

Program or Area(s) of Study under Review:

## ENGINEERING

Summary of Program Review:

### A. Major Findings

#### 1. Strengths:

The major strengths of engineering are:

- The Successful Course Completion Rate for Engineering Courses/Program are higher than the respective Institutional Rate. This can be attributed to several factors. Many engineering students take advantage and engage in the opportunities to interact in and out of the classroom, participate in extracurricular activities on-campus, attend regional and national conferences, and interact with professional organizations.
- Engineering has continued to work closely with Student Support Programs such as STEM/MESA Center, Extended Opportunity Program and Services (EOPS), and TRIO Educational Talent Search. Working closely with these programs helps to provide advice and ensure that students get resources available that they need.
- Over the past 2-3 years, the program developed many online activities that have helped to modernize the exposure to problem solving and engineering applications in the real-world. These activities are in the form of simulation labs, videos followed by written assignments and reflections, and research-based homework problems.

#### 1. Areas for Improvement:

Three areas of improvement for engineering are:

- Revamp outreach and interaction with local high schools. While sometimes this can and should be done individually by the Engineering Department, we need to look for effective ways to do outreach. Effective ways could include partnering with other programs on-campus to target more students in a broader area.
- Engage with local engineering industry and professionals to mentor, provide internships, have opportunities for visits and tours, and put together a kind of an engineering advising board. These activities will help to keep students in the program engaged and will help attract students from local high schools into Napa Valley College to enroll in engineering and then transfer.
- Work to continue to articulate courses such as ENGI 110 and ENGI 160 with universities where our students tend to transfer.

#### 1. Projected Program Growth, Stability, or Viability:

It is expected that engineering will remain stable with little growth over the next 3-5 years. Outreach will allow the program to grow a little. However, outreach needs to be expanded to Saint Helena and Calistoga.

Engineering is an integral part of Napa Valley College. Our students take general education classes and classes from other departments including chemistry, math, and physics.

## B. Program's Support of Institutional Mission and Goals

### 1. Description of Alignment between Program and Institutional Mission:

Here is a brief description of the alignment of Engineering and the Institutional Mission:

- Engineering alignment with the Institutional Mission is evident. First, engineering "prepares students for evolving roles in a diverse, dynamic, and interdependent world."
- Engineering is a "high-quality program" with excellent instruction that is "continuously evaluated and improved."
- Engineering offers "transfer courses" for students that plan to transfer to 4-year colleges/universities to complete their B.S. in an engineering field.

### 2. Assessment of Program's Recent Contributions to Institutional Mission:

Here is the assessment of Engineering's recent contributions to the Institutional Mission:

- The contributions of the program to the institutional mission are continuous. Every engineering class "prepares students for evolving roles in a diverse, dynamic, and interdependent world."
- In the Spring 2020 and now in Spring 2022, Engineering is undergoing Program Review to ensure that it is "continuously evaluated and improved."

### 3. Recent Program Activities Promoting the Goals of the Institutional Strategic Plan and Other Institutional Plans/Initiatives:

Here is a list of some of the engineering activities and objectives promoting the goals of the Institutional Strategic Plan and other Institutional Plans/Initiatives:

- Engineering is a department that focuses on the success of students. This is accomplished by excellent instruction in lectures and labs, support students in extracurricular activities, provide mentoring and help secure internships and scholarships.
- Engineering has supported the "Coffee with Engineers" event that the Society of Hispanic Professional Engineers (SHPE) has put together over the past three years.
- Over the past three years, engineering has participated on four On-Campus Internships mentoring and guiding students on an engineering related project. Projects have included the following: Band Pass Filters for Communication System, Object Identification with MATLAB, and Digital Logic. All the projects include a design, development, simulation, building, and testing phase.
- Engineering participated in a six-week Culturally Responsive Teaching in STEM Course in the Spring of 2022. This course was very informative; however, it included many real-life examples and practical guides/steps to apply the information presented in our own courses.

