



TUEE Collaboratory

*Transforming Undergraduate Education
in Engineering (TUEE)*

TUEE Collaboratory Two-Year Plan for Comprehensive Pilot Implementation AY 2022-2023

October 6, 2021

GOAL: To create, plan and implement a transformational comprehensive program for undergraduate education in engineering/computing that will employ a uniquely empowering student-centered, active learning model intensively engaging practicing professionals in providing mentoring and coaching in a wide variety of student experiences *throughout* the undergraduate engineering education experience. In such a program, students would have the opportunity to realize their full potential and acquire the technical and professional attributes and skill sets to be fully prepared to succeed immediately upon entering the ever-changing technical workplace. Upon implementation during AY 2022-23, it appears that this may be the only transformational comprehensive model in practice at a large university in the next 3-5 years.

- Conduct the creation, planning and development for the pilot program elements from the present through the end of AY 2021-22
- Implement the comprehensive pilot program throughout AY 2022-23
- Implement a comprehensive exemplar program scaled to at least 2-3 times the size of the pilot throughout AY 2023-24 along with adding additional majors and other programs that are expected to be created prior to June 2023

ACTIONS present to end of October 2021:

- Undertake the feasibility assessment necessary to begin pilot program planning and development.
- Identify two, possibly three, lead universities to implement a comprehensive pilot in AY 2022-23
 - At least one large university that has a top 40 ranked ABET accredited engineering/computing program with a strong capstone senior design program and a strong first-year program in place
 - Focus would be on establishing second- and third-year projects and programs by June 2022 in preparation for implementing the comprehensive pilot in AY 2022-23
 - Focus also on enhancement of existing first-year and senior capstone design programs to become national “best practices” for implementation in the pilot program year of AY 2022-23
 - A university (ideally an urban MSI or HSI) seeking to develop an exemplar and innovative new engineering program that currently has an ABET accredited Computer Science program in place
 - Focus would be on establishing second-and third-year Computer Science projects and programs during the development stage prior to

implementation of the comprehensive pilot in AY2022-23. The extent that engineering activities would be involved would be determined by mid-November 2021

- Begin preliminary discussions with 10-12 companies re: becoming a Strategic Corporate Partner (SCP) with a university(s)
 - Identify major companies that would consider an invitation from a lead university to be a SCP

ACTIONS by mid-November 2021

- Each university would immediately select four companies to be founding SCPs for their program. By mid-November, the SCPs would begin participating with students, faculty and staff to start the planning and development phase. Each campus would have about 10 founding Strategic Corporate Partners by mid-November 2021.
- By mid-November, student leaders (8) are identified (from ACM, ASME BMES, IEEE, AISES, NSBE, SHPE, SWE,) and they participate with faculty, staff and SCP representatives in developing the councils and recruiting a student cohort of at least 60 high potential, low income, second- and third-year honors students by mid-January 2022
 - GPA 3.0 or higher
 - Majoring in selected engineering fields or computer science (Suggest CS, EE, ME and BME initially)
 - Active member of student chapter of national professional societies (ACM, ASME, BMES, IEEE) and/or diversity organizations (AISES, NSBE, SHPE, SWE)
- Faculty representatives selected for Faculty Professional Practice Council (FPPC)
 - Lead faculty member with two supporting colleagues from each major field by early mid-November 2021
- Corporate representatives from four founding SCPs selected for Councils by mid-November 2021
 - Lead representatives determined for the following roles: campus executive, campus manager, technical manager, recruiting manager, diversity officer
- Program Councils: Executive (EC), Faculty Professional Practice (FPPC), Student Professional Practice (SPPC) and Student Diversity Solutions (SDSC) created on each campus
- Each university will select at least two partner community colleges (ideally Minority Serving Institutions (MSIs) with strong STEM programs who are current feeders)
 - Community colleges will implement/participate in similar first- and second-year programs as the university students including a second-year sponsored design project and the council structure
 - Partner community colleges will be principal sources of students for the Transfer Students Scholars program at each university
- By November 19, 2021, hold 2-hour zoom meeting for all stakeholders to include overview for 45 minutes and then councils meet for at least 1 hour to address their respective activities.

- *A final go/no go decision is made by November 23, 2021 to proceed with the project.*

ACTIONS winter/spring quarters 2021

- Councils plan and develop activities and projects to be conducted during the development phase through spring 2022 and implementation of the pilot AY 2022-2023 (externships, internships, projects, activities and events.)
- Select 12 Transfer Scholar finalists in late January 2022
- Finalize planning and conduct the Inaugural Day on Campus with Strategic Corporate Partners to take place in early February 2022 (see DwCP attachment) when all stakeholders meet together on campus for the first time.
- “Academic Skunkworks” environment established on campus for conducting the development phase through June 2022 and implementing the comprehensive pilot through June 2023 and beyond. The “Academic Skunkworks” functions as an autonomous entity. *All currently scheduled courses, student programs and events throughout THE UNIVERSITY should be carried out as planned through June 2023*
- One semester sponsored design projects for third-year students (possibly second-year students also) would be conducted during spring 2022
- Inaugural Day on Campus with Corporate Partners takes place in February 2022
 - About 12 Transfer Scholars Finalists will attend the event with about four finalists awarded full tuition scholarships. All finalists will be eligible to interview with SCPs for summer internships. Transfer Scholars and enrolled finalists will be assigned a SPPS peer mentor for the 2022 fall semester
- Externships, ideally team externships, for first- and second-year students with SCPs during Spring Break

ACTION for summer 2022

- Student internships with about 10 SCPs and at least 10 prospective SCPs for rising sophomores, juniors and seniors, including summer team internships for rising seniors, possibly rising juniors

ACTION for AY 2022-23

- Implement full comprehensive pilot at both campuses (see attachment for description of AY 2022-2023 pilot)
- Councils will include additional majors and create additional types of projects and other activities for implementation in AY 2023-2024

ACTION for AY 2023-24 and beyond

- Scale pilot to at least 2-3 times the size of AY 2022-23 pilot to include at least 20 SCPs and 300 students per campus along with additional majors and other programs that are expected to be created prior to June 2023
- Pilot versions of centers and/or institutes would be implemented AY 2023-24

- The “Academic Skunkworks” notion, as with Lockheed and its original skunkworks, will be maintained and refined at both universities into the future
 - to facilitate and conduct scalable and sustainable innovations required of engineering education, such as:
 - to include graduate education and sponsored research
 - to include global projects and other collaborations with universities and industry, for example, global, full-year, sponsored capstone projects undertaken by teams of three U.S. university students and three foreign university students who collaborate to solve a problem for a sponsoring company
- Collaborate with a wide range of new strategic partners throughout the education ecosystem in addition to founding Strategic Corporate Partners, local chapters of national professional societies and diversity organizations

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