Program: Engineering (ENGR)
Division: MSEPS
Date: October 15, 2017
Writer(s): Keith Level
SLO/SAO Point-Person: Keith Level

Audience: Deans, Vice Presidents of Student Services and Academic Services, All Planning and Allocation Committees. This document will be available to the public.

Uses: This Program Review will be used to inform the campus and community about your program. It will also be used in the processes of creating Division Summaries, determining College Planning Priorities and allocating resources. A final use is to document fulfillment of accreditation requirements.

Time Frame: This Program Review should reflect on program status during the 2016-17 academic year. It should describe plans starting now and continuing through 2017-18. This document also provides the opportunity to describe more long-term plans (optional).

Sections: The first section of this Program Review focuses on general program reflection and planning. The second section is a review of curriculum. Only programs with curriculum need to complete Section 2. The third section is a CTE update, to be completed by CTE programs only.

Topics: A list of topics of particular interest to Program Review readers can be found here: https://goo.gl/23jrxt

Help: Contact Karin Spirn: kspirn@laspositascollege.edu

Instructions:

1) *Please respond to each question as completely as possible.*
2) *If the requested information does not apply to your program, write "Not Applicable."*
3) *Optional: Meet with your dean to review this document before October 13.*
4) *Send an electronic copy of this form to Karin Spirn and your Dean by October 16*

Links:

Program Review Home Page: https://goo.gl/XATgjJ
Fall 2016 Program Review Updates : https://goo.gl/YV8QOt
Frequently Asked Questions: https://goo.gl/iIhRtt

Section One: Program Snapshot

A. **Data Review: Describe any significant changes to your program's data since last year's Program Review Update (Fall 2016).**

Possible sources of relevant information might include, but are not limited to, the following:

- Data generated by your program
- Data from the Office of Institutional Research (https://goo.gl/WuR9cQ)
- CEMC Data
- Labor Market Data
- SLO/SAO Data

Based on Institutional Research data, Fall enrollments in ENGR classes in each year from 2012-2016 have equaled 117(in 2012), 104, 138, 161, and 152 (in 2016). The 2016 enrollments, though down from 2015, are up 30% compared to 2012.

Based on the same data, Spring enrollments in ENGR classes in each year from 2013-2017 have equaled 123 (in 2013), 114, 150, 165, and 157 (in 2017). Like the Fall trend, the 2017 enrollments are down compared to 2016, but are up 28% compared to 2013.

Data generated internally have included an average of 30 Engineering transfer students to Four-year California universities in the span from 2014-2017, including nearly 40 Engineering transfer students for Fall 2017.

B. **Changes to Program and Needs: Describe any significant changes to your program or your program's needs since the previous Program Review Update (Fall 2016).**

ENGR is made up of 2 subsets: (1) Engineering Transfer and (2) Engineering Technology.	Mark an X next to each area that is addressed in your response.	
	Definitions of terms: https://goo.gl/23jrxt	
Engineering Transfer has been in existence at LPC for many years. Based on enrollment trends, an additional section of ENGR 44 (Intro to Circuit Analysis) was offered during Fall 2017, and an additional section of ENGR 35 (Statics) will be offered during Spring 2018. Increases in engineering enrollments will always likely be moderate; prerequisites for this major are as extensive and challenging as any major at the college, which keeps enrollment numbers down. It is important that this concept be considered when trying to compare WSCH/FTEF (or equivalent metrics) for ENGR courses vs. other courses.	X	Community Partnerships/Outreach
	X	Curriculum*
	X	Enrollment Management
	X	External Factors
	X	Facilities,** Supplies and Equipment (Including Software)
		Financial/Budgetary
	X	Human Resources
Engineering Technology began in Fall 2014, has grown steadily between 2014-2017, and in Fall 2017 began its 4th cohort of students, with a large presence of returning veterans students. Besides developing curriculum for ENGR 37 (Applied Statics and Materials), the one course created specifically for this program, the program involves		Learning Support
		LPC Planning Priorities https://goo.gl/LU99m1
		Pedagogy
		Professional Development

<table>
<tr><td>partnerships with Lawrence Livermore National Labs, other local employers, Alameda County Workforce Investment Board, and Growth Sector.

The Makers Space, currently housed in rooms 1822 and 1824, has grown and expanded Andrew Lozano, the lab technician for ENGR, has provided leadership in organizing this effort and coordinating use of the Maker Space with the Engineering Club.