## C. New Objectives/Goals:

Here are new objective/goals for Engineering:

- Reach out and engage with local engineering industry and professionals to mentor, provide internships, and do tours. These activities will help to keep students in the program engaged and will help to attract students from local high schools into Napa Valley College to enroll in engineering and then transfer.
- Broaden the area of outreach to Saint Helena and Calistoga.

D. Description of Process Used to Ensure “Inclusive Program Review”

The information included in this program review includes feedback, comments, suggestions, and other remarks made by engineering part-time instructors and instructors from other “adjacent” departments including Chemistry, Math, and Physics.

**Program Review Report**

Spring 2023

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 |
|---------|-------------|
| Courses | ENGI 110    |
|         | ENGI 122    |
|         | ENGI 160    |
|         | ENGI 199    |
|         | ENGI 240    |
|         | ENGI 241    |
|         | ENGI 242    |

Taxonomy of Programs, July 2022

## I. PROGRAM DATA

### A. Demand

#### 1. Headcount and Enrollment

|   | 2019-2020     | 2020-2021     | 2021-2022     | Change over<br>3-Year Period |
|---|---------------|---------------|---------------|------------------------------|
| <b>Headcount</b>  |               |               |               |                              |
| <b>Within the Program</b>                                 | <b>104</b>    | <b>104</b>    | <b>90</b>     | <b>-13.5%</b>                |
| <b>Across the Institution</b>                             | <b>8,285</b>  | <b>7,193</b>  | <b>6,646</b>  | <b>-19.8%</b>                |
| <b>Enrollments</b>  |               |               |               |                              |
| ENGI-110  | 51            | 51            | 46            | -9.8%                        |
| ENGI-122  | 11            | 13            | 18            | 63.6%                        |
| ENGI-160  | 13            | 8             | 10            | -23.1%                       |
| ENGI-240  | 23            | 12            | 17            | -26.1%                       |
| ENGI-241  | 16            | 26            | 16            | 0%                           |
| ENGI-242  | 30            | 25            | 19            | -36.7%                       |
| <b>Within the Program</b>                                 | <b>144</b>    | <b>135</b>    | <b>126</b>    | <b>-12.5%</b>                |
| <b>Across the Institution</b>                             | <b>33,414</b> | <b>30,381</b> | <b>25,203</b> | <b>-24.6%</b>                |
| <i>Source: SQL Queries for Spring 2023 Program Review</i> |               |               |               |                              |

*RPIE Analysis: The number of students enrolled (headcount) in the Engineering Program decreased by 13.5% over the past three years, while headcount across the institution decreased by 19.8%. Enrollment within the Engineering Program decreased by 12.5%, while enrollment across the institution decreased by 24.6%.*

*Enrollment in the following courses changed by more than 10% ( $\pm 10\%$ ) between 2019-2020 and 2021-2022:*

*Course with enrollment increase:*

- ENGI-122 (63.6%)

*Courses with enrollment decreases:*

- ENGI-242 (-36.7%)
- ENGI-240 (-26.1%)
- ENGI-160 (-23.1%)

#### Program Reflection:

The smaller decrease in head count in Engineering Program (-13.5%) versus the Institution (-19.8%) is in part attributed to the strong engagement of students in engineering courses, the support of students in extracurricular activities, working closely with student support programs such as MESA/STEM, EOPS, and TRIO Educational Talent Search. The smaller decrease in enrollment in Engineering Program (-12.5%) versus the Institution (-24.6%) is in part due to the outreach efforts that the Engineering Program has implemented over the years. While outreach decreased over the past three years due to COVID-19, Engineering is working on revamping its outreach and include Saint Helena and Calistoga.

Even though there appears to be a large difference in the head count and enrollment percentages between the Engineering Program and the Institution, the changes are very similar if we remove ENGI 122. This observation makes it even more important to expand outreach activities.

