PROGRAM REVIEW: ENGINEERING

FALL 2015

SOLANO
COMMUNITY COLLEGE

Engineering Program Review Self-Study, Fall 2015

1.1 Introduction. *Introduce the program. Include the program's catalogue description, its mission, the degrees and certificates offered, and a brief history of the program. Include the number and names of full-time faculty, adjunct faculty, and classified staff. Discuss any recent changes to the program or degrees.*

According to the SCC catalogue, "The field of Engineering deals with the design, production, and testing of new products, as well as maintaining and improving existing ones. Engineers are professionals who apply mathematical and scientific principles to solve technical problems."

The Engineering Department at Solano Community College traces itself back to the very start of the college in 1945. In accordance with the statewide master plan for higher education, the Engineering program has always been focused on preparing students to transfer to an engineering major at a four-year university. In recent years, we have transferred about fifteen students per year, mostly to UC Davis, Sacramento State, and UC Berkeley. Some go on to pursue graduate degrees after receiving their B.S. degree, and most eventually find highly paid and productive jobs in Solano and nearby counties.

This department currently offers four engineering courses: Introduction to Engineering (ENGR 001), Introduction to Electrical Engineering (ENGR 017), Engineering Mechanics: Statics (ENGR 030), and Properties of Materials (ENGR 045). A new engineering course, which will teach the MATLAB programming language, has been created and is currently being reviewed by the Curriculum Committee. If approved, it will be taught once a year, probably starting in Spring 2017. This course will be co-listed with the Math Department as MATH/ENGR 026.

Solano Community College does not currently offer a degree in Engineering. Plans for a new AS degree in Engineering have recently been submitted to the Curriculum Committee. Successful completion of this degree will provide an adequate background for employment in many technological and scientific areas, and provide a firm foundation for students planning to pursue a baccalaureate degree in engineering.

Historically, the Engineering Department has consisted of a single full-time faculty member, supplemented by adjuncts as needed. In the past decade, the teaching load, which has remained constant, has been covered by one full-time instructor, and one adjunct instructor, both of whom split their time between the Engineering and Physics Departments.

Recently and currently, the only full-time faculty member who teaches in this program is Dr. Melanie Lutz. Dr. Lutz received a Ph.D. from UC Berkeley, and has been a full-time Physics/Engineering instructor at SCC since 2000.

The only adjunct faculty who teaches in this program is Dr. Tom MacMullen. Dr. MacMullen has a Ph.D. from the University of Arizona, and has been an adjunct Physics/Engineering instructor at SCC since 1995.

The other staff member who is associated with the Engineering Program is Richard Crapuchettes. Richard has a B.S. from San Jose State University, and has been a technician for the Physical Sciences departments at SCC since 1987.

1.2 Relationship to College Mission and Strategic Goals. *Describe the program's relationship to the overall mission of the college.*

According to the SCC Mission Statement, "we are committed to helping our students achieve their educational, professional, and personal goals centered in basic skills education, workforce development and training, and transfer-level education". The Engineering program at SCC contributes to this third aspect of the College's mission by providing a firm foundation for students planning to transfer into a four-year engineering program.

Furthermore, "Solano Community College's mission is to educate a culturally and academically diverse student population drawn from our local communities and beyond". The Engineering Program complies with and contributes to this mission by having an intake that consists mainly of recent high-school graduates from Solano and Yolo Counties, as well as military personnel from Travis Air Force Base. Students who are accepted into our courses have a range of educational backgrounds and abilities. Our courses are carefully designed to help prepare these students for transfer to four-year programs, with particular attention paid to articulation of courses to the CSU and UC systems.

Table 1. SCC's Strategic Directions and Goals

Goal 1: Foster Excellence in Learning	Program Evidence
Obj. 1.1 Create an environment that is conducive to student learning.	The three main technical courses in the Engineering Department each consist of lecture sessions, one weekly discussion session, and, for two of the three courses, a laboratory session. The material is first presented in the lectures, after which the laboratory provides an opportunity for the students to reinforce and demonstrate their understanding. The discussion session provides an opportunity for the instructor to assess the students' grasp of the material and clarify any misconceptions. Homework assignments are generally given out weekly. The weekly discussion session is used to answer questions that have arisen in the students' attempts to solve the homework problems. Instructors provide rapid and detailed feedback to students on each homework assignment and test.

Obj. 1.2 Create an environment that supports quality teaching.	The Engineering Department typically employs full-time and adjunct teachers who possess Ph.D. degrees from leading universities (*i.e.*, Berkeley, Arizona), plus experience in industry or academic research. Consequently, these teachers have a mastery of the subject matter, and an understanding of how the material is used in practice. All teachers, whether full-time or adjunct, must demonstrate excellent teaching skills in their hiring interview. Teachers use student evaluations to identify areas that may need improvement.
Obj. 1.3 Optimize student performance on Institutional Core Competencies.	ICC 1B (writing) is developed through the writing of laboratory reports in ENGR 045. ICC ID (speak and converse) is developed through an oral presentation in ENGR 001. ICC 2A (analysis), ICC 2B (computation) and ICC 2D (problem solving) are each developed through solving homework problem sets in ENGR 017, ENGR 030, and ENGR 045.

Goal 2: Maximize Student Access & Success	**Program Evidence**
Obj. 2.1 Identify and provide appropriate support for underprepared students.	Students cannot register for Engineering courses unless they have taken and passed the required Mathematics and Physics prerequisites. Hence, underprepared students are identified and supported by those departments. For example, some engineering students who start to take the calculus-based physics sequence PHYS 006-007-008 are soon identified as not having the proper preparation, and are urged to take non-calculus PHYS 002 before attempting calculus-based PHYS 006. Similarly, students wishing to take Math courses must take placement tests to determine the level at which the can enter the sequence that leads up to the calculus courses that are required in the Engineering program.
Obj. 2.2 Update and strengthen career/technical curricula.	N/A
Obj. 2.3 Identify and provide appropriate support for transfer students.	Each of our four engineering courses articulate to most CSU and UC campuses. Our students are informed of transfer requirements by instructors and counselors.

	Extensive effort is expended by faculty to help students obtain summer internships at universities, national laboratories, and engineering companies, which will be of great advantage to them in eventually obtaining full-time jobs or being admitted to graduate school. Recent internships have been obtained, for example, at Lawrence Berkeley Lab, Sandia National Lab, the Stanford Linear Accelerator Center, and the Colorado School of Mines.
Obj. 2.4 Improve student access to college facilities and services to students.	Many, if not most, of our students work outside of college. Hence, we offer all of our engineering courses at the main Fairfield campus, allowing students to avoid having to commute between campuses to take all of their required courses, and minimizing the time spent other than in class or at work.
Obj. 2.5 Develop and implement an effective Enrollment Management Plan.	Our Engineering classes are carefully scheduled, in conjunction with the relevant classes taken by our students in other departments (Math, Chemistry, Physics, *etc.*) to allow students to complete their transfer requirements in a timely and efficient manner, so as to minimize attrition. An Engineering Program flyer has been prepared and distributed at various events involving high school students. New course degree pages (see SCC 2016-2017 Course Offerings Full Document) for Physics and Engineering were designed that explain the pathway through the program, and highlight the success of some of our recent students. Our admission policy is that any and all students who meet the prerequisites are welcomed into our program; this often takes the form of giving encouragement and positive feedback to inquiries from potential students.

Goal 3: Strengthen Community Connections	**Program Evidence**
Obj. 3.1 Respond to community needs.	Our Engineering Program serves as a major source of engineers and scientists for the local and state economy. Employers of our recent graduates include Applied Aerospace Structures, Biosense Webster, California Dept. of Water Resources, Chevron, Cisco Systems, Conoco Philips, Lockheed Martin,

	Northrup-Grumman, Pacific Gas & Electric, Powers Engineering and Inspection Co, U.S. Army Corps of Engineers, U.S. Naval Air Systems Command, and Worley Parsons, to name a few. Many Engineering students are in the MESA program, and participate in community-based projects there.
Obj. 3.2 Expand ties to the community.	We occasionally invite visitors from industry and academia to give presentations to our classes. For example, in Fall 2013, two scientists from Stanford Linear Accelerator spoke to our students. We regularly have organized groups of local high-school students visit our classroom and perform laboratory experiments. Melanie Lutz was an invited speaker at the monthly meeting of the Solano County Taxpayers Association in May 2013. Richard Crapuchettes regularly participates in outreach activities, such as the EPIC Spring Science Day (annually since 2006), the Kaiser Family Wellness Day (September 2012), and Celebrate SCC on April 27, 2012, each of which were attended by numerous high school students. Articles about the Engineering program and its students appear regularly in *The Tempest* and other local newspapers.

Goal 4: Optimize Resources	**Program Evidence**
Obj. 4.1 Develop and manage resources to support institutional effectiveness.	We utilize our allotment of General Funds to purchase crucial laboratory consumables and to upgrade our lab equipment as needed.
Obj. 4.2 Maximize organization efficiency and effectiveness.	The three main Engineering courses (ENGR 017, ENGR 030 and ENGR 045) are carefully scheduled, in conjunction with those related courses in other departments that are taken by our students, to optimize enrollment, and allow for rapid and efficient progression.
Obj. 4.3 Maintain up-to-date technology to support the curriculum and business functions.	Computers that are needed for laboratories are updated every five years. Software and other laboratory equipment are updated as needed. For example, the data logging software to control thermocouples in the phase diagram experiments the ENGR 045 was recently updated.

1.3 Enrollment. *Utilizing data from Institutional Research & Planning, analyze enrollment data.*

Enrollment data for the four courses offered by the Engineering Department are summarized in the table below, on a semester-by-semester basis.

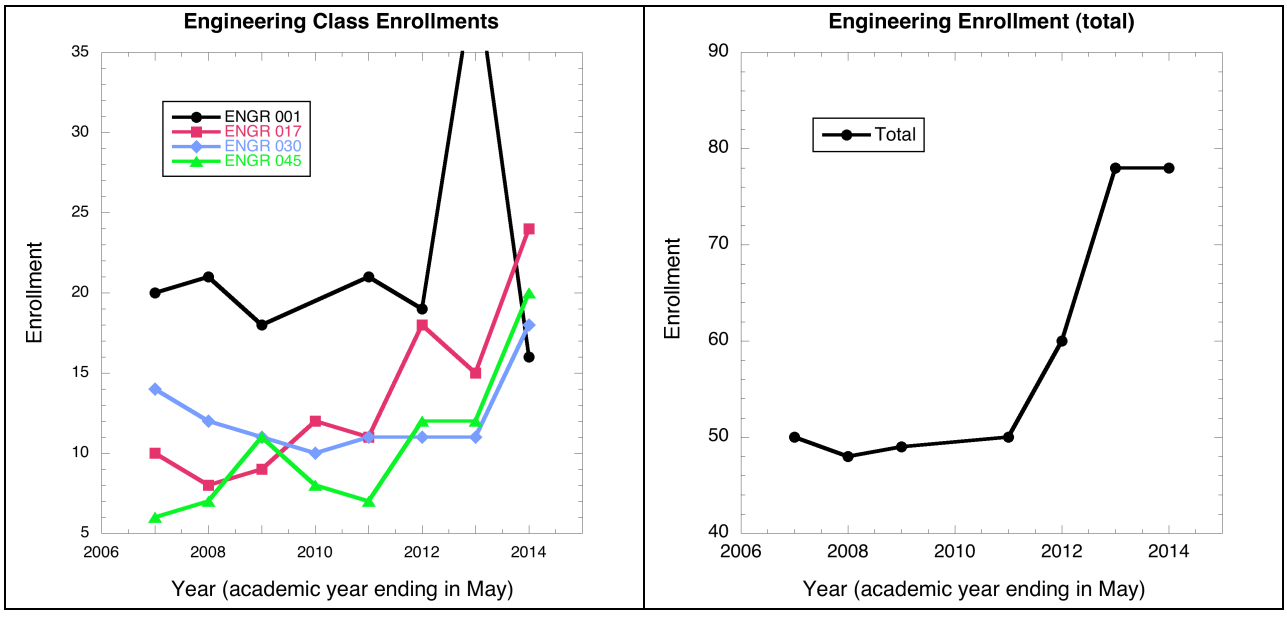
	Fall 10	Spring 11	Fall 11	Spring 12	Fall 12	Spring 13	Fall 13	Spring 14
Courses	3	1	3	1	3	2	3	1
Headcount	39	11	42	18	48	30	54	24
FTES	3.6	2.6	4.5	4.2	4.7	4.0	6.3	5.6

It is easier to interpret this information if the data are binned by academic year, starting in the Fall semester, as is done in the following table:

	2010-2011	2011-2012	2012-2013	2013-2014
Courses	4	4	5	4
Headcount	50	60	78	78
FTES	6.2	8.7	8.7	11.9

The clear conclusion that can be drawn from the enrollment data is that the number of courses offered in the Engineering Department has been stable, whereas the enrollment, as measured by headcount or by FTES, has been steadily increasing.

The enrollment data are plotted below, binned as in the table above, with, for example, the enrollments for Fall 2010 and Spring 2011 added together and plotted for "2011". (ENGR 001 was taught twice in the Fall 2012/Spring 2013 academic year, which accounts for the spike in the course-by-course enrollment data. However, the total enrollment in the additional section was deemed to be insufficient to justify offering this course twice a year in the future.)



These data should be interpreted in light of two other statistical measures. According to data collected by the National Science Foundation, the number of B.S. degrees awarded in Engineering, to US citizens and permanent residents, has been growing recently at about 5% per year (http://www.nsf.gov/statistics/wmpd/2013/race.cfm). Our FTES count, on the other hand, has recently been growing at about 30% per year. The other statistic to mention is that while our FTES count has doubled over the recent reporting period, the total FTES count for the College as a whole has *decreased* by 21%. Hence, the health of the Engineering program, as measured by FTES, has outperformed the College as whole, and has outperformed the nation-wide trend in engineering enrollment.

As another metric to judge the size of our Engineering program, note that according to the Fall 2015 Engineering Liaison Council Community Colleges Segment Enrollment Survey, of the five Northern California Community Colleges (Chabot, Las Positas, Monterey, Ohlone, San Mateo) that are of roughly the same size as SCC (*i.e.,* between 12,000-19,000 students; enrollment data from http://datamart.cccco.edu/datamart.aspx), and for which data are available, the number of students taking the Statics course (a key course for transfer; known as ENGR 030 at SCC) was 19, 21, 20, 20, 21, respectively, which is very close to our enrollment of 19.

1.4 Population Served. *Utilizing data obtained from Institutional Research and Planning, analyze the population served by the program (gender, age, and ethnicity) and discuss any trends in enrollment since the last program review.*

Women are under-represented, relative to their proportion of the student-age population as a whole, in engineering programs throughout the country. This fact is well known, and has been the subject of studies and debates for several decades. Our department is no exception to this pattern. As the issue is a pervasive nation-wide problem, it does not seem likely that it can be successfully addressed on the scale of any individual community college program. The best that we can hope for is that women are not under-represented in our department relative to engineering departments as a whole.

Bearing in mind the difficulties in performing any sort of statistical analysis on small data sets, we have binned the data according to academic year, to create more statistically meaningful data sets, and to avoid comparing "apples to oranges" by comparing Spring to Fall sessions. In the following table, we have combined the data from each successive Fall-Spring pair, and weighted the data by headcount, rather than simply averaging the Fall and Spring percentages, which would be simpler, but mathematically incorrect (although both methods would yield the same results for this data set, rounded to the nearest percentage point).

	2010-2011	2011-2012	2012-2013	2013-2014
Female	9%	8%	17%	15%
Male	91%	92%	81%	79%
Not reported	0%	0%	2%	6%
Total	100%	100%	100%	100%

These numbers show that our enrollment has been about 12% female over the past four years, although on a clear upward trend. As gender data were not asked for or reported in the previous program review, we cannot comment on any possible trend going back further in time. To provide context, note that the percentage of Associate Degrees in Engineering that are awarded to women, nationwide (*Women in Community Colleges: Access to Success*, A. St. Rose and C. Hill, AAUW, Washington, D.C., 2013), was 14% in 2010. The above data seem to show that the percentage of female students taking our engineering courses is roughly in line with the nationwide average.

A similar analysis with regards to the ethnicity of our students again shows that our numbers are roughly in line with expectations, based on national statistics. The following table shows the ethnicity of students taking Engineering classes, binned by academic year, and re-normalized so as to ignore the category of "other", since there is no sensible way to make comparisons if this un-knowable category is included in the data. The right-most column shows the average for all of SCC, over the reporting period.

	2010-2011	2011-2012	2012-2013	2013-2014	SCC
White	43%	38%	39%	36%	39%
Hispanic	13%	21%	29%	27%	23%
Black	4%	8%	5%	5%	18%
Asian or PI	33%	29%	22%	29%	19%
Amerindian	6%	4%	5%	3%	1%
Total	100%	100%	100%	100%	100%

These data show that white and Hispanic students take our Engineering classes at a rate nearly equal to their representation in the College as a whole, whereas Asian students take our Engineering courses at a rate in excess of their proportion of the College population, and Black students take our Engineering courses at a rate far below their proportion of the College population. These results are roughly in accord with nation-wide statistics (http://www.nsf.gov/statistics/wmpd/2013/race.cfm) that show, for example, that Blacks constitute 15% of the college-age US population, but receive only about 4% of all bachelor's degrees in Engineering, whereas Asians, on the other hand, constitute only 5% of the college-age US population, but receive about 12% of all bachelor's degrees in Engineering.

There are numerous clubs and programs on campus, such as Mathematics, Engineering, Science Achievement (MESA), National Society of Black Engineers (NSBE), Society for the Advancement of Chicanos & Native Americans in Science (SACNAS), and Society of Hispanic Professional Engineers (SHPE), that are active in recruiting under-represented minority groups to study physical sciences and engineering, and aiding them in reaching their goals.

The age profile of students taking Engineering classes is shown in the table below. As with the data presented above for ethnicity and gender, the data have been grouped by academic year, and then binned by age group. The right-most column shows the data for SCC as a whole, averaged over the period 2010-2014. (http://californiacommunitycolleges.cccco.edu/collegeDetails.aspx?collegeID=281&txt=Solano%20Community%20College). Note that the percentages in each column do not always add to 100%, due to round-off.

Age group	2010-2011	2011-2012	2012-2013	2013-2014	SCC
0-17	5%	4%	4%	4%	5%
18-25	80%	70%	77%	76%	59%
26-30	7%	15%	13%	11%	11%
31-35	5%	6%	3%	5%	6%
36-40	2%	2%	3%	2%	5%
41-45	0%	0%	0%	0%	4%
46-	2%	4%	0%	2%	9%
Total	100%	100%	100%	100%	100%

The age profile of Engineering students is slightly younger than that of the College as a whole. For example, 80% of students taking Engineering classes are twenty-five years old or younger, whereas only 64% of the total SCC student body falls into this age group. At the upper age brackets, only 2% of Engineering students are over forty years of age, whereas 13% of all SCC students are in this age group. This difference is probably attributable to older students tending to return to college for retraining in technical areas such as Welding or Biotech, or fields such as Nursing, rather than as preparation for transfer to four-year programs such as Engineering.

1.5 Status of Progress toward Goals and Recommendations. *Report on the status of goals or recommendations identified in the previous educational master plan and program review.*

Table 2. Educational Master Plan

	Educational Master Plan	Status
1.	Develop an Engineering/Math MATLAB course, MATH/ENGR 026.	A new 4-unit course, MATH/ENGR 026: Math and Engineering Problem Solving with MATLAB, was designed by Melanie Lutz and Darryl Allen in 2014, and is currently being reviewed by the Curriculum Committee.
2.	Explore the possibility of expanding ENGR 001, Introduction to Engineering, from a 1-unit to a 3-unit course.	The pros and cons of expanding ENGR 001, Introduction to Engineering, from a 1-unit to a 3-unit course are being discussed within the Department.
3.	Create an Associate in Science Degree in Engineering.	A new Associate in Science Degree in Engineering was designed by Melanie Lutz, approved by Dean Yu, and is currently being reviewed by the Curriculum Committee.
4.	Investigate the possible need for an Engineering/Math Computer Lab	The only course that might require extensive computer use is the new MATLAB course, MATH/ENGR 026. Upon investigation, it was found that this course will be taught in a room in Bldg 1500 that is already equipped with laptops, and so the computer lab is not needed.

