**PSME Division**

**Program Review 2014 PSME Deans Summary**

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**PSME Departmental Level View:**

**Astronomy:** the astronomy department continues to attain fill rates approaching 100% with additional waitlists, has very large class sizes, and has one of the highest productivity rates in the District. There is excess demand for astronomy courses, but growth and access are limited by available rooms for the very large lectures (up to 140) that normally meet in the planetarium. Some lecture meetings have been moved to alternative rooms to free the planetarium for increased utilization and income generation by community education. The overall Astronomy success rate (81%) is substantially higher than the college average and has remained constant during the review period. The equity gap, though significantly lower than the College average is still high enough to be of concern. The department is making changes in curriculum that foster a more hands on approach to the discipline that it hopes may partially address the equity gap. It is also interested in a closer integration with tutoring, mentoring, advising, and counseling services to see if this might also help decrease the equity gap. In the short run, the Department has a need for increased budget allocation to purchase and maintain classroom media materials and equipment and for an expansion of the new laboratory course they have initiated in response to program and student outcomes assessments. They also need additional copying funds to continue to provide printed assessment materials in the face of the elimination of campus wide materials fees. In the long run, the Department will require substantial capital investment in the planetarium facility, which after seven years since it was last updated, is expected to need an upgrade in the near future.

**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 completed a recent review of its yearly schedule and has altered its schedule to maximize room utilization. Lab courses have expanded to five days, adding up to 20% of additional capacity. Through a negotiated agreement, maximum class size has been increased. Despite these capacity improvements, the department has not been able to provide the numbers of sections needed to meet a continuing high demand. This has had a serious impact on those wishing to enter academic or career disciplines in the biological and health sciences. Chemistry is 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 losses of long-time part time faculty members. Chemistry, like several other departments in the PSME Division, has had a continuous growth over the past 10 years resulting in more than a 50% net growth in total students served. During that same time period, there has been an actual decline in the number of full time teaching faculty and the department has had little growth in additional laboratory technical support required to support efforts to meet student demand and to maintain a safe and healthy laboratory environment. The department is requesting a growth faculty position and additional laboratory support needed to sustain their efforts in program improvement, equity balance, and serving the unmet needs of students wishing to prepare for careers in chemistry, pharmacy, and the biological and health sciences.

The chemistry department, reflecting overall campus trends, has had a substantial increase in the numbers of targeted students participating in their programs and at the same time has a significant equity gap (14%) in student achievement. The department has recently made changes in curriculum and scheduling that attempt to address that gap. They plan on making additional efforts to better integrate tutoring, mentoring, advising, and counseling services into their program. As a result of their SLOAC and PLOAC reviews, they have begun to work with the De Anza institutional research department to determine specific factors (such as withdrawal rates) that most heavily influence differences in student success, and to additionally use those results to improve their program outcomes.

The department is also requesting an increased level of funding to help support their laboratory operations and maintenance and to purchase much needed laboratory equipment. They have also been impacted by loss of materials fees funding, and struggle to meet copying costs for quizzes and exams.

**Engineering:** In response to previous program reviews the department faculty and dean have completed a comprehensive review of the engineering curriculum and offerings. During the first two years of the program review period, the number of offerings was significantly reduced to allow a more focused and effective approach to encouraging engineering enrollment and success. Curriculum and strategies that would better meet the needs of students considering entry into engineering disciplines were formulated and put into place. During the last year (2012-13) of the review and continuing into the current year (2013-14), there has been a dramatic positive change in enrollment and student success and a corresponding significant decrease in the department equity gap. In the last review year (2012-13) department WSCH increased by 41.2% and the productivity from 492 to 663. During the same period the overall success rate jumped from 57% (the level it had been for several years) to 83%.

In addition to the impressive overall increase in student success, even greater changes have taken place in the targeted student population. From 2011-12 to 2012-13 the numbers of non-targeted students increased by 28%, but the number of targeted students increased by 72%, with particularly large increases in Filipino and Latino student populations. During that period, the non-targeted student success rose by 38% and the success rate of targeted students rose 81%. The result has been that the engineering equity gap, which has traditionally been one of the highest in the Division, has been reduced from 17% to 4%. A preliminary analysis of the 2013-14 data shows the positive trend continuing.

