general student population. Division success rates for targeted populations have risen by about 1.5% from the previous year though a 13% Division wide equity gap between targeted and non-targeted students remains. The rate of success for targeted populations in math classes has remained the same along with a persistent 15% gap from the non-targeted group. Once again, we hope that our increased efforts in the areas of tutorial, advising, counseling, and assessment support services will assist in reducing this discrepancy. I also believe that we need to provide increased staff development activities that directly address STEM specific curriculum and classroom techniques that have been demonstrated as effective in improving the success rates of targeted groups, and look forward to opportunities that the AANAPISI grant promises to provide in this area.
  
- 4) Progress on SLOACs and PLOACs are advancing, though as mentioned before, the high proportion of part time faculty and full time faculty teaching multiple overloads has had a significant impact on the time available to complete these critical tasks.
  
- 5) Continuous budget reductions during the past five years have had a significant impact on our Division. By their very nature, the physical sciences require the use of laboratory equipment and supplies as a fundamental part of their pedagogical approach. The existence of a dedicated equipment budget was eliminated before my tenure as a dean, and our “B” budget has declined in the recent past through the elimination of so-called B Budget “supplements”. Our Division was unable to spend a large part of the first tier of Measure C funding due to the prioritization of large capital project spending, issues with the introduction of the Banner financial system, and subsequent Measure C purchasing freezes. We hope that funds distributed through the second tier of Measure C funding will be available and that the process for processing requests will be expedited. Our day to day operations have been hindered by this lack of funds (such as our inability to order a Division Office copier to replace the existing machine which breaks down several times a week). Providing student laboratory supplies, especially in the chemistry laboratories has been a struggle, and such supplies do not qualify for funding through materials fees. However, the availability of lottery funding has sustained the chemical and supply needs of the chemistry labs and recent injections of additional lottery funds have greatly improved the situation for chemistry. We hope that we may find similar lottery funding for physics and geology lab supplies

Unfortunately neither material fee nor lottery funding can be applied to meet the Division equipment needs. Although the chemistry department equipment was replenished at the time of the construction of the Science Center, after eight intervening years, a large amount of the chemistry equipment is in need of repair or renewal. The physics and geology laboratories have not had any significant funding for equipment or equipment repair in over 15 years, and much of the physics equipment is more than thirty years old. As mentioned earlier, it is hoped that funds requested from the second tier of Measure C funding can be applied to address the

extreme need for laboratory equipment updates, and that the purchasing and acquisition process can be expedited to make the necessary acquisitions in a timely and efficient manner. In situations in which equipment can be shared between departments (such as in physics and engineering), department coordinators have combined their equipment requests to serve both areas.

In the area of personnel, the Division needs are primarily for additional full time faculty positions; especially in the math, chemistry, and physics disciplines. We are clearly aware of the dire financial circumstances facing the College and are realistic in our expectations; however, if we are to maintain our current enrollment and retain a modicum of excellence, at a minimum we require replacement positions for faculty who have left or will be leaving in the coming year. In addition, if we wish to pursue enrollment growth in math, chemistry or physics to meet the high student demand, we really need additional growth positions. As described earlier, we do have the potential to expand our chemistry program (which is a current bottleneck for students wishing to pursue biological and health science careers) by extending our lab facility usage to five days per week; however, the expansion would require additional hours of laboratory technical support and additional funding for chemical supplies.

#### **PSME Departmental Level Summaries:**

**Astronomy:** the astronomy department continues to attain a nearly 100% fill rate, has very large class sizes, and one of the highest productivity rates (1123) in the District. There is excess demand for the courses, but growth and access are limited by available instructors and room for the large lecture in the planetarium, which is shared with income producing community education programs. We have proposed that astronomy lectures meet once per week outside the planetarium – but the only available facility with the required capacity (140) will be in the new building coming on line next year. This one day per week move will free up the planetarium for additional community education activities, and will add a significant revenue potential to the college.

Limits in room and instructor capacity make it difficult to increase access or growth for targeted populations. However, the department has made some inroads in decreasing the equity gap between targeted and non-targeted groups by 2% over the past year.

We have had a traditional void in the laboratory component of the astronomy offerings. The department has been active in curriculum development and review, and during the past year Dr. Cichanski has developed a lab curriculum that will help fill that void, providing a laboratory science to the large number of students who wish to take a transfer lab science course. I highly recommend the implementation of the laboratory component of the astronomy curriculum, it matches the nature of physical science, provides an alternative lab science for areas heavily impacted by excess demand, and is relatively inexpensive to implement.

