

Santa Rosa Junior College

Program Resource Planning Process

Engineering 2014

1.1a Mission

Engineering Transfer Program Mission:

- To provide the academic and professional training for students pursuing engineering careers through course offerings and a robust range of engineering support activities and services.
- To improve the technological literacy in our general population and the awareness of the essential role engineering plays in our society and economy.

1.1b Mission Alignment

The Engineering Transfer Program aligns directly with the district's central educational mission. The program's lower division academic coursework and support services build the knowledge and skills of our engineering transfer students. Although not an occupational program, the Engineering Transfer Program also plays an important role in our community's economic development and global competitiveness because of the pivotal role engineers play in those arenas. SRJC is the only academic institution in Sonoma County delivering the complete spectrum of lower division engineering coursework and thus has a crucial role to play in meeting the engineering needs of our community.

1.1c Description

The Engineering Transfer Program provides the standard core of lower division engineering courses to prepare students to transfer to four-year universities and complete an engineering bachelor's degree. The program also offers an AS degree in Engineering. We are one of the largest and most respected engineering programs in the state, with about 250 engineering students on campus. About 60 engineering students transfer each year, making engineering the largest group of transfer students in STEM. Engineers comprise more than a quarter of the ~200 transfers in STEM majors. Our students are in demand by the top engineering schools and are extremely successful at those institutions.

In addition to developing math, science and engineering concepts and applying them to the world in which we live, the engineering courses develop analytical thinking, problem solving, visualization, design, and laboratory skills. The program has strong linkages with local engineering industry partners who have paid for classes, provided guest speakers and field trips, supplied internship opportunities, and built an engineering endowment.

1.1d Hours of Office Operation and Service by Location

Santa Rosa :

The engineering classes and labs are typically offered Mondays through Fridays in the Spring and Fall semesters during daytime hours on the Santa Rosa Campus. Each summer, we offer a section of Engr 10 (Intro to Engineering).

Since the reduction of the service center staff position to 75%, the program's service center is not open during all the normal work hours, especially as the service center must also serve the evening classes of the Applied Technology areas.

Petaluma :

Engr 10 (Intro to the Engineering Profession) is being offered on the Petaluma Campus in the Fall and Spring.

1.2 Program/Unit Context and Environmental Scan

Project Based Instruction

An exciting trend in engineering education is the move to more project based learning. The program hopes to team up with MAKE, SRJC's MESA program, and industry partners like Agilent to launch a MakerSpace on the SRJC campus that would serve our engineering students, reinvigorate our electronics program, and serve as a resource to the MESA high school programs in the county. Courses taught in this facility would include: Engr 101, Engr 102, and Engr 103, as well as electronics and photovoltaic offerings. The makerspace would also be used for student projects for Engr 49 (including MESA poster projects), the robotics club, and the engineering club (TEC) and other engineering classes (Engr 45 & Engr 25 have project components). This facility would also serve as a fieldtrip destination for high school groups including MESA high school programs. The ideal location would be in 1447 & 1448, an underutilized lab space and adjoining unused office/storage space. This facility would require SLIA staffing, to be shared with the rest of the engineering courses. Most of the required equipment already existed in storage within electronics, engineering, applied technology, and trade technology.

High School Student & Industry Demand for Engineering

Student demand for engineering continues to grow. The engineering education pipeline is full at every level with students eager for the training that leads to a rewarding career. Nationally and locally, the job market for engineers remains stronger than for any other

discipline. Locally, Medtronic is hiring, Agilent is hiring, JDSU is hiring... To meet their engineering needs, companies hire foreign engineers using the H1-B visa system (currently 59,400 per year).

Engineering as a Priority

Engineering education is a national priority as demonstrated by President Obama's Educate to Innovate campaign. At the state level, California's Labor and Workforce Development Agency (LWDA) forecasts that we will need 20,000 to 24,000 additional engineers to be educated in California to meet the growing engineering needs of both the private and public sectors over the next decade. Engineering education is also a priority with our local community. Recently, the Sonoma County business community formed BEST (Building Economic Success Together) to support and attract innovative businesses that will create high-quality jobs for the future. Agilent Technologies is a key player in BEST and they are spearheading an engineering education focused initiative to try and increase the size of the local engineering education pipeline. Agilent and the Sonoma State have requested an expansion of the SRJC engineering pipeline to feed SSU's Electrical Engineering program. Four times over the past 5 years, local engineering companies and groups (American Council of Engineering Companies, Winzler & Kelly, Agilent, and O'Reilly Publishing) have stepped in to pay for important engineering courses when they were cut. The external environment for engineering has never been brighter. Locally, the expansion of our engineering program is hamstrung by the lack of **LAB SUPPORT**. We will need to suspend offering lab courses if this critical need doesn't get addressed. Similarly, our current department structure creates unnecessary inefficiencies. With a dozen different disciplines, the ATEP department is too complicated for one person to effectively manage. The formula and structure that work for a monolithic department like chemistry or math does not meet the needs of our programs. ATEP is about half the size of Health Sciences, but more importantly, has just as many disciplines. If the district wants robust engineering and technology programs, it must support the move to a health sciences type of structure that is so effective at supporting those programs.