The department faculty have made a determined effort to provide students with interesting and engaging materials, and have incorporated hands-on projects as an important component in classwork. The faculty support and encourage students to successfully complete their mathematics and physics requirements, the most common a stumbling blocks for students wishing to pursue careers in engineering. Faculty and staff have also helped revive an engineering club which reinforces course and program goals and is very encouraging of student participation in engineering projects and provides opportunities for study group activities. They have initiated field trips to regional engineering facilities (Lawrence Livermore Labs, SLAC, NASA Ames, and San Jose State University) that engage and encourage student interest in engineering professions and that are an effective incentive for students to continue their engineering studies.

Additional efforts to improve curriculum are ongoing, and faculty and the dean are currently working to ensure curriculum is up to date and satisfies transfer requirements. The lack of a current full time faculty member teaching in the department and a recent necessary medical leave for one of the key part time instructors has slowed SLOAC and PLOAC progress, however plans to complete all reviews and assessments are back on schedule and should be completed during this spring and summer quarters, with enhancements to be developed during subsequent quarters.

A large proportion of STEM students in the PSME Division are interested in engineering careers, and the engineering program is a key factor in all PSME enrollments. Engineering provides an opportunity for successful students to pursue high paying career pathways, which is particularly encouraging given the recent increases in targeted student enrollment and success rates in the program.

The Division would benefit from an in-situ counselor who could work with pre-engineering students to assist them in academic advising and career opportunities. This is especially true for first college generation and other students who lack familiarity with the requirements and opportunities offered in engineering disciplines.

**Geology:** Following a period of large enrollment growth, there has been a 13% decline in geology enrollment during the final two years of the current reporting period. Much of the decline can be attributed to the temporary leave of a full time faculty member who was pursuing (and received) his Doctoral degree. A preliminary analysis of the current (2013-14) year enrollment show a restoration toward the earlier higher earlier enrollments.

The geology department has undergone a large increase in the proportion of targeted students to total students it serves. In the 2010- 11 period, targeted students made up 33% of the total geology students, while in the 2012-13 period the number rose to 39% of the total. Although the overall success rates in geology remain relatively high at 76% and the success rates of targeted populations at 66% are very close to the overall campus rates, there is a high persistence equity gap of nearly 16%.

The department is addressing the equity gap through changes in curriculum and staffing (single instructor format lecture/lab) that it feels may benefit student success. The department is also investigating strategies to increase the use of tutoring, counseling, advising, and mentoring services. It hopes to encourage student tutors, mentors, and classroom assistants as part of its internal curriculum. It would also like to rekindle an earlier relationship that provided strong academic support through a STEM adjunct study skills program sponsored by the Student Success Center.

The department is well along in the process of developing a transfer model curriculum in geology, and I encourage the completion of that activity.

The success rate for targeted groups has remained approximately level, at about 52%. Success rates for Pacific Islanders, a very small group of students, increased significantly from 47% to 53%; this may be in part due to an AANAPISI grant that supported an additional Math Performance Success class sequence with focus on attracting Pacific Islander students to STEM programs.

**Mathematics:** The mathematics department dominates the division in terms of courses offered and enrollment. Mathematics enrollment trends which have continuously increased in the 4 to 5% range for the past 5 to 7 years continue at a similar pace. For the review years of 2010 -11 to 2012-13 there has been a 16.2% increase in the total number of math enrollments. During that same period, there has been a significant shift in the ethnicity of students taking mathematics, including a 28% increase in Latino students, a 13% in Filipino students, and a 26% increase in African American students. The net result of these changes is that the overall % of targeted students enrolled in mathematics has changed from 29% to 32% of the total population served.

It is not clear that the assumption that these changes imply a larger proportion of students will be taking developmental level mathematics courses is correct. Although the growth in absolute numbers of targeted students has been about 1.3 times the growth in numbers of non-targeted students, an analysis of enrollments by course during the same period appears to demonstrate an actual decline in the proportion of students enrolled in basic skills classes and an increase in the proportions enrolled in pre-calculus and calculus classes.

Many mathematics classes continue to have large wait lists, but enrollment is limited by our inability to find qualified instructors and classroom space to accommodate student demand. Despite full-time faculty replacement hiring, the increase in demand has caused a further decrease in the per cent of classes taught by full time faculty. Given the continuous annual enrollment increases for at least the past 7 years, the number of students currently served is about 35% greater than when I first became dean. There are now approximately 5700 more math enrollments each year than during my first year at De Anza. During that same period we have had no increase in the net number of full time math faculty (in fact we have lost some due to reassignment duties). Serving these 5700 additional enrollments each year is extremely difficult and taxing on existing full time faculty and staff who are required to recruit, hire, train, mentor, and evaluate the large numbers of part time faculty who have been hired to help match our enrollment needs. 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.