**Chemistry:** The chemistry department has an extraordinarily high demand for all classes, with substantial wait lists on almost all of their courses. The department has not been able to provide the numbers of sections needed to meet this high demand, and this lack of capacity has had a serious impact on those wishing to enter academic or career disciplines in the biological and health sciences. Chemistry has become a bottleneck in the bio-health science pipeline, with some students having to wait quarter after quarter for entry into a chemistry class required for them to meet their academic goals. The lack of section capacity is due in some part to inadequate numbers of full time faculty and to the recent loss of a long-time part time faculty member. Although a full-time replacement chemistry position hiring is currently in progress and should assist in alleviating the low full time faculty ratio, next year's proposed leave by the current chairperson will postpone many of the anticipated benefits. A substantial part-time hiring effort at the close of this year, coupled with a concerted review of facility usage might allow the chemistry department to expand their capacity and to help ensure that the high demand needs of students are met in the coming year. Lab courses are only run 4 days per week, and could be expanded to five days, therefore freeing up to 20% of additional capacity; however, additional laboratory technical support would be required to implement such a plan.

During the past year the chemistry department has received supplementary funding through special lottery accounts, and they have for the first time been able to add equipment requests through Measure C funding for next year. Although the combination of B Budget and lottery funding has been adequate to sustain the department each year, it would be helpful and allow for better and more efficient planning if the necessary Lottery funds were allocated earlier and in one installment that reflects the actual laboratory costs rather than over several installments spread out during the year.

**Engineering:** Partially in response to previous program reviews, in 2011 the Division began a comprehensive review of the engineering curriculum and offerings. During that time, it was decided to reduce the number of offerings significantly while curriculum and strategies that would better meet the needs of students considering entry into engineering disciplines were formulated. From 2009-10 to 2010-11, there was a 50% reduction in the number of engineer sections offered and a consequent 43% decline in enrollments. During the past year, with far fewer sections, most engineering classes were filled to capacity and the retention and success rate crept up (by 6.5% and 7.8% respectively). However, there was an excessively high drop rate (not included in retention or success). It has been agreed upon by George Krestas, the sole full time member of the engineering faculty, that he would focus his efforts in teaching mathematics (where he is also qualified) while he and I would work to revamp the curriculum and recruit outside assistance to find ways to improve the engineering program. We are currently working in conjunction with San Jose State University Engineering Department and regional industry representatives to find ways to encourage engineering students and to assist them in basic skills development needed to guarantee their success. We are hoping to develop a program that focuses on the only two core classes (Engineering 10 and 37) required for transfer and to especially concentrate on revamping the current 8 credit Engineering 10 (Introduction to Engineering) class to provide the

curriculum and support needed to encourage students (especially those in targeted populations) who have shown an interest in an engineering career. We have also made use of an active engineering club to provide additional support and engineering related activities that would encourage students to pursue engineering. Last year the club produced a large solar furnace made out of used CDs. The project not only generated strong interest among current and potential engineering students, but was helpful in recruiting other students on campus and providing them with a taste of the engineering discipline. The engineering club and their project were strongly supported by Charles Norona, the physics technician, and by other community volunteers. We are also investigating ways to incorporate a cohort approach to engineering education and also mechanisms for extending tutoring and advising to engineering students.

The impact of the engineering program is felt in far greater proportion than its scale would indicate. Numerous other disciplines and programs at De Anza are indirectly linked to engineering and are seriously affected by even small changes to the engineering program. With the exception of statistics, all of the college level mathematics courses and the great majority of physics courses (all with large wait lists) are populated by students interested in engineering professions. If those students cannot get the one or two engineering classes they need to complete their engineering pre-transfer requirements, they will look to other schools to satisfy their academic plans, and there will be a major shift in enrollment patterns. Also, as the premier community college in the heart of Silicon Valley, (and with our Cupertino location), the lack of a pre-engineering program at De Anza would be disastrous and embarrassing in a region whose economy and reputation rests on its technological base. De Anza is the largest feeder community college to San Jose State, San Francisco State, and Berkeley, and the source of a significant number of its engineering graduates. The loss of a pre-engineering offering would have a significant impact on those institution's engineering programs and would essentially cut off the opportunities for students, especially those from targeted populations, to enter the engineering professions. Considering the Department of Labor projections for a continuing increase in demand for engineering jobs and the status of a four year engineering degree as offering the greatest number of employment opportunities and the highest salaries of any bachelor's program – a failure to offer a transfer level pre-engineering program in a manner that is encouraging and supportive of student success would preclude very large numbers of students from attaining their educational, career, and economic goals.

