



**TUEE Collaboratory**  
*Transforming Undergraduate Education  
in Engineering (TUEE)*

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

January 3, 2022

**SHORT-TERM GOAL:** By June 2022, develop the elements of the flexible framework for a comprehensive engineering education scalable pilot to be implemented throughout AY 2022-23 that will serve as a successful model for transforming undergraduate education in engineering/computing (TUEE.) The pilot 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.

- Immediately begin to create, plan and develop the small but scalable comprehensive pilot program elements, including the four councils described below, from the present through June of 2022
- 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 through mid-March, 2022:

To undertake immediately the start-up feasibility assessment necessary to begin comprehensive pilot program planning and development with a final “go/no go” decision by mid-March 2022 regarding moving forward with the project. (An alternative would be a final “go/no go” decision by mid-July 2022 regarding moving forward with implementing multiple regional comprehensive pilots AY 2023-2024.) All of the model’s elements must be in place in order for a “go” decision to be made for AY 2022-23.

- Identify a lead university to implement a comprehensive pilot in AY 2022-23 – a large university that has an 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:
  - *Innovative first- and second-year programs that engage students, especially low-income and underrepresented students, with practicing professionals* in proactive curricular and co-curricular learning experiences to acquire the attributes and skill sets to succeed

- *Integrating internships and externships with projects and programs* that engage students, especially low-income underrepresented students, that involve a variety of mentoring and coaching experiences with practicing professionals throughout the undergraduate experience
- An innovative *transfer scholar program* involving high potential community college transfer students.
- *Second- and third-year one semester industry sponsored interdisciplinary design projects*
- Begin preliminary discussions immediately with up to 10 companies re: becoming a Strategic Corporate Partner (SCP) with a university
  - Identify major companies that would likely be invited by the lead university to be a SCP and participate in establishing the Councils
- The lead university would immediately invite 3 companies to be founding SCPs for their program.
  - the SCPs would begin participating immediately with students, faculty and staff to establish the Councils and start the planning and development phase.
  - 3-5 additional companies would be invited to participate as SCPs by spring break 2022
- Immediately identify student leaders (8) (from ACM, ASME BMES, IEEE, AISES, NSBE, SHPE, SWE,) to participate with faculty, staff and SCP representatives in developing the councils and recruiting a student cohort of at least 40 high potential, low income, second- and third-year honors students by spring break 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)
- Immediately select faculty representatives for Faculty Professional Practice Council (FPPC)
  - Lead faculty member with two supporting colleagues from each major field
- Immediately select corporate representatives from 3 founding SCPs for Council
  - Lead representatives determined from the following roles: campus executive, campus manger, technical manager, recruiting manager, diversity officer
- Program Councils: TUEE Executive (TEC), Faculty Professional Practice (FPPC), Student Professional Practice (SPPC) and Student Diversity Solutions (SDSC) created immediately
- ***A final go/no go decision made by mid-March, 2022*** to proceed with the project

#### ACTIONS through June 2022

- 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.)

- Finalize planning and conduct the Inaugural Day on Campus with Strategic Corporate Partners to take place in mid-April, 2022 (see DwCP attachment) when all stakeholders meet together on campus for the first time.
- The 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 the university
    - Select 12 Transfer Scholar finalists
    - At Inaugural Day on Campus with Corporate Partners, 12 Transfer Scholars Finalists will attend the event
      - 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
- “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*
- Begin planning sponsored design projects for second- and third-year students that would be conducted during spring 2023

#### ACTION for summer 2022

- Student internships would be taking place with about 10 SCPs and about 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 (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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