ENGINEERING

PROGRAM RESEARCH AND RECOMMENDATION REPORT

SEPTEMBER 4, 2018

BACKGROUND

On February 20, 2018, Program Research and Recommendation (PRR) received a "Request to Initiate a Program Revitalization or Discontinuance Process" for Engineering from John Dahlgren (DFT) and Boyd Trolinger (CSCI). The request identified the following as "indicators that prompt the initiation" of the process:

- Insufficient availability of courses for students to complete the program within its stated duration
- Poor retention within courses
- Diminished outside funding resources
- Lack of available qualified program personnel
- Outdated equipment
- Outdated facilities
- Lack of full-time faculty leadership

After a review of quantitative program data, PRR met with John, Boyd and Denise Adams (Dean) to learn more about the status, needs and potential of Engineering at Butte College. Enclosed please find a summary of our findings as well as the recommendation from PRR to the President's Leadership Team.

STATUS

Programs

The AS Degree in Engineering is designed to prepare students for the rigors demanded by CSU and UC Schools of Engineering. The Civil Engineering Technology program is designed to prepare students to enter the world of Civil Engineering Technologists with an AS degree or a certificate of achievement for technician-level surveying competency.

For 2016-17 the program awarded 13 degrees and 3 certificates of achievement. In Spring 2018 there were 371 students who had indicated Engineering as their program of study. The small number of completions relative to declared majors is the clearest indicator that the Engineering programs does not have what it needs to retain students and enable them to achieve their educational goals.

Personnel

Currently there is no full-time instructor in the Engineering program. The most recent full-time instructor resigned at the end of Spring 2017, in the third year of his tenure-track position. That instructor taught overloads on a consistent basis. The program had a failed replacement hire in Spring 2018 due to the lack of fully-qualified applicants.

Currently, there are two associate faculty – one teaching ENGR 1 Introduction to Engineering and one teaching ENGR 3 Plane Surveying I. Their ongoing availability is in question and, even assuming their availability, it is highly doubtful that the program can offer the full complement of courses needed for students to complete either the AS Degree in Engineering or the AS Degree/Certificate in Civil Engineering Technology inside of a three-year period (much less two years).

Facilities and Equipment

The Engineering program does not have a dedicated classroom/lab but rather is a guest in facilities dedicated to other programs. In 2016-17, Engineering classes were scheduled in 6 different rooms, requiring the instructor to continuously cart around and set up and take down equipment. Another problem with the lack of a physical home for Engineering is safety. As an example, some lab classes are offered in LRC 116 which is not a wet lab room making safety conditions less than optimal. Lab equipment is not up to current technology standards for preparing students for transfer into four-year programs or for entry into industry.

NEEDS

Personnel

Engineering needs a fully-qualified full-time instructor and hopes to hire in the 2018-19 cycle. However, after the failed hiring process in Spring 2018, to be successful another hiring effort requires institutional support in the form of:

- A salary range and/or hiring incentive that, while not necessarily matching industry wages, at least acknowledges the reality of the labor market and makes teaching at Butte College more attractive to potential applicants
- Equipment and facilities that reflect the college's commitment to a viable program for students
- Reassign time in the first year or two allowing the new full-time instructor to resurrect and grow a near defunct program

Equipment and Facilities

As indicated above, Engineering as a program needs a centralized laboratory, properly equipped to match the requirements and demands of an engineering for transfer and a technology-based engineering certificate program.

In their meeting with PRR, John and Boyd suggested MC 145 as a room that could be upgraded to serve as an Engineering lab. The MC 145 classroom:

- Already has the right power supply to handle lab equipment
- Is located near Drafting and Computer Science classrooms – which would create a hub for students whose programs intersect, facilitate sharing of resources, and enhance collaboration between program faculty
- Is not serving any particular program now but rather is an "overflow" room with a collection of various classes
- Would require facilities work including demolition, electrical, data, shelving/fixtures, lighting, paint/finish at an estimated cost of $97,000 (see attached Excel spreadsheet for details)
- Would also require usage of two nearby offices (currently occupied by Peter Dahl and Chris Westbay, Media Production Specialists) for equipment storage and instructional office space

A significant investment in new equipment, along with the refurbishing of existing equipment, is also needed. The estimated cost for equipment is $208,864 (see Excel spreadsheet for details).