Engineering TMC Major

Statewide efforts to develop the TMC for various engineering majors are progressing in spite of its high unit issues. At SRJC, the Engineering Transfer Program has most of the pieces in place to transition to AS-T majors. The program is very involved with the state-wide efforts in this area.

Technological Literacy

An important trend in engineering education is the move to foster technological literacy of our society through the development of general education courses related to engineering. If the program's lab support crisis can be stabilized, the program hopes to expand in this area by offering the approved Engr 12 How Stuff Works course and developing the Engr 14 America's Technological Infrastructure course.

2.1a Budget Needs

Restore Engineering Supplies Budget

Over the past 20 years, the Engineering Transfer Program has doubled in size. Meanwhile, our meager non-personnel budget has been cut to less than half (\$4143 in 1996-7, \$1766 in 2010-11). Our budget is not able to support the project centered learning that is essential for a quality engineering program. Engineering lacks the

resources to maintain the equipment and supplies that are essential to deliver our lab curriculum. For example, in Engr 16: all the protoboards need desparately to be replaced, similarly - all the stepdown transformers, we rely on the students to buy solder kits, half the function generators are broken, half the oscscope leads are broken, we have no banana-banana leads, we desparately need a class set of grounding busses, there are no solder wicks. In comparison with other STEM disciplines, Engineering is significantly underfunded with only \$39 per FTES in non-personnel costs - and it shows in the quality of the labs we have. For comparison: Life sciences \$98 per FTES, Chemistry \$163 per FTES, Construction Management \$65 per FTES. A slender 3% cut to chemistry would DOUBLE our budget and would go a long way towards allowing BOTH programs to have quality lab environments.

Restore Engineering Staff Travel Budget

Engineering is not like other disciplines in which faculty can share responsibilities, curriculum and professional development. With only one full time faculty member at the college, program quality REQUIRES participation in statewide organizations. Professional development REQUIRES conference and workshop attendance. Engineering isn't even one discipline, the full-time faculty member needs to maintain discipline currency in computer science, electrical engineering, mechanical engineering, civil engineering, and computer aided design. This discipline currency crisis is likely to get much worse with the impending retirement of the materials science instructor. Physics will likely request a straight physics position and the extra discipline of material science will add to the disciplines list of the remaining faculty member.

Restore Engineering Grader Budget

Engineering has significantly higher homework loads than almost all other disciplines. Every semester, engineering homework grading is being done by students paid under the table.

2.1b Budget Requests

| Rank | Location | SP | M | Amount | Brief Rationale |
|------|------------|----|----|------------|---|
| 0001 | Santa Rosa | 02 | 01 | \$1,500.00 | Replacement of antiquated and broken equipment for Engr 16 & Engr 45 (items<\$200). Support project based engineering curriculum. |
| 0002 | Santa Rosa | 02 | 01 | \$600.00 | Restore staff travel budget. |
| 0003 | Santa Rosa | 02 | 01 | \$1,200.00 | Restore grader budget. |

2.2a Current Classified Positions

| Position | Hr/Wk | Mo/Yr | Job Duties |
|----------|-------|-------|------------|
|----------|-------|-------|------------|

2.2b Current Management/Confidential Positions

| Position | Hr/Wk | Mo/Yr | Job Duties |
|----------|-------|-------|------------|
|----------|-------|-------|------------|

2.2c Current STNC/Student Worker Positions

| Position | Hr/Wk | Mo/Yr | Job Duties |
|------------------|-------|-------|---|
| Engineering SLIA | 5.00 | 4.00 | Support Engr 16 in 1447 (3 lab sections) Support Engr 45 in 1767 (1 lab section) Support Engr 101 in 1784 (1 section) |

2.2d Adequacy and Effectiveness of Staffing

Engineering Lab Support

Engineering needs technician support for the lab rooms 1452 and 1767. Cuts to lab staffing have left engineering with **NO LAB SUPPORT**. The program has scrambled using FWS students, CalWorks students, student volunteers, MESA funded students, a Teaching Fellows student, and most recently an emergency 5 hrs/wk STNC to try and bridge the gap. In the lab environments, broken and uncalibrated equipment seriously degrades the learning environments for Engr 16 and Engr 45 and make them unsafe. We cannot offer engineering labs without engineering lab support. Other courses with lab components (Engr 25, Engr 6, Engr 101, and Engr 102) also have no support or partial support from staff in other disciplines who lack the basic engineering knowledge and skills to be effective. Engineering has expansion plans on hold (Engr 12 and Engr 103) until this inadequate staffing situation gets addressed. This position would be further expanded into a 100% position if the proposed Maker Space collaboration gets underway. This 50% engineering instructional aide/lab technician could also support ATEP programs including electronics and and would serve as back up to the physics lab technician.

ATEP Department Coordination

The ATEP Department structure is extremely inefficient because the needs and paperwork of 13 different programs get filtered through a part-time chair. Communications to and from the administration, the scheduling office, the foundation, HR, purchasing, accounting, IT etc. get delayed or forgotten. Similarly, many forms must be delivered through the extra "chair" step. The chair doesn't initiate or follow through on any actions to support the engineering program but rather is just an extra person to keep "in the loop". The structure and release time that are effective for a monolithic department like math or chemistry is not effective at meeting the needs of ATEP. The person responsible for a program needs direct efficient access to the decision makers that support that program.