Table 3. Program Review Recommendations

Although there was no previous program review for the Engineering Program *per se*, Engineering was included in the 2010 Program Review for the Physical Sciences. The following table lists the sole recommendation from the 2010 Program Review that was relevant to Engineering, and the status of this goal.

2010 Program Review	Status
1. No cancellation of any course that is offered only once a year, so that students can count on Solano as a viable institution for their educational goals and can satisfy transfer agreements.	None of the four Engineering courses, ENGR 001, ENGR 017, ENGR 030, and ENGR 045, have been cancelled during the last five years, and have each been taught at least once each year during the period covered by this review.

1.6 Future Outlook. *Describe both internal and external conditions expected to affect the future of the program in the coming years.*

The Engineering Program *per se* functions with two instructors, Dr. Lutz and Dr. MacMullen. As the size of the program is expected to remain essentially stable, with perhaps a slight growth, over the next five to ten years, and in light of the relatively small size of our department, there should be no need for any growth in the number of academic staff. However, it is likely that Dr. MacMullen will retire within the next five-ten year period, in which case he would need to be replaced.

All of our transferring Engineering students take at least as many Math and Physics courses at SCC as they do Engineering courses. Hence, the viability of our Engineering program is crucially dependent on maintaining the Physics and Math Programs.

A new A.S. degree in Engineering has been developed, was approved by the Dean, and was submitted to the Curriculum Committee in Fall 2014. As an A.S. degree is not needed for transfer, the effect of this new degree on our enrollment numbers is difficult to predict.

The inquiry-based learning offered to our students in the laboratory components of our courses is heavily dependent on having a skilled, dedicated technician. The current technician, Richard Crapuchettes, will probably retire within the next ten years, if not the next five years. It is imperative for the continued health of the Engineering Program that he be replaced by an equally experienced and skilled technician who will work exclusively for the Physical Sciences Departments, and not be shared with other departments.

According to the U. S. Bureau of Labor Statistics Employment Projections, nationwide engineering employment is expected to grow by only 7.4% over the eight-year period of 2012-2020. This growth rate is barely 1% per year, *i.e.*, essentially stable. On the other hand, there is a commitment on the part of the UC and CSU systems to admit more transfer students into their four-year degree programs. Overall, the most reasonable expectation is that the size of our program will remain stable, or grow slightly, over the next five years.

The main threat to the Engineering Program is the fact that it has been under constant threat of Program Discontinuance. This decision was first announced by the administration in June 2011, and continues to this day. Furthermore, if students cannot be certain that the program will exist for the entire duration of their community college studies, they will very likely look to other nearby community colleges to fulfill their transfer requirements.

As part of the Program Discontinuance Process, and in accordance with Policy 6105, the Engineering faculty prepared a program self-study in 2011. This self-study provided extensive evidence of the success of our program, and the esteem in which it is held by current and former students, and by the local business and educational community. The self-study document, which includes testimonials and letters of support from twenty-one current and former students, the Deans of Engineering at UC Berkeley, UC Davis and Sacramento State, the president of the California Society of Professional Engineers, and U.S. Congressman John Garamendi, is attached to this Program Review as an Appendix.

Curriculum Development, Assessment, and Outcomes

Program Level Outcomes

2.1 *Using the chart provided, list the Program Level Outcomes (PLOs) and which of the "core four" institutional learning outcomes (ILOs) they address.*

Table 4. Program Level Outcomes

Program Level Outcomes	ILO (Core 4)	How PLO is assessed
1. Students will demonstrate conceptual and/or analytical problem-solving skills.	IID. Problem Solving	Percentage of students who complete the course with a grade of C or better should exceed 70%; this is measured for all four Engineering courses
2. Students will learn how to carry out experiments and critically assess their data. Students will learn the role of hypotheses, measurement and analysis in the development of scientific theory, as evidenced by laboratory reports.	IIA. Analysis	Percentage of students who achieve 70% or better on lab portion of course should exceed 70%; this is measured for the two courses that have a lab component, ENGR 017 and ENGR 045
3. Students will learn how to write a laboratory report or give an oral presentation.	IB. Write ID. Speak and Converse	Percentage of students who achieve 70% or better on lab portion of course should exceed 70%; this is measured for the two courses that have a lab component, ENGR 017 and ENGR 045

2.2 Report on how courses support the Program Level Outcomes at which level (introduced (I), developing (D), or mastered (M))

Table 5. Program Courses and Program Level Outcomes

Course	PL01	PL02	PL03
ENGR 001	I	N/A	N/A
ENGR 017	D	D	N/A
ENGR 030	D	N/A	N/A
ENGR 045	D	D	M

2.3 Utilizing table 6, describe the results of the program level assessments and any changes/planned actions made based on the outcomes of program level student learning assessments.

Table 6. Program Level Assessments

Program Level Outcomes		Date(s) Assessed	Results	Action Plan
1.	Students will demonstrate analytical and problem-solving skills.	Fall 2013	84% of students received a grade of C or better	To improve the performance of the remaining 16%, we should impress upon them the importance of regular attendance, and that learning is fundamentally their responsibility
2.	Students will learn how to carry out experiments and critically assess their data. Students will learn the role of hypotheses, measurement and analysis in the development of scientific theory, as evidenced by laboratory reports.	Fall 2013	89% of students received 70% or better on lab reports	To improve the performance of the remaining 11%, we should impress upon them the importance of regular attendance, and that learning is fundamentally their responsibility
3.	Students will learn how to write a laboratory report or give an oral presentation.	Fall 2013	89% of students received 70% or better on lab reports	To improve the performance of the remaining 11%, we should impress upon them the importance of regular attendance, and that learning is fundamentally their responsibility

2.4 *Describe any changes made to the program or courses that were a direct result of program level assessments.*

The action plan described above has been discussed by all faculty members, and has been implemented in all Engineering courses. Collaborative learning methods have been introduced by instructor Tom MacMullen. Groups of students are assigned to work on problems during the lecture part of the course. Dr. MacMullen is also developing an algorithm that students can use, along with a firm grasp of physical concepts, to solve engineering problems effectively and efficiently.

Student Learning Outcomes

2.5 *Describe the current status of SLOs in your program.*

Each Engineering course has a full updated set of SLOs. The SLOs for each course are revisited each year, and updated as necessary. Each SLO is assessed every time a course is taught. If deficiencies are uncovered, modifications are made in the course by the instructor, as they deem fit.

There are no Engineering courses with multiple sections, and so the issue of maintaining consistency in the SLO assessments for different sections of the same course does not arise.

2.6 *Review the course level SLOs completed by the program in the last year to ensure accuracy of information provided.*

The SLOs for ENGR 001 were changed in order to make them more specific and easier to assess. These changes will be implemented in Fall 2016.

2.7 *Describe any changes made to the program or courses that were a direct result of student learning outcomes assessments.*

As an example of a change in a course that was made as a result of analysis of the SLOs, in ENGR 001, the instructor decided to increase the amount of group learning activities in the class.

Curricular Offerings

2.8 Course offerings*. Attach a copy of the course descriptions from the most current catalogue. Include a discussion of courses offered at Centers (Vacaville, Vallejo, Travis) and any plans for expansions/contraction of offerings at the Centers.*

The following four courses are taught in the Engineering Department:

ENGR 001 1.0 Units
Introduction to Engineering
Course Advisory: Eligibility for English 001 and SCC minimum Math standard.
This course is a first, non-technical course for engineering students and students considering majoring in engineering. Introduction to different engineering fields, the campus life of engineering students, schedule guidelines, opportunities in engineering, engineers' roles in society, ethics in engineering, and strategies and approaches required to survive math, science, and engineering courses. Possible field trips.
One hour lecture.

ENGR 017 5.0 Units
Introduction to Electrical Engineering
Corequisite: MATH 023 Prerequisite: PHYS 007 with a minimum grade of C.
Course Advisory: Eligibility for English 001.
This course is required for engineering majors, the course presents a study of basic circuit analysis techniques including Kirchhoff's laws, mesh-current, node-voltage, Thevenin and Norton equivalent; transient and steady-state responses of passive circuits; sinusoidal steady-state analysis; power calculations; operational amplifier; semiconductor devices. Weekly homework assignments and written tests, including a comprehensive final examination and lab reports, will be used to evaluate student success.
Four hours lecture, three hours lab.

ENGR 030 4.0 Units
Engineering Mechanics: Statics
Prerequisite: A minimum grade of C in each MATH 021, and PHYS 006.
Course Advisory: Eligibility for English 001.
This course, which is required for engineering majors, presents a study of the principles of statics of particles and rigid bodies as applied to equilibrium problems of two and three-dimensional structures, and the principles of friction, virtual work, and stability of equilibrium.
Four hours lecture.

ENGR 045 4.0 Units
Properties of Materials
Prerequisite: PHYS 006 and CHEM 001.
Course Advisory: Eligibility for English 001.
This required course for engineering majors covers the application of basic principles of physics and chemistry to the structure and properties of engineering materials. Special emphasis is devoted to the relationship between microstructure and the mechanical properties of metals, polymers and ceramics, and the electrical, magnetic, and optical properties of materials. Possible field trips.
Three hours lecture, three hours lab.

Each of these four courses is taught in face-to-face mode. No individual courses have been added or discontinued since the last program review cycle. No courses are generally taught at the Vacaville or Vallejo Centers. ENGR 001 was offered at the Vacaville Center in Fall 2015. Enrollment numbers did not justify continuing this additional offering.

A new course in MATLAB programming, MATH/ENGR 026, has been designed, and is currently being reviewed by the curriculum committee.

The Engineering Department currently offers no degrees or certificates. However, in 2014, an AS degree in Engineering was developed and submitted to the Curriculum Committee. Successful completion of this degree will assure competence in lower division physics, chemistry and mathematics, provide an adequate background for employment in many technological and scientific areas, as well as providing a firm foundation for students planning to pursue a baccalaureate degree in Engineering.

The lower-division Engineering Core Courses that are included in this degree have been recommended by the Engineering Liaison Committee of the State of California, as a result of coordination between community colleges and the four-year colleges and universities throughout California. All of the math, science and engineering courses contained as part of our engineering program articulate to the CSU and UC systems. Although most engineering students transfer to a four-year university, those with an AS degree can also be employed in entry-level jobs that require two years of college-level science and math.

***2.9 Fill rates/Class size**. Discuss the trends in course fill rates and possible causes for these trends (include comparison/analysis of courses by modality if applicable).*

Fill rates for all Engineering courses over the past four years are shown in the following table, as fractions. The fractions are rounded to two decimal places, for ease of reading. The average fill rates by term are weighted averages, weighted according to the maximum enrollment for each class; they are not calculated by simply averaging the numbers in that column. Note that no Engineering courses are taught during the Summer session.

	Fall 10	Spr 11	Fall 11	Spr 12	Fall 12	Spr 13	Fall 13	Spr 14	Average
ENGR 001	0.84	–	0.59	–	0.78	0.47	0.50	–	0.64
ENGR 017	–	0.40	–	0.60	–	0.50	–	0.80	0.58
ENGR 030	0.34	–	0.34	–	0.34	–	0.56	–	0.40
ENGR 045	0.27	–	0.43	–	0.40	–	0.67	–	0.44
Average	0.49	0.40	0.46	0.60	0.51	0.48	0.58	0.80	0.54

Our program-wide fill rate by semester has fluctuated between 0.40 and 0.80, with an average of 0.54. Although the fill rate fluctuates from semester to semester, a linear least-squares fit to the data shows an upward slope of +4.9%/year. Another positive point to note is that the fact that our classes tend not to be overfilled allows us to provide the one-to-one instruction and mentoring that is the hallmark of our program.

***2.10 Course sequencing.** Report on whether courses have been sequenced for student progression through the major, how students are informed of this progression, and the efficacy of this sequencing.*

The three main engineering courses, ENGR 017, ENGR 030 and ENGR 045, can themselves be taken in any sequence. Demand for these courses is not sufficient to allow any of them to be taught more than once each year. However, some constraints are imposed by the scheduling of pre-requisite course in other departments, and by the need to spread out the load on the laboratory technician.

For example, PHYS 007, which is a pre-requisite for ENGR 017, is only taught in the Fall. Hence, in order to allow efficient progression through the engineering sequence, ENGR 017 is offered in the following Spring. In order to balance the load on the laboratory technician, the other engineering course that has a laboratory component, ENGR 045, is therefore taught in the Fall.

All engineering students are made aware of this sequencing by Counselors, and by the teaching faculty. Our schedule has proven to allow rapid and efficient progression and transfer to four-year programs.

***2.11 Basic Skills* (if applicable).** *Describe the basic skills component of the program, including how the basic skills offerings prepare students for success in transfer-level courses.*

There is no basic skills component to any of the courses in the Engineering program.

2.12 Student Survey. *Describe the student survey feedback related to course offerings.*

In accordance with the Program Review Handbook, student surveys were distributed in ENGR 017 in Spring 2014. The response rate was 96% (23/24). The survey consisted of fourteen questions. The responses indicated that our students generally approve of the timing, location and mode of our course offerings. A copy of the survey is appended at the end of this report.

With regards to location of classes, 91% (21/23) preferred Fairfield, 13% (3/23) preferred Vallejo, and 0% (0/23) preferred Vacaville. (Some students indicated more than one preference; hence, the totals add to more than 100%). There is clearly little interest in Engineering courses being offered at the satellite campuses. Given the current overall demand for our classes, adding sections at the satellite campuses does not seem feasible at the current time, as it would only serve to siphon off students from our offerings at Fairfield.

In response to a question regarding expansion of the courses offered (*i.e.*, new courses, not additional sections of existing courses), 91% (21/23) of respondents indicated an interest in a MATLAB course, 78% (18/23) of respondents indicated an interest in a C++ programming course, and 57% (13/23) of respondents indicated an interest in a drafting/CAD course. All of these interests have subsequently been addressed in a satisfactory manner. A new MATLAB course, MATH/ENGR 026, was designed and submitted to the Curriculum Committee in 2014. The course CIS 022, Introduction to Programming, had previously been taught using a different programming language, C#. In response to the Student Surveys, and after discussion with the Computer Science Department, this course is now based on C++. The existing course DRFT 045: Introduction to Computer-Aided Drafting (CAD), has been listed as a recommended elective course in the new Engineering AS degree, and it will be available to all engineering students.

With regards to scheduling of classes, 78% (18/23) of respondents said that it was very important that there be no scheduling conflicts between Engineering classes and upper-level Math classes, and 48% (11/23) of respondents said that it was very important that there be no scheduling conflicts with upper-level Chemistry classes.

***2.13 Four-year articulation* (if applicable).** *Utilizing the most current data from the articulation officer, and tools such as ASSIST.org, state which of your courses articulate with the local four-year institutions.*

All four of the courses taught in the Engineering Department, ENGR 001, ENGR 017, ENGR 030, and ENGR 045, articulate to most campuses and engineering programs of the CSU and UC systems.

***2.14 High school articulation* (if applicable).** *Describe the status of any courses with articulation/Tech Prep agreements at local high schools.*

As all four of the courses taught in the Engineering Department are college-level, we have no articulation agreements with local high schools.

***2.15 Distance Education* (if applicable).** *Describe the distance education courses offered in your program, and any particular successes or challenges with these courses. Include the percentage of courses offered by modality and the rationale for this ratio.*

Currently, no engineering courses are offered online; all are offered only in face-to-face mode. This is in accord with the overwhelming sentiments expressed by our students in the Student Surveys. According to the surveys, 96% (22/23) of our Engineering students preferred face-to-face mode, only 9% (2/23) preferred hybrid mode, and 0% (0/23) preferred online mode; one student indicated two preferences, causing the total to exceed 100%. There is clearly no appreciable demand to change our current mode of face-to-face course delivery. Faculty continue to monitor this situation, in light of the Online Education Initiative and other college-wide programs.

***2.16 Advisory Boards/Licensing (CTE)* (if applicable).** *Describe how program curriculum has been influenced by advisory board/licensing feedback.*

The Engineering Program currently has no external advisory board. Our main purpose is to prepare students for transfer, and the key requirement for doing so is that our courses articulate to the CSU and UC systems. As mentioned above, our courses do articulate to most CSU and UC engineering majors. Our curricula are reviewed regularly to ensure that our articulation and TAG agreements are up to date. This does not require input from an advisory board.

Student Equity & Success

3.1 Course Completion and Retention. *Anecdotally describe how the program works to promote student success.*

Our small class sizes provide the opportunity for individual mentoring of students. We collaborate with Counseling to help students succeed in reaching their goals to transfer as

quickly and efficiently as possible. Accommodations are made for any DSP student, to provide learning modalities that are recommended by the DSP counselors. Copies of all textbooks are kept on reserve in the library, to allow accessibility to those students who cannot afford to purchase the textbook.

The needs of under-prepared students are addressed in ENGR 001. As shown in the course outline of ENGR 001, topics covered include Successful study skills, Communication skills (including Word processing, equation editors, spreadsheets, and graphics), and Concepts of problem solving.

The Engineering Program has long-standing Transfer Agreements (TAGs) with UC Davis, in all areas of engineering, and we routinely transfer students into the UC Davis Engineering Program.

Collaborative learning methods are used in ENGR 001 by instructor Tom MacMullen. Groups of students are assigned to work on problems during the lecture part of the course. Dr. MacMullen is also developing an algorithm that students can use, along with a firm grasp of physical concepts, to solve engineering problems effectively and efficiently.

Two of the three main engineering courses, ENGR 017 and ENGR 045, contain laboratory sessions to provide the students with hands-on experience, to complement the lectures. As discussed in the recent Educational Master Plan, we are currently gathering data and discussing the possibility of adding a laboratory component to ENGR 001.

The faculty members in the Engineering Department expend much time and energy in finding and obtaining summer internships for our students, usually at universities or governmental laboratories. Such internships, which are difficult to obtain, invariably prove to be an excellent educational experience for the student, and provide great motivation for them to continue to persevere in their studies. A list of these internships is given below, in many cases with links to articles in the SCC Tempest.

Student	Internship	Year
Dan Wiese	NASA Community College Aerospace Scholars Program http://www.solanotempest.net/news/2010/10/20/nasa-selects-scc-student-to-participate-in-onsite-program/	2010
Scott Berta	NASA Community College Aerospace Scholars Program	2011
Seth Cooley	NASA Community College Aerospace Scholars Program	2011
Jerica Duey	NASA Community College Aerospace Scholars Program	2011
Caleb Morrison	NASA Community College Aerospace Scholars Program	2012
Antonio Cruz	Sandia National Laboratory REU Internship	2012
Jerica Duey	Lawrence Berkeley National Laboratory CCI Internship	2012
Anthony Salazar	Colorado School of Mines REU Internship http://www.solanotempest.net/news/2015/03/18/internship-leads-to-presentation-64212/	2014
Andre Miranda	Stanford Linear Accelerator (SLAC) Internship http://www.solanotempest.net/news/2014/03/05/andre-	2014

	miranda-awarded-prestigious-internship-at-stanford-30499/	
Scott Paniccia	NASA Community College Aerospace Scholars Program http://www.solanotempest.net/news/2014/11/12/scc-engineering-student-secures-position-in-nasa-program-74292/	2014

As an additional incentive to our students, and to provide recognition of their achievements, Melanie Lutz established the Solano Community College Materials Science Scholarship, which is awarded annually to the best student in ENGR 045 (Properties of Materials). Dr. Lutz donates $100 each year to fund this award. Recent winners have been as follows:

2010: Seth Cooley
2011: no award
2012: Zvi Davidoff
2013: Alec Murchie
2014: Anthony Salazar

The following table shows the success rate, defined as the fraction of students who obtained a grade of C or better, term-by-term for those terms within the reporting period, and broken down into various sub-categories of gender, ethnicity, and age. To avoid having too many age groups with very small populations, the age distribution has been divided into two groups, intended to represent "traditional college age", ages 0-25, and "older students", ages 26 and older.

