Program Review Summary Page
For Instructional Programs

Program or Area(s) of Study under Review: Engineering

Term/Year of Review: Spring 2020

Summary of Program Review:

A. Major Findings

1. Strengths:

Given the decrease on campus wide enrollment, engineering has kept a relatively stable enrollment. This is due in part to outreach activities. On campus, we work closely with MESA/STEM Center and Counseling on efforts to find students interested in engineering. Outside campus, we work with some staff at local high schools to promote our engineering program.

Retention Rates and Course Completion Rates for Engineering Courses are higher than the corresponding Institution Rates. This is due to working with students in and out of the classroom, supporting student extracurricular activities on campus, and the diverse background of engineering instructors.

Now, offering ENGI 110 in the Spring semester. This is an important gateway course. Offering ENGI 110 in the Fall and Spring semester gives students more accessibility to this course. This course was added because MESA/STEM and SSS/Trio programs requested it.

We added ENGI 160 to cover a major gap in our curriculum. ENGI 160 is a requirement or a recommend course to take before transferring to several CSU and UC campuses. In three semesters (Fall 2018, Spring 2019, and Fall 2019) offering ENGI 160, 51 students already took the course.

2. Areas for Improvement:

While the numbers do not justify offering ENGI 122 and ENGI 160 on both Fall and Spring semesters, offering these classes only on the Fall semester will limit growth and accessibility for students.

While outreach within the college and at local high schools has resulted in a favorable enrollment trend compared to the institutional level, we need to find more effective ways to carryout outreach activities. We can possibly partner with other programs and look for better ways to reach target students. Target students are students that are interested in engineering but don't know about the engineering program at NVC.

3. Projected Program Growth, Stability, or Viability:

It is projected that the program will remain stable for the next 4-5 years. The outreach efforts from the past 2-4 years will continue to have a positive impact on enrollment over the next 2 – 4 years.

It is hard to project beyond 4-5 years; however, it is important to keep the outreach efforts. The Napa Valley Unified School District (NVUSD) is seen a decrease in enrollment. This wave of decrease in enrollment is marching its way through middle schools now. So, we will see the impact in 4-5 years in the future.

B. New Objectives/Goals:.

Integrate some of the class projects with the Maker's Lab. The Maker's Lab is an excellent resource that we have; however, due to funding issues, its utilization is limited mainly to classes that can integrate a lab or project with the Maker's Lab. There are some labs in ENGI 240 – Properties of Materials, ENGI 241 – Engineering Mechanics: Statics, and ENGI 242 – Circuits that can make use of the Maker's lab. For ENGI 240, we can design and build testing samples to measure mechanical and electrical properties of materials; for ENGI 241, we can design and build trusses to do structural testing; and for ENGI 242, we can design and build printed circuit boards (PCBs) for circuits and test them.

Look for more effective/efficient outreach efforts to target students. While our outreach efforts have paid off over the past years, I strongly believe that we could be more effective in reaching students. For example, the participation in the Breakfast with High School Counselors and Administrators have been efficient because we get to reach a large audience in one presentation; however, we can't participate every year. Engineering has participated on three occasions in the past 12 years, in 2009, 2014, and 2019. We would like to learn from and brainstorm with other departments/programs about ways to make our outreach more effective. One key part of effectiveness would be reaching the students that are interested in engineering but do not know that NVC has an engineering program.

Get institutional support to find industry sponsorship and funding for equipment for ENGI 240 and ENGI 241. Given the limited funding available to purchase equipment for classes such as ENGI 240 and ENGI 241, each with an annual enrollment of about 25 students, we think that we should look for industry support. Here is a list of possible ways to pursue industry support:

- Contact Alumni working in engineering related industries locally and in the Bay Area.
- Inquire with the Napa Engineering Society for ideas.
- Contact the Napa Chamber of Commerce for assistance.