2.2e Classified, STNC, Management Staffing Requests

| Rank | Location | SP | M | Current Title | Proposed Title | Type |
|------|------------|----|----|---------------|---|------------|
| 0001 | Santa Rosa | 02 | 01 | | Lab Technician/Instructional Aide, 50% | Classified |
| 0002 | Santa Rosa | 02 | 01 | | STNC Lab Technician/Instructional Aide, 50% | Classified |

2.3a Current Contract Faculty Positions

| Position | Description |
|--------------------------------|--|
| Engineering, full time | Primarily engineering, qualified to teach engineering and physics. |
| Engineering/Physics, full time | Primarily physics and materials, qualified to teach engineering and physics. |

2.3b Full-Time and Part-Time Ratios

| Discipline | FTEF Reg | % Reg Load | FTEF Adj | % Adj Load | Description |
|-------------|-------------|---------------|-------------|---------------|-------------|
| Engineering | 1.4000 | 69.0000 | 0.6300 | 31.0000 | |

2.3c Faculty Within Retirement Range

The ATEP department has 4 of its 7 faculty members (Ed Sikes, Deborah Sweitzer, Gary Pasqualetti, and Younes Ataiyan) who have all given 2 year notice. The remaining three faculty members are in engineering and physics leaving no full time faculty to support or coordinate the applied technology programs.

2.3d Analysis of Faculty Staffing Needs and Rationale to Support Requests

Civil Engineer Instructor for ATEP CTE Programs

Jerry Miller's position needs to be replaced with a civil engineer to oversee the certificate programs of Civil Tech, Survey Tech, GIS, GPS, Water, Waste Water, and the proposed program in Construction Management. It is a civil engineer that oversees these programs at all government agencies and at the companies that hire these technicians. A civil engineer would also be able to share the load within engineering (Engr 34), add a UC transferrable Civil Engineering Graphics & Design class, and restore the UC transferrable Surveying for Engineers offering. This position would bridge the gap between engineering transfer and the related certificate programs and take a major step forward in merging these 12 programs into a department. Adding to the urgency of this request is the stated intent of the other three applied technology instructors/coordinators to retire over the next two years. If the district is looking to continue offering these certificates, a replacement faculty member for Jerry's position is essential this year.

2.3e Faculty Staffing Requests

| Rank | Location | SP | M | Discipline | SLO Assessment Rationale |
|-------------|-----------------|-----------|----------|-------------------|---|
| 0001 | Santa Rosa | 02 | 01 | Civil Engineering | This position is essential in order to acheive the program level SLO's in the civil engineering CTE programs (water, waste water, GIS, surveying, civil tech, and construction management). |

2.4b Rational for Instructional and Non-Instructional Equipment, Technology, and Software

Engineering's top priority is to expand its project based learning opportunities for students. Central to this expansion is access to modern manufacturing processes. After the purchase of a 3D printer (just arrived), the next key purchase is a laser cutter, then a 3D scanner.

Pedestal style chairs in 1783 are dangerous in that they are extremely old, frequently break, and the bolts connecting them to the floor gradually loosen. The mini "stenographers" desks are completely inappropriate for technical disciplines which require textbooks, workbooks, and calculators to be used simultaneously.

2.4c Instructional Equipment and Software Requests

| Rank | Location | SP | M | Item Description | Qty | Cost Each | Total Cost | Requestor | Room/Space | Contact |
|------|------------|----|----|------------------|-----|------------|------------|------------|------------|------------|
| 0001 | Santa Rosa | 02 | 01 | Laser Cutter | 1 | \$2,500.00 | \$2,500.00 | V. Bertsch | 1799 | V. Bertsch |
| 0002 | Santa Rosa | 02 | 01 | 3D scanner | 1 | \$3,500.00 | \$3,500.00 | V. Bertsch | 1799 | V. Bertsch |

2.4d Non-Instructional Equipment, Software, and Technology Requests

| Rank | Location | SP | M | Item Description | Qty | Cost Each | Total Cost | Requestor | Room/Space | Contact |
|------|------------|----|----|--------------------------------------|-----|-------------|-------------|------------|------------|------------|
| 0001 | Santa Rosa | 02 | 01 | Remodel 1783 for long tables | 1 | \$15,000.00 | \$15,000.00 | V. Bertsch | 1783 | V. Bertsch |
| 0002 | Santa Rosa | 02 | 01 | Remodel 1767 to alleviate congestion | 1 | \$20,000.00 | \$20,000.00 | V. Bertsch | 1767 | V. Bertsch |