## 2. Average Class Size

|                               | 2019-2020    |              | 2020-2021    |              | 2021-2022    |              | Three-Year           |              |
|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------------|--------------|
|                               | Sections     | Average Size | Sections     | Average Size | Sections     | Average Size | Average Section Size | Trend        |
| ENGI-110                      | 2            | 25.5         | 2            | 25.5         | 2            | 23.0         | 24.7                 | -9.8%        |
| ENGI-122                      | 1            | 11.0         | 1            | 13.0         | 1            | 18.0         | 14.0                 | 63.6%        |
| ENGI-160                      | 1            | 13.0         | 1            | 8.0          | 1            | 10.0         | 10.3                 | -23.1%       |
| ENGI-240                      | 1            | 23.0         | 1            | 12.0         | 1            | 17.0         | 17.3                 | -26.1%       |
| ENGI-241                      | 1            | 16.0         | 1            | 26.0         | 1            | 16.0         | 19.3                 | 0%           |
| ENGI-242                      | 2            | 15.0         | 1            | 25.0         | 1            | 19.0         | 18.5                 | 26.7%        |
| <b>Program Average*</b>       | <b>8</b>     | <b>18.0</b>  | <b>7</b>     | <b>19.3</b>  | <b>7</b>     | <b>18.0</b>  | <b>18.4</b>          | <b>0%</b>    |
| <b>Institutional Average*</b> | <b>1,332</b> | <b>25.1</b>  | <b>1,202</b> | <b>25.3</b>  | <b>1,111</b> | <b>22.7</b>  | <b>24.4</b>          | <b>-9.6%</b> |

Source: SQL Queries for Spring 2023 Program Review

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 18.4 students per section. The average class size in the program has been lower than the average class size of 24.4 students per section across the institution during this period. Average class size in the program was stable between 2019-2020 and 2021-2022. Average class size at the institutional level decreased by 9.6% over the same period.*

Average class size in the following courses changed by more than 10% ( $\pm 10\%$ ) between 2019-2020 and 2021-2022:

*Courses with increases in average class size:*

- ENGI-122 (63.6%)
- ENGI-242 (26.7%)

*Courses with decreases in average class size:*

- ENGI-240 (-26.1%)
- ENGI-160 (-23.1%)

### Program Reflection:

The reduction in average class size is a direct effect of the decrease in headcount and enrollment in Engineering. The reduction in head count has put ENGI 110, ENGI 122, and ENGI 160 at a level just barely above the minimum enrollment to avoid class cancellation. Last minute outreach and promoting classes have helped to keep classes and avoid any cancellation.

At the moment, Engineering courses are offered as follows:

- ENGI 110 (Fall and Spring)
- ENGI 122 (Fall)
- ENGI 160 (Fall)
- ENGI 240 (Fall)
- ENGI 241 (Spring)
- ENGI 242 (Spring)

Only ENGI 110 is offered twice per year. All engineering courses have only one section when offered.

### 3. Fill Rate and Productivity

| Fill Rate  |             |            |              |
|--|-------------|------------|--------------|
|  | Enrollments | Capacity   | Fill Rate    |
| 2019-2020  | 144         | 184        | 78.3%        |
| 2020-2021  | 135         | 167        | 80.8%        |
| 2021-2022  | 126         | 161        | 78.3%        |
| <b>Three-Year Program Total</b>  | <b>405</b>  | <b>512</b> | <b>79.1%</b> |
| Productivity   |             |            |              |
|  | FTES        | FTEF       | Productivity |
| 2019-2020  | 23.5        | 2.6        | 9.0          |
| 2020-2021  | 21.6        | 2.4        | 9.0          |
| 2021-2022  | 20.9        | 2.4        | 8.7          |
| <b>Three-Year Program Total</b>  | <b>66.0</b> | <b>7.4</b> | <b>8.9</b>   |
| <i>Sources: SQL Queries for Spring 2023 Program Review; SQL Server Reporting Services – Term to Term Enrollment FTES Load Comparison Report (by Credit Course)</i> |             |            |              |