Program Review Report Spring 2020

This report covers the following program, degrees, certificates, area(s) of study, and courses (based on the Taxonomy of Programs on file with the Office of Academic Affairs):

Program	**Engineering**
Area of Study	
Degrees / Certificates	
Courses	ENGI 110
	ENGI 122
	ENGI 160
	ENGI 199
	ENGI 240
	ENGI 241
	ENGI 242

Taxonomy of Programs, July 2019

I. PROGRAM DATA

A. Demand

1. Headcount and Enrollment

	2016-2017	2017-2018	2018-2019	Change over 3-Year Period
Headcount				
Within the Program	97	98	141	45.4%
Across the Institution	8,930	8,843	8,176	-8.4%
Enrollments				
ENGI-110	35	26	45	28.6%
ENGI-122	16	28	29	81.3%
ENGI-160			37	
ENGI-240	25	30	18	-28.0%
ENGI-241	25	28	30	20.0%
ENGI-242	27	34	47	74.1%
Within the Program	128	146	206	60.9%
Across the Institution	36,525	36,115	32,545	-10.9%
Source: SQL Enrollment Files				

RPIE Analysis: The number of students enrolled (headcount) in the Engineering Program increased by 45.4% over the past three years, while headcount across the institution decreased by 8.4%. Similarly, enrollment within the Engineering Program increased by 60.9%, while enrollment across the institution decreased by 10.9%.

Enrollment in the following courses changed by more than 10% (±10%) between 2016-2017 and 2018-2019:

Courses with enrollment increases:

- *ENGI-122 (81.3%)*
- *ENGI-242 (74.1%)*
- *ENGI-110 (28.6%)*
- *ENGI-241 (20%)*

Course with enrollment decrease:

- *ENGI-240 (-28%)*

Program Reflection:

ENGI 160 began to be offered in the Fall 2018. This was an important addition to the engineering curriculum. This class is required or recommend by some CSU and UC campuses. In three semesters that we have offered this class, 51 students have taken it.

The decrease in ENGI 240 enrollment is probably due to fluctuations in the students' engineering major of choice. ENGI 240 is required for most mechanical and civil engineering majors. It is not required for electrical engineering. In the 2018-2019

academic year, there was an increase in electrical engineering students and a decrease in mechanical and civil engineering students. We need to keep monitoring over the next couple of years to see if this trend continues.

Due to the increase in enrollment in ENGI 242 over the past years, this Spring 2020 semester we are offering two sections of ENGI 242: one lecture but two separate labs. This allows to spend more one-on-one time with individual students and the number of students per group is between 3 and 5, not 6 and 10. This is great for learning.

This semester, Spring 2020, we decided not to offer ENGI 122 because the enrollment was low, 4 or 5 students. For now, we plan to offer ENGI 122 only in the Fall semesters. Since the ENGI 122 maximum enrollment is 24 (this is the number of computers available in the Computer Lab, Room 1833), we think that this class will be at maximum capacity. The average enrollment over the past three years was 24.3 (average of 16, 28, and 29). So, offering ENGI 122 only in the Fall semester means that we do not have room for growth for students that need to take ENGI 122.

2. Average Class Size

	2016-2017		2017-2018		2018-2019		Three-Year	
	Sections	**Average Size**	**Sections**	**Average Size**	**Sections**	**Average Size**	**Average Section Size**	**Trend**
ENGI-110	1	35	1	26	2	22.5	26.5	-35.7%
ENGI-122	1	16	2	14	2	14.5	14.6	-9.4%
ENGI-160					2	18.5	18.5	
ENGI-240	1	25	1	30	1	18	24.3	-28.0%
ENGI-241	1	25	1	28	1	30	27.7	20.0%
ENGI-242	1	27	1	34	1	47	36	74.1%
Program Average*	5	25.6	6	24.3	9	22.9	24	-10.6%
Institutional Average*	1,474	24.8	1,406	25.7	1,313	24.8	25.1	0.0%

Source: SQL Enrollment and Course Sections Files

Average Section Size across the three-year period for courses, and both within academic years and across the three-year period for the program and institutional levels is calculated as:

$$\frac{\text{Total \# Enrollments}}{\text{Total \# Sections}}.$$

It is not the average of the three annual averages.

RPIE Analysis: Over the past three years, the Engineering Program has claimed an average of 24 students per section. The average class size in the program has been lower than the average class size of 25.1 students per section across the institution during this period. Average class size in the program decreased by 10.6% between 2016-2017 and 2018-2019. Average class size at the institutional level remained stable between 2016-2017 and 2018-2019.