2.5a Minor Facilities Requests

| Rank | Location | SP | M | Time Frame | Building | Room Number | Est. Cost | Description |
|------|------------|----|----|------------|----------|-------------|-------------|---|
| 0001 | Santa Rosa | 02 | 01 | Urgent | Shuhaw | 1783 | \$15,000.00 | The existing chairs with mini desks don't meet student needs. |
| 0002 | Santa Rosa | 02 | 01 | Urgent | Bussman | 1447 & 1448 | \$50,000.00 | Convert under utilized lab space into a "maker" space to reinvigorate electronics, energize our local industry partners, recruit for MESA and STEM, and advance engineering project based learning. |
| 0003 | Santa Rosa | 02 | 01 | Urgent | Shuhaw | 1767 | \$20,000.00 | Remodel Materials lab for improved safety. |

2.5b Analysis of Existing Facilities

Chairs Needed (Rm 1783)

The primary engineering lecture room (1783) is in desperate need of an upgrade to the 40+ year old chairs. Each semester, chairs break and are a danger to the students. Some have been removed and not replaced. The small & sloped "steno pad" size desks are totally inadequate for the engineering students who must use notebooks, textbooks and calculators all at the same time. Collaborative learning is an important element in all our classes and this is greatly hampered by the small fixed desks.

Maker Space (Rm 1447 & 1448)

Engineering, MESA, and electronics would all benefit from the reallocation of 1447 and 1448 into a "Maker Space". Project based learning is an essential component of engineering and technology education as well as a tremendous outreach tool. Courses taught in this facility would include: Engr 101, Engr 102, and Engr 103, as well as electronics and photovoltaic offerings. The makerspace would also be used for student projects for Engr 49 (including MESA poster projects), the robotics club, and the engineering club (TEC) and other engineering classes (Engr 45 & Engr 25 have project components). The space would serve as a magnet for the local high school groups including MESA programs, Expanding Your Horizons, and other STEM outreach activities. Electronics and engineering would benefit with an infusion of project based learning opportunities and an expansion into mechatronics applications. Most of the required equipment already exists within electronics, engineering, applied technology, and trade technology. Funding support for the remodel and to round out the equipment needs would be available through local engineering companies who have supported project based learning in the past. Other funding sources include Perkins STEA, existing department, and existing foundation funds. This facility would require SLIA staffing, to be shared with the rest of the engineering courses and ATEP.

Materials Lab (Rm 1767)

The materials laboratory (Room 1767) is too small for the number of students (16) and the amount of lab equipment necessary to conduct the materials labs. Lack of equipment means that multiple labs are conducted by different groups during the same lab period and this presents oversight challenges for the instructor. Many labs require the use of ovens and the manipulation of hot samples. The room needs an overhaul to improve the safety concerns.

3.1 Develop Financial Resources

3.2 Serve our Diverse Communities

The Engineering Transfer Program follows the guidance of the Human Resources department when conducting hiring for the program.

3.3 Cultivate a Healthy Organization

| | | | | | | | | | | | | | | | | | | | |
|-----------------|--|--|--|--|--|---|--|--|--|--|--|--|---|---|--|--|--|--|--|
| | 2. Apply various mechanical, thermal and electrical techniques to the characterization and/or manipulation of the properties of materials. | | | | | | | | | | | | | | | | | | |
| ENGR 49 | 1. Expand upon their foundational knowledge and skills through independent projects. | | | | | x | | | | | | | | | | | | | |
| ENGR 101 | 1. Apply the individual and team skills appropriate for functioning as an engineering professional. | | | | | | | | | | | | x | | | | | | |
| | 2. Complete small scale projects related to an engineering discipline of their choice. | | | | | | | | | | | | x | | | | | | |
| ENGR 102 | 1. Demonstrate individual and team skills on a narrowly defined engineering task under time and competition pressures. | | | | | | | | | | | | | x | | | | | |
| | 2. Design, build, program, test, and troubleshoot a LEGO Mindstorm autonomous robot. | | | | | | | | | | | | | x | | | | | |

4.1b Program Student Learning Outcomes Assessment

Engineering Transfer Program SLO's are incorporated into the Engineering Major (Approved by state: 7/15/09). Development work continues at the state level to add AS-T engineering transfer majors in the main broad disciplines of Mechanical Engineering, Electrical/Computer Engineering, and Civil Engineering. The lead engineering faculty member is one of the 6 elected community college representatives to the Engineering Liaison Council which generated the drafts for the FDRG. He is also an active participant on the JEP grant (Joint Engineering Project) which endeavors to facilitate state wide solutions to the curriculum challenges in engineering. These groups are also striving to facilitate the assessment of program level SLO's within the context of ABET requirements and transfer articulation. ABET is the Accrediting Board for Engineering and Technology.