*RPIE Analysis: The fill rate within the Engineering Program ranged from 78.3% to 80.8% over the past three years, and the fill rate across the three-year period was 79.1%. [Fill rate has not been calculated at the institutional level.] Between 2019-2020 and 2020-2021, both enrollment and capacity decreased, resulting in an increase in fill rate (due to a higher rate of decrease in capacity). Between 2020-2021 and 2021-2022, both enrollment and capacity decreased, resulting in a decrease in fill rate (due to a higher rate of decrease in enrollment).*

*Productivity within the Engineering Program ranged from 8.7 to 9.0 over the past three years, totaling 8.9 across the three-year period. [Productivity has not been calculated at the institutional level.] The three-year program productivity of 8.9 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:

While the fill rates for Engineering appear to indicate that on average 79.1% of the spaces are taken, the fill rate varies by course. The data provided does not show the variation of fill rate by engineering course. However, as noted in the section above on Average Class Size, most engineering classes have experienced a large decrease class size.

Again, revamping and expanding our outreach efforts and working with “adjacent” department such as Chemistry, Math, and Physics will help to turn the trends around. But it will take time.

### 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

| Level  | Retention Rates<br>(Across Three Years) |                                 |          | Successful Course Completion Rates<br>(Across Three Years) |                                 |          |
|--|---|---------------------------------|----------|--|---------------------------------|----------|
|  | Rate                                    | Course Rate vs.<br>Program Rate |          | Rate   | Course Rate vs.<br>Program Rate |          |
|  |   | Above                           | Below    |  | Above                           | Below    |
| ENGI-110   | 88.0%                                   |                                 | X        | 73.2%  |                                 | <b>X</b> |
| ENGI-122   | 78.0%                                   |                                 | <b>X</b> | 68.3%  |                                 | <b>X</b> |
| ENGI-160   | 93.5%                                   | X                               |          | 90.3%  | X                               |          |
| ENGI-240   | 98.1%                                   | X                               |          | 96.2%  | <b>X</b>                        |          |
| ENGI-241   | 96.6%                                   | X                               |          | 93.1%  | <b>X</b>                        |          |
| ENGI-242   | 98.6%                                   | <b>X</b>                        |          | 97.3%  | <b>X</b>                        |          |
| <b>Program Level</b>   | 92.0%                                   |                                 |          | 84.4%  |                                 |          |
| <b>Institutional Level</b>   | 89.6%                                   |                                 |          | <b>74.0%</b>   |                                 |          |
| <p>Source: SQL Queries for Spring 2023 Program Review<br/>           -- Indicates a value that is within 1% of the program-level rate.<br/> <b>Bold italics</b> denote a statistically significant difference between the course-level rate and the program-level rate.<br/> <b>Bold</b> denotes a statistically significant difference between the program-level rate and the institutional rate.<br/> <b>Note:</b> Grades of EW (Excused Withdrawal) for spring 2020 and beyond are not included in the calculations of the three-year retention and successful course completion rates reported above. This approach reflects the standard recommended research practice of not including EWs in either the numerator or the denominator for these rates.</p> |   |                                 |          |  |                                 |          |

**RPIE Analysis:** Over the past three years, the retention rate for the Engineering Program was higher than the rate at the institutional level. (The difference was not statistically significant.) The retention rate for ENGI-122 was significantly lower than the program-level rate. The retention rate for ENGI-242 was significantly higher than the program-level rate. The retention rate for the Engineering Program falls within the third quartile (Q3) among program-level retention rates (across 58 instructional programs, over the past three years). The retention rate for Engineering falls within the 50%-75% range of retention rates among NVC programs.