Average class size in the following courses changed by more than 10% (±10%) between 2016-2017 and 2018-2019:

Courses with increases in average class size:

- *ENGI-242 (74.1%)*
- *ENGI-241 (20%)*

Courses with decreases in average class size:

- *ENGI-110 (-35.7%)*
- *ENGI-240 (-28%)*

Program Reflection:

The three-year trend decrease of 35.7% for the average ENGI 110 class size is due to the addition of ENGI 110 in the Spring semester. Prior to Spring 2019 semester, ENGI 110 was only offered in the Fall semesters. We began to offer ENGI 110 in the Spring semester in the Spring 2019.

It is important to offer ENGI 110 on both, Fall and Spring, semesters. ENGI 110 is a gateway class for other engineering courses. It helps students to stay engaged and interested in engineering as a career.

The three-year trend increase of 74.1% is what prompted us to offer two sections of ENGI 242 in the Spring 2020 semester.

3. Fill Rate and Productivity

Fill Rate*			
	Enrollments*	**Capacity**	**Fill Rate**
2016-2017	128	114	112.3%
2017-2018	146	132	110.6%
2018-2019	206	200	103.0%
Three-Year Program Total	480	446	107.6%
Institutional Level	94,614	117,777	80.3%
Productivity*			
	FTES	**FTEF**	**Productivity**
2016-2017	22.2	2.0	11.1
2017-2018	27.5	2.4	11.7
2018-2019	36.4	3.3	11.1
Three-Year Program Total	86.2	7.6	11.3
Source: SQL Enrollment and Course Sections Files			

RPIE Analysis: Fill rates within the Engineering Program tend to be higher than the fill rates at the institutional level. [Compare program-level rate of 107.6% to institution-level rate of 80.3% over the past three years.] Between 2016-2017 and 2017-2018, enrollment increased and capacity increased, resulting in a decrease in fill rate. Between 2017-2018 and 2018-2019, enrollment and capacity increased, resulting in a decrease in fill rate.

Productivity remained consistent over the three-year period. [Productivity has not been calculated at the institutional level.] The three-year program productivity of 11.3 is lower than the target level of 17.5, which reflects 1 FTEF (full-time equivalent faculty) accounting for 17.5 FTES (full-time equivalent students) across the academic year. (This target reflects 525 weekly student contact hours for one full-time student across the academic year.)

Program Reflection:

Fill rates for Engineering are higher than the fill rates at the institutional level. Over the past three years, the average fill rate for engineering was 107.6% and at the institution level it was 80.3%. An average fill rate of over 100% implies that we don't have much room for growth unless we add more sections.

Productivity for engineering was consistent over the past three years at an average of 11.3. Since the productivity at the institutional level has not been calculated, we can't compare the engineering productivity to the institutional level. It is interesting that the Productivity target level is 17.5. We would like to know if this target level is for the engineering program, institutional level, or both. In researching the Productivity at the institutional level over a ten year period, it has not reached 17.5.

4. Labor Market Demand

This section does not apply to the Engineering Program, as it is not within the Career Technical Education Division.

B. Momentum

1. Retention and Successful Course Completion Rates

	Retention Rates (Across Three Years)			Successful Course Completion Rates (Across Three Years)		
Level	**Rate**	**Course Rate vs. Program Rate**		**Rate**	**Course Rate vs. Program Rate**	
		Above	**Below**		**Above**	**Below**
ENGI-110	97.2%	--	--	92.5%		X
ENGI-122	***90.4%***		***X***	***83.6%***		***X***
ENGI-160	100%	X		97.3%	X	
ENGI-240	97.3%	--	--	95.9%	X	
ENGI-241	97.6%	--	--	96.4%	X	
ENGI-242	99.1%	X		97.2%	X	
Program Level	**96.9%**			**93.8%**		
Institutional Level	89.8%			75.1%		

Source: SQL Enrollment Files
-- Indicates a value that is within 1% of the program level value.
Bold italics denote a statistically significant difference between the course-level rate and the program-level rate.
Bold denotes a statistically significant difference between the program-level rate and the institutional rate.

<u>RPIE Analysis:</u> Over the past three years, the retention rate for the Engineering Program was significantly higher than the rate at the institutional level. The retention rate for ENGI-122 was significantly lower than the program-level rate. The retention rates for ENGI-160 and ENGI-242 were higher than the program-level rate. The retention rate for the Engineering Program falls in the 89.7th percentile among program-level retention rates (across 59 instructional programs, over the past three years).