4.1c Student Learning Outcomes Reporting

| Type | Name | Student Assessment Implemented | Assessment Results Analyzed | Change Implemented |
|--------|-------------------------------|--------------------------------|-----------------------------|--------------------|
| Course | Engr 6 Matlab Programming | Spring 2014 | Spring 2014 | N/A |
| Course | Engr 10 Intro to Engineering | Spring 2014 | Spring 2014 | N/A |
| Course | Engr 16 Circuits and Devices | Spring 2014 | Spring 2014 | N/A |
| Course | Engr 25 Engineering Graphics | N/A | N/A | N/A |
| Course | Engr 34 Statics | Fall 2013 | Fall 2013 | N/A |
| Course | Engr 45 Engineering Materials | Fall 2012 | Fall 2012 | N/A |
| Course | Engr 49 Independent Study | Spring 2014 | Spring 2014 | N/A |
| Course | Engr 101 Design Project | N/A | N/A | N/A |
| Course | Engr 102 Robotics Project | N/A | N/A | N/A |

4.2a Key Courses or Services that address Institutional Outcomes

| Course/Service | 1a | 1b | 1c | 2a | 2b | 2c | 2d | 3a | 3b | 4a | 4b | 5 | 6a | 6b | 6c | 7 |
|----------------|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|---|
|----------------|----|----|----|----|----|----|----|----|----|----|----|---|----|----|----|---|

| | | | | | | | | | | | | | | | | |
|--------------------------------|---|---|--|---|---|--|---|---|---|---|---|---|---|---|--|---|
| Engineering Job Shadow Program | | | | X | | | | X | X | | | | | | | X |
| ENGR 10 | | X | | X | X | | X | X | X | X | | X | X | X | | X |
| ENGR 101 | X | X | | X | | | | X | X | X | X | X | | | | |
| ENGR 102 | X | X | | X | | | | X | X | X | X | X | | | | |
| The Engineer's Club | | | | X | X | | | | | | | | X | | | X |

4.2b Narrative (Optional)

5.0 Performance Measures

Program Performance Overview

The Engineering Transfer Program at SRJC is one of the largest and most respected engineering programs in the state, with about 250 engineering students on campus. Transferring 60 students a year, engineering is by far the largest cohort of transfer students in STEM and one of the largest in the college. Engineering students comprise about a third of the transfer students from STEM each year. Our students are in demand by the top engineering schools and are extremely successful at those institutions.

The most recent statewide data is from Fall 2010
Transfers to UC/CSU from STEM at SRJC

| | |
|-------------------------------|----------|
| Engineering | 45 |
| Biology & Anatomy | 28 |
| Environmental Sci | 25 |
| Mathematics & Statistics | 17 |
| Chemistry | 14 |
| Physics | 6 |
| Geo/Earth Sci | 3 |
| <u>Constr & Surveying</u> | <u>3</u> |
| Total | 141 |

from <http://www.cpec.ca.gov/OnLineData/GenerateReport.ASP>

Custom Reports, Transfer, Fall term by major

These numbers do not include private or out of state schools.

These numbers do not include mid-year transfers.

These numbers do not always include all UC & CSU institution.

Course Level Performance

The Engineering Transfer Program courses have had excellent enrollment efficiency, average class sizes, retention, and student success over the past 15 years. The slight dip in these numbers in Fall 2012 is hopefully a one time aberration and not a trend resulting from the reductions to engineering support programs.

5.1 Effective Class Schedule: Course Offerings, Times, Locations, and Delivery Modes (annual)

Engineering courses are scheduled in coordination with math and physics courses to allow students to progress efficiently through the sequence of courses required for engineering transfer.

The Engineering Transfer Program has successfully offered Engr 10 in Petaluma in the past. Restoring this class in Petaluma is a logical step if the college moves to increase the size of the Fall schedule.

There are currently no plans to offer any online engineering courses. Other colleges and universities that have tried offering engineering courses online report tremendous faculty startup costs and significant challenges maintaining the quality of student course work to the rigorous standards required for engineering disciplines.

| Discipline | X2010 | F2010 | S2011 | X2011 | F2011 | S2012 | X2012 | F2012 |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Engineering | 0 | 171 | 208 | 0 | 133 | 168 | 0 | 128 |
| | | | | | | | | |

5.2a Enrollment Efficiency

The Engineering Transfer Program's enrollment efficiency is very good.

| Discipline | X2010 | F2010 | S2011 | X2011 | F2011 | S2012 | X2012 | F2012 |
|-------------|-------|--------|--------|-------|-------|--------|-------|-------|
| Engineering | 0.0% | 104.8% | 109.9% | 0.0% | 95.8% | 100.0% | 0.0% | 88.9% |

5.2b Average Class Size

Average class sizes in engineering are solid. Many of our engineering classes are at or above capacity and fill very early in the registration process. Lab facilities limit most of our enrollments (Engr 25, 6, 45, and 16.)

| Discipline | X2010 | F2010 | S2011 | X2011 | F2011 | S2012 | X2012 | F2012 |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Engineering | 0.0 | 25.1 | 26.4 | 0.0 | 23.0 | 24.0 | 0.0 | 21.3 |

The slight dip in these numbers in Fall 2012 is hopefully a one time aberration and not a trend resulting from the reductions to engineering support programs.

5.3 Instructional Productivity

The engineering offerings have solid enrollment. We only offer single sections of most of our classes so we have no flexibility in combining sections gain efficiency. Lab enrollments are limited by facilities and equipment.