	F 10	S 11	F 11	S 12	F 12	S 13	F 13	S 14	Overall
Total	0.72	0.91	0.79	1.00	0.75	0.77	0.70	1.00	0.79
Male	0.74	0.90	0.79	1.00	0.74	0.75	0.67	1.00	0.78
Female	0.50	1.00	0.75	1.00	0.75	0.83	1.00	1.00	0.79
Amerindian	1.00	1.00	1.00	1.00	1.00	–	0.80	1.00	0.92
Asian	0.67	0.50	1.00	1.00	0.82	1.00	1.00	1.00	0.88
Black	0.50	–	0.40	–	1.00	0.00	0.50	1.00	0.50
Hispanic	0.55	1.00	0.75	1.00	0.77	0.73	0.64	1.00	0.73
White	0.83	1.00	0.76	1.00	0.69	0.67	0.64	1.00	0.78
0-25 yrs old	0.68	0.89	0.81	1.00	0.76	0.77	0.72	1.00	0.83
26+ yrs old	0.60	0.91	0.71	1.00	0.70	0.75	0.50	1.00	0.78

As mentioned previously, breaking the data into sub-categories and semesters exacerbates the difficulties in trying to interpret small data sets. Moreover, any semester-by-semester fluctuations probably reflect the facts that different courses have different success rates, and the same set of courses are not taught in each semester.

So, to shed more light on the success rate data, the rates have been recalculated for the entire four-year period, weighted student-by-student, with these results plotted in the right-

most column (see table above). Please note that the success rates reported in this column are not obtained by averaging across each row; the success rates in each semester is first weighted by the number of students in that semester who fall into the given sub-group.

The overall success rate has been more or less stable in time, at about 79%, with no discernible upward or downward trend. Success rates for male and female student are essentially identical. The success rate for Engineering students is about 10% higher than that for SCC as a whole. The success rate for white students is essentially equal to the mean success rate of all students; the success rate for Asian students is about 10% above the mean; the success rate for Hispanic students is slightly below the mean; and the success rate for Black students is substantially below the mean, albeit based on a very small total student population of twelve. It is difficult to know if these slight differences are statistically meaningful, although the relative success rates agree with national trends, and correlate with the fact that Black and Hispanic students are traditionally economically and educationally disadvantaged in our society. It should also be noted that the deficit in the success rate of Black students amounted to only three students over the past four years, *i.e.*, less than one per year. For Hispanic students, the shortfall in success rate (*i.e.*, the difference between 73% and 79%) amounted to only four students, *i.e.*, only one per year.

The average success rate for student of "traditional college age", defined here as being 25 or younger, was 83%, whereas the success rate for "older students", defined here as being 26 or older, was 78%. This slight difference is probably not statistically meaningful, as the total deficit of successful outcomes for older students amounted to only two non-successes out of 46 attempts, over four years.

Most (60%) of the students who fall into the category of "not succeeding" completed the course, but did not received a grade of C or above, whereas 40% of the "not succeeding" students withdrew from the course. However, the success rate was much lower in Introduction to Engineering (ENGR 001) than in the three subsequent Engineering courses, ENGR 017, ENGR 030, and ENGR 045. The withdrawal rate is actually 19% in ENGR 001, and only 1% in the other three Engineering courses. Likewise, the proportion of students who complete the course with a D or F grade is 24% in ENGR 001, but only 5% in the other three engineering courses. It is understandable and somewhat unavoidable that there will be a sizable attrition rate in a course such as "Introduction to Engineering", which attracts students who are contemplating going into Engineering, but are not yet sure if this is the right path for them.

3.2 Degrees/Certificates Awarded (if applicable).

Include the number of degrees and certificates awarded during each semester of the program review cycle. Describe the trends observed and any planned action relevant to the findings.

As mentioned above, at the time of the preparation of this program review self-study, SCC does not award any degrees or certificates in Engineering. A new AS degree in Engineering has been proposed, and is currently under review by the curriculum committee. If it is approved, it will likely start in Fall 2017.

However, it should be reiterated that our students are mainly, with very few exceptions, interested in transferring to a four-year institution, and this process does not require an AS degree. Furthermore, there has traditionally been little if any demand from students at SCC

to obtain an AS degree as a *terminal* degree in engineering. Nevertheless, 65% (15/23) of the respondents to the Student Survey indicated that they "would be interested in obtaining an AS degree in Engineering". With these points in mind, it is difficult to predict the extent to which our future students will pursue the new AS degree in Engineering.

3.3 Transfer (if applicable).

The main purpose of our Engineering program is to prepare students to transfer to an Engineering program at a four-year institution. The following table shows the total number of transfers, each year, amongst the cohort of students who took at least one Engineering course. Most of these students transferred to an Engineering program; a small number transferred to Physics, Mathematics or Computer Science programs.

	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	Total
Transfers	9	5	16	14	19	63

All Engineering students at SCC are well aware of transfer opportunities and requirements, which are discussed with them by Counseling and by faculty in the department. In particular, they will be informed of the new Transfer Pathways scheme that has been started by the UC system. Currently, our students who satisfy the requirements of the TAG agreement with UC Davis already satisfy the UC Transfer Pathways for Mechanical and Electrical Engineering, the only majors for which these pathways have been established, as of September 2016 (http://admission.universityofcalifornia.edu/counselors/q-and-a/transfer-pathways/index.html.) All students who complete our new Engineering AS degree will automatically satisfy the UC Transfer Pathway requirements for Mechanical Engineering and Electrical Engineering. As of yet, the CSU system does not yet have a transfer degree template.

According to the California Postsecondary Education Commission (as quoted in paper AC-2011-188, A. G. Enriquez, Cañada College, American Society for Engineering Education), among the 101 California community colleges that have an engineering program, the median number of students to transfer to a four-year engineering program, per year, is 17. Our transfer rate for the period 2012-2014 has been 16.5 per year, which is exactly in line with the state median.

3.4 Career Technical Programs (if applicable).

The Engineering Department does not run a technical training program.

PROGRAM RESOURCES

***4.1 Human Resources**. Describe the adequacy of current staffing levels and a rationale for any proposed changes in staffing (FTES, retirements, etc.).*

For the past fourteen years, the three main technical courses in the Engineering Program, ENGR 017, ENGR 030 and ENGR 045, have been taught by one full-time

Engineering/Physics instructor, Melanie Lutz. Dr. Lutz earned a Ph.D. in Materials Science and Engineering from UC Berkeley, and has six years of experience as a process engineer in the semiconductor industry.

The other Engineering course, ENGR 001: Introduction to Engineering, is taught by adjunct instructor Tom MacMullen. Dr. MacMullen has a B.S. in Electrical Engineering from UC Berkeley, a Ph.D. in Physics from the University of Arizona, and experience working at the Concord Naval Weapons Station.

Our Engineering courses are therefore taught by instructors who have the highest possible academic training and credentials in engineering and/or physics, as well as practical experience in industry or the military.

The new MATLAB course, MATH/ENGR 026, will probably be taught by Darryl Allen of the SCC Math Department.

The configuration of teachers described above is sufficient for the number of courses that we will be offering during the next five years.

4.2 Current Staffing. *Describe how the members of the department have made significant contributions to the program, the college, and the community.*

Most of the teaching, and the entire administrative burden, of our small program is shouldered by a small number of faculty – one full-time faculty and one adjunct, both of whom split their effort between Engineering and Physics. This does not leave our faculty members much time for optional or extracurricular activities. Nevertheless, we have achieved some major accomplishments in the past few years.

Full-time Physics/Engineering Instructor Melanie Lutz designed the new Engineering AS degree, which was approved by Dean Yu, and was submitted for approval to the Curriculum Committee in Fall 2014.

Dr. Melanie Lutz designed the AS-T degree in Physics, which was approved in Spring 2014. She prepared the e-brochure for the Physics Program in Spring 2014. She chaired the hiring committees for a full-time and part-time Physics/Astronomy instructor in 2014 and 2015, respectively.

Dr. Melanie Lutz regularly reviews papers for scientific and engineering journals. During the period covered by this program review, she reviewed four papers: two for the *International Journal of Solids and Structures*, one for *Applied Mathematics and Computation*, and one for the *Zeitschrift für Angewandte Mathematik und Mechanik*.

Dr. Melanie Lutz also continues to do scientific research, and recently published the following paper, which can be downloaded from http://www.sciencedirect.com/science/article/pii/S0020722515001056:

> Effect of the Interphase Zone on the Conductivity or Diffusivity of a Particulate Composite using Maxwell's Homogenization Method, M. P. Lutz and R. W. Zimmerman, *International Journal of Engineering Science*, vol. 98, pp. 51-59, 2016.

***4.3 Equipment**. Address the currency of equipment utilized by the program and how it affects student services/success. Make recommendations (if relevant) for technology, equipment, and materials that would improve quality of education for students.*

Although most of our laboratory equipment is old, it is still functional, and suitable for its purpose. This equipment needs to be, and is, maintained and upgraded as needed.

Nevertheless, almost half (10/23) of the students who responded to the Student Survey mentioned something along the lines of "better functioning lab equipment" when asked the question "Do you have any suggestions for ways that the Engineering program could be improved?" Note that we submitted Instructional Equipment Requisition forms in 2013 and 2014 for new microscopes for ENGR 045, but these applications were not funded. We suggest that money be made available to regularly repair and calibrate equipment such as oscilloscopes and power supplies.

***4.4 Facilities**. Describe the facilities utilized by your program. Comment on the adequacy of the facilities to meet program's educational objectives.*

All of the Engineering classes are taught in room 302. This room is perfectly suited to our classes, which involve a mixture of lectures, demonstrations and laboratory work. The large desks function well as writing desks during lectures, and as laboratory benches. The proximity of these rooms to the prep room and equipment room is ideal for laboratories and demonstrations. The proximity of this room to the Bird Room allows students to efficiently use their study time between classes. Overall, after the refurbishments made in 2011 with Measure G funds, our facilities should suit the needs of the Engineering Department for many years to come.

As explained in the Educational Master Plan, the Engineering Department intends to remain in its current space in Building 300, as new space is not needed, and creating new facilities would not be an efficient use of taxpayer's money, when other programs are in more urgent need of new facilities. Moreover, 83% (19/23) of students reported in the student survey that they were "satisfied" or "very satisfied" with the lecture and laboratory facilities, and only 4% (1/23) were "dissatisfied" or "very dissatisfied"; 13% (3/23) were "neutral". Furthermore, as shown by the student survey, our students overwhelmingly prefer (91%; 21/23) to take their Engineering classes at the Fairfield campus.

For the longer term, the Engineering department faculty, along with the Physics and Astronomy Departments, have been advocating the construction of a new dedicated Physical Sciences building, which would include a domed planetarium. Astronomy is a growth area for the college, and can serve as an entry port into all of the physical sciences. An e-mail was sent to the Bond Manager and Governing Board on 12/18/15, and to President Esposito-Noy on 2/4/16, regarding this matter. Our present facilities will be entirely suitable until then.

***4.5 Budget/Fiscal Profile**. Provide a five year historical budget outlook including general fund, categorical funding, Perkins, grants, etc. Discuss the adequacy of allocations for programmatic needs. This should be a macro rather than micro level analysis.*

The following table shows the general funds budget for the Engineering Department over the past five years. These funds have been adequate to replace equipment and purchase consumables, but are not sufficient to replace major pieces of equipment that break or fail. The drastic decrease that our budget has suffered over the past four years must be reversed if we intend to maintain the quality of our laboratory experiments and demonstrations.

Category	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
Academic Salaries	$6,667	$3,285	$3,262	$50,477	$53,825
Classified Salaries	$0	$952	$0	$0	$0
Benefits	$626	$422	$1,028	$11,415	$11,730
Supplies	$1,123	$701	$(21)	$63	$0
Other operating	$0	$0	$0	$0	$0
Capital outlay	$0	$0	$900	$0	$0
Total	$8,416	$5,360	$5,169	$61,955	$65,555

PROGRAMMATIC GOALS & PLANNING

***5.1** Summarize what you believe are your program's strengths and major accomplishments in the last 5 years. Next, state the areas that are most in need of improvement.*

The main strength of our program is the excellent instruction and mentoring that we deliver to our students. According to the Student Survey, 70% (16/23) of respondents mentioned our "excellent teachers" as the Engineering Department's main strength, with specific comments such as "[teachers are] very passionate about the class", and "the professors care deeply about their students". Our relatively small class sizes, generally around twenty students per class, allow us to give our students individualized attention, providing them not only with knowledge transfer, but also with mentoring and career advice.

Our main success is helping to prepare our students for transfer to four-year programs. A very high proportion of our students successfully transfer to four-year programs. Moreover, many of the graduates of our program not only transfer to a four-year university and obtain a B.S. degree, most of them then either obtain productive and high-paying jobs in industry or with governmental agencies, or go on to graduate school.

The following table tracks the progress of students who pass through our Engineering program, as they transfer to a four-year school, receive a B.S. degree, get hired in an engineering-related position, *etc*. The information contained in this table is accurate, and is based mainly on personal feedback received from our former students, although it is not claimed to be exhaustive. Nevertheless, it clearly and dramatically illustrates the success of our program in training the future engineers of Solano County and northern California.

Student Tracking Data, 2010-2014		
2010		
Transfers	Seth Cooley	UC Davis, Mechanical/Aerospace Engineering
	Yosuf Hamkar	UC Davis, Civil Engineering
	Luis Hernandez	Sacramento State, Civil Engineering
	Kirk Lumaye	Sacramento State, Mechanical Engineering
	Michelle Morales	Sacramento State, Mechanical Engineering
	Karl Ono	Sacramento State, Civil Engineering
	Sidney Parker	Sacramento State, Mechanical Engineering
	Matt Salts	UC Davis, Mathematics
	Sukhdeep Singh	UC Davis, Civil Engineering
BS Degrees	Jeremy Conway	B.S., Mechanical Engineering, UC Davis
	Vaneet Lomba	B.S., Mechanical Engineering, UC Davis
	Hamid Massoud	B.S., Mechanical Engineering, UC Berkeley
	James Morad	B.S., Physics, UC Davis
	Charles Nichols	B.S., Civil Engineering, UC Davis
	Mohammad Osman	B.S., Mechanical/Aerospace Engineering, UC Davis
	Ben Pochop	B.S., Aerospace Engineering, San Diego State University
Beyond	Vaneet Loomba	Hired, Metier Consultants
	Hamid Massoud	Hired, Biosense Webster
	Mohammad Osman	Hired, Biruni Motors
	Sean Shaw	M.S., Civil Engineering, UC Davis Accepted, Ph.D. program, Civil Engineering, UCD
	Eric White	M.S., Civil Engineering, UC Davis Hired, Tam Consultants
2011		
Transfers	Douglass Adams	Sacramento State, Civil Engineering
	Jeremy Compton	San Jose State, Industrial Engineering
	Allen Fisher	Sacramento State, Electrical Engineering
	Daniel Pleau	Cal Poly San Luis Obispo, Electrical Engineering
	Chad Warren	UC Davis, Physics
BS Degrees	Scott Berta	B.S., Civil Engineering, UC Berkeley
	Daniel Fletcher	B.S., Mechanical Engineering, UC Davis
	Sana Vaziri	B.S., Electrical Eng & Computer Science, UC Berkeley
	Daniel Wiese	B.S., Mechanical/Aerospace Engineering, UC Davis
Beyond	Daniel Fletcher	Hired, Navair
	James Morad	Accepted, Ph.D. program, UC Davis, Physics

2012		
Transfers	Francis Ambion	UC Davis, Electrical Engineering
	Joshua Cox	UC Davis, Chemical Engineering
	Zvi Davidoff	UC Davis, Mechanical Engineering
	Dustin Davis	UC Merced, Physics
	Andrew Esberto	UC Merced, Mathematics
	Javier Flores	UC Davis, Electrical Engineering
	Jack Hooper	Sacramento State, Civil Engineering
	Sijie Lin	UC Davis, Computer Science
	Dylan Macy	Sacramento State, Mechanical Engineering
	Julio McClellan	Sacramento State, Electrical Engineering
	Caleb Morrison	UC Davis, Mechanical/Aerospace Engineering
	Silvia Murguia	UT San Antonio, Chemical Engineering
	Jesus Rives	UC Davis, Physics
	Jonathan Roldan	UC Davis, Civil Engineering
	Julio Sanchez	UC Davis, Electrical Engineering
	Khon Tram	UC Davis, Civil Engineering
BS Degrees	Seth Cooley	B.S., Mechanical/Aerospace Engineering, UC Davis
	Zach Dobson	B.S., Civil Engineering, UC Davis
	Kirk Lumaye	B.S., Mechanical Engineering, Sacramento State
	Sidney Parker	B.S., Mechanical Engineering, Sacramento State
	Gabriel Reyla	B.S., Computer Engineering, UC Davis
	Mark Rogers	B.S., Electrical Eng & Computer Science, UC Berkeley
	Sukhdeep Singh	B.S., Civil Engineering, UC Davis
Beyond	Jeremy Conway	M.S., Mechanical Engineering, UC Davis Hired, Applied Aerospace Structures
	Seth Cooley	Hired, SIGNa Chemistry
	Zack Dobson	Hired, Monterrey Mechanical Co
	Kirk Lumaye	Hired, O'Connor Engineering, Inc.
	Gabriel Reyla	Hired, IBM
	Sukhdeep Singh	Hired, Reiser Building Group
	John Tatyosian	P.E. License
2013		
Transfers	Galen Anderson	UC Davis, Bioengineering
	Jeremiah Cabugao	San Jose State, Electrical Engineering
	Antonio Cruz	UC Davis, Materials Science & Engineering
	Austin de Los Reyes	Sacramento State, Civil Engineering
	Jerica Duey	UC Berkeley, Materials Science & Engineering
	Edgar Guzman	UC Riverside, Electrical Engineering

	Dean Lukes	UC Davis, Computer Science
	Parsa Mahmoudieh	UC Berkeley, Mechanical & Electrical Engineering
	Calen Mclean	UC Santa Barbara, Mechanical Engineering
	Jeston Mitchell	Cal Poly San Luis Obispo, Electrical Engineering
	Alec Murchie	Missouri U of Sci & Tech, Ceramics Engineering
	Jimmyhee Quach	Cal Poly San Luis Obispo, Civil Engineering
	Timothy Trujillo	UC Riverside, Mechanical Engineering
	Robert Williams	Sacramento State, Civil Engineering
BS Degrees	Jeremy Compton	B.S., Industrial Engineering, San Jose State
	Yosuf Hamkar	B.S., Civil Engineering, UC Davis
	Michelle Morales	B.S., Mechanical Engineering, Sacramento State
	Karl Ono	B.S., Civil Engineering, Sacramento State
	Chad Warren	B.S., Physics, UC Davis
	Aaron Werneke	B.S., Electrical Engineering, Sacramento State
Beyond	Scott Berta	M.S., Civil Engineering, UC Berkeley
	Jeremy Compton	Hired, Cisco Systems
	Christian Des Champs	M.S., Civil Engineering, UC Davis Hired, Anderson Structural Group
	Yosuf Hamkar	Hired, The Gap
	Michelle Morales	Hired, US Navy
	Karl Ono	Hired, NV5 Consulting
	Sidney Parker	Hired, Royce Instruments
	Aaron Werneke	Accepted, M.S. program, Sacramento State, Electrical Engineering
	Daniel Wiese	M.S., Mechanical Engineering, MIT Continuing on for Ph.D., MIT, Mechanical Engineering
2014		
Transfers	Jesus Beltran	UC Davis, Electrical Engineering
	Sebastian Bloem	UC Davis, Computer Engineering
	Thomas Bock	Sacramento State, Electrical Engineering
	Arturo Castillo	Sacramento State, Civil Engineering
	Tyler Chilson	UC Davis, Mechanical & Electrical Engineering
	Justin Duhow	UC Davis, Mechanical Engineering
	Christopher Ellis	UC Davis, Computer Engineering
	Matt Escalante	UC Davis, Mechanical Engineering
	Ian Hellman-Wylie	Cal Poly San Luis Obispo, Electrical Engineering
	Joe Hennis	UC Davis, Computer Engineering
	Nestor Ibarra	Sacramento State, Mechanical Engineering
	Nathan Malley	Sacramento State, Computer Engineering
	Andre Miranda	UC Davis, Electrical Engineering

	James Robertson	Sacramento State, Physics
	Nick K. Sherman	UC Davis, Mechanical Engineering
	Ivan Soria	UC Irvine, Computer Engineering
	Shrishti Thakur	Sacramento State, Civil Engineering
	Natalie Wagner	UC Davis, Electrical Engineering
	Suwadi Yunior	San Francisco State, Electrical Engineering
BS Degrees	Joshua Cox	B.S., Chemical Engineering, UC Davis
	Zvi Davidoff	B.S., Mechanical Engineering, UC Davis
	Adam Douglass	B.S., Mechanical Engineering, Sacramento State
	Jack Hooper	B.S., Civil Engineering, Sacramento State
	Dylan Macy	B.S., Mechanical Engineering, Sacramento State
	Caleb Morrison	B.S., Mechanical/Aerospace Engineering, UC Davis
	Daniel Pleau	B.S., Electrical Engineering, Cal Poly San Luis Obispo
	Jesus Rives	B.S., Physics, UC Davis
	Jonathan Roldan	B.S., Civil Engineering, UC Davis
Beyond	Scott Berta	Hired, ConSol
	Joshua Cox	Hired, Powers Engineering and Inspection Co
	Zvi Davidoff	Hired, Chevron
	Jack Hooper	Hired, Foulk Civil Engineering
	Dylan Macy	Hired, Powers Engineering and Inspection Co
	Jesus Rives	Accepted, Ph.D. program, Rutgers Univ., Physics
	Mark Rogers	Accepted, M.S. program, SF State, Mathematics
	Sana Vaziri	Accepted, Ph.D. program, UC Davis, Computer Science
	Chad Warren	Accepted, Ph.D. program, UC Riverside, Materials Science

Although our laboratory equipment is just about sufficient for its purposes in regards to both quality and quantity, our ability to continue to update and replace the equipment as necessary is an ongoing concern. A fairly large fraction (43%, 10/23) of respondents to our student survey mentioned "lab equipment" as the area of the department most in need of improvement.