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 rates for ENGI-110 and ENGI-122 were significantly lower than the program-level rate. The successful course completion rates for ENGI-240, ENGI-241, and ENGI-242 were significantly higher than the program-level rate. The successful course completion rate for the Engineering Program falls within the fourth quartile (Q4) among program-level successful course completion rates (across 58 instructional programs, over the past three years). The successful course completion rate for Engineering is among the top 25% of successful course completion rates among NVC programs.



Over the past three years, the difference between retention and successful course completion at the program level (7.6%) was significantly lower than the difference at the institutional level (15.6%). This figure represents the proportion of non-passing grades assigned to students (i.e., grades of D, F, I, NP).

The following Engineering course claimed a difference (between retention and successful course completion) that exceeded 10%:

- ENGI-110 (14.8%)

**Program Reflection:**

The Retention Rates for the Engineering Program (92.0%) are slightly higher than for the Institutional Level (89.6%). However, the Successful Course Completion Rates for the Engineering Program (84.4%) are significantly higher than for the Institutional Level (74.0%). The Successful Course Completion Rate in the Engineering Program are significantly higher compared to Institutional Level in part due to the Engineering Program support of 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 (73.2%) and ENGI 122 (68.3%) are lower than the Engineering Program average Successful Course Completion Rate (84.4%). This is probably because ENGI 110 and ENGI 122 do not have prerequisites and any student interested in these classes can enroll. Some students while enrolled in ENGI 110 and ENGI 122 lose interest in the classes and/or change majors.

**2. Student Equity**

|                        | Retention Rates<br>(Across Three Years) |                   | Successful Course Completion Rates<br>(Across Three Years) |                   |
|------------------------|---|-------------------|--|-------------------|
|                        | Program Level                           | Institution Level | Program Level  | Institution Level |
| African American/Black | *                                       | 86.4%             | *  | 65.6%             |
| Latinx/Hispanic        |   | 88.7%             | 83.7%  | <b>70.3%</b>      |
| First Generation       |   | 89.2%             | 87.4%  | <b>72.7%</b>      |
| Veteran                |   | 91.1%             | 76.9%  | 71.9%             |
| 19 or Younger          |   | 89.8%             | 72.7%  | 72.3%             |

Source: SQL Queries for Spring 2023 Program Review

**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.

**Note:** Grades of EW (Excused Withdrawal) for spring 2020 and beyond are not included in the calculations of the three-year retention and successful course completion rates reported above. This approach reflects the standard recommended research practice of not including EWs in either the numerator or the denominator for these rates.

\*Data suppressed due to low N (<10 students in cohort).

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

*The program-level retention rate among African American/Black students is not reported due to small cohort size.*

*Within the Engineering Program, the successful course completion rates among Latinx/Hispanic and first-generation students were significantly higher than the corresponding rates at the institutional level. The successful course completion rates among veterans and students 19 and younger were also higher at the program level than the institutional level, but the differences were not statistically significant. (The program-level successful course completion rate among African American/Black students is not reported due to small cohort size.)*

*These findings regarding successful course completion rates among equity groups are consistent with the findings that emerged from the comparison of successful course completion at the program vs. institutional level, where the program-level rate was significantly higher than the institution-level rate. (See Section I.B.1 above.)*

#### **Program Reflection:**

The higher Successful Completion Rates in Engineering versus Institutional Rates for Latinx/Hispanics and First Generation are due to:

- 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, and other student support programs.
- 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.
  - However, sometimes, it is difficult to find and keep adjunct instructors. Engineering lost three adjunct instructors in the past three years. Now, we are looking for one to teach ENGI 122. It is tough to find a qualified instructor with some experience teaching Engineering Graphics and Design including AutoCAD.
- 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 a professional network, and increase their confidence to do well in classes and persist even in difficult courses.

The Engineering program should work on identifying mechanisms to better support and increase higher Successful Completion Rates for Veteran students and students 19 and younger. For example, veteran students should be pointed to Veterans Services and Engineering should learn how to best serve these students. Students 19 and younger should be advised to meet with a counselor and put together a study plan.