**Geology:** During the past three years the geology program at De Anza has supported an enormous growth, including an overall increase of 76% in general enrollments and a 108% increase in number of targeted students participating. During the same period there was a concomitant 6.5 % increase in the success rate of the targeted population, resulting in a 19% decrease in the equity gap. Though the equity gap still persists, the encouragement of tutoring, counseling, and advising services are being utilized to reduce it even further. The department is also in the process of developing a transfer model curriculum in geology, which would require the introduction of just a single additional course (Geol 11, Historical Geology). The department has submitted Measure C funding requests that would allow the modernization of laboratory facilities that are more than twenty years old. The department also recognizes the need for replacement supplies for labs that cannot be funded by Measure C or materials

fees, but that might be funded by additional Lottery fund availability. Finally, the lab and classrooms most often used by the geology department does not have a projector or instructor computer station, and should be updated to provide those necessary teaching tools.

**Meteorology:** There has been an overall growth in meteorology enrollment of 17% and a growth of the targeted student population of 29% during the past three years, with some intervening fluctuation in numbers of sections and enrollment due to the difficulty of finding instructors qualified in this discipline. The department has an extraordinarily high productivity (904) and high overall retention (95%) and success (85%) rates. During the past year there was also an increase in the success rate of targeted populations of 9.5%. The department has worked closely with the DSS and tutorial departments and reduced the equity success gap over three years from 13% to 5%. The retention rate for targeted populations is currently higher than for non-targeted groups. Currently the limitation on enrollment is due to the dearth of large classroom facilities and the great difficulty in finding qualified, outstanding instructors. During the past three years the department lost a key part time member, and there was a clear and significant impact on enrollment potential. The department coordinator, Paul Olejniczak, has been involved in national curriculum standards efforts, and has developed an excellent new lab curriculum that matches the new national standards. We hope to implement the lab in the coming year and provide a much needed laboratory experience for students. Integration of the laboratory experience is important from a pedagogical point of view and is attractive to students as a means of satisfying their transfer laboratory science requirements.

**Math:** The mathematics department dominates the division in terms of courses offered and enrollment. Enrollment trends which had previously increased at double digit rates have slowed to 4% for the past three years and actually decreased around 1% during the past reporting year. During this period of level enrollment, many mathematics classes continue to have large wait lists, but enrollment has been limited by our inability to find qualified instructors and classroom space to accommodate student demand. From 2009-10 to 2010-11 the FTEF ratio decreased from 51% to 40% due to retirements and deaths in the department. It has been extremely difficult and taxing on full time faculty and staff to recruit, hire, train, mentor, and evaluate the large numbers of part time faculty who have been hired to help match our enrollment needs, and many duties and obligations necessary for a smoothly functioning department and division have gone unsatisfied due to the large number of faculty teaching maximum allowable loads and the high proportion of part time employees. The greatest need for the department is for additional full time hires and for training and staff development opportunities, both for the many new faculty and other faculty desiring additional training in basic skills and other instructional techniques.

**Physics:** Enrollments in physics increased about 5% from the previous year, with retention and success rates remaining essentially the same as in the past. A significant increase (9%) in the success rate of targeted populations occurred, closing the equity gap between targeted and non-targeted students to

9%. Reductions of very large class sizes in some sections were purposely initiated, but the overall productivity remained extremely high at 840. The department has particularly suffered from lack of funds to replenish and repair laboratory equipment – some of which is over thirty years old. Attempts to expend Measure C funds on equipment were thwarted by prioritization of large capital project spending, problems with Banner implementations, and a Measure C spending freeze. It is hoped that the allocation and disbursement of the second tier Measure C funds will be expedited so that badly needed equipment and repairs can be purchased. As in the case of the geology department, classroom and laboratory facilities lack an instructor computer station and display technology, and it is hoped that in the coming year the rooms are equipped with these necessary tools.