5.2 Based on the self-study analysis, prioritize the program's short (1-2 years) and long term goals (3+ years). In the source column denote "SP" for Strategic Proposals, "DB" for Department Budget, "P" for Perkins or "NR" for No Additional Resources Needed.

The self-study analysis has clearly indicated that the overall outlook for our program is for no major growth in the near future in terms of number of courses offered, or number of instructors needed. Enrollment in individual courses may exhibit modest gradual growth, particularly as fee increases render the CSU and UC systems more expensive. Both students and staff are satisfied with the existing space in Building 300 at the Fairfield campus. Students are also satisfied with the face-to-face mode of instruction used in all of our courses. The student survey indicated that the historical schedule should be maintained, with no conflicts with the relevant Math, Physics or Chemistry classes.

Overall, our laboratory equipment is appropriate for its purpose, although an ongoing budget is needed to replace equipment as it breaks down or fails. We have adequate technical support, although the current technician will probably retire in the not-so-near future, and must be replaced with equivalent staff as soon as that occurs. Our short-term and long-term goals for the program are listed in the table below.

Table 8. Short-Term and Long-Term Goals

Short-Term Goals	Planned Action	Target Date	Person Responsible	Source
1. Maintain current scheduling of classes	Scheduling is in progress	Ongoing	Melanie Lutz, subject to approval by the Dean	NR
2. Gain approval for course MATH/ENGR 026 (MATLAB)	Course proposal has been submitted to Curriculum Committee	Spring 2017	Melanie Lutz / Darryl Allen	NR
3. Continue to teach ENGR 017, ENGR 030 and ENGR 045 in Bldg 300 on Fairfield campus	Ongoing	Ongoing	Administration	NR

Long-Term Goals	Planned Action	Target Date	Person Responsible	Source
1. Create equipment budget for ENGR 017 and ENGR 045	Administration must restore budget	Fall 2017	Administration	DB
2. Replace technician upon his retirement	Will address when time comes	TBD	Administration	NR
3. Create maintenance fund for Physics/ Engineering classrooms in Bldg 300	A portion of Measure Q funds should be allocated for this purpose	Fall 2017	Administration	DB
4. Create new AS degree	Degree proposal has been submitted to the Curriculum Committee	Spring 2018	Administration	NR

The foregoing material, as well as the Program Discontinuance Self-Study attached to this report as an Appendix, has abundantly demonstrated the great success of the SCC Engineering Program in preparing students from Solano County to transfer to four-year Engineering programs, setting them on the path to productive engineering careers. The program's success can be attributed to the efforts of the faculty and staff, as evidenced by numerous quotes from the Program Discontinuance Self-Study, some of which are repeated here.

According to SCC graduate Christian Des Champs, who went on to be a 1st Lieutenant in the USAF, "The engineering program at Solano Community College is an excellent program that greatly aided my seamless transfer to UC Davis, where I graduated with a degree in Civil Engineering with High Honors. The mastery of the core subjects that I obtained while at SCC put me significantly ahead of my peers who started at UC Davis as freshmen. All of this is due to the excellent faculty and staff, and the one-on-one attention the professors made available for their students."

Sean Shaw, a former Solano student who is currently a Ph.D. student and teaching assistant at UC Davis, wrote that "I would say that the courses offered in the Engineering Program at SCC are superior to those taught at the undergraduate level at UC Davis". Former student Daniel Wiese, who went on to graduate from UC Davis and is now a PhD student at MIT, wrote that "I can say without doubt that the lower-division engineering courses taught at Solano Community College were the best courses I have ever taken". Jason Tolvtvar, an SCC graduate who transferred to Cal Poly San Luis Obispo, and went on to become a Senior Engineer at Lockheed Martin, attested that "when I transitioned to Cal Poly I found that I was very well prepared to take on upper division engineering work. I consistently out-performed most of my Cal Poly classmates, and I believe this was in large part due to the excellence of the education that I received from SCC Engineering".

Unfortunately, the great esteem in which this program is held by graduates and by the local community has not always been reflected in support for the Engineering Program by the SCC administration, which has kept the program under threat of Program Discontinuance for over four years. The main goal of the Engineering Program is to be permanently removed from the threat of Program Discontinuance, and to receive a commitment that this excellent program will be supported by the SCC administration.

Solano Community College Engineering Student Survey

The Engineering Department is undergoing program review this semester. The following questions are designed to help the department evaluate the overall program and its offerings. **If this current class is the only course you have taken in the Engineering Department, please respond to the questions based on this course. If you have taken more than one Engineering course, consider the questions in light of *all* the Engineering courses you have taken in this department.** If you have recently completed and submitted this survey in another Engineering class, please do **not** complete a second survey.

Please place crosses in the boxes as appropriate. Do not sign your name to this survey. All information that you provide in this survey will remain strictly confidential.

1. How many Engineering courses have you taken at Solano Community College (including this one)?
   - ☐ One
   - ☐ Two
   - ☐ Three
   - ☐ Four

2. In which Engineering course are you currently enrolled?
   - ☐ ENGR 001
   - ☐ ENGR 017
   - ☐ ENGR 030
   - ☐ ENGR 045

3. What is your major?
   - ☐ Engineering
   - ☐ Physics
   - ☐ Mathematics
   - ☐ Computer Science
   - ☐ Other: _____

4. What is your reason(s) for taking this class? (mark all that apply)
   - ☐ General education requirement
   - ☐ Required for major
   - ☐ Required for transfer
   - ☐ Professional development
   - ☐ Required for my current job
   - ☐ Prerequisite for another course
   - ☐ General interest
   - ☐ Fits my schedule
   - ☐ Other: _____

5. At which campus would you prefer to take your Engineering classes?
   - ☐ Fairfield (Main)
   - ☐ Vacaville
   - ☐ Vallejo

6. What were your reasons for choosing Solano Community College? (mark all that apply)
   - ☐ Location
   - ☐ Good programs/reputation
   - ☐ Availability of childcare
   - ☐ Availability of classes
   - ☐ Other: _____

7. How do you choose your classes? (mark all that apply)
   - ☐ Fits my schedule
   - ☐ Needed for my Major
   - ☐ Instructor's reputation
   - ☐ Friends' advice
   - ☐ Rate My Professor
   - ☐ Location

8. Would it be greatly inconvenient for you if one of your Engineering courses conflicted with any upper level math courses?
   - ☐ Yes
   - ☐ No

9. Would it be greatly inconvenient for you if one of your Engineering courses conflicted with any upper level chemistry courses?

- ☐ Yes
- ☐ No

10. By which mode would you prefer to take this course?

- ☐ Face-to-face
- ☐ On-line
- ☐ Hybrid

11. How satisfied are you with the quality of textbooks and instructional materials utilized in the Engineering Department?

- ☐ Very Satisfied
- ☐ Satisfied
- ☐ Neutral
- ☐ Dissatisfied
- ☐ Very Dissatisfied

12. How satisfied are you with the space and facilities in which the courses (lectures/labs/discussions) are taught?

- ☐ Very Satisfied
- ☐ Satisfied
- ☐ Neutral
- ☐ Dissatisfied
- ☐ Very Dissatisfied

13. Would you be interested in taking the following courses if they were available? (mark all that apply)

- ☐ Matlab
- ☐ Drafting/CAD
- ☐ C++

14. Would you be interested in obtaining an AS degree in Engineering?

- ☐ Yes
- ☐ No

15. Would you be interested in obtaining an AS degree in Engineering, if it required taking more classes than are required for transfer?

- ☐ Yes
- ☐ No

16. What are the Engineering Department's greatest strengths?

_____

_____

_____

_____

17. Do you have any suggestions for ways that the Engineering program could be improved?

_____

_____

_____

_____

Thank you! We appreciate your time, and your opinions are very valuable to us.

SIGNATURE PAGE

The undersigned faculty in the Engineering program have read, and concur with, the findings and recommendations in the attached program review self-study, dated December 31, 2015.

Dr. Melanie Lutz (full-time, Engineering/Physics)
Faculty Name

Melanie P. Lutz
Signature

Dr. Tom MacMullen (adjunct, Engineering/Physics)
Faculty Name

Signature

Solano Community College

Program Discontinuance Self-Study: Engineering Program

October 17, 2011

1. Introduction

In June 2011, the Engineering Program at Solano Community College was placed on notice of program discontinuance. The final decision as to whether or not the program will be discontinued will follow the guidelines given in Policy 6105, "Program Discontinuance", adopted by the Solano Community College District on June 20, 2007. The first and key step in this process is a "self-study" conducted by the faculty and staff involved in that program. This document presents the results of that self-study.

2. Engineering Program

According to Policy 6005, "a Program is defined as an organized sequence or grouping of courses or other educational activities leading to a defined objective such as a major, degree, certificate, job-direct certificate, job career goal, license, the acquisition of selected knowledge or skills, or transfer to another institution of higher education". The Engineering Program at Solano Community College is an organized grouping of roughly one dozen courses that leads to the acquisition of knowledge that normally corresponds to the lower division of an undergraduate engineering program, and to transfer to the engineering program in a four-year university. This program is located within the former Division of Mathematics and Science, now known as the School of Sciences.

The main purpose of this program is to prepare students for transfer to the engineering program in a four-year university. As such, the "engineering program" can be defined as those courses that are taken by students who are preparing to transfer to a four-year engineering program. These courses include:

MATH 020:	Analytic Geometry and Calculus I
MATH 021:	Analytic Geometry and Calculus II
MATH 022:	Analytic Geometry and Calculus III
MATH 023:	Differential Equations
MATH 040:	Introduction to Linear Algebra
PHYS 006:	Physics for Science and Engineering

PHYS 007:	Physics for Science and Engineering
PHYS 008:	Physics for Science and Engineering
CHEM 001:	General Chemistry
CHEM 002:	General Chemistry
ENGR 017:	Introduction to Electrical Engineering
ENGR 030:	Engineering Mechanics (Statics)
ENGR 045:	Properties of Materials

Many faculty members from throughout the School of Sciences contribute to the teaching of the engineering program, since this program encompasses courses in Math, Physics, Chemistry and Engineering. The only full-time faculty member dedicated to the Engineering Program is Dr. Melanie Lutz.

3. Conditions for Discontinuance

According to Policy 6005, the following conditions may cause a program to be recommended to the Curriculum Committee for discontinuance:

a. Program Review and Analysis trends

b. Changes in demand in the workforce

c. Changes in requirements from transfer institutions

d. Availability of human resources

e. Budget concerns

Each of these conditions will now be addressed in detail.

a. Program Review and Analysis trends

According to the most recent Program Review, enrolment in the Engineering Program has been stable over the past half decade, and the program has a very high success rate its main goal of transferring students to four-year universities.

Table 1 shows enrolments in those courses that comprise the Engineering Program, over the period 2006-2010.

Table 1. Enrolment in courses in the SCC Engineering Program, 2006-2010

	F06	S07	F07	S08	F08	S09	F09	S10	F10
MATH 020	58	67	52	30	66	77	65	63	84
MATH 021	40	41	42	50	37	46	47	58	44
MATH 022	16	21	12	19	9	16	24	25	21
MATH 023	10	21	21	14	11	18	17	22	13
MATH 040	9	17	13	16	14	14	17	25	12
CHEM 001	134	99	282	216	155	127	174	143	163
CHEM 002	39	64	54	148	48	80	43	83	24
PHYS 006	17	28	23	-	22	14	25	20	26
PHYS 007	16	-	14	-	12	-	14	-	13
PHYS 008	-	11	-	-	-	13	-	15	-
ENGR 001	20	-	21	-	18	-	26	-	21
ENGR 017	-	10	-	8	-	9	-	15	-
ENGR 030	12	-	12	-	11	-	10	-	11
ENGR 045	7	-	7	-	11	-	9	-	7

The best indication of enrolment trends in the Engineering Program can be gained by examining those courses that are essentially taken exclusively or primarily by engineering students: PHYS 6, 7 and 8, and ENGR 1, 17, 30 and 45. Simple visual analysis of Table 1 shows that enrolment in these courses has been very stable over the past five years. For example, enrolment in ENGR 1 has been essentially 21 students per year, ENGR 30 has enrolled about 11 students per year, *etc*. There is clearly no evidence of any downward trend in enrolment in engineering courses.

The Engineering Program has been extremely successful in meeting its Student Learning Outcomes (SLOs) and Institutional-Level Outcomes. According to the most recent Program Review (2009), the number of students who successfully transfer to four-year universities has been steady at about 11-12 per year. The "percentage of students that complete course with a C or better" has ranged from 70-83%. The fill rate has ranged from 69-81%.

As shown in the 2009 Program Review, the engineering program has had a 95% success rate in transferring students to four-year universities. Furthermore, 100% of those that transfer eventually graduate with a Bachelor's Degree in Engineering within two years, and those graduates have all found employment as engineers upon graduation, or have been accepted into graduate school.

b. Changes in demand in the workforce

All available evidence points to an increase in the demand for engineers, and an increase in the attractiveness of engineering as a profession, over the next decade. According to the U.S. Department of Labor's Bureau of Labor Statistics *Occupational Outlook Handbook, 2010-11 Edition*, "Overall engineering employment is expected to grow by 11 percent over the 2008–2018 decade" (http://www.bls.gov/oco/ocos027.htm#outlook).

According to a recent report by the Economics and Statistics Administration of the U.S. Department of Commerce's (*STEM: Good Jobs Now and For the Future, ESE Issue Brief #03-11, July 2011*):

- STEM (Science, Technology, Engineering and Mathematics) occupations are projected to grow by 17.0 percent from 2008 to 2018, compared to 9.8 percent growth for non-STEM occupations.

- STEM workers command higher wages, earning 26 percent more than their non-STEM counterparts.

- STEM degree holders enjoy higher earnings, regardless of whether they work in STEM or non-STEM occupations.

(According to this report, about 35% of STEM jobs are in engineering, the others being in areas such as computer technology, biomedical technology, *etc.*).

The projected increases in demand for engineering jobs, as described above, clearly do not support the decision to discontinue or curtail the Engineering Program at SCC. In fact, the increased need for engineers, and the higher salaries earned by engineers as compared to the average non-technical job, are strong arguments in favor of maintaining this program.

c. Changes in requirements from transfer institutions

The fourteen courses listed in part (b) above all articulate to the UC system, and the CSU system, which includes the two California Polytechnic State Universities. Specifically, the three core engineering courses, ENGR 17 (Circuits), ENGR 30 (Statics), and ENGR 45 (Materials), each articulate to the UC and CSU systems. These are key courses in the engineering curriculum at all four-year universities, and it is not anticipated that the requirements at UC or CSU will change in the near future.

d. Availability of human resources

The human resources required to run the Engineering Program are extremely modest. The only courses that can be considered to be "unique" to the engineering program are PHYS 7 and 8, and ENGR 17, 30, and 45, as these are the only ones not taken by any large numbers of non-engineering students. These five courses are each offered once per year. Four of these courses (PHYS 7 and ENGR 17, 30, and 45) are currently taught by Dr. Melanie Lutz, a tenured, full-time instructor who will not be retiring for at least the next decade. The other course, PHYS 8, is taught by Dr. Phil Petersen, but could also be taught by full-time faculty members Dr. Melanie Lutz or Dr. Mark Feighner. Hence, the availability of human resources does not pose a constraint on SCC's ability to offer an engineering program.

e. Budget concerns

The financial costs of running the Engineering Program are actually quite modest when viewed in the context of the program's important role as the only training ground for engineers in Solano County. Most of the courses taken by students in the engineering program, such as the calculus sequence (MATH 020/021/022), or the two-term general chemistry sequence (CHEM 001/002), would need to be offered in any event, as these courses are taken by large numbers of other non-engineering students. Hence, there is no incremental cost associated with these courses being taken by engineering students.

The only courses that would probably be eliminated in the event of discontinuance of the engineering program are ENGR 17, 30, and 45, as these are the only ones not taken in any large numbers by non-engineering students. Each of these courses is offered once per year, and each is currently taught by a tenured, full-time instructor, Dr. Melanie Lutz, who is also a tenured physics instructor. If these courses were cancelled, this current instructor would most likely be assigned to other physics classes, displacing part-time instructors. Hence, the incremental savings that would be accrued by canceling these three courses are equivalent to the cost of three courses taught by adjunct instructors. These courses contain a total of 288 hours of in-class instruction, at a rate of $53.85/hour, for a total yearly cost of $15,508.80, as shown in Table 2.

Table 2. Yearly instructional cost savings from discontinuing the Engineering Program

Course	hours	Cost
ENGR 017	108	$5815.80
ENGR 030	72	$3877.20
ENGR 045	108	$5815.80
Total	288	$15,508.80

4. Issues Relevant to the Discontinuance Decision

The Academic Senate for California Community Colleges (ASCCC) has recommended that program discontinuance assessments take the following issues into account:

a. Negative effects on students

b. College curriculum balance

c. Educational and budget planning

d. Regional economic and training issues

e. Collective bargaining issues

Each of these issues will now be addressed in detail.

a. Negative effects on students

Discontinuance of the Engineering Program at Solano Community College would mean that students from Solano County who wish to pursue engineering at the community college level would have no option but to attend a community college in a neighboring county. Community colleges in nearby counties include American River College in Sacramento (57.7 mi, 60 mins), Contra Costa College in San Pablo (25.2 mi, 32 mins), Cosumnes River College in Sacramento (57.3 mi, 59 mins), Diablo Valley College in Pleasant Hill (22.0 mi, 30 mins), Los Medanos College in Pittsburg (32.3 mi, 42 mins), Napa Valley College in Napa (12.7 mi, 20 mins), Santa Rosa Junior College in Santa Rosa (51.2 mi, 73 mins), and Sacramento City College in Sacramento (48.3 mi, 53 mins). Most of these colleges are sufficiently far from Solano as to make the commute unreasonable, as explained below.

Roughly 80% of community college students work part-time or full-time (*US Department of Education Report NCES 2006-184*), and there is no reason to think that the statistics at SCC are drastically different from this average. This imposes a severe constraint on our students' ability to commute, since attendance at an out-of-county college would typically require two long daily commutes – from home to work and then from home to school. In most cases this would not be feasible.

Moreover, all evidence points to the fact that engineering students at SCC receive a preparation for upper-division work that exceeds that obtained at nearby community colleges. Although the evidence for this is anecdotal, it is

overwhelming. Numerous recent graduates of our engineering program have provided testimonials stating that their training at SCC provided them with an exceptional preparation for upper division and graduate work that exceeded that obtained by students who attended nearby community colleges. (Many of these testimonials are attached as appendices to this document). For example, one student, Michelle Morales, asserted that "the excellent education that my fellow classmates and I have received from this school is beyond the reaches of even my current university [CSUS]." According to Sana Vaziri, "I have seen a number of students transferring [to UCB] from other facilities who did not succeed due to being inadequately prepared". Scott Berta asserted that "upon transferring to UC Berkeley, it became clear to me that I had a much better understanding of engineering fundamentals than my classmates, even those who did not transfer and had been at Berkeley from the beginning."

b. College curriculum balance

The engineering program is essentially unique within Solano Community College. There is no other program at SCC that will prepare students to transfer to a four-year engineering program. Other technical programs at SCC, such as Aeronautics, Automotive Technology, Electronics Technology, or Drafting, do not fulfill this role, as they do not include courses that will allow a student to transfer into a four-year engineering program as an upper-division student.