Keith Level is on sabbatical during Fall 2017, but has still been involved in extensive administrative duties, including recruiting and hiring 4 new adjunct instructors; substituting for an adjunct instructor who resigned 3 weeks into the Fall 2017 semester; and evaluating 5 different adjunct faculty in ENGR. The administrative duties for managing both Engineering Transfer and Engineering Technology are extensive, and have grown since 2014. There is an on-going, many-times-before-requested need for some release time to cover these responsibilities.</td>
<td colspan="2">

X	Services to Students
	SLO/SAO Process
	Technology Use

*Curriculum will also be addressed in Part 2 (Curriculum Review).

**Facilities will also be addressed in Question H.
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C. Reflection: **What plans from the 2016 Program Review Update or any previous Program Reviews/Updates have been achieved and how?**

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1. Four new adjunct ENGR faculty have been hired to teach both (a) additional course sections and to (b) replace Keith Level on his sabbatical leave during Fall 2017.

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2. The Makers Space located in Rooms 1822 and 1824 has added a laser cutter, and has plans for additional 3D printers.

3. New equipment has been added to the lab equipment used for ENGR 44 (Intro to Circuit Analysis). There are still some unmet needs for lab equipment used in ENGR 46 (Materials of Engineering)

4. One additional section of ENGR 35 (Statics) and ENGR 44 (Intro to Circuit Analysis) has been added to the 2017-18 schedule.
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Mark an X next to each area that is addressed in your response.

Definitions of terms: https://goo.gl/23jrxt

	Community Partnerships/Outreach
x	Curriculum*
x	Enrollment Management
	External Factors
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	Professional Development
x	Services to Students
	SLO/SAO Process
x	Technology Use

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	**Facilities will also be addressed in Question H.

D. Impacts to Students (Optional): Discuss at least one example of how students have been impacted by the work of your program since the last Program Review Update (only if you did not already answer this in Questions A, B or C).

Several returning veterans students have successfully completed the two-year Associates of Science degree in Mechanical Engineering Technology (ASMET) at LPC, and have successfully been hired into full-time employment at Lawrence Livermore National Laboratories (LLNL). Success of this program has been acknowledged by (a) LLNL representatives getting invited to the President Obama White House, (b) meeting with US Senator Dianne Feinstein's staff, and (c) veterans getting special acknowledgement at June commencement ceremonies.	Mark an X next to each area that is addressed in your response.

	Mark X	Area
		Definitions of terms: https://goo.gl/23jrxt
	X	Community Partnerships/Outreach
	X	Curriculum*
		Enrollment Management
		External Factors
		Facilities,** Supplies and Equipment (Including Software)
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		Learning Support
		LPC Planning Priorities https://goo.gl/LU99m1
		Pedagogy
		Professional Development
	X	Services to Students
		SLO/SAO Process
	X	Technology Use
		*Curriculum will also be addressed in Part 2 (Curriculum Review).
		**Facilities will also be addressed in Question H.

E. Obstacles: What obstacles has your program faced in achieving plans and goals?

Same obstacles as listed in about the last 4-5 program reviews: 1. People / unassigned time 2. Scheduling Unassigned time, in some form, is overdue in ENGR. Scheduling is an on-going challenge, and needs to occur every semester.	Mark an X next to each area that is addressed in your response. Definitions of terms: https://goo.gl/23jrxt

	Mark X	Area
		Community Partnerships/Outreach
	X	Curriculum*
	X	Enrollment Management
		External Factors

X	Facilities,** Supplies and Equipment (Including Software)
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	SLO/SAO Process
X	Technology Use
*Curriculum will also be addressed in Part 2 (Curriculum Review).	
**Facilities will also be addressed in Question H.	

F. Short Term Planning: What are your most important plans (either new or continuing) for next year?

1. Maintain enrollment numbers, and troubleshoot areas (eg, ENGR 25) where numbers have been low. 2. Continue to improve/maintain laboratory equipment, with specific emphasis on the ENGR 46 (Materials of Engineering) lab. 3. Begin the process to generate certificates of achievement for different programs within ENGR 4. Continue to provide accurate guidance for engineering transfer students.	Mark an X next to each area that is addressed in your response.	
	Definitions of terms: https://goo.gl/23jrxt	
		Community Partnerships/Outreach
	X	Curriculum*
	X	Enrollment Management
		External Factors
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	**Facilities will also be	

	addressed in Question H.