Overall student success rates have slowly increased during the review period and are presently around 64%. During this same period, characterized by a large increase in numbers of targeted students, the success rate of the targeted students also increased slightly to 52%; however, despite small gains in targeted and non-targeted groups the net result has been a persistent equity gap of approximately 17%.

The math department has found demonstratively effective methods for decreasing the equity gap and at the same time increasing overall student success. Through such special programs as MPS and Statway, the department has the documented capability of increasing success rates between 14 and 31% (depending upon the class); however, participation in these programs are hampered by limitations on recruiting, registration, scheduling, advising, counseling, tutoring and other student support services- all of which have been severely affected by budget cuts. Although these programs have expanded slowly over the years, they have not been able to keep pace with the overall growth of enrollment. Expansion of the program is also limited by recruiting and training of faculty and counselors prepared to teach in these specialized programs. In order to reduce the equity gap and raise the general level of student success in mathematics I highly recommend:

1. the creation of a position for a coordinator for special STEM programs. This coordinator would have the ability to increase the scope and effectiveness of our existing special programs (such as MPS and Statway) by providing assistance in student and faculty recruitment, scheduling, advising, faculty training and other components necessary for a more efficient use of MPS, Statway and similar programs. The coordinator would also work closely with existing cohort teams to better integrate mathematics preparation and scheduling with the cohort programs
2. The implementation of an in-situ STEM counselor who would work closely with the Division to provide advising and counseling services to students taking STEM classes
3. A significant expansion in the number of MPS and Statway classes
4. Faculty professional development for training and encouraging new special programs faculty

Finally, due to its large size and special requirements for printing and copying exams and other assessment materials, the mathematics department has been especially hard hit by changes in materials fees policies. A budget supplement is needed to ensure that there are sufficient funds to support at least the copying of exams and quizzes.

**Meteorology:** After a period of overall growth, enrollment has declined in the three years covered by the current review. Overall WSCH declined by about 23% between 2010-11 and 2012-13. The cause of this decline was primarily the reduction in the number of sections offered (-20%), which in turn was due to a change in circumstance of a part-time instructor that prevented her from teaching and the inability to find a qualified replacement. The instructor has since begun offering additional online sections, and the current (2013-14) has seen a restoration of lost enrollment and a subsequent growth.

The enrollment of both targeted and non-targeted populations declined with the general decline in enrollment from 2010–11 to 2012-13, though the percentage decline in targeted students was greater than the non-targeted decline.

Overall success rates for Meteorology are relatively high, and ranged from 85% to 86% during the review period, with a small gain during that time. Likewise, the success rate of targeted students was also high and increasing, going from 81% in 2010-11 to 84% in 2012-13. The corresponding equity gap during the period improved from 5% to 3%, and was the lowest in our Division.

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. The lab has begun to be offered this (2013-14) year and provides 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.

The Meteorology Department is currently integrating the use of a new air quality monitoring station into its curriculum and hopes to create a unique opportunity to provide students with an engaging and relevant learning experience. The department has requested funds for the purchase and installation of additional air monitoring components that will enable them to expand the capabilities of their instrumentation to measure pollen and other particulates in the air. The monitoring device is being shared with the Environmental Science program.

**Physics**: Overall enrollments in physics have decreased by about 10% from 2010-11 to 2012-13. The decrease was across all ethnic subpopulations, except Latinos, which had a 25% *increas*e in enrollment. The net decrease was in large measure due to purposeful reductions in class sizes for very large classes, thus reducing class capacity from 90 to 60.This was done to improve teaching effectiveness. The overall productivity remains relatively high at 669. Other factors in enrollment decline may be continued enforcement of course prerequisites, especially the relatively recently adopted calculus prerequisite for non-engineering physics. We believe the enrollment will rise slowly over the next few years as students become more aware of the need and reason for these more rigorous standards and begin to enroll in the necessary mathematics prerequisites.

Overall success rates for physics declined from 69% in 2010-11 to 62% in 2012-13. Targeted student success declined even more during the same time frame, going from 61% to 49%. The resulting equity gap increased from 9% to 16%. The department is unsure of the causes of these negative changes, and has pledged to do a more detailed analysis to try to determine probable causes and formulate possible responses in order to improve success and reduce the equity gap.