Engineering as a field is an important component of most institutions of higher education. Nationwide, according to the National Center for Education Statistics (http://nces.ed.gov/programs/coe/indicator_fsu.asp), 5% of all bachelor's degrees are granted in engineering. Loss of its engineering program would create an imbalance in Solano's educational portfolio.

c. Educational and budget planning

N/A.

d. Regional economic and training issues

Solano Community College is currently the only institution of higher education in Solano County that offers an academic program in engineering. The Engineering Program at SCC transfers roughly ten-twelve students per year to four-year engineering programs, almost exclusively in the local area (UC Davis, Sacramento State, and UC Berkeley). As such, it plays a crucial role in the pipeline of engineering students for Solano County and surrounding areas.

e. Collective bargaining issues

N/A.

5. Qualitative Factors Relevant to the Discontinuance Evaluation

According to the document Program Discontinuance 6105, "For each affected Program, ... both qualitative and quantitative factors shall be discussed in order to have a fair and complete review". The "qualitative factors" include the following fourteen issues, each of which will now be addressed.

a. Quality of the program and how it is perceived by students, faculty, articulating universities, local business and industry and the community

The academic quality of the engineering program is extremely high, and the program is held in high regard by current and former students, faculty members from other departments, and the local community. This can be demonstrated by the large number of supportive testimonial letters that have been written in support of continuing this program, and which have been appended to this self-study. For example, former student Karl Ono, now a senior in Civil Engineering at Sacramento State, stated that "I truly believe the Engineering Program at SCC to be a local gem". Sean Shaw, a former Solano student who is currently a Ph.D. student and teaching assistant at UC Davis, wrote that "I would say that the courses offered in the Engineering Program at SCC are superior to those taught at the undergraduate level at UC Davis". Former student Daniel Wiese, who went on to graduate from UC Davis and is now a PhD student at MIT, wrote that "I can say without doubt that the lower-division engineering courses taught at Solano Community College were the best courses I have ever taken".

Prof. Enrique Lavernia, Dean of the UC Davis College of Engineering, wrote that the academic and subsequent professional record of the numerous students who have transferred to Davis from Solano is "great evidence of the instructional excellence of the Engineering Program at SCC". The engineering program is also very highly regarded among the faculty at SCC. Phil Petersen, a physics instructor, wrote that "Solano College has a fantastic Engineering program".

Among the many local business, community and political leaders who have expressed strong support for continuing the Engineering Program at SCC is U.S. Congressman John Garamendi, 10th District California, who writes that "discontinuing the Engineering Program at Solano Community College ... would represent a significant disservice to our community, state and nation". Kenneth Discenza, President of the California Society of Professional Engineers, stated that "discontinuing the Engineering Program would do a grave disservice, not only to the current and prospective students at SCC, but also to the future of

our profession".

b. Ability of students to complete their educational goals of remediation, obtaining a certificate or degree, or transferring

The Engineering Program at SCC does not play a remedial role, nor does it offer a degree or certificate. Its sole purpose is to prepare students to transfer to a four-year engineering program. Its success rate over the past decade, defined as the percentage of students who take one or more engineering courses at SCC who subsequently transfer to a four-year program, has been over 90%. It would not be possible for students to transfer from SCC into four-year engineering programs if the Engineering Program is discontinued.

c. Balance of college curriculum

The engineering program is essentially unique within Solano Community College. There is no other program at SCC that will prepare students to transfer to a four-year engineering program. Other technical programs at SCC, such as Aeronautics, Automotive Technology, Electronics Technology, or Drafting, do not fulfill this role, as they do not include courses that will allow a student to transfer into a four-year engineering program as an upper-division student.

d. Effect on students of modifying or discontinuing the program

If the engineering program were discontinued, many of the students who are currently enrolled in the program would not yet have accumulated enough credits to be able to transfer to four-year university. The only option available to these students would be to transfer to another community college. However, for many students, this would not be feasible, due to geographical and travel constraints.

Several proposed modifications to the Engineering Program would also seriously degrade the quality of the program, and compromise its ability to properly prepare students for transfer. For example, if individual courses were no longer offered each year, students would be unable to compete the required lower division courses in two years. In most cases, this would lead to the student being forced by necessity to attempt to take their classes at a different community college. Offering some of the classes on-line or on closed-circuit television would eliminate the personal attention and close monitoring that our students receive, which has repeatedly been cited as a main reason for the success of our program. Former student Chad Warren, a now a junior at UC Davis, majoring in Physics, wrote that "without the one on one interaction I received in the Engineering Program from Dr. Lutz, I wouldn't be the student I

am today." Former SCC student Daniel Fletcher, a UC Davis graduate in Mechanical Engineering, currently working at the U.S. Naval Air Systems Command, said that "this personal interaction was vitally important for me, and it can really only be achieved through instruction in a classroom. Watering down of the program by offering classes online or only every other year is not a viable option for students seeking a quality education." According to Michelle Morales, currently a senior in Mechanical Engineering at Sacramento State, "The hands-on nature of experiments and laboratories under the supervision of faculty are what encourage the critical thinking and learning process." (Note that each of the three pre-engineering physics courses, PHYS 6-7-8, and two of the engineering courses, ENGR 17 and 45, include weekly laboratories). Numerous other such testimonials can be found in the letters appended to this report.

e. Comprehensiveness of the college experience

Engineering as a field is an important component of most institutions of higher education. Nationwide, according to the National Center for Education Statistics (http://nces.ed.gov/programs/coe/indicator_fsu.asp), 5% of all bachelor's degrees awarded in the US are granted in engineering. Loss of its engineering program would create a severe imbalance in Solano's educational portfolio.

f. Uniqueness of the program

The engineering program is essentially unique within Solano Community College. There is no other program at SCC that will prepare students to transfer to a four-year engineering program. Other technical programs at SCC, such as Aeronautics, Automotive Technology, Electronics Technology, or Drafting, do not fulfill this role, as they do not include courses that will allow a student to transfer into a four-year engineering program as an upper-division student.

g. Importance of the program in its relationship to other programs

The existence of the engineering program is crucial to the continued health of several other programs and departments at SCC. For example, the Physics department currently teaches a total of six courses: PHYS 2&4, a two-term sequence for teachers, technicians, pre-dentistry, pre-medical, and biology majors, PHYS 6-7-8, a three-term sequence for students of engineering or physical sciences, and PHYS 10, a one-term introduction for non-science students. Ninety percent of the students taking the PHYS 6-7-8 sequence are engineering students. Hence, if the engineering program were cancelled, there would be essentially no demand for the PHYS 6-7-8 sequence, and the PHYS Department would lose half of its courses.

Discontinuance of the engineering program would also have a detrimental effect on the Mathematics Department. Over 80% of the students who take MATH 023 (Differential Equations) or MATH 040 (Introduction to Linear Algebra) are in, or are intending to enter, the engineering program. Roughly half of the students who take the MATH 020-021-022 sequence (Analytic Geometry and Calculus I-II-III) are in the engineering program, or intending to enter the engineering program. Hence, discontinuance of the engineering program would, at the least, eliminate the justification for teaching MATH 023 and 040, and would severely undercut the basis for teaching the calculus sequence. The ultimate result could, in the worst case, be a mathematics department that teaches no courses that are generally thought of as being "college level".

h. Replication of programs in the surrounding area and their efficacy

Several community colleges in nearby counties have engineering programs that are formally equivalent to that offered at SCC. These include American River College, Contra Costa College, Cosumnes River College, Diablo Valley College, Los Medanos College, Napa Valley College, Santa Rosa Junior College, and Sacramento City College. However, considering the distances involved, and the fact that most students work while attending SCC, continuing their studies at a community college in an adjacent county would not be a feasible option for many of not most students. Furthermore, anecdotal evidence from students who have taken classes at more than one community college seems to point to the conclusion that nearby programs generally to not have the same quality as that offered at SCC.

i. Potential for a disproportionate impact on diversity at Solano Community College

It is well known that women and ethnic/racial minorities are grossly under-represented in the field of engineering in the US. The percentage of minority students in the Engineering Program at Solano Community College, as measured from those students who transfer to four-year universities, has been 31% (10 out of 32) over the years 2007-2009, according to the most recent program review. This is much higher than the national norm. The percentage of female students has been 10% (3 out of 32), lower than the national norm. Nevertheless, both of these figures show that the Engineering Program at SCC is doing its part to increase diversity within engineering. Closure of the Engineering Program would have an adverse affect on bringing more women and minorities into the field of engineering.

j. Necessity of the program in order to maintain the mission of the College

According to the SCC Mission Statement:

Solano Community College prepares a diverse student population to participate successfully in today's local and global communities. We accomplish our mission by providing:

* quality teaching
* innovative programs
* effective transfer preparation
* economical and workforce training
* services that are responsive to the needs of our students
* life-long learning
* a broad curriculum

The Engineering Program helps Solano Community College fulfill several key components of its mission:

(a) As shown by the numerous testimonials from current and former students, and by the success of our students after transferring, the Engineering Program offers teaching at the highest level.

(b) As shown by its success in transferring about ten-twelve students each year to four-year universities, and the successful performance of those students after they transfer, the Engineering Program is helping SCC fulfill one of its core mission goals, "effective transfer preparation".

(c) As shown by the data provided by the most recent program review, Solano's Engineering Program is a major source of engineers for the local and state economy. Employers of our graduates include Northrup-Grumman, Applied Aerospace Structures Corporation, Conoco Philips, Vandenberg Air Force Base, PG&E, U.S. Army Corps of Engineers, Lockheed Martin, California Dept. of Water Resources, Musco Olive Company, Biruni Motors, U.S. Naval Air Systems Command, and Worley Parsons, to name a few. Many students have gone on to obtain Masters degrees at UC Davis, one is currently completing his Ph.D. in Civil Engineering at UC Davis, and one is currently a Ph.D. student at MIT.

(d) The existence of the Engineering Program helps SCC to provide a broad curriculum that covers a wide range of disciplines.

k. Source of funding for the program (outside vs. general funds)

General funds.

l. Impact on other programs, including transfer, if the program is modified or closed. If there are any, these must be identified.

As discussed above, discontinuance of the Engineering Program would seriously jeopardize the viability of several other programs and departments at SCC, such as Physics and Mathematics. Fully half (three out of six) of the courses taught in the Physics Department are taken almost exclusively by engineering students, as are five courses in the Mathematics Department.

In addition, nearly all of the student tutors in the Math Activity Center are engineering students. The loss of these tutors would have a severe impact on the ability of the MAC lab to help other Solano students.

m. Requirements by federal/state/accreditation or other areas (e.g. Title IX); for the program. If there are any, these must be identified.

N/A.

n. Impact on articulated programs

Solano Community College currently has a Transfer Agreement with U.C. Davis, under which students who take the required transfer courses, and maintain a specified GPA, are automatically admitted into the Engineering Program at UC Davis. Discontinuance of the Engineering Program at SCC, or curtailing it by eliminating some courses, would render it impossible for pre-Engineering students at Solano to satisfy the requirements and get a TAG.

6. Conclusions

In summary, the results of this Self Study do not in any way provide support for discontinuing the Engineering Program at SCC. As shown in detail above, none of the five conditions listed in Policy 6005 – Program Review and Analysis trends, Changes in demand in the workforce, Changes in requirements from transfer institutions, Availability of human resources, and Budget concerns – provide arguments for discontinuance. Furthermore, the thirty-three letters appended to this Self Study show that continuation of the Engineering Program in its current form is strongly supported by current and former students, faculty members from other departments at SCC, the deans of all three local four-year Engineering programs, and local business and a political leaders.

Furthermore, this document, and the numerous attached letters from current and former students, make it abundantly clear that modifying the Engineering

teaching courses only every other year, or by teaching courses on-line in conjunction with nearby colleges, would effectively destroy the program. The former proposal would make it impossible for students to complete the program in a reasonable time, whereas the latter would eliminate the hands-on laboratory experience and personalized teaching that has made the program so successful.

As detailed above, the annual incremental cost of maintaining the Engineering Program is $15,508.80. Considering that the average number of students completing this program each year is about twelve, the "cost" of the program is barely $1300 per student – each and every one of whom eventually becomes a fully-trained engineer! This must surely be considered a remarkable return on a very modest "investment".

Letters of Support

The following pages contain letters in support of maintaining the Engineering Program, written by students, faculty and business and community leaders.

SCC Engineering Students, current and former

1. Eian Vizzini – Northrup-Grumman
2. Nicolas Walli – NANA WorleyParsons
3. Chad Warren – Undergraduate, UC Davis
4. Mark Rogers – Undergraduate, UC Berkeley
5. Christian Des Champs – US Air Force
6. Daniel Wiese – PhD student, MIT
7. James Morad – PhD student, UC Davis
8. Michelle Morales – Undergraduate, Sacramento State
9. Karl Ono – Undergraduate, Sacramento State
10. John Tatyosian – CA Department of Water Resources
11. Jason Tolvtvar – Lockheed Martin Corporation
12. Daniel Fletcher – Navair
13. Sana Vaziri – Undergraduate, UC Berkeley
14. Jeremy Conway – Applied Aerospace Structures
15. Scott Berta – Undergraduate, UC Berkeley
16. Seth Cooley – Undergraduate, UC Davis
17. Kristine Des Champs – US Army Corps of Engineers
18. Yosuf Hamkar – Undergraduate, UC Davis
19. Arthur Jack Hooper Jr. – Solano Community College
20. Sean Shaw – PhD student, UC Davis
21. Kirk LuMaye – Undergraduate, Sacramento State

Political, Educational, Business and Community leaders

22. Hon. John Garamendi – U.S. Congressman, 10th District CA
23. Dr. Shankar Sastry – Dean of Engineering, UC Berkeley
24. Dr. Enrique Lavernia – Dean of Engineering, UC Davis
25. Dr. Emir Jose Macari – Dean of Engineering, Sacramento State
26. Paul Wiese – County Engineer, Solano County
27. Todd Remington – American Council of Engineering Companies
28. Kenneth Discenza – California Society of Professional Engineers

SCC Faculty

29. Ms. Christine Ducoing – Chemistry Department
30. Dr. Mark Feighner – Geology & Physics Departments
31. Dr. Phil Petersen – Physics Department
32. Dr. Svetlana Podkolzina – Mathematics Department
33. Various Faculty Members – Mathematics Department

August 2, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Dear Sir/Madam:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. As a successful graduate of the Engineering Program at Solano, I strongly urge you not to discontinue this excellent program. The classes in this program were the most challenging and motivating experiences I had at Solano. They tied theoretical derivations with hands on laboratory experiments, which cannot be taught online. As a result, I feel I was better prepared than my peers at the University of California, Davis. I graduated at the top of my class and had several job offers during my last quarter at Davis. I am now an RF Engineer with 3 ½ years experience at my company. I truly enjoy my job, which not many people can say. In order for students at Solano Community College to continue succeeding in the engineering field, they must have access to the full engineering program so they can excel at the four year university they transfer to.

Sincerely yours,

Eian Vizzini
(SCC student, 2003-2006)
563 Clifton Ave.
San Jose, CA 95128

August 1, 2011

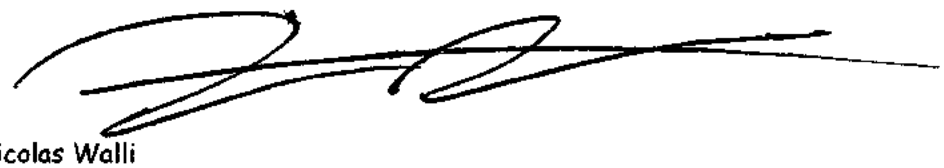
Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

I've just been informed that Solano Community College is undertaking a "Program Discontinuance Review" of the Engineering Program. Through my experience, as a former Solano Community College graduate, I feel that this is a major blow to the low income families that lack the educational background to enroll in a four year engineer program. My experience at Solano Community College provided me with the knowledge to transfer to, and to receive a four year degree from, UC Davis. With this degree, which I would not have obtained without Solano's Engineering Program, I am able to earn a living as a Professional Engineer with an income of over $100k a year. This has elevated my economical status from low income to middle class. By removing programs like this one, we will be talking away opportunities for potential young engineers like me to succeed. Throughout your evaluations, please be mindful that many students within Solano's Engineering Program will have a similar experience as mine.

Respectfully,



Nicolas Walli
Process Engineer, PE
NANA WorleyParsons
800 E. Diamond Blvd 2nd Floor
Anchorage, AK 99511
Phone: (907) 375-7002
Nicolas.Walli@nanaworleyparsons.com

August 20, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

Much to my concern, it has been brought to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. As a successful UC Davis transfer student from the Engineering Program at Solano, I strongly urge you not to discontinue this wonderful program. The mere thought that this program may no longer be offered to future Solano students is a complete and utter shame, and I fear that by discontinuing this program, or altering it in any other manner, will cause far greater harm to Solano Community College than whatever gains might be made through altering it.

It truly amazes me that the Engineering Program was ever submitted to a discontinuance review in the first place. From my experience at Solano, the Engineering Program constitutes the best and brightest students that Solano has to offer, and the records of former Solano Engineering student's achievements after transferring confirm this sentiment. I understand that at every community college in California, and at Solano Community College in particular, there are new budgetary constraints that the administrative committees are now being forced to deal with, but I also understand that the first and foremost responsibility of these administrative committees is to provide their students with both the tools that they need to transfer, and the best education possible. Seeing as how engineers, just like medical professionals and scientific researchers, are our nation's means to both creating new jobs and helping the global economy, and then combining this fact with the knowledge that the importance of engineers in modern society is not going to diminish anytime soon, it is clear that by discontinuing the Engineering Program at Solano, the Solano Academic Senate will be acting in a manner directly opposed to the responsibility required of it, i.e., to provide the students of SCC with the tools that they need to transfer and the best education possible.

It is true that the Engineering Program at Solano only constitutes a

small percentage of the total SCC Student Body, and I am also aware that this is one of the main reasons why the Engineering Program was submitted to the "Program Discontinuance Review" in the first place. Yet as stated before, the Engineering Program also constitutes the best and brightest students at Solano, and it is the Academic Senate's responsibility to ensure the means for their students to transfer. So why is it even a question of whether to discontinue the Engineering Program? By their very nature, engineering programs will never have the highest enrollments. Engineering is a difficult course of study that many don't seem to have either the mental faculty for, or the desire to pursue, and those who do have both the faculty and drive to pursue engineering more often than not go to a four-year university directly after high school. We should never choose to make it more difficult for those engineering students who chose to save money by attending a community college before transferring to a four-year college. We should instead choose to help our brightest students achieve their transfer goals, and never divert funding away from our most prospective students.

On a personal level as well, I must argue for the continuance of the Engineering Program at Solano. Without the one on one interaction I received in the Engineering Program from Dr. Lutz, I wouldn't be the student I am today. Dr. Lutz makes it a point to teach her students not just what they are required to know for her courses, but also many useful life lessons that will carry on in her students beyond the realm of academia. She taught me what I needed to do to be the best possible student at the university level, she taught me how to work at the best of my potential, she taught me how to manipulate the college bureaucracy to help me achieve my goals, and she taught me how to go about getting accepted into grad school. These things she taught me have already helped me to get accepted into a UC, and I am certain that they will be useful for the rest of my life as I transition from college out into the professional world. I am blessed to have had the opportunity to study under Dr. Lutz, and it would be doing the world a dishonor to make it any more difficult for Dr. Lutz to continue teaching as she sees fit.

Sincerely yours,

Chad Warren
(SCC student, 2008-2011)
872 Corcoran Ct.
Benicia, CA 94510

cc: Dr. Melanie Lutz, SCC

August 1, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

To even consider discontinuing the Solano College Engineering Program indicates to me that you have only a shallow understanding of its importance. Therefore, I want to make sure you realize the impact the program has had on my life before you make a decision.