G. Long Term Planning (Optional): Please detail any long-term plans for the next 3-5 years. (Only if you have significant plans, such as implementation of a grant project, creation of long-term initiatives including those using restricted funds such as Equity or SSSP, construction and outfitting of a new building).

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<td rowspan="17">Carefully plan course schedules, course offerings, and the hiring of adjunct faculty as the program grows. Analyze carefully instances where significant numbers of students, who would normally attend courses at Chabot College, are taking courses at Las Positas College (as happened during academic year 2016-17)

Analyze whether offering sections of ENGR courses at night is effective for program.

Currently, there are some initial discussions regarding some NSF (National Science Foundation) grants. If these proceed, there will be updated information in the next Program Review update.

Keith Level may retire within the next 5 years</td>
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H. Do you have any facilities needs that are currently unmet? If yes, please describe.

Storage of equipment is inadequate. The construction of Bldg 1850 and remodeling of Bldg 1822 resulted in a decrease of storage space for Engineering and Physics.

Expanded access to software used in ENGR 22 (Engineering Graphics) is needed. Currently, only computers in Rm 1859 and a few other computers on campus provide students access to Solidworks software at times other than when classes meet.

I. Mission: Explain how your program's plans and accomplishments support the mission of Las Positas College:

Las Positas College is an inclusive learning-centered institution providing educational opportunities and support for completion of students' transfer, degree, basic skills, career-technical, and retraining goals.

Transfer in Engineering: About 30 students per year, a large number given the overall size of the college.

AS degrees in Engineering Technology (ET): An average of about 10 AS degrees granted in ET, in each of the last 3 years.

Career-Technical: Veterans (and other) students are completing degrees in preparation for work as Engineering Technicians and Technologists.

Retraining: Veterans (and other) students are obtaining new skills to prepare them for working in local high-tech companies.

J. Program-Set Standard (Instructional Programs Only): Did your program meet its program-set standard for successful course completion? __X_yes _____no

(This data can be found here: https://goo.gl/b59nCy)

If your program did not meet your program-set standard, discuss possible reasons and how this may affect program planning or resource requests.

Not applicable

K. SLO/SAO Reflection: Describe an example of how your program used course SLO data (CSLOs), Student Service Area Outcome (SAO) data or Program SLO data (PSLOs) from last year (2016-17) to impact student learning or achievement. <u>Focus on PSLOs or CSLOs where you have multiple semesters of data to analyze</u>. (Copy the box below if you would like to discuss multiple examples.)

Course: ENGR 10 (*Intro to Engineering*)
Text of the CSLO, SAO, or PSLO: Identify and differentiate between the different engineering branches, based on worded-descriptions of each
Describe the quantitative or qualitative results: The average rubric score was 2.27 for the class, with the rubric described below. This understanding is between average and above average.
Discuss any actions taken so far (and results, if known):

Discuss your action plan for the future:
Different approach to teaching the subject matter; some sample test questions provided during lecture time.

Rubric: Mastery   4   more than 19 correct
Above Average 3   16 – 18 correct
Average 2   14-15 correct
Below Average 1   less than 14 correct
No Demonstration Achieved   did not complete assessment

Course: ENGR 10 (Introduction to Engineering)
Text of the CSLO, SAO, or PSLO: Work as a team to design and build a solution to an engineering problem using the engineering design process.
Describe the quantitative or qualitative results: The average rubric score was 2.67 for the class, with the rubric described below. This understanding is between average and above average.
Assessment Description: Build a jumping device that can move from one table to another across a 50 cm gap with nothing on the floor and nothing left behind. The jumper should be self-supported and have no stored energy. Total cost of apparatus should be under $10. Write a group design report that shows how you worked through the engineering design process.
Rubric: Mastery   4   Table Jumper successfully makes it over 50 cm gap and is fully supported by second table leaving nothing on floor or behind.
Above Average 3   Table Jumper successfully makes it over 50 cm gap, but was not fully supported by second table, or things fell on floor or was left behind.
Average   2   Table Jumper was made and moved, but was unable to make it over 50 cm gap.
Below Average 1   Table Jumper was made, but unable to move at all.
No Demonstration Achieved   Did not complete assessment