The department has particularly suffered from the elimination of the physics technician position. This has hampered the design of laboratory experiments, the repair and maintenance of laboratory facilities and the ordering of already allocated Measure C funded equipment purchases. The lack of a physics technician has also placed a severe strain on the ability of instructors to perform in-class demonstrations, since it is almost impossible for an instructor to move the demonstration apparatus in and out of the classroom and calibrate and set it up so that it can be used during a class session. A laboratory technician also plays an important role in student learning, and in the past has served as a mentor and advisor to physics and engineering clubs. The lack of a qualified laboratory technician has had a serious and significant effect on the quality of physics instruction, and I highly encourage restoration of funding for this position as soon as it is financially feasible.

**Division Wide View:**

**Enrollment**:

Overall **Enrollment** in the PSME Division has grown during the three report years. There has been an increase of enrollment of about +**5.0%** in contrast to a **-3.6%** decrease in overall College enrollment during the same period. This follows a pattern of continuous PSME enrollment gain over the past six years. Preliminary data for the next (2013-14) year shows the PSME enrollment increase continuing. The high *per* *cent* gains coupled with the large absolute size of the Division means that there have been very large gains in total numbers of enrolled students and WSCH. Division **productivity** overall is high, despite the large number of developmental level courses offered. Engineering (663), physics (669), meteorology (819), and astronomy (1026**)** are particularly highly productive.

Mirroring campus trends, there have been major changes in the ethnic composition of student groups enrolled in PSME. The numbers of targeted students enrolled in PSME has increased by 23% in the past three years. The largest significant gains have been in Latino (34.5%), African American (23.4%), and Filipino (7.8%) student populations. During the same period the number of non-targeted Asian students has increased by 13.9% while the white student population has remained nearly constant. The most dramatic change (-48%) has been in the number of students declining to state their ethnicity. The net effect has been an overall large increase in targeted and a small increase in non-targeted students, with the proportion of targeted students rising from 38.8% to 46.4% (close to half) of all students served. Changes in the proportions of ethnic populations appear fairly uniform across all departments, and the few exceptions to the general trend may not be significant given the small sample size in the smaller departments. The increasing numbers and proportion of targeted students highlights the problem of a continuing equity gap that exists in most PSME departments, and makes efforts to reduce that gap of even greater importance.

Despite a high demand in almost all courses (with continuing significant wait lists in astronomy, chemistry, mathematics, physics, and engineering), the **limiting factors of faculty and room availability** continue to be responsible for capping our enrollment.

In the mathematics department, which accounts for roughly ½ of total Division enrollment, for the third year in a row every faculty member (both full and part time) was maxed out in the number of classes they could (by contract or desire) teach. Similar situations occurred in astronomy, chemistry, meteorology, and physics. The resignation, retirement, reassignment, and other loss of faculty (especially in mathematics, meteorology and chemistry) added to the difficulty of meeting student demand. Recruiting, hiring, training, mentoring, and evaluating new instructors to meet the enrollment demands continues to place an onerous burden on existing faculty and the Division Office staff and limits the number of sections that can be offered. Despite the recent hiring of replacement faculty in mathematics and chemistry, increases in enrollment have again led to a situation similar to past years, and over 30 new part-time faculty have been hired to meet the increased recent student demand. Recruitment letters were sent to over 25 regional colleges, Universities, career centers, and high schools, and it appears that we have completely saturated the part time market. It is doubtful that future attempts to recruit part-time faculty will be successful.

Overall, in our Division only 37% of all courses are taught as full-time load (a 2.6% decrease since the last review). Reassigned time has also increased during that period, further reducing the number of full time faculty available for teaching. Developmental level courses are disproportionally taught by part-time faculty, and for those courses this ratio is much lower. 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, SLO and program review obligations, curriculum development, and equity balancing efforts). Reductions in office staff as well as in registration, assessment, and scheduling have had a further severe impact on our ability to find and support additional faculty and courses.