FTES/FTEF Efficiency

| Engineering | | X2010 | F2010 | S2011 | X2011 | F2011 | S2012 | X2012 | F2012 |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | FTES | 0.00 | 20.86 | 24.37 | 0.00 | 16.86 | 19.19 | 0.00 | 15.45 |
| | FTEF | 0.00 | 1.42 | 1.50 | 0.00 | 1.20 | 1.26 | 0.00 | 1.20 |
| | Ratio | 0.00 | 14.64 | 16.26 | 0.00 | 14.06 | 15.23 | 0.00 | 12.88 |

| | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|
| Engr | F09 | S10 | F10 | S11 | F11 | S12 | F12 |
| FTES | 17.86 | 19.87 | 18.06 | 21.57 | 16.86 | 19.19 | 15.45 |
| FTEF | 1.19 | 1.27 | 1.19 | 1.27 | 1.20 | 1.26 | 1.20 |
| Ratio | 14.99 | 15.70 | 15.18 | 16.98 | 14.05 | 15.23 | 12.88 |

The slight dip in these numbers in Fall 2012 is hopefully a one time aberation and not a trend resulting from the reductions to engineering support programs.

5.4 Curriculum Currency

Curriculum Status

| Course | Version | Approved |
|----------|---------|----------|
| Engr 6 | 3 | S-2012 |
| Engr 10 | 3 | S-2009 |
| Engr 16 | 3 | 10/15/08 |
| Engr 25 | 4 | 5/5/08 |
| Engr 34 | 4 | 4/28/08 |
| Engr 45 | 3 | 5/5/08 |
| Engr 49 | 3 | F-2013 |
| Engr 101 | 1 | 2/25/08 |
| Engr 102 | 1 | 2/25/08 |

The Engineering Trasfer Program is up to date with its curriculum, but is facing a daunting pile of classes that will all be coming due in the next two years. The program is also behind in SLO assesments.

Curriculum Plans

In the absence of adequate program support, the engineering faculty will need to triage the long list of curriculum development tasks and focus on the most important.

1. Adjust the engineering major to address the Lib 10 - Engr 10 situation.
2. Adjust Engr 25 to reflect adopted changes and add 3D printing.
3. Adjust Engr 101 to reflect the lessons learned from offering the class.
4. Adjust Engr 102 to reflect the lessons learned from offering the class.
5. Make progress on SLO assessment in at least some of the courses.
6. Submit AS-T majors in engineering when TMC is state approved.
7. Add Engr 26 as a Civil Engineering Graphics Course (similar to CEST)
8. Cross list surveying as an engineering course to improve articulation.
9. Add SLO's and reinstate Engr 12 when support for engineering improves.
10. Investigate bio and biomedical engineering course options.

11. Add GE course: Engr 14 America's Technological Infrastructure.

5.5 Successful Program Completion

The Engineering Transfer Program's core mission is to prepare students for transfer in the disciplines within engineering. The last year for state data on engineering transfer to the UC and CSU is shown below (from <http://www.cpec.ca.gov/OnLineData/OnLineData.asp>). These statistics don't include the students who either transfer out of state or to private institutions. They don't always include every UC & CSU or mid-year transfers. This data demonstrates that SRJC offers one of the larger engineering transfer programs in the state and is an important pipeline in the training of engineers. These engineers play a crucial role in our community's and our state's economy and infrastructure. The collection of transfer statistics for engineering has been done sporadically in the past, and pretty consistently reveals about 60 students a year are transferring in engineering.

Engineering Transfers from SRJC

| Year | Higher Ed | Engineering |
|-------------|------------------|--------------------|
| 2010 | UC | 16 |
| | CSU | 29 |
| | '10 Total | 45 |

5.6 Student Success

GPA statistics remain steady in the 2.8 - 3.0 range. Retention and completion rates for engineering are quite high for what are some of the most challenging lower division classes at any college. Our retention statistics are significantly higher than at other institutions. We feel this is accomplished primarily by the excellent quality of students we enjoy at SRJC because of both the college's and the program's excellent reputation,

the superb preparation our students receive in all their STEM preparatory classes, and the esprit de corps developed in our program both in classes and extra curricular activities.

The slight dip in the retention and success numbers in Fall 2012 is hopefully a one time aberation and not a trend resulting from the reductions to engineering support programs.

5.6a Retention The percentage of students receiving a grade of A,B,C,D,CR, or I in each Discipline (duplicated headcount).

| | X2010 | F2010 | S2011 | X2011 | F2011 | S2012 | X2012 | F2012 | S2013 |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Engineering | 0.0% | 84.5% | 87.8% | 0.0% | 85.9% | 80.6% | 0.0% | 75.6% | 78.5% |

5.6b Successful Course Completion The percentage of students receiving a grade of A,B,C, or CR in each Discipline (duplicated headcount).

| | X2010 | F2010 | S2011 | X2011 | F2011 | S2012 | X2012 | F2012 | S2013 |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Engineering | 0.0% | 79.3% | 85.0% | 0.0% | 83.7% | 78.2% | 0.0% | 71.7% | 73.1% |

5.7 Student Access

The gender statistics for the Engineering Transfer Program shown an extremely disturbing development.

| Year | Engr - % of students who are women |
|-------|------------------------------------|
| 07-08 | 18.7% |
| 08-09 | 15.5% |
| 09-10 | 21.7% |
| 10-11 | 20.3% |
| 11-12 | 9.9% |
| 12-13 | 8.7% |

This change is directly attributed to the elimination of key support activities in engineering that were so essential AND SUCCESSFUL in improving our programs gender statistics. These programs had to be suspended because of the disproportionate cuts to lab support and faculty coordination time. The top critical restoration to the engineering program is **LAB SUPPORT STAFF**. Second is to allocate resources using judgement on the needs of the programs, not a formulaic allocation chair release time based on gerrymandering programs together.