Course: ENGR 10 (Introduction to Engineering)
Text of the CSLO, SAO, or PSLO: Demonstrate knowledge of the Engineering Transfer Process, from LPC to a 4 year university
Describe the quantitative or qualitative results: The average rubric score was 3.00 for the class, with the rubric described below. This understanding is above average.
Assessment Description: Create a list of specific courses you will take each semester (or quarter, if applicable) for your entire college course schedule *which will lead to a Bachelor's Degree in some branch of engineering*. Include all lower-division courses that you have taken or will take here at Las Positas College (and at any other colleges or universities), *and, very importantly,* the courses you will take *after* you transfer, which will lead to a Bachelor's of Science degree in Engineering. Use assist.org, the LPC catalog, requirements for transfer students and the catalog of the 4-year university where you are hypothetically planning to transfer. Make sure you include which engineering major and college you are "transferring to" for the purposes of this transfer plan.

Rubric: Mastery	4	Transfer plan included at least 60 units of transferable courses including Math, Science and Engineering classes taken at LPC. Classes scheduled with prerequisites in mind. Also included most required Upper Division and General Education classes needed to attain Bachelor's Degree. (95-100% Grade)
Above Average	3	Transfer plan included most of the transferable courses including Math, Science and Engineering classes taken at LPC. Most classes scheduled with prerequisites in mind. Also included most required Upper Division and General Education classes needed to attain Bachelor's Degree. (80-94% Grade)
Average	2	Transfer plan included some transferable courses including Math, Science and Engineering classes taken at LPC. Also included some required Upper Division and General Education classes needed to attain Bachelor's Degree. (60-79% Grade)
Below Average	1	Transfer plan did not include at least 60 units of transferable courses and did not include any upper division courses. (Less than 60% Grade)
No Demonstration Achieved		Did not complete assessment

Course: ENGR 10 (Introduction to Engineering)
Text of the CSLO, SAO, or PSLO: Demonstrate an understanding of Microsoft Excel spreadsheet skills that are typically used in Engineering applications
Describe the quantitative or qualitative results: The average rubric score was 3.29 for the class, with the rubric described below. This understanding is between above average and excellent.
Assessment Description: Use Microsoft Excel to calculate both semester and cumulative GPAs over at least 50 semester units. Use a LOOKUP function to assign grade points to letter grades. Spreadsheet will have class names, number of units and letter grades put in by you. Fill in all other fields necessary to calculate GPA using cell functions. Calculate GPAs to 2 decimal points. Turn in assignment electronically.

Rubric: Mastery	4	Excel spreadsheet correctly uses all formulas and correctly calculates GPA (and all associated fields) (95-100% grade)
Above Average	3	Excel spreadsheet uses formulas in most fields. May not have calculated all fields correctly. (80-94% grade)
Average	2	Excel spreadsheet uses formulas in some fields (i.e. calculates total grade points, but does not use LOOKUP function) (60-79% grade)
Below Average	1	Excel spreadsheet includes no formulas. (less than 60% grade)
No Demonstration Achieved		did not complete assessment

L. Plans for Analysis of SLO/SAO Data: Identify the PSLOs, CSLOs, or SAOs that your program plans on focusing on the upcoming year with subsequent analysis. (Copy the box below as needed.)

Circle One:
CSLO   PSLO   SAO

Course, Program Name, or Student Service Area:
ENGR 10 (Introduction to Engineering)
Text of CSLO/PSLO/SAO:
Identify and differentiate between the different engineering branches, based on worded-descriptions of each
This was the CSLO with the lowest average score (2.27) out of the four assessed CSLOs.
If you plan on analyzing a PSLO, identify the CSLOs that feed into the PSLO that will need to be assessed.
The plan is to use some alternate methods for teaching this material, and preparing students better for analyzing the types of test questions they might encounter.

Section Two: Curriculum Review
(Programs with Courses Only)

The following questions ask you to review your program's curriculum. To see the last outline revision date and revision due date:

> **1. Log in to CurricUNET**
> **2. Select "Course Outline Report" under "Reports/Interfaces"**
> **3. Select the report as an Excel file or as HTML**

Curriculum Updates

A. Title V Updates: Are any of your courses requiring an update to stay within the 5 year cycle? List courses needing updates below.

> **Yes; The following courses are in need of an update:**
> ENGR 10 (update textbooks)
> ENGR 22 (update textbooks)
> ENGR 25 (update textbooks)
> ENGR 35 (update textbooks, prerequisites)
> ENGR 37 (update prerequisites)
> ENGR 44 (update textbooks, prerequisites)
> ENGR 46 (update textbooks, prerequisites)

B. Degree/Certificate Updates: Are any degrees/certificates requiring an update to do changes to courses (title, units) or addition/deactivation of courses? List needed changes below.