In addition to enrollment limitations due to the lack of additional qualified instructors, classroom availability, especially for the very large (70 to 140) student classes in astronomy, meteorology, and physics prevented offering additional sections of those highly productive courses. During the past program review we suggested a college wide comprehensive review of room utilization to address limitations on enrollment caused by lack of room availability. The Astronomy department is currently experimenting with a model that utilizes other large classrooms as a meeting place for astronomy classes on some meeting days. This policy frees the Planetarium for additional sections of very large (140+) Astronomy classes. I have also met with other deans to try to more efficiently match classroom size to course capacity. We have had a limited success with this approach; however, further work on campus wide room scheduling and allocation would be very helpful in increasing our enrollments. This need is particularly crucial to our mathematics department. Limitations in classroom space often prevent us from adding classes. When a room is freed late in the schedule process (sometimes due to low enrollment) it is often too late to offer the assignment to a part time faculty member who has found employment at another campus. Rooms also appear to be block scheduled in a manner that inhibits optimum utilization. I would highly recommend a comprehensive review of room scheduling processes and policies to see if improvements can be made. Within our Division we have reviewed our chemistry laboratory usage patterns and class capacities and have recently revised our longtime chemistry scheduling patterns to make greater use of the relatively scarce laboratory resources. Likewise, we have tried to improve the utilization of our computer lab facilities, and have proposed dual usage (computer lab/lecture) to improve utilization.

**Student Success and Equity:**

Despite the demands of continued Division growth rates at a time of reductions in support, overall Division **success rates** remained approximately constant at about 67% over the 2010-11 to 2012-13 review period. There were small (less than 1%) gains in success of both targeted and non-targeted sub-populations. The only large change in PSME ethnic subgroup success rate during the period is a change for African Americans from 51% to 55% (a 7.8% increase); however, the overall result remained that the equity gap in Division wide success increased from an already high 15% to 17% during the review time frame.

There were large differences in success rates and equity gaps for various departments within the Division. Although astronomy had an overall success rate 0f 81%, it had a relatively large, 16% equity gap. Chemistry, geology, math, and physics had success rates in the range of 73% to 62%, but all had equity gaps in the 14 – 17% range. Only engineering (overall success 83% and equity gap 4%) and meteorology (overall success 86% and equity gap 3%) might be considered commendable.

The issue of success rates and equity are not a comfortable topic for polite society. It is easy to compare our Division performance to those of other institutions in the state and country. It can be fairly said that in comparison, our results “are much better than average”. Studies of mathematics success rates and equity gaps in 4th and 8th grade students show a very similar pattern, and so it may be fair to ask if the differential success rates are to some degree a product of our culture and history, and that the best way to make significant changes might be to institute a universal preschool program that begins to address these issues. On the other hand, we charge the same tuition for all of our students, and our job is to provide a meaningful and useful education for each of our students as they arrive, not as we wish them to have arrived. I certainly do not have any simple answers (if I did, I would be rich *and* famous), but given our mission and the thoughtful discussions of our faculty, I would suggest a starting point that includes some general ideas for increasing our success rates and decreasing our equity gaps:

1. Rethink how we provide support services to students, especially those in targeted groups with traditionally low success rates
   1. Integrate counseling and advising services with instruction. Using the MPS model, have advisors and counselors visit classrooms and work directly with course instructors to assist students in need of advising and counseling services. Use a distributed mode of counseling, locating counselors in Division offices (in-situ), in the cafeteria, library, tutorial areas, and other locations where students gather and study
   2. Create a tighter coupling between instructors and tutorial services. Have instructors mentor tutors and peer mentors for their own classroom. Increase the contact between classroom instructors and student success staff. Utilize student “teaching assistants” who have been trained in student success programs; hold office hours in the tutorial areas
2. Provide spaces and structures for students to congregate and work together. Train faculty and students in how to encourage successful study groups.
3. Work with student clubs to foster activities that support instruction
4. Look at the data
   1. Carefully investigate which factors are most likely to inhibit or foster student success;
   2. Encourage reading and discussions of literature on improving student success and develop best practices guidelines
   3. Ask the students; survey students about what works or doesn’t work for them. Survey them early in the quarter, so that we can collect information for those who succeed and those who do not
5. Review college policies on drops and withdrawals to see how they may affect student success
6. Develop curriculum that is relevant and engaging to students; involve students in curriculum development at a department level
7. Work with existing cohort programs to develop math(and STEM) components
8. Expand existing successful programs such as MPS and Statway.

**Resource Needs**

**Facilities**

As discussed earlier in the enrollment section, our Division is in need of additional classroom space. I would recommend the following:

1. A comprehensive review of room scheduling and room utilization to see if we cannot improve usage patterns and provide classroom allocations earlier in the scheduling process
2. Use of S3 building for physics classes. The building provides storage room adjacent to classrooms for demonstration equipment that is essential to teaching physics. Given the loss of a physics laboratory technician position, it is impossible for physics faculty to move and set up demonstration equipment in other locations.
3. Conversion of the computer labs in S4 (s42, S44, and S48) to a dual (computer lab/lecture) mode with the purchase of desks that allow computers to be lowered and raised
4. Maintenance and repair of Science Center HVAC system
5. Long term conversion to fob based key systems.

