

Santa Rosa Junior College

Program Resource Planning Process

Engineering 2016

1.1a Mission

See Applied Technology PRPP

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

See Applied Technology PRPP

Engineering Transfer Program Only

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

See Applied Technology PRPP

Engineering Transfer Program Only

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 240 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

See Applied Technology PRPP

Engineering Transfer Program Only

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

See Applied Technology PRPP

Engineering Program **Project Based Instruction**

An exciting trend in engineering education is the move to more project based learning. This is also an essential instructional mode for the CTE programs in our department.

Currently, the department lacks the light fabrication/maker space facility necessary for project based instruction and skill development. Such a facility is a requirement to begin the proposed new Mechatronics Technician program, to improve the Elect-Mech Maintenance Technician program, and to boost the project based instruction in our engineering courses. The engineering curriculum is already in place (Engr 770, Engr 12, Engr 101, Engr 102, Engr 103 draft) awaiting the necessary fab-lab environment. 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 for this Fab-Lab would be in 1447 & 1448, an underutilized lab space and adjoining unused office/storage space. This facility would require SLIA staffing, to be shared between all the of Engineering and Applied Technology programs. 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 and technology 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 6 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 have cancelled classes these past two Fall semesters because of inadequate staffing. This Fall's offerings were again reduced because of the lack of lab support staff.

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 if that comes to pass. SRJC's Engineering Transfer Program is a partner in the JEP Grant (Joint Engineering Project) and is directly involved in the state-wide engineering coordination efforts. The lead faculty member is currently serving as the Community College Segment Chair for the

Engineering Liaison Council that coordinates the statewide engineering curriculum efforts.

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

See Applied Technology PRPP

2.1b Budget Requests

Rank	Location	SP	M	Amount	Brief Rationale
0001	ALL	00	00	\$0.00	See Applied Technology PRPP

2.2a Current Classified Positions

Position	Hr/Wk	Mo/Yr	Job Duties
See Applied Technology PRPP	30.00	12.00	See Applied Technology PRPP

2.2b Current Management/Confidential Positions

Position	Hr/Wk	Mo/Yr	Job Duties
See Applied Technology PRPP	20.00	10.00	

2.2c Current STNC/Student Worker Positions

Position	Hr/Wk	Mo/Yr	Job Duties
See Applied Technology PRPP	10.00	10.00	

2.2d Adequacy and Effectiveness of Staffing

See Applied Technology PRPP

2.2e Classified, STNC, Management Staffing Requests

Rank	Location	SP	M	Current Title	Proposed Title	Type
0001	Santa Rosa	02	01	See Applied Technology PRPP		Classified

2.3a Current Contract Faculty Positions

Position	Description
See Applied Technology PRPP	Engineering transfer focus, qualified in physics & ap tech.

2.3b Full-Time and Part-Time Ratios

Discipline	FTEF Reg	% Reg Load	FTEF Adj	% Adj Load	Description
See Applied Technology PRPP	0.0000	26.3000	0.0000	71.6000	

2.3c Faculty Within Retirement Range

See Applied Technology PRPP

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

See Applied Technology PRPP

2.3e Faculty Staffing Requests

Rank	Location	SP	M	Discipline	SLO Assessment Rationale
0001	Santa Rosa	02	01	See Applied Technology PRPP	

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

See Applied Technology PRPP

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	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	See Applied Technology PRPP	1	\$0.00	\$0.00		1783	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	See Applied Technology PRPP		\$0.00	

ENGR 6	1. Apply standard programming techniques to write, test, and debug computer programs that solve engineering related problems.						x						
	2. Properly document both computer code and the resulting output.						x						
	3. Apply programming and collaboration skills to the completion of a group project with partially defined parameters.						x						
ENGR 10	1. Apply a spectrum of resources and personal skills to develop opportunities and make decisions regarding their education and career.			x									
	2. Demonstrate effective study skills and teamwork.			x									
ENGR 16	1. Apply the complete range of circuit analysis techniques to determine voltages, currents, and powers in alternating current, direct current, and transient response circuits.						x						
	2. Explain and mathematically characterize the operation of common electronic devices including operational amplifiers, timing and counter chips digital building blocks, diodes, and transistors.						x						
	3. Demonstrate the proper use of electronic lab equipment such as oscilloscopes, multimeters, frequency generators, power supplies, and prototyping boards.						x						
	4. Apply professional documentation standards to lab experiment and technical analysis reports.						x						
ENGR 25	1. Convert between two-dimensional and three-dimensional representations of								x				