5.7a Students Served - by Ethnicity The number of students in each Discipline at first census broken down by ethnicity (duplicated headcount).

| Engineering | Ethnicity | 2010-11 | Percent | 2011-12 | Percent | 2012-13 | Percent | 2013 |
|-------------|------------------------|------------|---------------|------------|---------------|------------|---------------|------|
| | White | 211 | 60.5% | 167 | 64.0% | 166 | 61.7% | |
| | Asian | 24 | 6.9% | 6 | 2.3% | 21 | 7.8% | |
| | Black | 0 | 0.0% | 1 | 0.4% | 8 | 3.0% | |
| | Hispanic | 43 | 12.3% | 45 | 17.2% | 35 | 13.0% | |
| | Native American | 3 | 0.9% | 2 | 0.8% | 6 | 2.2% | |
| | Pacific Islander | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | |
| | Filipino | 6 | 1.7% | 5 | 1.9% | 9 | 3.3% | |
| | Other Non-White | 0 | 0.0% | 0 | 0.0% | 0 | 0.0% | |
| | Decline to state | 62 | 17.8% | 35 | 13.4% | 24 | 8.9% | |
| | ALL Ethnicities | 349 | 100.0% | 261 | 100.0% | 269 | 100.0% | |

5.8 Curriculum Offered Within Reasonable Time Frame

With the restoration of the schedule, the Engineering Transfer Program will once again offer its core courses either each semester or every other semester. If other key resources get restored (lab staffing and program coordination), the program hopes to offer Engr 12, How Stuff Works, the GE course developed with grant funding.

5.9a Curriculum Responsiveness

The Engineering Transfer Program oversees curriculum in many different areas: mechanical engineering, electrical engineering, civil engineering, material science, and even some computer science. Innovative curriculum in bio engineering, civil engineering graphics, and engineering for GE are on the back burner because of the dual crises of **NO LAB SUPPORT** and **COORDINATION TIME**. Bio and biomedical engineering has seen a tremendous surge across the state and the country. We currently have no orientation, recruitment, or curriculum in this area. Another potential growth area is Civil Engineering. The addition of a civil engineering graphics course (modeled on CEST 85) would boost enrollment and better serve students. The national trend to add general education classes to the engineering curriculum is another advance deserving of resources. The grant funded development of Engr 12, How Things Work was successfully in getting the class added to the list of GE science courses at SRJC. But offering the class was delayed by schedule cuts and is now on hold until resources are sufficient to offer the class.

5.9b Alignment with High Schools (Tech-Prep ONLY)

5.10 Alignment with Transfer Institutions (Transfer Majors ONLY)

The Engineering Transfer Program articulates well with the UC, CSU, and Private university engineering programs. We sends students to universities all over the state and beyond. Each specific engineering field at each university has autonomy to set their own transfer and graduation requirements. As a result, we do not meet all the requirements for all the university programs. It is a complicated decision whether to add a course to the offerings, especially in these constraining fiscal times. The faculty are very involved with state and national groups that address the challenges of engineering articulation and transfer including ELC (the Engineering Liaison Council) and ASEE (American Society for Engineering Education).

5.11a Labor Market Demand (Occupational Programs ONLY)

The Engineering Transfer Program is not an occupational program, but labor market demand suggests the college invest more resources to strengthen and expand the program. The labor market for bachelor degreed engineers avoided the precipitous downturn than affected so many other job sectors and has already rebounded. Throughout the economic malaise, US companies continued to hire foreign engineers

using the H1-B visa system at the maximum allowed 59,400 per year. Locally, even a year ago, Agilent, Medtronic, and JDSU were all hiring. Just last month, the outgoing CEO of the Healdsburg General Dynamics Division contacted the department about hiring some students. Just today (Sat April 14), the Agilent's Santa Rosa marketing VP asked the department about bringing in a student or faculty member to help with a backlog of excel work they have.

5.11b Academic Standards

For the Engineering Transfer Program, a real concern has been the difficulty in maintaining quality in the face of dwindling resources and packed classes. Inadequate lab support forces students to triple or quadruple up on lab equipment. Lack of operable equipment and staff support is driving some curricular decisions. The merger of the departments and the corresponding elimination of department chair time exacerbated what was already a crisis. An example of the cumulative ripple effect of these cuts: This past Fall, Engr 34 shifted to an online homework grading system to free up faculty time for program management. Exam scores suffered significantly! So we conscientiously respond to this extremely urgent situation. Engineering faculty apply for and got a teaching fellow, freeing up MESA resources to put in place a special tutor for the online Engr 34 HW system. Kudo's to Darci Rosales for being so flexible and supporting. We'll see if this has mitigated the negative impact after the next Engr 34 exam in about a week.