Over the past three years, the successful course completion rate for the Engineering Program was significantly higher than the rate at the institutional level. The successful course completion rate for ENGI-122 was significantly lower than the program-level rate. The successful course completion rates for ENGI-160, ENGI-240, ENGI-241, and ENGI-242 were higher than the program-level rate. The successful course completion rate for the Engineering Program falls in the 96.5th percentile among program-level successful course completion rates (across 59 instructional programs, over the past three years).

Over the past three years, the difference between retention and successful course completion at the program level (3.1%) was lower than the difference at the institutional level (14.7%). This figure represents the proportion of non-passing grades assigned to students (i.e., grades of D, F, I, NP). No Engineering Program courses claimed differences (between retention and successful course completion) that exceeded 10%.

Program Reflection:

Over the past three years, the Retention Rates for the Engineering Program (96.9%) are higher than for the Institutional Level (89.8%). In addition, over the same period, the Successful Course Completion Rates for the Engineering Program (93.8%) are significantly higher than for the Institutional Level (75.1%). The higher Retention Rates and Successful Course Completion Rates in the Engineering Program compared to Institutional Level are probably due to how the Engineering Program tries to support students in and out of the classroom. This allows student to persist, stay in classes, and succeed.

Within the Engineering Program, the Successful Course Completion Rates for ENGI 110 (92.5%) and ENGI 122 (83.6%) are lower than the Engineering Program average Successful Course Completion Rate (93.8%). This is probably because ENGI 110 and ENGI 122 do not have prerequisites. Hence, any student interested in these classes can enroll. Sometimes while enrolled some students lose interest in the classes and/or change majors.

2. Student Equity

	Retention Rates (Across Three Years)		**Successful Course Completion Rates (Across Three Years)**	
	Program Level	**Institution Level**	**Program Level**	**Institution Level**
Black/African American	100%	85.8%	100%	***64.2%***
Hispanic			92.7%	***72.9%***
First Generation			94.6%	***73.9%***

Source: SQL Enrollment Files
Bold italics denote a statistically significant difference between rates at the program and institutional levels, with the lower of the two rates in ***bold italics***.
Shaded cells pertaining to retention rates indicate that statistically significant differences for those groups were not found at the institutional level.

RPIE Analysis: This analysis of student equity focuses on the three demographic groups with significantly lower retention and/or successful course completion rates found at the institutional level (vs. the corresponding rates among all students) over the past three years. Tests of statistical significance were conducted to compare program-level and institution-level rates among the three groups listed above.

Within the Engineering Program, the retention rate among Black/African American students was higher than the retention rate at the institutional level. The difference was not statistically significant. Within the Engineering Program, the successful course completion rates were significantly higher than the rates at the institutional level for all three groups.

This pattern reflects the findings from the comparison of retention and successful course completion at the program vs. institutional level (with the program-level rate exceeding the institution-level rate for retention and successful course completion). (See Section I.B.1 above).

Program Reflection:

The higher Retention Rates and Successful Course Completion Rates in Engineering in comparison to the Institutional Level are due to three main factors:

Working and supporting students academically in and out of the classroom:

- Pointing out resources available on-campus: Math Success Center, Counseling, Library, MESA/STEM Center, Writing Center, etc.

Faculty with Hands-On Experience and Diverse Background:

- Engineering faculty has real-world experience that we bring to our classroom.
- Making connections between academia and the professional world gives students some insight and motivation to stay engaged in their respective courses.

Engaging students in extracurricular activities:

- Many engineering students are active in the SHPE, MESA, SACNAS, Robotics Club. Engaging in these student organizations allows students to gain leadership skills, build a student and professional network, and increase their confidence to do well in classes and persist even in difficult courses.

3. **Retention and Successful Course Completion Rates by Delivery Mode (of Courses Taught through Multiple Delivery Modes, i.e., In-Person, Hybrid, and Online)**

This section does not apply to the Engineering Program, as courses associated with the program were not offered through multiple delivery modes within the same academic year between 2016-2017 and 2018-2019.

C. Student Achievement

1. Program Completion

This section does not apply to the Engineering Program, as there are not any degrees or certificates associated with the program. See Taxonomy of Programs.

2. Program-Set Standards: Job Placement and Licensure Exam Pass Rates

This section does not apply to the Engineering Program, as the discipline is not included in the Perkins IV/Career Technical Education data provided by the California Community Colleges Chancellor's Office, and licensure exams are not required for jobs associated with the discipline.