	mechanical objects both manually on paper and in a computer aided design environment.												
	2. Prepare and interpret mechanical engineering drawings using industry documentation standards and practices.								x				
	3. Apply team skills and a formal design algorithm to the design and construction of an engineering related project.								x				
ENGR 34	1. Apply Newton's 1st and 3rd laws to the force analysis of rigid bodies in static equilibrium.		x										
	2. Use scientific calculators to perform vector operations and solve systems of equations.		x										
	3. Use spreadsheets to analyze statics problems and display results to the standards of an engineering analysis report.		x										
ENGR 45	1. Describe materials classifications, properties and theories related to the behaviors of various materials.	x											
	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		
ENGR 770	1. Demonstrate increased skill and knowledge in engineering and applied technology courses for which the students sought assistance.			x											

4.1b Program Student Learning Outcomes Assessment

Engineering Transfer Program Only

Engineering Transfer Program SLO's are incorporated into the Engineering Major (Approved by state: 7/15/09). The program's SLO's align closely with ABET (Accrediting Board for Engineering and Technology) and university articulation requirements. Program SLO Assessment was completed in Summer 2011. Data was collected in Spring 2015 for a second Engineering Transfer Program SLO Assessment to be completed Summer 2015.

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	Fall 2013	Fall 2013	N/A
Course	Engr 34 Statics	Fall 2013	Fall 2013	N/A
Course	Engr 45 Engineering Materials	Fall 2013	Fall 2013	N/A
Course	Engr 49 Independent Study	Spring 2014	Spring 2014	N/A
Course	Engr 101 Design Project	Fall 2012	Fall 2012	N/A
Course	Engr 102 Robotics Project	Fall 2013	Fall 2013	N/A
Course	Engr 770 Suppl Instructr E&AT	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				
ENGR 770		X			X		X			X		X				X
The Engineer's Club				X	X							X				X

4.2b Narrative (Optional)

5.0 Performance Measures

See Applied Technology PRPP

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

See Applied Technology PRPP

5.2a Enrollment Efficiency

See Applied Technology PRPP

5.2b Average Class Size

See Applied Technology PRPP

5.3 Instructional Productivity

See Applied Technology PRPP

5.4 Curriculum Currency

See Applied Technology PRPP

5.5 Successful Program Completion

See Applied Technology PRPP

5.6 Student Success

See Applied Technology PRPP

5.7 Student Access

See Applied Technology PRPP

5.8 Curriculum Offered Within Reasonable Time Frame

See Applied Technology PRPP

5.9a Curriculum Responsiveness

See Applied Technology PRPP

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

See Applied Technology PRPP

5.10 Alignment with Transfer Institutions (Transfer Majors ONLY)

See Applied Technology PRPP

5.11a Labor Market Demand (Occupational Programs ONLY)

See Applied Technology PRPP

5.11b Academic Standards

See Applied Technology PRPP.

6.1 Progress and Accomplishments Since Last Program/Unit Review

Rank	Location	SP	M	Goal	Objective	Time Frame	Progress to Date
0001	Santa Rosa	02	01	See Applied Technology PRPP		Fall 2015	Classified Staffing
0002	Santa Rosa	02	01			Fall 2016	Facilities Budget and/or Industry support
0003	Santa Rosa	02	01			Spring 2017	Agilent grant, faculty time

6.2a Program/Unit Conclusions

Location	Program/Unit Conclusions
Santa Rosa	See Applied Technology PRPP

6.2b PRPP Editor Feedback - Optional

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6.3a Annual Unit Plan

Rank	Location	SP	M	Goal	Objective	Time Frame	Resources Required
0001	Santa Rosa	02	01	See Applied Technology PRPP		Fall 2015	Classified Staffing