### **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 2019-2020 and 2021-2022.*

**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 Program above.*

**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.*

**II. CURRICULUM**

**A. Courses**

| <b>Subject</b> | <b>Course Number</b> | <b>Date of Last Review</b><br><i>(Courses with last review dates of 6 years or more must be scheduled for immediate review)</i> | <b>Has Prerequisite*</b><br>Yes/No & <b>Data of Last Review</b> | <b>In Need of Revision</b><br><i>Indicate Non-Substantive (NS) or Substantive (S) &amp; Academic Year</i> | <b>To Be Archived (as Obsolete, Outdated, or Irrelevant) &amp; Academic Year</b> | <b>No Change</b> |
|----------------|----------------------|---|---|---|--|------------------|
| ENGI           | 110                  | 2018  | No  | Non-Substantive 2023-24   |  |                  |
| ENGI           | 122                  | 2018  | No  | Non-Substantive 2023-24   |  |                  |
| ENGI           | 160                  | 2018  | Yes   | Non-Substantive 2023-24   |  |                  |
| ENGI           | 240                  | 2018  | Yes   | Non-Substantive 2023-24   |  |                  |
| ENGI           | 241                  | 2018  | Yes   | Non-Substantive 2023-24   |  |                  |
| ENGI           | 242                  | 2018  | Yes   | Non-Substantive 2023-24   |  |                  |

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

**B. Degrees and Certificates<sup>+</sup>**

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

\*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:**

All Engineering courses will be submitted for Non-Substantial review. The objective is to update/revise textbooks and make other minor changes. This will be a good opportunity to update SLOs.

There is no plan to discontinue any engineering courses at the moment.

**III. LEARNING OUTCOMES ASSESSMENT**

**A. Status of Learning Outcomes Assessment**

Learning Outcomes Assessment at the Course Level

| Number of Courses | Number of Courses with Outcomes Assessed |                   | Proportion of Courses with Outcomes Assessed |                   |
|-------------------|--|-------------------|--|-------------------|
|                   | 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 Engineering Program courses, except ENGI 199, have Student Learning (SLOs). All of these courses have been assessed over the last 4 and last 6 years. Here are the last assessment semester for each of the 6 engineering courses with SLOs:

- ENGI 110: Fall 2021
- ENGI 122: Fall 2021
- ENGI 160: Fall 2020
- ENGI 240: Fall 2020
- ENGI 241: Spring 2022
- ENGI 242: Spring 2022

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**

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. This was began to be looked at in the Spring 2020; however, when COVID-19 hit this was put aside. It is time to look at it again and include learnings from online course offerings.

For ENGI 110 and ENGI 122, we plan to look at implementing before and after assessments. 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 the gain is when students take these classes. We planned to do this beginning in the Fall 2020; however, COVID-19 got in the way.

**Program Reflection:**

|  |
|--|
|  |
|--|

**IV. PROGRAM PLAN**

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

- Viability
- X  Stability
- 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 decrease in enrollment is smaller than the decrease at the Institutional level.
- Course Completion Rates for Engineering are higher than the corresponding Institutional Rates.
- Outreach decreased between Spring 2020 and Spring 2022; however, it is picking up since Fall 2022.

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: 2023-2024 through 2025-2026**

| Strategic Initiatives<br>Emerging from Program Review       | Relevant Section(s)<br>of Report                        | Implementation Timeline:<br>Activity/Activities &<br>Date(s) | Measure(s) of<br>Progress or<br>Effectiveness                                |
|---|---|--|--|
| Effective and Broader Outreach                              | Program Data,<br>Demand,<br>Headcount and<br>Enrollment | Consistently over the next<br>three years                    | Monitor<br>Headcount and<br>Enrollment<br>trends.                            |
| Increase Attractiveness of<br>Program                       | Program Data,<br>Demand,<br>Headcount and<br>Enrollment | Consistently over the next<br>three years                    | Monitor<br>Headcount and<br>Enrollment<br>trends, and<br>survey<br>students. |
| Engage with Local Engineering<br>Industry and Professionals | Program Data,<br>Demand,<br>Headcount and<br>Enrollment | Consistently over the next<br>three years                    | Survey<br>students.  |