> **Yes; the ASMET (Associates of Science, Mechanical Engineering Technology) degree requires an update to reflect the change in prerequisite classes.**

C. DE Courses/Degrees/Certificates: Detail your department's plans, if any, for adding DE courses, degrees, and/or certificates. For new DE degrees and/or certificates (those offered completely online), please include a brief rationale as to why the degree/certificate will be offered online.

> **There are no immediate plans for offering Distance Education courses in Engineering at Las Positas College in the near future. There are about 3-4 Bay Area community colleges which do offer different Engineering courses in DE format. Some of these colleges developed DE formats to address declining in-person enrollments; currently LPC does not share that issue in most of its ENGR courses.**

Section Three: CTE Updates
(CTE Programs Only)

A. Labor Market Conditions: Examine your most recent labor market data. Does your program continue to meet a documented labor market demand? Does this program not represent unnecessary duplication of other training programs in the college's service area? (Please note: your labor market data should be current within two years. Contact Vicki Shipman or the current CTE Project Manager for access to data).

> The Engineering Technology degree program, which targets returning veterans students (but is open to all students), is addressing a need found at several high-tech employers, and most notably, at Lawrence Livermore National Laboratories: an immediate need to replace technicians and technologists, who are typically close to retirement.

B. Advisory Boards: Has your program complied with advisory board recommendations? If not, please explain.

> Yes; an Advisory Board meeting for Engineering Technology was held on the LPC campus on Thursday, September 21, 2017

C. Strong Workforce Program Metrics: Utilizing LaunchBoard, review the Strong Workforce Program Metrics. Review the data and then answer the following questions.

 (Contact Vicki Shipman or the current CTE Project Manager for help accessing the data).

C1. Does your program meet or exceed the regional and state medians **for increased enrollments, completions, and/or transfer since your last program review**? If not, what program improvements may be made to increase this metric?

> See document at end of this report

C2. Does your program meet or exceed the regional and state medians **for students gaining employment in their field of study**? If not, what program improvements may be made to increase this metric?

> See document at end of this report

C3. Does your program meet or exceed the regional and state medians **for student employment rates after leaving the college**? If not, what program improvements may be made to increase this metric?

C4. Does your program meet or exceed the regional and state medians **for increased student earnings and median change in earnings?** If not, what program improvements may be made to increase this metric?

ENGINEERING TECHNOLOGY – Labor Market Information

TOP Code: 0924.00 – Engineering Technology

SOC Codes: 17.3029 – Engineering Technicians

Summary Based on Demand and Supply: The following tables illustrate the total supply and demand for occupations within the Engineering Technology discipline at Las Positas College. The Centers of Excellence Community College Consortia (COECCC) data projects **98 annual Engineering Technology based job openings** between 2015-2018. The COECCC data reports a total of **7 Engineering Technology based completers per year** from 2012 to 2016, **yielding a demand of 91 openings per year of the combined occupations** (SOC Codes).   Geographic Coverage: SF Bay Area.

(Source: Data compiled by and used with the permission of the Centers of Excellence Community College Consortia. More information available at www.COECCC.net.)

DEMAND

SOC Code	Occupational Title	Typical Entry Level Education	2015 Jobs	2018 Jobs	2015-18 Change	% Change 2015-18	Openings (New + Replace-ments)	Annual Openings	Median Hourly Earnings
17-3029	Engineering Technicians, Except Drafters, All Other	Associate degree	2,464	2,569	105	4.3%	293	98	$35.81
Grand Total			**2,464**	**2,569**	**105**	**4.3%**	**293**	**98**	**$35.81**

SUPPLY

TOP6 - Program Title	2012-13	2013-14	Note: Preliminary data for Other Ed. Institutes - #s may change 2014-15	Note: Preliminary data for Community Colleges - #s may change 2015-16	Latest 3 Yr Avg
092400 - Engineering Technology, General (requires Trigonometry)					
Cabrillo		5	8	4	6
Marin		1	-	-	0
San Francisco		1	1	-	1
San Mateo		-	-	-	-
092400 - Engineering Technology, General (requires Trigonometry) Total		7	9	4	7
Grand Total		7	9	4	7