Program Reflection:

II. CURRICULUM

A. Courses

Subject	**Course Number**	**Approval Date**	**Has Prerequisite*** Yes/No	**In Need of Revision** *Indicate Non-Substantive (NS) or Substantive (S)* ***& Academic Year***	**To Be Archived** *(as Obsolete, Outdated, or Irrelevant)* **& Academic Year**	**No Change**
DISC						
DISC						

*As of fall 2018, prerequisites need to be validated (in subsequent process) through Curriculum Committee.

B. Degrees and Certificates[+]

Degree or Certificate & Title	**Implementation Date**	**Has Documentation** Yes/No	**In Need of Revision+** *and/or Missing Documentation* **& Academic Year**	**To Be Archived*** *(as Obsolete, Outdated, or Irrelevant)* **& Academic Year**	**No Change**

*As of fall 2018, discontinuance or archival of degrees or certificates must go through the Program Discontinuance or Archival Task Force.

[+]Degrees and Certificates cannot be implemented until the required courses in them are approved and active.

Program Reflection:

In the Fall 2018 semester, we started to offer ENGI 160 – Programming for Scientists and Engineers with MATLAB. This was a major gap that we had in our curriculum. At the moment we plan to offer ENGI 160 in the Fall semesters. The expected enrollment is 20-24 students every Fall semester.

ENGI 110 is now offered in the Fall and Spring semesters. We believe that doing this will increase the number of students that will continue in the engineering program. Hence, we expect to see an increase in enrollment in ENGI 160, ENGI 240, ENGI 241, and ENGI 242 in the next two to three years due to this addition.

ENGI 122 will be offered only in the Fall semesters. Offering ENGI 122 only in the Fall semester will limit growth of students taking this class. ENGI 122 has an enrollment cap of 24 students. This was the average annual enrollment over the past three years.

ENGI 242 now has two sections: one lecture but two separate labs. An additional section was needed because over the past three years we had an average enrollment of 36 students in a class with a maximum enrollment

of 24. To support the over enrollment, we held lab in two adjacent rooms, used both the desktop computers in Room 1833 and the Laptop computers that we share with Physics.

At the moment, we do not plan to discontinue any of the active Engineering courses.

III. LEARNING OUTCOMES ASSESSMENT

A. Status of Learning Outcomes Assessment

Learning Outcomes Assessment at the Course Level

	Number of Courses with Outcomes Assessed		Proportion of Courses with Outcomes Assessed	
Number of Courses	Over Last 4 Years	Over Last 6 Years	Over Last 4 Years	Over Last 6 Years
6	6	6	100%	100%

Learning Outcomes Assessment at the Program/Degree/Certificate Level

Degree/Certificate	Number of Outcomes*	Number of Outcomes Assessed		Proportion of Outcomes Assessed	
		Over Last 4 Years	Over Last 6 Years	Over Last 4 Years	Over Last 6 Years

Program Reflection:

All Courses with Student Learning Outcomes (SLOs) have been assessed over the last 4 and 6 years. Here are the last assessment years for each of the 6 Engineering Courses with Outcomes:

- **ENGI 110 – Fall 2019**
- **ENGI 122 – Fall 2019**
- **ENGI 160 – Spring 2019**
- **ENGI 240 – Fall 2017**
- **ENGI 241 – Spring 2019**
- **ENGI 242 – Spring 2019**

ENGI 240 is planned to be assessed in the Fall 2020.

The assessment methods for Engineering Courses include:

- **ENGI 110 – Tests, Writing Assignments, and Presentations**
- **ENGI 122 – Tests, Writing Assignments**
- **ENGI 160 – Tests, Lab Assignments**
- **ENGI 240 – Tests, Homework Assignments, Lab Reports**
- **ENGI 241 – Tests, Homework Assignments, Lab Reports**
- **ENGI 242 – Tests, Homework Assignments, Lab Reports**

B. Summary of Learning Outcomes Assessment Findings and Actions

Overall, the Learning Outcomes Assessment results for Engineering Courses have met the established thresholds. As a general action, the engineering program should revisit the thresholds put in place for each assessment method. In addition, we need to explore ways to better assess qualitative related Student Learning Outcomes. We have found that it is more difficult to assess

qualitative components of SLOs than quantitative components. Currently, we assess qualitative SLO via Response/Explain Questions in Homework Assignments and Exam, and Lab Report Write-Ups. However, we would like to know what other departments/programs are doing.