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:**

In general, the Engineering program resources are adequate; however, there are some resources needed to reach the strategic initiatives outlined above:

Effective and Broader 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 and Engage with Local Engineering Industry and Professionals:

- Engage with local engineering industry and professionals to mentor, provide internships, and do tours. These activities will help to keep students in the program engaged and will help attract students from local high schools into Napa Valley College to enroll in engineering and then transfer.
- Resource Needed: Support from NVC as institution to form a kind of Engineering Advisory Board.

## V. PROGRAM HIGHLIGHTS

The program-level plan that emerged from the last review (Spring 2020) included the following initiatives:

- Effective outreach
- Increase attractiveness of program
- Search for industry support to fund some equipment needs

### A. Accomplishments/Achievements Associated with Most Recent Three-Year Program-Level Plan

Effective outreach could not be achieved because of COVID-19. However, outreach has begun to revamp since Fall 2022.

The desktop computers in Room 1833 were replaced and we have new Physics/Engineering laptops. This helps to increase the attractiveness of the program.

No search for industry support to fund equipment needs was attempted. Again, the main reason was COVID-19. However, we think that outreaching and engaging local engineering industry will also help to find funds to get new engineering equipment.

### B. Recent Improvements

Some of recent improvements are:

- New desktop computers in Room 1833.
- New set of laptops for Physics and Engineering.
- Engaging with Maker's Lab to integrate some course project with it.

### C. Effective Practices

Here is a list of some effective practices:

- Work closely with other departments and student support services including:
  1. Chemistry, Math, and Physics
  2. MESA/STEM, EOPS, and TRIO Educational Talent Search.
- Developed many effective simulations, laboratories, and other assignments for delivery online.
- Facilitating and mentoring students participating in On-Campus Internship
  1. 13 students in four semesters
  2. Projects have varied from Filters for Communication Systems to Digital Designs.
- Participation in:
  1. Coffee with Engineers
  2. ESCALA: Culturally Responsive Teaching in STEM 6-week Course
  3. Hosting visiting student groups from local high schools
  4. MESA/STEM Fair
- Outreach of local high schools.



**ENGINEERING SPRING 2023**

Completed by Supervising Administrator:

Robert Van Der Velde, Senior Dean

Date:

4/2/23

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

Engineering is a solid small program, offering excellent preparation for transfer students. Student success rates are good, and higher than institutional average for equity groups. Fill rates are very good, but as the Engineering classes have lab components with cramped facilities, efficiency rates (FTES/FTEF) will never reach anywhere near the target rates for other disciplines.

Areas of concern, if any:

Enrollment in Engineering courses has dropped during the COVID pandemic, consistent with enrollment declines across campus, but leaving many Engineering sections close to class size minimums with the specter of class cancellation due to low enrollment. Pre-pandemic the program (esp. Prof. Castro) engaged in considerable outreach efforts, as well as collaboration with the MESA/STEM Center, and those efforts were yielding dividends.

Recommendations for improvement:

The college should actively promote Engineering as an excellent pathway for students seeking to transfer in this field. The program should continue the efforts to restart outreach activities.

Anticipated Resource Needs:

| Resource Type                      | Description of Need (Initial, Including Justification and Direct Linkage to State of the Program)             |
|------------------------------------|---|
| Personnel: Faculty                 |   |
| Personnel: Classified              |   |
| Personnel: Admin/Confidential      |   |
| Instructional Equipment            | The current unit plan includes instructional equipment requests to provide up-to-date resources for students. |
| Instructional Technology           |   |
| Facilities                         |   |
| Operating Budget                   |   |
| Professional Development/ Training |   |
| Library & Learning Materials       |   |