**Budget**

Continuous budget reductions during the past seven 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 long ago, and our operating (B) budget has declined in the recent past through the elimination of so-called supplements. Measure C funding has helped provide funds for large equipment and computer purchases, but cannot provide support for certain necessary materials and supplies, software, maintenance and repair, and other operating expenses. In addition, a nearly 50% net growth in the number of students served over the past seven years has stretched our already thin operating budget to its limits. In addition, the recent elimination of materials fees has had a severe impact on our Division. Whether correctly or incorrectly utilized, the fees supported Division copying and printing. Our division has made an extraordinary effort to minimize copying by using electronic resources to distribute course material. The division faculty and staff also make use of the campus print facility and book store to provide students with necessary course content and strongly encourage students to use the ubiquitous print kiosks for printing. However, we have been unable to find a practical method of distributing quizzes and exams other than by traditional copying. Given the nature of assessment materials in our Division, which often include diagrams, graphs, and charts, exams and quizzes often require extensive number of pages. The result is that, even after a nearly 50% reduction in copying costs from the previous year, our current Division copying costs consume nearly our entire operating (B) budget. Although there is a phased plan to allow for funding copying during a transition period, we will require a permanent solution that enables us to continue distributing assessment materials *and* continue to fund our normal operating expenses.

**Equipment**

The following is a summary of items that have been requested by PSME departments that I feel are necessary for our effective operation. I strongly support the funding of these items through appropriate budget expenditures. Some of the items may be part of the college standard refresh cycle, others may be purchased through future Measure C funding or lottery funds.

* Upgrade of Planetarium instructor multi-media console and data projector, including an upgrade of the computer used by the instructor
* Chemistry lab equipment replacements, including analytic balances, hotplates, centrifuges, and Vernier probes, and locks for students’ lockers
* Chemical inventory software
* IR spectrophotometer
* Electrical engineering laboratory equipment including oscilloscopes, power supplies, and circuit components
* Particulate module for air quality monitor
* Earth science and meteorology videos
* Replacement of outdated and broken physics lab equipment
* Purchase of physics demonstration equipment and experiments in electrostatics and modern physics
* Data acquisition system for physics labs
* Mathematics and statistics software licenses
* Mobile devices for mathematics classroom use
* Long term update of planetarium projection system

**Personnel:**

We continue our need for additional full time faculty positions; especially in math and chemistry. In order to maintain our current enrollment and retain a modicum of excellence, we require replacement positions for faculty who have left or will be leaving in the coming year. In addition, if we wish to continue the successful pursuit of enrollment growth in math and chemistry and meet the high student demand in these areas, we will need additional growth positions in these disciplines. Despite the College’s support for replacement faculty, continuous high enrollment growth, especially in mathematics and chemistry, has far outpaced what can be handled by replacement positions. The Division’s percent of classes taught as full-time load continues to decline and is currently at 37%. This low FT percentage has a significant impact on the number of faculty available for the many necessary non-classroom duties such as serving on committees, developing curriculum, performing SLOAC and PLOAC activities, and other essential non-instructional duties. In addition, departments require additional full time members to assist with hiring, training, mentoring, and evaluating the large number of part time faculty required to sustain our current efforts.

Recent and future losses in technical support personnel are also negatively affecting our operations**.** The loss of our physics technician position has made it difficult to specify, procure, repair, and maintain critical physics laboratory equipment. It has also placed a severe strain on the ability of instructors to perform in-class demonstrations, since it is almost impossible for an instructor to move the demonstration apparatus in and out of the classroom and calibrate and set it up so that it can be used during a class session A physics technician is also needed to assist with specifying, ordering, and maintaining inventory for physics laboratory equipment and supplies. The technician also often plays a key mentoring role to physics and engineering students, and past technicians have served as a mentor and advisor to physics and engineering clubs.

Our chemistry program is in dire need of a second laboratory technician. The additional technician would enable the expansion of chemistry offerings to meet the very large student demand and would help ensure a safe and smoothly functioning chemistry laboratory program.

A special math programs coordinator for MPS and Statway is critical for the continued growth of these successful programs. The coordinator would provide support for recruiting and scheduling students, assist with the coordination of special counselors and tutors, and help schedule and facilitate program meetings. The coordinator would also be a liaison for other cohort groups wishing to integrate MPS and Statway courses into their programs.