Also, we plan to look at implementing a before and after assessments in classes without prerequisites such as ENGI 110 and ENGI 122. This way we can measure gain in these courses. Since these two courses don't have prerequisites, we think it is important to know what is the gain in SLOs when students take these classes.

Program Reflection:

IV. PROGRAM PLAN

Based on the information included in this document, the program is described as being in a state of:

- O Viability
- X O **Stability**
- O Growth

*Please select ONE of the above.

This evaluation of the state of the program is supported by the following parts of this report:

- Engineering has kept a relatively stable enrollment given the decrease on campus wide enrollment.
- Fill rates for Engineering are higher than the fill rates at the institutional level. Over the past three years, the average fill rate for engineering was 107.6% and at the institution level it was 80.3%.
- Retention Rates and Course Completion Rates for Engineering Courses are higher than the corresponding Institution Rates. This is due working with students in and out of the classroom, supporting student extracurricular activities on campus, and the diverse background of engineering instructors.

Complete the table below to outline a three-year plan for the program, within the context of the current state of the program.

Program: __Engineering_____
Plan Years: _2020 – 2021 to 2022-2023 _____

Strategic Initiatives Emerging from Program Review	Relevant Section(s) of Report	Implementation Timeline: Activity/Activities & Date(s)	Measure(s) of Progress or Effectiveness
Effective Outreach	Program Data, Demand, Headcount and Enrollment	1 – 2 Years See below	Compare with existing efforts and monitor future enrollment trends.
Increase Attractiveness of Program	Program Data, Demand, Headcount and Enrollment	1 – 2 Years See below	Monitor future enrollment trends.
Search for Industry Support to fund some Equipment Needs		1-2 Years See below	Obtain industry support.

Describe the current state of program resources relative to the plan outlined above. (Resources include: personnel, technology, equipment, facilities, operating budget, training, and library/learning materials.) Identify any anticipated resource needs (beyond the current levels) necessary to implement the plan outlined above.

Note: Resources to support program plans are allocated through the annual planning and budget process (not the program review process). The information included in this report will be used as a starting point, to inform the development of plans and resource requests submitted by the program over the next three years.

Description of Current Program Resources Relative to Plan:

While most of the program resources are adequate, there are some resources needed to reach the strategic initiatives outlined above:

Effective Outreach:

- Collaborate with other NVC programs to join efforts in doing outreach.
- Find effective ways to reach target students, students interested in engineering that don't know about NVC Engineering.
- Resource Needed: Time to collaborate, coordinate, and execute.

Increase Attractiveness of Program:

- Replace the Computers in the Computer Lab (Room 1833) and the Laptops which are shared with Physics and are used for laboratories in controlling test equipment, collecting and analyzing data, and simulating models.
- This was already requested through the Engineering Unit Plan annual planning and budget process.

Search for Industry Support to fund some Equipment Needs:

- Tap former students now working industry.
- Obtain support and/or brainstorm ideas with the Napa Engineers Society.
- Get support for this initiative from the Napa Chamber of Commerce.
- Resource Needed: Time to collaborate, coordinate, and execute.

Response to Feedback Regarding Concern with Respect to Institutional Support:

- The Engineering Program should be viewed by the institution as an integral component of the college as a whole that positively contributes to its success and service to students.
- Engineering students enroll and take classes offered by other departments: General Education, Mathematics, Science, and Electives. Without our engineering students, these other departments/classes would have lower enrollment numbers.
- Engineering students put together and participate in activities on campus and off campus. These activities motivate and encourage our students to stay engaged in their academics. In addition, some of these activities bring positive recognition to Napa Valley College.

Some of these activities include: Breakfast with Engineers, Participation on Latina/o Engineer Day at San Francisco Exploratorium, Variety of Field Trips to Local Industries, Networking with the Bay Area Society of Hispanic Professional Engineers (SHPE) and Napa Engineers Society (NES).

- It is important to note that the institution has increased the support of the Engineering Program. The 2019 – 2020 academic year is the first year that Engineering and Physics have a Program Coordinator. This is an important show of support. For many years, all the coordinating-related work for Engineering and Physics was done without any compensation. However, it is essential to have a compensation attached to the coordinating-related work because in the future not every faculty heading the Engineering department might be willing to the work without compensation.