I am an Electrical Engineering and Computer Science student at UC Berkeley who has spent two summers at the Massachusetts Institute of Technology in one of the most cutting-edge artificial intelligence laboratories in the world. I have also received opportunities to work at Google and conduct research at Stanford University. I am able to think critically about and develop solutions to difficult problems, effectively communicate both orally and on paper in a highly technical field, and discipline myself to spend long hours reading challenging material. I largely attribute these qualities to Dr. Melanie Lutz and the Solano College Engineering Program.

In the physics and engineering courses taught by Dr. Lutz, students are required to write professional-quality lab reports and solve challenging problem sets every week and take tests that genuinely measure their understanding of the material. The high expectations of Dr. Lutz, which are motivated by her strong desire to see her students learn and become successful, force students to push themselves to their full potential. As a result, only students who understand physics and engineering deep in their bones will walk out of one of her courses with an A. One may argue that Dr. Lutz is too challenging—I could certainly take the side of that argument if I wanted to because I earned only one A out of the five courses I took with her. Instead, I thank Dr. Lutz from the bottom of my heart for not going easy on me and preparing me for academia as well as life in general.

I can say with absolute confidence that making any detrimental changes to the Solano Engineering Program is a mistake. Please find a different way to resolve your fiscal issue.

Sincerely yours,

Mark Rogers
(SCC student, 2007-2009)
904 Lassen St.
Vallejo, CA 94591

cc: Dr. Melanie Lutz, SCC

MEMORANDUM FOR: Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

FROM: Lt Christian Des Champs

SUBJECT: Program Discontinuance Review of the Engineering Program at SCC

1. The purpose of this memo is to support the continuation of the Engineering Program at SCC

2. The engineering program at Solano Community College is an excellent program and the greatly aided my seamless transfer to the University of California, Davis where I graduated with a degree in Civil Engineering with High Honors recognition. Not only did this program prepare me for the level of work required by a four-year university but helped me develop the time management skills required for the fast pace of a quarter system. The mastery of the core subjects that I obtained while at Solano Community College put me significantly ahead of my peers who started at UC Davis as college freshman. All of this is due to the excellent faculty and staff that were employed during my tenure and the one on one attention the professors made available for their students.

3. The core engineering courses that are offered at SCC provide the foundation on which future engineering discipline specific classes are built. The smaller class sizes, one-on-one mentoring, and hands-on exercises allowed for the easier grasp of the concepts and maximized my understanding of the material. To achieve the learning objectives, classes of this nature must be taught by a person who is an expert not only in the field of the material but who is also well versed in presenting that information in a way that can be absorbed by the student body.

4. Throughout the years, I have kept in contact with several of the students that were in the program at the same time. In some cases students that transferred from the SCC engineering program were able to test out of some of the Mechanical Engineering courses due to the level of understanding they achieved from their course work while at SCC. This is a testament to the level of education received at SCC. Removing this program from the curriculum will greatly hinder future engineering students from transferring and would be a great disservice to them.

5. If any further information is required please contact me at (805) 606-3590

CHRISTIAN DES CHAMPS, 1st Lt, USAF
Design Engineer/Project Manager

Cc: Dr. Melanie Lutz, SCC

August 1, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. As a successful graduate of the Engineering Program at Solano, I strongly urge you not to discontinue this excellent program.

As a graduate of UC Davis in the department of Mechanical and Aerospace Engineering, I can say without doubt that the lower-division engineering courses taught at Solano Community College were the best courses I have ever taken. These courses, instructed by Dr. Melanie Lutz, prepared me for my upper division coursework better than I could have ever imagined. In addition to the material and concepts covered in the engineering classes at Solano, the teaching style and delivery made these classes invaluable. The small class-sizes, and intimate interaction with the instructor, provided for the best learning environment I have experienced in my academic career. The large class sizes and cookie-cutter teaching styles at many large schools allow students to 'slip between the cracks', passing classes without having learned the material. Dr. Lutz's passion and dedication to teaching allows every student to have the best possible opportunity to learn the material, as well as how to become critical and independent thinkers, and be ready to transfer into any four year engineering program.

As a first year graduate student in MIT's department of Mechanical Engineering, I have to attribute am enormous portion of my success to Dr. Lutz and the engineering classes at Solano. The concern Dr. Lutz has for her students and their future is another amazing aspect about the engineering classes at Solano which I have never since experienced in school. By taking such genuine interest in her students, Dr. Lutz was able to motivate and mentor each and every student individually to achieve the best they possibly could. It is because of her instruction and guidance that I have excelled in achieving my academic goals. This close support from an instructor early on in my academic career would not have been possible at any four year schools.

By discontinuing or altering the engineering program at Solano, the college will suffer dramatically. Offering courses every other year will make it impossible for many students to finish their classes in a timely manner. This will cause these students to seek engineering programs at other colleges, which will not be as strong. Offering these courses online would detract from the value of the courses immensely, hugely reducing the quality of education that students currently receive. Solano Community College would lose some of its best students, as well as its reputation for being the strongest community college in the area.

The only reasonable option for Solano Community College to take is the unaltered continuance of the engineering program as it exists currently. The engineering program at Solano offers absolutely the best lower division engineering education possible, with a huge percentage of successful transfers to four year schools and beyond. Without engineering at Solano Community College, the students, as well as the community, would suffer greatly.

Sincerely yours,

Daniel Wiese
SCC student, 2004-2010
607 Fox Hollow Way
Vacaville, CA 95687

cc: Dr. Melanie Lutz, SCC

August 24, 2011

Academic Senate

Solano Community College

4000 Suisun Valley Road

Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

I believe that it would be an extreme disservice to future Solano Community College students, as well as the citizens of Solano County, to discontinue the engineering program at SCC or to modify it in such a way that renders it useless. This belief comes from the shared experiences of the engineering program by my peers when I attended Solano Community College. Specifically, my experience with Melanie Lutz teaching the Engineering 17 course (Introduction to Electrical Engineering), helped motivate my later decision to major in Physics with a concentration in Physical Electronics.

Engineering 17 is a class that is split into multiple levels of learning: lecture, discussion, and laboratory. Each of these levels proved critical to my learning of the subject; however, laboratory gave me the experimental tools necessary to excel in my undergraduate studies and undergraduate research in Physics while at UC Davis. The confidence I gained working with electrical equipment such as oscilloscopes and frequency generators set me aside from my peers at UC Davis who had no such experience. I was able to use this experience to my benefit by working in a condensed matter research facility in the UC Davis Department of Physics directly after transferring from Solano Community College. As of June, 2011, my undergraduate honors thesis was published in the UC Davis Undergraduate Research Journal--a major event in my academic career that I can trace back to my experience with Melanie in the engineering department at SCC.

In the fall of the current year, I will be starting the first year of my Physics Ph.D. at UC Davis.

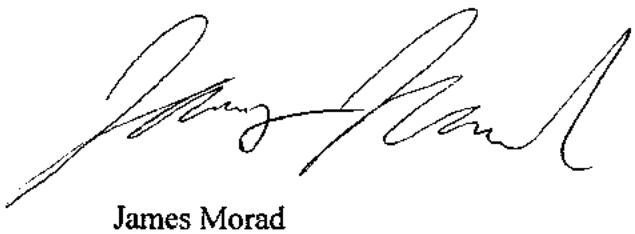
I plan to study experimental high energy physics--an academic path that relies heavily, among other things, on a solid foundation of circuits and electronics. My experience at SCC has propelled me into a rich and satisfying academic experience that is really only just beginning.

I would like to also offer that teaching engineering courses every other year will render the program virtually useless to any serious student. Transfer agreements between California State Universities, the University of California, and community colleges have strict requirements for prerequisites--especially so for the engineering and physical science majors. By offering courses that are required prerequisites, Solano Community College will force students to delay their advancement and likely deter new engineering students who live in Solano County from Solano Community College.

Online or video courses will prove to be as useless, if not more so, as teaching courses every other year. Above, I listed the three levels of instruction that engineering courses at Solano Community College are split into. By offering video/online only courses, Solano College would effectively be cutting out two components that are essential to providing students with a solid foundation in engineering concepts. Without a strong foundation, the students who are forced to take online or video courses will be set up for failure at the university level.

It is the responsibility of Solano Community College to provide a positive educational experience for the citizens of Solano County. By discontinuing the engineering program or modifying it in the ways presented above, Solano College will strike a massive blow to the hopes and dreams of past and future engineering and physical science students in Solano County.

Sincerely yours,



James Morad

(SCC student, 2006-2008)

1103 Hickory Ave

Fairfield,. CA 94533

cc: Dr. Melanie Lutz, SCC

August 1, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

As a successful transferring student of the SCC Engineering Program, it has been brought to my attention that it is under review for discontinuance due to the fiscal crisis occurring in California. Seeing as I have benefited immensely from this program, I feel it is my duty to share insight into what this program has done for me and has yet to offer to so many future students. Any action that would cause a diminishing or discontinuance of this program would be of great disservice to not only students, but local universities as well as the surrounding community and nation.

For many students such as myself who could not afford to go straight to a University, SCC provides an excellent means to obtaining a quality and top notch lower division engineering foundation before transferring on to a four year university. It is unfortunate that community colleges have established a connotation of existing for the sole purpose of remedial learning as the excellent education that my fellow classmates and I have received from this school is beyond the reaches of even my current university. The smaller class sizes, easy access to helpful and qualified faculty, and the hands on nature of the program allow for a deeper understanding of fundamental concepts and foster a method of learning and critical thinking that cannot be duplicated in a university environment.

At the university, lower division engineering classes are already severely impacted and limited in their offerings. Since they are required for all engineering majors, this makes the possibility of one on one interaction with professors nonexistent because of their immense workload of taking on such large classes. This lack of access to enrich and aid the learning process has dire consequences and is a main reason why there is such a visible discrepancy between the quality of education received from transfer students of a community college and students who have only been at a university. This is a problem that the SCC Engineering Program helps to alleviate by relieving the burden on the universities and fostering a better quality foundation of education for students. Allowing students to complete their general education requirements and lower division engineering prerequisites greatly reduces the size of these impacted classes and allows transferring students to graduate in a timely manner.

Classes via internet and video have been proposed and would be a great travesty to the program as it completely disregards the main component that makes this program so successful. The hands on nature of experiments and laboratories under the supervision of faculty are what encourage the critical thinking and learning process. Learning theory alone is not enough in engineering and the fact that the students from this program can then apply what was learned to

real life scenarios is what SCC should take great pride in. Conducting classroom learning this way also provides time for interaction among peers which I think is the greatest lesson that can be taken away and is not possible in cases of internet classes. Group work allows for the exchange of ideas among classmates who are all in the same boat and allows us to question each other and think for ourselves. The sharing of new ideas in groups leads to creativity that is so desired for engineers and is not something that can be taught.

I hope that when reviewing the case for keeping the program at SCC, great consideration is given to not the quantity but rather the quality of students that this program propels into the world. Nearly every former student has gone on to do great things for their local community, state, and nation. From local jobs to NASA internships, the fingerprints of this program are far reaching and benefit us all. I feel that SCC should take this chance to rid the stigma of community colleges being havens for those needing remedial education and show that they are an institution which provides everyone the opportunity to pursue higher learning. The program has allowed me to pursue my goals which would have otherwise been impossible in its absence and it would be greatly disheartening to see future students robbed of the same great opportunity.

Michelle P.A. Morales
(SCC Engineering Student, 2005-2010)
(CSUS Mechanical Engineering Student, 2010-2012)
1019 Canterbury Court
Vacaville, CA. 95687
moralesm@ecs.csus.edu

cc: Dr. Melanie Lutz, SCC

CITY OF VACAVILLE
UTILITIES DEPARTMENT
6040 VACA STATION ROAD
ELMIRA, CALIFORNIA 95625
www.cityofvacaville.com

ESTABLISHED 1850

August 3, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. As a successful graduate of the Engineering Program at Solano, I strongly urge you not to discontinue this excellent program.

Dr. Lutz's Engineering Program at SCC has been a primary influence in my educational career, and to cut it would deprive hundreds of students like myself of an incredible opportunity to improve their lives and the lives of others in the community.

I first transferred to SCC in the fall of 2007, after two years of attending California State Polytechnic University, San Luis Obispo. I had not been a good student at Cal Poly. I found myself to be unmotivated and uninterested in my chosen major of Mechanical Engineering, and after multiple quarters on academic probation, I decided to return home to Vacaville. Luckily, I had been working summers at the State of California Department of General Services (DGS) as a Civil Engineering Student Intern, and my Supervising Engineer persuaded me to pursue a change in major from Mechanical to Civil Engineering. In the fall, I continued to work part-time for DGS, and enrolled in ENGR 30 (Engineering Mechanics) at SCC.

Having already attempted an Engineering Mechanics course at Cal Poly, I had a perspective to compare from. My experience in Dr. Melanie Lutz's course was much different than that at Cal Poly, and frankly, the SCC course was much more effective.

While the course at Cal Poly was designed to be sufficient in terms of meeting academic standards, it followed a simple formula. The instructor would simply lecture, assign homework (which was only checked for completeness), and give quizzes and exams. The day-to-day classroom agenda involved a pre-planned lecture, and students would simply take notes and leave afterwards. Student interaction with the professor was infrequent, and while questions were encouraged, they were not usually given much class time.

The ENGR 30 class at SCC had multiple benefits over the one I attempted at Cal Poly. Dr. Lutz structured the class to allow time for students to attempt example problems, and one class session per week was solely dedicated to in-class discussion. Her passion for and mastery of the subject matter clearly showed in the way that she communicated with students. Every problem of every assignment was graded, and we received valuable

feedback and suggestions on how to prepare for the exams. The course was taught in much greater detail and depth than I had experienced at Cal Poly, and therefore was much more difficult. However, Dr. Lutz did her best to make sure that no one got discouraged and worked hard to ensure that we understood the material.

Because I was working in Sacramento for DGS, commuting to Fairfield was impractical, so I decided to transfer to American River College after one semester. At ARC, I took mostly general ed. and math courses, attending part time with the goal of transferring to Sacramento State. During this time, I was hired by the City of Vacaville as an Engineering Technician, where I currently work part time to manage and update engineering drawings of our utilities facilities.

Working in Vacaville allowed me to once again take classes at SCC with Dr. Lutz, and, in my final year before transferring to Sacramento State, I took PHYS 7 (Electricity and Magnetism) and ENGR 17 (Intro. to Electrical Engineering). These courses are notoriously challenging, especially for non-Electrical Engineering majors, but they are considered fundamental and necessary to students in all fields of engineering. Immediately, I was reminded of the intensity of the SCC Engineering courses. While I took fewer units that year than any other, I still believe it to be the most difficult yet rewarding of all my college years.

I have since transferred and completed one year of coursework in the Civil Engineering program at Sacramento State. I credit the Engineering Program at SCC for providing me with the inspiration, work ethic, and skills required to excel academically. Since transferring, my GPA is 3.28.

The time commitment and workload of the SCC courses was significantly higher than would have been required to pass at any of the other colleges I've attended, and the exams are still the most difficult that I have ever taken. However, I left the Engineering Program with not only a deep understanding of the material, but also a well trained intuition of how to approach and solve complex engineering problems. The experience has increased my confidence as a student and in my career path.

I truly believe the Engineering Program at SCC to be a local gem, and I have recommended it to friends of mine considering studying engineering. The courses offered are very important to engineers, as they teach the fundamental principles upon which later courses are based. The rigor of SCC's program ensures a thorough understanding of these principles, one which is far from guaranteed at other colleges.

To discontinue or reduce the Engineering Program would be a major loss for Solano County. While the volume of students enrolling in and completing the program remains relatively low, the success rate of those who take advantage of it is high. Attempting to cut costs by reducing the frequency of classes or offering them through electronic media would obviate the unique classroom experience that makes it so great. As one of the few programs at SCC that prepares students to obtain a professional degree and license, it should be preserved and touted.

Yours Faithfully,

Karl Ono
(SCC student, 2007, 2009-10)
Engineering Technician
kono@cityofvacaville.com
W: 707.469.6429, C: 707.365.9002

cc: Dr. Melanie Lutz, SCC

July 27, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, California 94534

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It has come to my attention that Solano Community College (SCC) is currently undertaking a "Program Discontinuance Review" of the Engineering Program. As a successful graduate of the Engineering Program at Solano, I strongly urge you not to discontinue this excellent program due to its strong value to students and to the larger community. In my personal and professional experience, the lower division instruction I received at Solano for my engineering degree surpassed the quality of instruction offered by University of California, Davis (UC Davis), my alma mater. The personal attention from professors at Solano helped me better understand and apply the fundamentals of engineering in my upper division courses, which resulted in me earning my Bachelor's of Science Degree in Civil and Environmental Engineering with Honors.

When I pursued engineering at Solano, it took me a little over two years to obtain all the necessary credits to transfer to UC Davis. The engineering courses offered at SCC comprise exactly the ones UC Davis looks for when one transfers. Modifying the current schedule of classes for the engineering major could possibly double the amount of time a student would need to take required courses for transferring. Some people may even transfer to a four-year university without being properly prepared for the engineering major. Eliminating the availability of this program would be a great detriment to the educational goals of future students, and will set a terrible precedent for other important degree programs offered at SCC.

Engineering is an experience-based career. One must learn to think on the spot and produce correct results. As such, quality classroom education cannot simply be supplanted by a video lecture or an online curriculum. An experienced educator needs to be firmly planted in front of future engineers to hold them accountable for their understanding and coursework. Civilization cannot rely on television or internet-based teaching where accountability is nonexistent – especially in a field of study where accountability is important. Future engineers deserve a better education today simply because we all deserve a better future tomorrow.

The engineering courses that stand in review for possible discontinuance make up the framework of our modern civil infrastructure. Having these courses proves critical to being able to engineer structures related to California's proposed High Speed Rail, the mechanics of the automobile industry, bridges, electricity, water, and sanitation to name

a few examples. Solano should be motivating more students to study engineering instead of discouraging them by only giving them the option to go to schools in other counties to pursue their educations. As a State of California employee for the Department of Water Resources, I understand this is a difficult financial time for California; however, SCC's Administration should promote important degrees for students such as engineering. Removing or watering down the Engineering Program at SCC not only adversely effects future students, but it should also concern the school Administration because they are restricting Solano County from providing an education for engineers who will contribute to the future of California.

Sincerely,

John Tatyosian, B.S.
Safety of Dams, DWR
2200 X Street, Ste #200
Sacramento, California 95818

cc: Dr. Melanie Lutz, SCC

July 30, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. While I understand the current economic climate and the high pressure on cost savings in all areas, I feel very strongly that engineering is not the place to make cuts.

I attended SCC for a number of years and graduated in 2001 with AA degrees in General Science and Liberal Arts. I went on to California Polytechnic State University (Cal Poly) where I earned a BS degree in Aerospace Engineering. I moved quickly into an engineering position with Lockheed Martin Corporation and have advanced rapidly to the position of Senior Engineer. While working full time, I am currently pursuing an MS degree in Mechanical Engineering from Santa Clara University.

I consider my life after SCC to be very highly successful and I attribute much of that success to the solid foundation in engineering that I gained from my tenure at SCC. When I transitioned to Cal Poly I found that I was very well prepared to take on upper-division engineering work. I consistently out performed most of my Cal Poly classmates and I believe that was in large part due to the excellence of the education I received from SCC Engineering.

In consideration of the fact that engineering as an educational discipline has been in decline in America for many years yet is so vital to maintaining a position of national technological superiority in the world, it would truly be a travesty if the Engineering Program at SCC were to fall victim to budget cuts. America **needs** engineers and engineering minded students **need** educational facilities where they can develop their engineering skills. SCC Engineering had a strong hand in helping me become a highly successful engineer and I strongly encourage you to maintain the Engineering Program at SCC.

Sincerely yours,

Jason A. Tolvtvar
(SCC student, 1998 - 2002)
2438 Loma Vista Ln.
Santa Clara, CA 95051

cc: Dr. Melanie Lutz, SCC

August 22, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

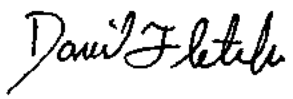
To Whom It May Concern:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. As a successful graduate of the Engineering Program at Solano, I wish to provide insight into my experience in the Engineering Program and to urge for even the thought of discontinuance to cease. I would like to let you know how this program prepared me for my transfer to the University of California Davis Mechanical and Aerospace Engineering Program.