6.1 Progress and Accomplishments Since Last Program/Unit Review

| Rank | Location | SP | M | Goal | Objective | Time Frame | Progress to Date |
|------|------------|----|----|---|---|------------|--|
| 0001 | Santa Rosa | 00 | 00 | Lab Support for Engineering & Electronics | 50% shared lab technician for Spring 14, STNC for Fall 13 Covering 1767, 1447, and 1452 | Fall 2013 | Classified Staffing |
| 0002 | Santa Rosa | 00 | 00 | Effective ATEP department structure | 1. Efficiency - direct link from coordinator/directors to admin tasks. 2. Appropriate release time.. | Fall 2013 | Faculty release time |
| 0003 | Santa Rosa | 00 | 00 | Bring back the Agilent Robotics Challenge | Revive the Agilent & MESA partnerships in Fall to add Engr 102 class for Spring 14 | Fall 2013 | Agilent grant, faculty time |
| 0004 | Petaluma | 00 | 00 | Restore Engr 10 class in Petaluma. | Add Engr 10 in Petaluma to schedule for Fall 2014 | Fall 2014 | Faculty load |
| 0005 | Santa Rosa | 00 | 00 | 1783 Lecture Room Upgrade | Replace the stenographer mini tables with tables and chairs appropriate for engineering instruction. | Fall 2013 | Facilities Budget |
| 0006 | Santa Rosa | 00 | 00 | Expand Project Based Learning Opportunities | Maker Space in 1447 & 1448 | Fall 2014 | Facilities Budget, Grants, and/or Industry support |
| 0007 | Santa Rosa | 00 | 00 | Supplies Budget Restoration | 1. Support lab equipment needs 2. Support project based learning. | Fall 2013 | Budget Restoration |
| 0008 | Santa Rosa | 00 | 00 | Staff Travel Budget Restoration | Support unique needs of engineering disciplines. | Fall 2013 | Budget Restoration |
| 0009 | Santa Rosa | 00 | 00 | Grader Budget Restoration | Support unique homework grading needs of engineering disciplines. | Fall 2013 | Budget Restoration |

6.2a Program/Unit Conclusions

| Location | Program/Unit Conclusions |
|------------|--|
| Santa Rosa | Engineering has enormous local industry support potential and untapped grant possibilities. |
| Santa Rosa | Engineering has excellent job markets and high student demand. |
| Santa Rosa | Engineering has many growth opportunities, especially in bio related engineering fields. |
| Santa Rosa | Engineering and electronics need a restoration of lab staffing to maintain, improve, and expand. |
| Santa Rosa | Engineering and the other ATEP programs need a department structure with improved efficiency and faculty coordination time based on their needs not a formula. |
| Santa Rosa | Engineering needs Younes' replacement to share in the tasks of engineering and support the materials engineering part of the curriculum. |
| Santa Rosa | Engineering needs a restoration of its supplies budget to meet its growing focus on projet based learning. |
| Santa Rosa | Engineering, electronics and MESA could all benefit from a "Maker Space" in Bussman. |

6.2b PRPP Editor Feedback - Optional

6.3a Annual Unit Plan

| Rank | Location | SP | M | Goal | Objective | Time Frame | Resources Required |
|------|------------|----|----|---|---|------------|--|
| 0001 | Santa Rosa | 00 | 00 | Lab Support for Engineering & Electronics | 50% shared lab technician for Spring 14, STNC for Fall 13 Covering 1767, 1447, and 1452 | Fall 2013 | Classified Staffing |
| 0002 | Santa Rosa | 00 | 00 | Effective ATEP department structure | 1. Efficiency - direct link from coordinator/directors to admin tasks. 2. Appropriate release time.. | Fall 2013 | Faculty release time |
| 0003 | Santa Rosa | 00 | 00 | Bring back the Agilent Robotics Challenge | Revive the Agilent & MESA partnerships in Fall to add Engr 102 class for Spring 14 | Fall 2013 | Agilent grant, faculty time |
| 0004 | Petaluma | 00 | 00 | Restore Engr 10 class in Petaluma. | Add Engr 10 in Petaluma to schedule for Fall 2014 | Fall 2014 | Faculty load |
| 0005 | Santa Rosa | 00 | 00 | 1783 Lecture Room Upgrade | Replace the stenographer mini tables with tables and chairs appropriate for engineering instruction. | Fall 2013 | Facilities Budget |
| 0006 | Santa Rosa | 00 | 00 | Expand Project Based Learning Opportunities | Maker Space in 1447 & 1448 | Fall 2014 | Facilities Budget, Grants, and/or Industry support |
| 0007 | Santa Rosa | 00 | 00 | Supplies Budget Restoration | 1. Support lab equipment needs 2. Support project based learning. | Fall 2013 | Budget Restoration |
| 0008 | Santa Rosa | 00 | 00 | Staff Travel Budget Restoration | Support unique needs of engineering disciplines. | Fall 2013 | Budget Restoration |
| 0009 | Santa Rosa | 00 | 00 | Grader Budget Restoration | Support unique homework grading needs of engineering disciplines. | Fall 2013 | Budget Restoration |