

Collaborative Partner: Fresno State – Engineering

Project #7c: Broadening Participation and Success in Engineering and Construction Management Education and Careers

Pathway(s): Engineering

Project Summary

Fresno State - Engineering with the Collaborative partners will be executing their proposal (attached) to support a great need for diverse engineers and construction managers in the profession, our regional student pipelines and efforts are not producing adequate numbers of students who pursue engineering in college resulting in missed opportunities that could in many cases be life-changing. Only a tiny fraction (less than 1.5% in Fall 2020) of high school graduating classes from our regional school districts in any given year end up enrolling as freshmen in engineering and construction management programs at Fresno State.

Only 27 students who identified as African American are enrolled in engineering and construction management programs in the Lyles College of Engineering. This comprises only 2% of our students, even though African Americans constitute 5.8% of the Fresno County population. This is of special concern because African American students are not only minorities as engineering and construction management students but are also severely underrepresented in the corresponding professions. By leveraging the assets of the greater Fresno region, we will work to broaden the participation and success of students pursuing engineering and construction management education and careers. The project has a strong focus on African American as well as other under-represented students.

Our approach will be focused on outreach, fostering access to participation in engineering education, assisting with academic readiness of students entering the university as first time freshmen, regional coordination of articulation, dual enrollment and admissions, K-12 teacher professional development in engineering related topics, and overall student support.

Our proposal's focus areas are:

1. Expanding community outreach to focus on communities traditionally underrepresented in engineering and construction management education and careers. Our efforts will be in partnership with the State Center and Industry to engage community-based organizations, community influencers, parent networks, and K-12 schools/teachers/counselors in ways that we have not done so previously. The priority will be increasing awareness about the educational opportunities and resources in our region, careers, and rewards in the field of engineering and construction management. Our work will include community convenings, targeted communications and marketing, forums with families, K-12 teachers and leaders, and so on.

2. Increasing the capacity of K-12 teachers to better prepare high school students for engineering education and careers via professional development workshops focusing on high school math and science content to engineering applications mapping, engineering design processes, and similar key skills.
3. Providing informal learning experiences for diverse K-12 students via the Lyles College of Engineering's "Young Minds Explore Engineering" summer programs and Saturday academies to stimulate an interest in engineering and construction management careers.
4. Sustaining and strengthening the ongoing efforts of the Partnership for Engineering Education (PARTEE), a regional consortium of Fresno State and State Center Community District colleges. Dual enrollment, dual admission, articulation, time to graduation, student support services, new course development, summer bridge courses, and expansion of the Valley Industry Partnership for Cooperative education will be addressed.
5. Partnering with Reedley College to develop a new 2-year Associate's Degree in Geomatics Engineering (first of its kind in all of Central California) in the near term and to offer upper division courses in Geomatics Engineering at Reedley College in the long term.

Project Progress Report

The work to date has focused on the following:

1. The Lyles College of Engineering's K-16 Engineering collaboration core team met to discuss the project goals. Ongoing work includes: Student admissions /enrollment data collection and analysis, identification of specific schools for focused attention for next round of admissions, identification of specific schools to focus on meetings with school leadership, community leader convening focusing on African American and Hmong student participation and success in engineering programs, summer camps, bridge courses. We are currently identifying and securing commitments from faculty for teaching in summer programs. Camp and bridge course announcements will be made by end of April.
2. PARTEE meetings: Faculty and administrators of the institutions of the Partnership for Engineering Education group met in February to discuss various issues relating to enrollment, admissions, student progress, student support services, articulation, admission, and curricular changes taking place in Lyles College programs. An articulation issue with a lower division electric circuits course for mechanical engineering students that has festered for several years was again discussed. It had to do with a manual process of accepting a community college course at Fresno State rather than relying on assist.org and the automated processes for degree progress report generation. Lyles College faculty

had subsequent discussions and the Electrical and Computer Engineering and the Mechanical Engineering faculty finally developed a solution that will mitigate the pending articulation issue. The Mechanical Engineering department will initiate a catalog change that will reflect the outcome. Starting 2022, it is expected that students and counselors in community colleges will have clarity on this when assist.org is updated. This outcome was celebrated by the community college faculty members.

Another PARTEE meeting is expected to be held in May 2021.

3. **Dual Admissions:** A dual admissions draft framework has been developed. Discussions have been held with Associate Vice President for Enrollment Management and Dean of Undergraduate Studies at Fresno State. As the draft continues to be refined further, we will continue with the discussions, and we will need to eventually seek CSU Chancellors Office review and approval. There is considerable interest in this concept across the state as evidenced by this [PPIC report](#). Because each of the community colleges in PARTEE operate differently internally, we may need to develop specific agreements with each college, or have a general agreement covering all State Center Colleges and an addendum that is specific to each college. Our next step are to add in specific details for the addenda. There will likely be some challenges regarding how the dual admitted students will / must be counted in the CSU.
4. **Dual Enrollment:** We have done some preliminary research on dual enrollment that would allow community college students to enroll in limited number of courses at Fresno State. SB 1914 was the original bill that supported this but has since sunset. However, there is evidence that such enrollment is currently taking place at other CSU campuses and community colleges; We will need to explore how those practices can be adapted for the PARTEE institutions.
5. **Supporting freshmen students:** In 2020-21 the Lyles College of Engineering implemented the first-year mentoring program for 100% of the first-time freshmen and transfer students on a pilot basis. We will assess this effort and the feasibility of continuing this in 2021-22 and beyond. We are also discussing how we can support engineering students currently enrolled in the PARTEE institutions. We are expecting to have a plan developed by end of Spring 2021.

The Lyles College of Engineering faculty are also working on the development of a Pre-Engineering program. This will be an all-college program. It is envisioned that all first-time freshmen will be enrolled as Pre-Engineering and will be expected meet certain degree progress benchmarks in order to transition to their major of choice. The Pre-Engineering

approach will provide much needed support services to improve student engagement, learning, persistence, and also provide targeted services for student soft-skills

development. We are currently working on developing an organizational structure that is faculty driven so that it can be owned by the faculty and sustained over the years. We anticipate that this will greatly improve student success at the freshmen level.

1. Though not critical yet, we have not received information on the setting up of the grant account that will allow for expenses to begin.