When I started at Solano Community College, I wasn't entirely sure what career path I wanted to pursue, but I ended up deciding on engineering of some kind. I had no idea the caliber of such a program at UC Davis, and something I really needed at a community college was a solid foundation and preparation for a transfer into such a difficult program. The engineering program at Solano Community College more than prepared me for my transfer through special care, attention, and a requirement to make intense creative leaps with the material that was presented in lecture. What made the program especially helpful was the faculty in the department. Even though the classes were extremely difficult and required a lot of time and dedication, I could really tell that they wanted me to succeed. This personal interaction was vitally important for me, and it can only be achieved through instruction in a classroom. Thus, I believe that a watering down of the program by offering classes online or only every other year is not a viable option for students seeking a quality education. From what I understand, a community college exists to provide an affordable, quality education and discontinuing or weakening this program would deprive the brightest students of an opportunity to more than prepare themselves for a university program.

From the experience I have had at UC Davis, I can say that the Solano College engineering program has more than prepared me for dealing with the amount of material that needs to be understood at such a high level. I was one of the best in my Aerospace/Mechanical Engineering class at UC Davis and I have experienced great success with finding work in my field, and all of the other students that I transferred with experienced great success at the upper division level and beyond. I believe it is no coincidence and I attribute much of my success to the preparation I received from the Solano engineering program. The engineering program at Solano Community College is something that needs to be there for those who wish to receive the best preparation they can for an upper division level transfer.

Best Regards,



Daniel J. Fletcher
(SCC student, 2006-2009)
121 N. Gateway Boulevard
Ridgecrest, CA 93555

cc: Dr. Melanie Lutz, SCC

August 1, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. As a successful graduate of the Engineering Program at Solano, I strongly urge you not to discontinue this excellent program, as it has played an important role in my studies as an undergraduate engineering student. The courses in engineering and physics that I completed at Solano had thoroughly prepared me for the classes and provided a great foundation of knowledge prior to transferring to a four-year university. In particular, the instructors of these classes were excellent in preparing me for the upper level coursework at UC Berkeley. Without this program, I believe that many students would either be discouraged from applying to a university or be inclined to change to a different field of study, as they would be at a great disadvantage as an incoming junior. From my own experience, I can say that the quality of the engineering program at Solano was excellent, and the foundation that the program provided me with helped a great deal in the transfer process. In particular, I have seen a number of students transferring from other facilities who did not succeed even for an entire semester due to being inadequately prepared. However, I myself had a much smoother transition, which I attribute to the engineering program at Solano and its excellent quality of instructors. Given the nature of technical classes, I believe the in-class design is essential to the student, especially in regards to the laboratory work. Without the lab sections in many of the classes, I cannot see how I would have been prepared to transfer into another engineering program. These lab-sections were very vital to the learning of the material. If these classes were to be offered via the Internet, I do not believe this would help any of the students, as the inability to ask questions and get feedback or face-to-face help would greatly discourage any student, whether they are having difficulties or not. Speaking as a student, this kind of a set-up would be extremely inconvenient and not at all motivating for learning and thus simply useless, especially for a student who is planning to transfer to a four-year university.

I would like to thank you for taking the time to read this letter, and I urge you not to discontinue or modify this program. As I have mentioned before, I would like to again stress its importance to the college, its students, and the community as a whole. It is an excellent program with great instructors, without which, I honestly believe I would not have been able to successfully transfer to UC Berkeley.

Sincerely yours,

Sana Vaziri
EECS senior, UC Berkeley
(SCC student, 2007-2009)
1759 Sarah Drive
Pinole, CA 94564

cc: Dr. Melanie Lutz, SCC

August 1, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. As a successful graduate of the Engineering Program at Solano, I strongly urge you not to discontinue this excellent program.

The Engineering Program at Solano has done an outstanding job at teaching me engineering fundamentals, and it was inspiring and motivational along the way. I believe that the program has played a major role in all of my successes towards building future career opportunities. I am currently working towards a Master of Science degree in Mechanical & Aerospace Engineering at UC Davis. I have been working on research projects that may play a role in improving manufacturing processes through analysis of control theory and machine dynamics.

While working towards my Bachelor of Science degree at UC Davis in Mechanical Engineering, I performed additional work for the Formula Hybrid student design team at UC Davis. Our team ended up placing 4th place at an international competition and 1st place at a special event at Indianapolis Motor Speedway.

The summer before my senior year I capitalized on an opportunity (that was provided by an SCC colleague) to work for the National Highway Traffic Safety Administration. I worked with a team of engineers performing research on passive safety systems to mitigate vehicle related injuries for people around the country.

Without the proper training I was given from the Engineering Program at Solano, I strongly believe that many of these successes may not have played out so well or at all in my life. Much credit is due to professors at Solano, they have been such a key influence in the confidence and motivation that generated the drive for me to accomplish these amazing feats.

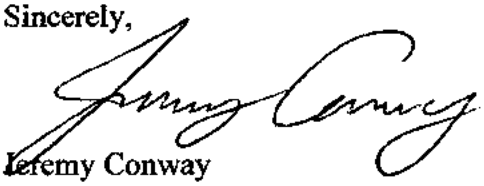
Furthermore, I believe that modifying the program in any way would severely diminish the quality of the program. Online programs may prove to be successful in other fields, but fields that require a strong background in math and science heavily rely on enriching the student's education through laboratory exercises.

For instance, a laboratory section is including the Engineering 17 (Circuit Analysis) course at Solano Community College. The lab provided students with a hands-on experience with electronic components that is not even matched at a university because the comparable course at UC Davis does not include a lab section.

As a result, I have seen many students at the university struggle in laboratory work when dealing with electronic components. This course alone has given Solano Community College students a leading edge over other university students just by integrating laboratory assignments into the coursework. Imagine what kind of impact the smaller class sizes create since the students have more opportunities to meet with the professors.

After reviewing all of the successes and opportunities that occurred for me and others that have attended Solano, I sincerely hope that you would reconsider on the idea of discontinuing the program. Engineering students from Solano have proven over and over again to have a leading edge over other university students. I would be extremely disappointed if this type of opportunity was cut off from future students in the community that have a desire to enter the engineering field.

Sincerely,



Jeremy Conway
(SCC engineering student, 2005-2008)
521 Pioneer Ave 528
Woodland, CA 95776

cc: Dr. Melanie Lutz, SCC

August 1, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. As a successful graduate of the Engineering Program at Solano, I strongly urge you not to discontinue this excellent program because it prepares students so well for transferring to 4-year institutions.

I graduated from Solano Community College in the Spring of 2009, after completing all the engineering courses that were offered. Upon transferring to UC Berkeley, it became clear to me that I had a much better understanding of engineering fundamentals than my classmates, even those who did not transfer and had been at Berkeley from the beginning. I directly attribute my strong engineering foundation to my classes at Solano Community College.

The classes were also extremely beneficial in meeting transfer requirements at UC Berkeley. Had it not been for the Statics class at Solano Community College, I would have been forced to take 2 extra classes at Berkeley, which would of made my workload even heavier than it already was.

It has also came to my attention that there are currently considerations of offering engineering courses on an every other year basis, on-line, or via video have also been considered. I believe that the latter 2 options would be extremely detrimental to the program, since engineering is such a difficult subject matter, a traditional classroom style is virtually the only way that it can be conveyed effectively. The former option would also hurt students greatly because the engineering classes are generally the very last classes that a student will take in their community college studies, so by offering them on an every other year basis, students will likely loose an entire year before transferring. This will simply make what fundamentals they learned at Solano Community College less fresh in their minds and will make continuing their education, upon transferring, all the more difficult.

Sincerely yours,

Scott Berta
(SCC student, 2007-2009)
3177 Cherry Valley Circle
Fairfield, CA 94534

cc: Dr. Melanie Lutz, SCC

August 1, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. As a successful graduate of the Engineering Program at Solano, I strongly urge you not to discontinue this excellent program. It is my belief that a discontinuation of this program would be detrimental to any student considering engineering, physical sciences, or mathematics related careers through Solano Community College.

To consider giving up the engineering program at Solano Community College is to say that the rich field of engineering is no longer necessary in Solano County. The discontinuance of this program will undoubtably influence dozens of students to attend other schools. Although Solano Community College may be considering this discontinuance to cut costs, the effect of this action will only further decrease enrollment.

As a result of a missing engineering program, students considering careers in STEM academics will be more than likely to attend other colleges. Having graduated from Solano Community College after two years in Spring of 2010, I am very familiar with the scheduling difficulties of the courses offered, and believe that to offer certain courses less frequently will cause students to have to remain at Solano Community College an additional year before transferring.

Since graduating from Solano Community College, I have attended UC Davis as a double engineering major. In comparison to continuing UC Davis students as well as other California Community colleges, the engineering program at Solano has prepares me extensively. As a senior in the Mechanical & Aerospace Engineering program at Davis, I still frequently explain fundamental engineering principles to my classmates as a result of the great wealth of knowledge I acquired from Solano Community College's engineering program.

It is my strong conviction that any dilution of the engineering program will have severe consequences to both the engineering community and future engineers. I hope you will consider continuing Solano Community College's greatest assets.

Sincerely yours,

Matthew Seth Cooley
(SCC student, 2008-2010)
1825 Rehrmann Dr.
Dixon, Ca. 95620
cc: Dr. Melanie Lutz, SCC

August 1, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

To Whom It May Concern:

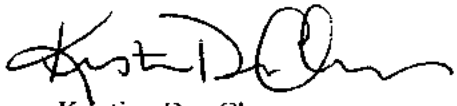
It has come to my attention that Solano Community College (SCC) is currently undertaking a "Program Discontinuance Review" of the Engineering Program. I am writing this letter to support the engineering curriculum currently in place at SCC.

In 2002, I was a recent high school graduate with a goal of becoming a civil engineer. I enrolled in SCC and began taking the courses necessary to transfer into the University of California in a Civil Engineering major. I found that all of my engineering courses at SCC were excellent, providing me with the tools and education necessary to excel at the University of California, Davis, where I enrolled after finishing my coursework at SCC. Once I had graduated with a Bachelor of Science in Civil Engineering with Honors recognition, I was approached by the Department Chair for Civil Engineering and offered the opportunity to obtain a Master's Degree due to my academic record. I attribute much of this to the exceptional engineering education that I received at SCC before I matriculated into the university.

The education that the Engineering Program provides in the fundamental engineering courses is excellent and these classes are the foundation on which all engineering discipline specific coursework at the university is based. The program at SCC provides for the smooth transition to the engineering program at the university. After transferring to the university, in most cases, I was better prepared for the rigorous upper division engineering classes than my peers who had started at the university as freshmen.

It will be a disservice to students should the engineering program at SCC be altered in any way. The current curriculum has proved to offer an excellent education to those seeking engineering degrees and as a recipient of this education, I strongly urge you to keep the engineering program at Solano Community College as it is now presented.

Sincerely yours,



Kristine Des Champs
Design Engineer
U.S. Army Corps of Engineers

cc: Dr. Melanie Lutz, SCC

July 22, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

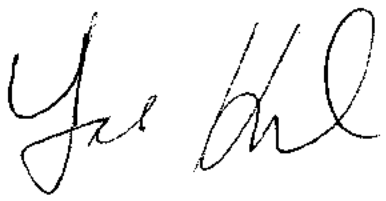
It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. As a successful graduate of the Engineering Program at Solano, I strongly urge you not to discontinue this excellent program.

The Engineering Program at Solano prepared me enormously for my current Upper-Division Engineering courses at UC Davis. My knowledge of the fundamental engineering concepts learned from the program at Solano has far surpassed an overwhelming majority of my peers at Davis. Without the preparation and dedication toward teaching provided by Dr. Melanie Lutz's Engineering courses, I know for a fact that I wouldn't be as successful in my Civil Engineering career as I have been.

My knowledge and background in engineering prior to the Solano program was very minimal and often intimidating. The summer after completing the Engineering Program at Solano my confidence in problem solving, critical thinking and work ethic increased dramatically. Not only did I notice this different but friends and family members did as well and every time I credited the Engineering Program at Solano for the positive changes I made. I was no longer intimidated by my future as a Civil Engineer and in fact I obtained a position as a paid Intern Traffic Engineer for the City of Vacaville.

I can honestly say that I will take the lessons I've learned during the two year program to the grave and it would be a shame for future engineering students within the Solano County to not have the opportunity of experiencing and learning what I did.

Sincerely yours,



Yosuf Hamkar
SCC student, 2007-2010
472 Bald Eagle Drive
Vacaville, CA 95688

cc: Dr. Melanie Lutz, SCC

August 2, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It has recently come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. I have been a student at SCC since 2008 with a cumulative 3.5 GPA. I also placed first in the 2011 California State Fair Industrial and Technology competition. I will be attending Sacramento State University, CSUS, in the spring of 2012 to earn my bachelors in Structural Civil Engineering and plan to pursue my master. I tell you this because I owe my success to the education I received from the SCC Engineering Program and Dr. Melanie P. Lutz. This is why I am writing to you. I feel that it would be a tragic loss for SCC, its students and future students, so I strongly urge you not to discontinue this exceptional program. The alternative of offering classes once a year and/or having professors lecture over the computer is not a solution; it's an easy way out that will only hurt the students. I understand that this "review" is, in part, due to financial issue and that there may be other SCC programs that fill more seats in classrooms, which brings in more money. However, there are other aspects of a college program that are just as important; success rate and prestige, for example. The success rate of students who go through the SCC Engineering Program is astounding and should not be overlooked. I feel so strongly about SCC's Engineering Program that I decided to stay at SCC for a extra semester to take two more undergraduate classes, even though I was accepted to CSUS this fall. I did this because I feel that the quality of SCC Engineering Program is unmatched at any level. One last thing to consider, engineers are essential to the success of local businesses and industries. SCC's Engineering Program benefits our community and it would be a travesty if it were to be discontinued.

Sincerely yours,

Arthur Jack Hooper Jr.
(SCC student, 2008-Present)
261 Deodara St.
Vacaville, CA 94589

July 21st, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It had come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. As a successful graduate of this very program I would strongly recommend you to not discontinue this program. Had it not been for this program I would not be where I am today. In the fall of 2003 I began taking classes at SCC with the intent of transferring to UC Davis to obtain a Bachelors and Masters Degree in Civil and Environmental Engineering. However, to support my family and to become eligible for Montgomery G.I. Bill benefits, I enlisted in the US Air Force as an aircraft mechanic and was subsequently stationed at Travis Air Force Base (AFB), CA. I enrolled in two or three classes at a time while working full time in order to fulfill the transfer agreement contract. Often when Travis AFB participated in military exercises (12 hours shifts, 7 days a week), I was only able to attend at great personal sacrifice. However, the course content and instructor assistance that I received was second-to-none and allowed me to push through those difficult times. I am extremely grateful to SCC and to all of my instructors in the Engineering Program for offering those engineering classes and for their professionalism, dedication, and effort.

The engineering courses that I attended were well organized, high quality, and an excellent preparation for upper division coursework in Civil Engineering at UC Davis. In fact, I would say that the courses offered in the Engineering Program at SCC are superior to those taught at the undergraduate level at UC Davis. As a Graduate Researcher and Teaching Assistant in the Department of Civil and Environmental Engineering at UC Davis, I see first hand the deficiencies of the undergraduate student that attend this school. I believe that many of these deficiencies arise due to very large class sizes (150-180 student per class), minimal interaction, and professor apathy. I believe firmly that if I had not received my strong engineering background from the Engineering Program at SCC I would not now be pursuing my Ph.D. in Structural Engineering and Mechanics. I also believe that offering the courses in alternate years would a great disservice to future students. In the first place, most students that transfer from community colleges take longer than the ideal two years to complete their lower division transfer requirements due to a variety of factors. Courses only offered in alternate years would prolong the time before transfer. I am also of the opinion that offering online classes and/or streaming-

video lectures are a very poor substitute for the real thing. I have personally experienced both class formats and found both very unsatisfying. These formats may be appropriate for other types of classes, but for mathematics, science, and engineering classes I feel that direct interaction is the only way that the next generation of student must be taught. Engineering student (as well as math and science) in general are very hesitant about voicing their concerns, problems, and misunderstanding to begin with, due to the rigorous and quantitative nature of our courses. We are taught to only state what we know and then we must prove it. There is very little room for subjective reasoning and mild opinions in math, engineering, and the sciences. Distance learning of any form, in my opinion, places another barrier between instructor and pupil and impedes in-depth understanding and instruction since the professor is not able to pick up on crucial visual cues.

In short, it is my belief that discontinuing the Engineering Program would be a great disservice to the engineering students that take them. Many of them are economically challenged and simply not be able to afford an engineering degree, at a four year school, in today's grim economic circumstances. Quite simply, if not for the Engineering Program at SCC I would not be where I am today.

Sincerely yours,

Sean M. Shaw
Graduate Researcher, MS, EIT
530-723-3307
smshaw@ucdavis.edu

August 2, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

I have been made aware that Solano Community College is currently evaluating the necessity of its Engineering Program. As a student having completed SCC's engineering program, I advise against ending or significantly altering the engineering program. I transferred from SCC to Sacramento State in the fall of 2010 entering into the mechanical engineering program. Throughout my attendance at Sacramento State I have found myself well above average in terms of preparedness for my courses. I find myself better able to comprehend material than most other students. In addition my problem solving skills and strategies are more developed than many of my classmates. I can say with complete confidence that these qualities can be attributed to completion of the SCC engineering program. I can attribute them to the excellent curriculum offered in the program. Every lesson was well prepared and thought out. The weekly labs were crucial to my complete understanding of the material. They allowed me to not only gain hands on experience in engineering related tasks, but they also allowed me to find the practicality in the countless equations and theories learned in class. I am certain that any dilution of this program will have disastrous consequences for future students. The skills developed while in the engineering program at SCC were integral to my success at Sacramento State and I feel that future students deserve the same quality education that I received while at SCC.

Sincerely yours,

Kirk LuMaye

Kirk LuMaye
(SCC student, 2007-2010)
7729 College Town Drive
Sacramento, CA 95826

cc: Dr. Melanie Lutz, SCC

JOHN GARAMENDI
10TH DISTRICT, CALIFORNIA

228 CANNON HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
PHONE: (202) 225-1880
FAX: (202) 225-5914

DISTRICT OFFICE:
1981 N. BROADWAY, SUITE 220
WALNUT CREEK, CA 94596
PHONE: (925) 932-8899
FAX (925) 932-8159

http://garamendi.house.gov

Congress of the United States
House of Representatives
Washington, DC 20515

COMMITTEE ON ARMED SERVICES
SUBCOMMITTEE ON STRATEGIC FORCES
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

COMMITTEE ON NATURAL RESOURCES
SUBCOMMITTEE ON NATIONAL PARKS, FOREST AND PUBLIC LANDS
SUBCOMMITTEE ON WATER AND POWER

September 13, 2011

Academic Senate
Solano Community College
400 Suisun Valley Road
Fairfield, CA 94534

Re: Program Discontinuance Review of the Engineering Program at Solano Community College

To the Members of the Academic Senate:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of its Engineering Program. I strongly oppose discontinuing the Engineering Program at Solano Community College and feel that doing so would represent a significant disservice to our community, state, and nation.

Economic recovery and growth in California and our nation depends on our ability to develop skilled technical talent; including scientists, engineers, researchers, and programmers. By developing this talent, we ensure that the innovation, creativity and technical demands of the future can and will be met.

We must produce more trained engineers to meet our economic, environmental, and security challenges. Yet, we are falling further behind. The U.S. Bureau of Labor Statistics predicts a shortage of 160,000 engineers by 2016; a number that will likely grow as expected retirements will further deplete America's engineering ranks.

Moreover, with the regrettable rising costs of public higher education, many California students are opting to attend community college before transferring to a four-year institution. This makes any decision to discontinue the Engineering Program at SCC even more concerning. At a time when our state and nation need more engineers, we must avoid creating additional roadblocks for promising students who may lack the means or opportunities to otherwise fully realize their talents.

For these reasons, I strongly urge you to continue the Engineering Program at Solano Community College.