V. PROGRAM HIGHLIGHTS

A. Recent Improvements

Installed a 4K Projector in Computer Lab (Room 1833) for all classes that use Computer Lab, especially ENGI 122 – Engineering Graphics and Design, and ENGI 160 – Programming for Engineers and Scientists with MATLAB. Here is a list of other classes that use the Computer Lab:

- Some physics courses (PHYS 140, PHYS 240, and PHYS 241) for Problem Solving,
- Some chemistry classes to do an Introduction to Excel,
- ENGI 110 – Introduction to Engineering to do an introduction to AutoCAD, MATLAB, and/or LTSpice.

New sets of Multi-meters for ENGI 242 – Circuits. These meters are also used for other courses such as ENGI 240, PHYS 111, PHYS 121, PHYS 240, and PHYS 241.

A couple of Basic Stress-Strain Apparatuses for ENGI 240. These two additional sets reduced the number of students per group from 10 – 12 to 5 – 6.

Acquisition of Engineering Kits for Demonstrations and Outreach Purposes. These kits are great to use in hands-on demonstrations when visiting high schools, hosting visiting students and doing demonstrations with them.

Maker's Lab as a resource to integrate labs with and make use of a variety of equipment and tools including: LASER cutter, Printed Circuit Board (PCB) router, 3-D Printers, Soldering irons, assortment of hand tools, and design software programs. Over the past three years, we used some of the resources for engineering courses, to do a lab tour and demonstration of LASER cutter, 3-D printer, and PCB router.

B. Effective Practices

Working closely with Physics and share equipment and instructional resources for laboratories.

Participating in Summer Bridge

Participating and Highlighting Engineering at on-campus events:

- MESA/STEM Fair
- Lak'Ech Youth Summit
- Breakfast with High School Counselors and Administrators
- Hosting Visiting Student Groups from Local High Schools

Field Trips to Local Industry and Laboratories

- Stanford Linear Accelerator Center (SLAC)
- Intelsat Corporation
- James Loudspeaker
- TenCate Advanced Materials
- CalTrans – Carquinez Bridge
- Napa Sanitation
- City of Napa - Jameison Water Treatment Plant
- Napa County Building Inspection and Engineering Services

Outreach to Local Middle and High Schools

- Napa High School
- American Canyon High School
- Vintage High School
- Calistoga High School
- Napa High School

Welcome Student Visitors from Local Schools and do Hands-On Demonstrations

- Usually 2-3 tours in the Spring Semester.

Outreach at Local Community Events

- A variety of events as availability permits.

Hands-On Activities and Demonstrations:

- C-STEM Day at Upper Valley Campus
- STEM Day at Calistoga High School
- Napa Valley College Founders Day (2018)

Feedback and Follow-up Form

Completed by Supervising Administrator:

Robert Van Der Velde, Senior Dean, Arts & Sciences

Date:

4/22/2020

Strengths and successes of the program, as evidenced by analysis of data, outcomes assessment, and curriculum:

Engineering is a strong program providing an excellent pathway for students to transfer to pursue engineering baccalaureate degrees. The faculty engage in a wide range of outreach and co-curricular activities which have yielded benefits by producing a diverse student population. Fill rates, retention, and student success rates are considerably higher than the institution, and Engineering has achieved student success across all equity groups.

Areas of concern, if any:

The biggest concern about Engineering is not within the program control, but whether there is sufficient institutional support for this program to remain current. The Makers Lab can only be useful if students can be present under staff supervision; the program is using 8+ year old computers and struggles with bandwidth issues not compatible with modern engineering technologies, and equipment is aging and should be replaced. Funding is essential for this program to thrive.

Recommendations for improvement:

Funding for staffing, technology, and other equipment as discussed above.

Anticipated Resource Needs:

Resource Type	**Description of Need (Initial, Including Justification and Direct Linkage to State of the Program)**
Personnel: Faculty	
Personnel: Classified	Staffing is needed to support Makers Lab open hours
Personnel: Admin/Confidential	
Instructional Equipment	Unit plan requests for engineering testing equipment have not been funded, but the program needs up to date equipment to maintain up to date instruction.
Instructional Technology	Engineering requires state-of-the-art computer technology; computing labs must be refreshed and with sufficient computing power to run engineering applications.
Facilities	
Operating Budget	
Professional Development/ Training	

Library & Learning Materials	