POTENTIAL

Support the College Mission

Butte College is a student-centered learning institution which provides quality education and support services, that are continuously evaluated and improved

With 371 students indicating Engineering as their program of study in Spring 2018, revitalizing this program that is barely limping along would reflect the college's commitment to being *student-centered* and *continuously evaluating and improving* educational programs.

to prepare students to be productive members of a diverse, sustainable, and ever-changing global society.

Engineering, along with programs it supports such as Math, Drafting, Physics and Computer Science, provides knowledge and skills essential to solving a myriad of challenges facing our *diverse* and *ever-changing global society*.

Butte College students who complete an Engineering degree or certificate program are well-poised to become *productive members* of society, as evidenced by Labor Market Indicators from Doing What Matters:

	2015 Jobs	2018 Jobs	% Change	Median Hourly Earnings	2014-15 Supply	2015-16 Supply	2016-17 Supply
Only North Far North Region	2980	3019	3.7	$29.92	35	75	29
North Far North & Bay Regions	22,151	22,820	4	$32.03	44	81	53
North Far North, Central & Bay Regions	25,587	26,356	3	$32.15	66	121	87
Fields Included in Data (Middle Skill Level)					**Supply Includes**		
Civil Engineering Technicians	Requires an Associate Degree				Associate Degrees		
Electircal and Electronic Equipment Assemblers	On-the-Job Training, No College Required				Certs 30 to < 60		
Electircal and Electronics Engineering Technicians	Requires an Associate Degree				Certs 18 to < 30		
Engineering Technicians, except Drafters, all other	Requires an Associate Degree						
Industrial Engineerig Technicians	Requires an Associate Degree						
Mechanical Engineering Technicians	Requires an Associate Degree						

We provide career and transfer pathways for students to become life-long learners and critical thinkers through the mastery of basic skills, workforce training, and the achievement of degrees and certificates.

In Fall 2013 and 2014, Engineering enrollments totaled 24 and 30 students, respectively. Enrollments for the following three Fall semesters – after hiring a full-time instructor – jumped to 92, 92 and 79 students (despite the fact of subpar facilities/equipment and an overloaded instructor). The increase in enrollments highlights the positive impact a well-resourced Engineering program could have on outcomes for students as well as on the college's funding.

Support Butte College Values

This report has provided examples of how a healthy Engineering program aligns with several Butte College values such as *Students First, Excellence, Communication, Accountability and Sustainability*. *Diversity* and *Equity* would likewise be served by a thriving Engineering program. The percent of women in the Engineering program increased from 0% in Fall 2012 to 18.1% (13 students) in Fall 2016. During the same period, Hispanic students in the program increased from 12.5% (3 students) to 25% (18 students). Sustaining this progress will only be possible if the college commits to meeting the needs of this struggling program. The college's *Diversity* and *Equity* goals would suffer a significant blow if underrepresented and low income students in our community cannot enter the highly-skilled and in-demand world of Engineering and related fields through their local community college.

CONCLUSION AND RECOMMENDATION

Conclusion

Engineering has great potential to serve a significant number of students and support the institution's mission and values. The program has several strengths that provide a foundation for an infusion of support:

- One of the largest declared majors at Butte College
- Growing enrollments in Engineering courses
- Engineering students make up significant enrollments in Mathematics, Drafting and Physics, and also take courses in Computer Science (plus General Education courses)
- Sustained collaboration with related fields would support Guided Pathways
- Core curriculum in place
- With improvements, could tap a latent demand for Construction Management

PRR Recommendation

Revitalization of the Engineering program in the form of a commitment by the institution to fully meet the personnel, facilities and equipment needs as described in this report by the start of Fall 2019, and to ongoing support to sustain a viable program.