Sincerely,

JOHN GARAMENDI
Member of Congress, CA-10

UNIVERSITY OF CALIFORNIA, BERKELEY

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S. SHANKAR SASTRY
ROY W. CARLSON PROFESSOR OF ENGINEERING
DIRECTOR, BLUM CENTER FOR DEVELOPING ECONOMIES
UNIVERSITY OF CALIFORNIA
COLLEGE OF ENGINEERING
320 McLAUGHLIN HALL # 1700
BERKELEY, CA 94720-1700

TELEPHONE: (510) 642 5771
FACSIMILE: (510) 642-9178
email: sastry@coe.berkeley.edu

August 05, 2011
79-11

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the engineering program. In partnership with UC Berkeley's College of Engineering and many other California and U.S. institutions, SCC's engineering program plays a key role in educating a highly qualified workforce to meet the demands of our technology-based economy. To discontinue the program due to fiscal considerations would be short-sighted and a disservice to students, regional employers, and the state as a whole.

The need for more engineers to drive innovation and industrial growth is especially acute during this period of economic stagnation. Intel CEO Paul Otellini, recently appointed by the President to the Council on Jobs and Competitiveness, notes that the number of engineers graduating from U.S. colleges and universities has stagnated at about 120,000 a year during the last decade. By contrast, roughly 1 million engineers graduate each year from universities in India and China.

I am now serving on an advisory body that is helping the Council on Jobs and Competitiveness find ways to graduate at least 10,000 more engineers in the U.S. each year. Among our suggested strategies, widening the pipeline from community colleges to four-year engineering schools and colleges will be especially important. The SCC students who continue their education here at Berkeley Engineering are vital members of our student body, and we want our relationship with SCC to continue and grow. I offer my enthusiastic support of SCC's engineering program and am happy to speak further about its value to UC Berkeley and the people of California.

Sincerely,

S. Shankar Sastry
Dean, College of Engineering

cc: Dr. Melanie P. Lutz, SCC

UNIVERSITY OF CALIFORNIA, DAVIS

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ENRIQUE J. LAVERNIA, DEAN
PHONE: (530) 752-0554
FAX: (530) 752-8058
e-mail: lavernia@ucdavis.edu

COLLEGE OF ENGINEERING
OFFICE OF THE DEAN
ONE SHIELDS AVENUE
DAVIS, CA 95616-5294

July 27, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. I am writing in support of the SCC Engineering Program, and in opposition to the program's discontinuance.

Economic recovery and growth in California and our nation depends on our ability to develop skilled technical talent, including scientists, engineers, researchers, and programmers. Invention, creativity, innovation, and technology are the key to moving forward.

We must produce more trained engineers to meet our economic, environmental, and security challenges. Yet we are falling further behind. The U.S. Bureau of Labor Statistics predicts a shortage of 160,000 engineers by 2016; this figure is likely to be an underestimate, as expected retirements will further deplete America's engineering ranks.

The College of Engineering at UC Davis is working hard to meet this challenge. This year we awarded bachelor's degrees to 468 students, and graduate degrees to more than 266 students. We are extending our efforts to attract young students at an early age, assisting local K-12 educators of STEM subjects (science, technology, engineering, math) through our C-STEM Center.

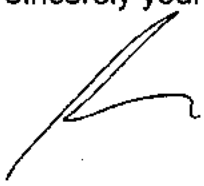
To facilitate this development, we are increasingly dependent on critical partners, such as Solano Community College. Over the past five years, 2007-11, approximately five percent (5%) of incoming transfer students to the College of Engineering at UC Davis have transferred from Solano Community College. One recent SCC transfer, Daniel Weise, came to UC Davis in fall 2009. He graduated this spring with highest honors (GPA 3.962) and a double major in Mechanical and Aerospace Engineering. He earned an astonishing 13 A+ grades in his two years here. He has been admitted to the Ph.D. program at MIT in the fall.

Daniel is typical of the exemplary students given the opportunity to achieve through the Engineering Program at Solano Community College. Given our college's very competitive admissions requirements, this record of accomplishment is great evidence of the instructional excellence of the Engineering Program at SCC.

With the regrettable rising costs of public higher education, many California students are opting to attend community college before transferring to a four-year institution. This makes any decision to discontinue the Engineering Program at SCC even more concerning. At a time when our state and nation need more engineers, we must avoid creating additional roadblocks for promising students who may lack the means or opportunities to otherwise fully realize their talents.

Again, I would urge you to give serious consideration to protecting the Engineering Program at Solano Community College.

Sincerely yours,



Enrique Lavernia, Dean
College of Engineering
Distinguished Professor, Department of Chemical Engineering and Materials Science

cc: Dr. Melanie P. Lutz, SCC

California State University, Sacramento
College of Engineering & Computer Science
Office of the Dean
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August 8, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It is with great pleasure that I express my strongest of supports to the Engineering program at Solano Community College. Solano Community College has been a major feeder of engineering talent to Sacramento State form many years and continues to do so to date. Currently we have several of your former students enrolled in our engineering programs including Michelle Morales, Karl Ono, Kirk Lumaye and many more.

I have been especially happy to see many underrepresented students in STEM disciplines come to us from SCC. As you may be aware, Latinos are one of the groups that are most underrepresented in engineering and knowing that our State's population is now more Latino than ever we need to focus on this ethnic group to ensure we develop sufficient engineering to help us get from under the current economic crisis this state and our nation is facing. In addition, we must develop many more women and SCC has been able to develop many young girls who have gone on to become engineers and leaders in our community.

Two very successful Solano Community College alums who are also our alums include James L. Jensen, P.E., an Associate Civil Engineer for the Phillippi Engineering, Inc., and Kyle Bickler, PE, GE, Senior Geotechnical Engineer for GEI Consultants, Inc. But like these two wonderful engineers I could name a hundred or more who have followed the same path to success thanks to our institutions' partnership.

As you can see, not only Sacramento State but the entire state of California depends on engineering talent developed at Solano Community College to help fuel the high-tech engineering companies and corporations that will in turn help us emerge from the financial crisis facing Sacramento and the entire state of California.

Best regards and please let me know what else I can do to help ensure Solano Community College continues to do this great service on behalf of the citizens of California and the nation.

Sincerely yours,

Emir José Macari, PhD.
Dean

C: Dr. Melanie P. Lutz
1812 Delaware Street, Apt. 207
Berkeley, CA 94703

Paul Wiese
607 Fox Hollow Way
Vacaville, CA 95687

July 26, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

I understand that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. I understand that this is not a reflection on the program itself, but is driven by funding issues the college is facing.

I urge you to preserve SCC's Engineering Program.

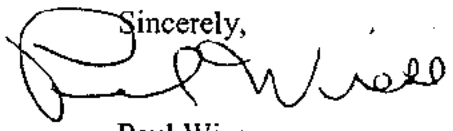
As the County Engineer for the County of Solano, I have seen on a daily basis that engineering is the key to a functioning community. Everything one does depends on engineering: from the buildings we live and work in, to the roads we drive on, to the sewer and water systems that support our daily life. Engineering is essential to the life and health of our communities.

For years, America has been importing engineers from other countries due to our inability to produce enough home-grown engineers. In many cases, I think this is the result of the lack of interest of American students in technical courses such as engineering, mathematics and the sciences. As a society, we should do all we can to encourage and develop the interest of the younger generation in such critical subjects.

Although with the current economic conditions the job market is tough for nearly all occupations, historically engineers are readily able to find good jobs and make valuable contributions to the community. In my family, I have been employed as a civil engineer for 34 years; one of my sons is also employed as a civil engineer; another son, who received his lower division technical and engineering training at SCC before graduating from UC Davis in mechanical engineering, is currently enrolled in the PhD program in Mechanical and Aeronautical Engineering at the Massachusetts Institute of Technology, a real tribute to the success of your Engineering Program.

Please, consider the importance of providing key technical training to the youth of our growing region and retain Solano Community College's Engineering Program.

Sincerely,



Paul Wiese

c. Dr. Melanie P. Lutz, SCC

August 11, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

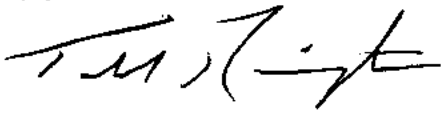
Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

It has come to my attention that Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. In my opinion, it would be a shame if the program is discontinued. Solano College offers an alternative path to a four year engineering program for students who, for whatever reason, can't take the traditional path directly from high school. As the Student Outreach coordinator for the Napa-Solano Chapter of the American Council of Engineering Companies (ACEC), I have met several such students through our scholarship program. Students who have been accepted to and are now attending a four year engineering college.

Our infrastructure is in dire need of an overhaul and future engineers are needed to help design it. As you conduct your review of the program, please keep in mind that it serves a vital role in producing engineers that will help design our future. I hope you realize what a mistake it would be to eliminate the program.

Sincerely yours,



Todd Remington, P.E.
Napa-Solano Chapter, American Council of Engineering Companies
Remington Engineering
774 Dynasty Drive
Fairfield, CA 94534

cc: Dr. Melanie P. Lutz, SCC

SITE DESIGN ASSOCIATES, INC.
1016 BROADWAY, SUITE A, EL CAJON, CA 92021 (619) 442-8467 FAX: (619) 442-8417

July 22, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at Solano Community College

To the Members of the Academic Senate:

As the current State President of the California Society of Professional Engineers, I was dismayed to learn from our Executive Director, Marti Kramer, that Solano Community College is considering its Engineering Program for a "Discontinuance Review." I feel discontinuing the Engineering Program would represent a serious mistake on the part of the Academic Senate and do a grave disservice, not only to the current and prospective students at SCC, but also to the future of our profession.

Certainly, it has been consistently demonstrated that an education in engineering is of enormous value because the demand for engineers is always high. Recent statistics have proven that even in a struggling economy such as our county has recently experienced, there are ample employment opportunities for those students who have acquired a throughly sound engineering education. It is my understanding that Solana Community College's Engineering Program has in the past provided its students with just such an engineering education basis, and, in addition, enabled economically disadvantaged undergraduates to get a head start on a Bachelor of Science degree in engineering at a much lower cost than at a traditional four-year university.

It is not an exaggeration to state that an engineering degree holds a high value in business and industry. Our society is constantly creating and designing new technologies that require engineering expertise. Should the Academic Senate of Solano Community College decide to discontinue its Engineering Program purely for financial reasons, I believe it would demonstrate a lack of foresight which would not reflect well on the school. For this reason, I urge you to retain your school's Engineering Program and take pride in the students who will contribute to society as a result of their engineering education at SCC.

Sincerely,

Kenneth J. Discenza, P.E., D.M. CSPE
President, California Society of Professional Engineers
President, Site Design Associates, Inc.

c: Dr. Melanie P. Lutz, SCC

2011 Admin. Directory

July 25, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Colleagues:

Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. Among the factors that must be considered as part of the review process are "Importance of the program in its relationship to other programs", and "Impact on other programs, including transfer, if the program is modified or closed." As an instructor in the Chemistry Department, I would like to explain why the closure of the Engineering Program would have a negative effect on the Chemistry Department, and on the college as a whole.

I survey all my students at the beginning of each semester. Whether I'm teaching Chem 001, 002, 010, or 160, I always have at least five students (per section of chemistry) planning a career in engineering. Usually it's more! And during the semester, I usually talk at least one student who didn't list engineering as a major into changing majors to engineering. If we didn't have the Engineering Program at SCC, I know SCC would have fewer students taking chemistry! These students have to take Chem 001 at a minimum, and since they want good grades, they often take Chem 010 or 160 before taking Chem 001. If they are planning on chemical engineering, they have to take Chem 001, 002, 003, and 004!

Two former students of mine are still in touch with me ten years after leaving SCC. They both have great careers as engineers because of SCC and our Engineering Program. Our division's faculty members have made that occur for our students over and over again.

It will be a devastating blow to the Chemistry Department, our division and to the college overall, to eliminate the Engineering Program. Please consider all the aspects of this proposed program discontinuance. As a former engineer myself, I see that the costs of the program are more than covered by the >100% fill rate in the science and math classes, with many of those students at least considering an engineering major. It would be shortsighted to think that we would only lose the engineering students if the program is discontinued.

Sincerely yours,

Christine Ducoing

Christine Ducoing
Chemistry Department
Solano Community College
Fairfield, CA 94534

✓cc: Dr. Melanie Lutz, SCC

August 1, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. Among the factors that must be considered as part of the review process are "Importance of the program in its relationship to other programs", and "Impact on other programs, including transfer, if the program is modified or closed." As an instructor in the Physics and Astronomy Department, I would like to explain why the closure of the Engineering Program would have a negative effect on the Physics Department, and on the college as a whole.

Our Engineering Program is a high-quality program with an excellent record of transferring students to four-year universities such as UC Davis, UC Berkeley and Sacramento State. From there, they go on to high paying jobs that contribute greatly to Solano County and our Nation. With a shortage of Engineers nationwide, I believe it is critical to keep our well-run program and offer our best students a bright future and businesses of Solano County the workforce they need.

The closure of this program would also have a drastic impact on our college with negative spillover effects on other departments, such as Physics, Mathematics and Chemistry. In particular, Physics 6, 7, and 8, calculus-based Mathematics classes, and Organic Chemistry would be severely impacted. This would drag down the overall academic and intellectual level of the college.

Finally, our engineering students are frequently our best tutors in Science and Math and give back to our college every semester. Let us make the commitment to keep our Engineering Program, so instead of just offering general education classes, we can also continue an important career option for students of Solano County.

Sincerely yours,

Mark Feighner

Dr. Mark Feighner
Geology and Physics Departments
Solano Community College
Fairfield, CA 94534

August 7, 2011

To whom it may concern,

Globally, nationally, and locally (at Solano College), ending a wonderful program in Engineering would be reprehensible! In other words, such a move would deserve rebuke and censure!

Our economy is now based on Engineering: software, computers, mechanical devices, roads, buildings, energy efficient devices. All our supporting structures rely on capable engineers. Most of our Physics students are future engineers, students who can save us from major disasters. Take away Engineering and Physics will go away too! Take away Physics and we have no foundation for science!

If you want to be science free, have a destroyed economy, solve no major planetary problems—get rid of engineers! President Obama has said that we should focus on science—and that means Engineering! With the US economy floundering, this is no time to erase Engineering from academia!

Now locally: Solano College has a fantastic Engineering program run by a great instructor—Dr. Melanie Lutz. I have seen the results of her work. By the time her students reach my class, Physics 8 (Modern Physics with calculus), she has produced extremely mature lab students, who are creative in solving laboratory challenges and in writing about them. They are students who work hard!

When they leave Solano College, most of them succeed in completing Undergraduate and Graduate Engineering degrees at college campuses like UC Berkeley and Davis. Then (she tracks them) they get fantastic jobs and academic pursuits. Small numbers, but almost everyone accomplishes something great! Destroy this program, and you destroy some of the greatest contributions to science that Solano provides!

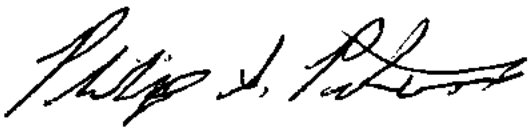
I think my job in teaching modern physics is to inspire student to learn the theoretical approach and be creative. However, without these AMAZING well-

grounded and disciplined engineering students Melanie has produced, I would have almost NOTHING to work with!

Yes, there are those who find the hard work in Engineering at Solano too much, and drop out or don't start (that's why the numbers are small), but the focus on this work makes those who stay INCREDIBLE!

Please move to save Engineering! That way, you can help save Physics, Science, and the economy in general, globally and locally!

Sincerely,



Philip S. Petersen,
PhD in Physics
UCSD, 1987
Tenured professor,
Solano College

July 22, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Sir/Madam:

Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. Among the factors that must be considered as part of the review process are "Importance of the program in its relationship to other programs", and "Impact on other programs, including transfer, if the program is modified or closed." As an instructor in the Mathematics Department, I would like to explain why the closure of the Engineering Program would have a disastrous effect on Solano Community College and Solano County in general and also on the Mathematics Department.

1. It will undermine enrollment in most upper division math classes (Math 20, Math 21, Math 22, Math 23 and Math 40) and eventually degrade Solano Community College to the level of a vocational school.
2. It will therefore jeopardize the sound academic programs of Solano Community College related to fundamental math, physics, chemistry, biology and natural science in general.
3. During these difficult economic times our college is one of fewer venues to higher education for most underserved poor and minority population of Solano county and beyond.

Our Engineering Program has been a very successful program that needs nurturing, support and help due to its highest importance for the future of our country.

From what I have heard from my students, the engineering program at our college is highly sought after by students geared towards higher education in the natural sciences. It took years to build a successful program, and will take very little to destroy it.

Should economic times improve, it would take years to get enrollment for this program, as well as related programs, back to at least current levels, while it is imperative to train more bright and capable engineers in this country now!

To discontinue this program simply does not make any sense and it breaks my heart even to hear talk about it.

Yours truly,

Svetlana Podkolzina
Mathematics Department
Solano Community College
Fairfield, CA 94534

cc: Dr. Melanie Lutz, SCC

SOLANO
COMMUNITY COLLEGE

http://www.solano.edu

August 25, 2011

Academic Senate
Solano Community College
4000 Suisun Valley Road
Fairfield, CA 94534-3197

Re: Program Discontinuance Review of the Engineering Program at SCC

Dear Senators:

Solano Community College is currently undertaking a "Program Discontinuance Review" of the Engineering Program. Among the factors that must be considered as part of the review process are "Importance of the program in its relationship to other programs", and "Impact on other programs, including transfer, if the program is modified or closed." As instructors in the Mathematics Department, we would like to explain why the closure of the Engineering Program would have a disastrous effect on the students of Solano County, Solano College and the Solano Mathematics Department.

Most importantly, the students in the engineering program are among the best and brightest in Solano County. Here and nationally, education in the Science, Technology, Engineering, and Mathematics (S.T.E.M.) is in great demand. Eliminating engineering at the college would remove one of the components of S.T.E.M. from county residents. Discontinuing the Engineering Program would also affect student equity at Solano College because underrepresented students are more likely not to have the means to commute to a neighboring district. It would also weaken science (especially physics and chemistry) and mathematics since so many of our upper level courses are taken by engineers. For example, in fall 2011, 61% of students in Math 020, Math 021 and Math 040 identified themselves as engineering majors. Loss of these students would severely affect the course offerings in our department by reducing the pool of students who take them. This would impact students in other majors who also need these courses. Moreover, since these are the more advanced courses in the department, their cancellation would leave us with a curriculum that would be even more prominently skewed to pre-college material.

A crucial component of our program is the Math Activities Center (MAC). Most of the student tutors in the MAC come from among the engineering majors. In fact, in fall 2011, 10 of the 11 tutors who responded indicated that they were engineering majors. We are in danger of losing

our MAC tutors if the Engineering Program is eliminated. Lack of available MAC tutors will directly affect assistance for our math basic skills program and other mathematics students. The tutoring center would be similarly affected because many of their student tutors in math are also engineering majors.

Another very successful Solano program which would be affected is the MESA program. MESA is an acronym for Mathematics Engineering Science Achievements program. The program supports economically and educationally disadvantaged students with a focus on historically underrepresented students who are majoring in calculus-based majors. Approximately 25% of the students who are active in MESA are engineering majors. The lack of diversity in the sciences puts Solano College students at a disadvantage. For example, every year the National Science Foundation, through the MESA Statewide office at the UC Office of the Presidents, allocates funding for two to three $14,000 scholarships exclusively for students in Solano College's MESA program. This year the winner was civil engineering student, Abraham Gacad. Without engineering students Solano College will not have an opportunity to apply for scholarships like this. The MESA program and the students involved are highlighted nationally because of the engineering students. Currently, four Solano College civil engineering MESA students are building a school for a poverty-stricken town in Charette, Haiti. The project is scheduled to be completed next year. This type of global-service learning opportunity is not possible without engineering students. Additionally, the MESA program may fall out of compliance and may lose statewide support if the engineering program is eliminated. As the cuts from the MESA statewide office get deeper, the elimination of MESA programs becomes inevitable. It is important that we maintain the integrity and diversity of not only the math and science students, but the MESA program at Solano Community College.

In conclusion, we believe that the elimination of the engineering program at Solano Community College would have disastrous effects on the mathematics department, the School of Sciences, the college as a whole and, most importantly, on the future S.T.E.M. majors from Solano County who will find access to their desired education reduced or eliminated.

Sincerely yours,

Members of the Mathematics Department

Randy Robertson

Svetlana Podkolzina

Corrine Kellogg

Robert H. Scott

Alan Jian

Rebecca Lum

cc: Dr. Melanie Lutz, Engineering Instructor