

**DATE:** January 28, 2016

**SUBJECT:** Tennessee Technological University and East Tennessee State University, Joint Bachelor of Science – Engineering

**ACTION RECOMMENDED:** Approval

**BACKGROUND INFORMATION:** The proposed joint Bachelor of Science in Engineering (BSE) is a coordinated effort of the College of Engineering at Tennessee Technological University (TTU) and the College of Business and Technology at East Tennessee State University (ETSU). The partnership will expand opportunities for students, increase resource sharing, and minimize unnecessary duplication. Both TTU and ETSU will provide a program director to facilitate the administration of the program. Details of the program administration have been outlined in a Memorandum of Understanding signed by the college deans at both institutions. Students who earn this degree will be provided a diploma bearing the names of both institutions.

The proposed degree program is in the spirit of the Master Plan for Tennessee Postsecondary Education in that it will combine the strengths of two institutions to serve a growing need for more Science, Technology, Engineering, and Mathematics (STEM) graduates. The program will be first joint program in the state thereby reducing duplication and focusing on the ability to supply higher education opportunities to a larger geographical area.

The curriculum for the program will be developed primarily from existing courses in Association Board for Engineering and Technology (ABET) accredited engineering and engineering technology programs at TTU and ETSU. The proposed BSE program will provide a general knowledge base of many different engineering areas and also allow students to select from an array of technical electives. Graduates of this program will be able to integrate projects across many engineering disciplines or support small to medium size industries which do not have the need for specialized engineering skills on a daily basis.

**PROPOSED IMPLEMENTATION DATE:** Fall 2016

**1.1.20A MISSION:** The proposed joint program supports the mission profiles at both institutions in delivering engineering programs to address the needs of the State and the nation. Tennessee Technological University’s mission as the “state’s only technological university is to provide leadership and outstanding programs in engineering, the sciences, and related areas that benefit the people of Tennessee

and the nation.” In concert with the mission of TTU, the ETSU mission states the goal of enhancing educational access. ETSU provides “outstanding programs of study, enhanced access to education, and distinctive educational and research opportunities to attract students from around the region and the world.”

The joint Engineering BS program is in alignment with the goals outlined in the THEC 2015-2025 Master Plan for Tennessee Postsecondary Education, specifically “using institutional mission differentiation to realize statewide efficiencies through institutional collaboration and minimized redundancy in degree offerings, instructional locations, and competitive research.” The proposed program, through shared resources and shared governance, will allow students across the central and northeastern tiers of the state access to a critical STEM discipline.

**1.1.20B CURRICULUM:** The degree program will require completion of 128 hours. The curriculum components consist of 36 hours in general education, 76-78 hours in major field core, 12 hours in electives and 2-4 hours in other courses.

In order to support fulfilling the need to provide wider access across the state, the proposed program will be offered online and at campus locations. The lab component for some courses will require students to attend on-campus labs at either TTU or ETSU. The modes of delivery for offsite students will include synchronous and asynchronous modes.

**1.1.20C ACADEMIC STANDARDS:** The proposed joint Engineering BS program will be identically listed on each institution’s undergraduate application form. A student may apply at either institution. Both universities will include in their respective undergraduate catalogs and recruitment materials, the following text for the program:

Students pursuing the TTU-ETSU B.S. degree in engineering should apply for admission to either Tennessee Technological University or East Tennessee State University. In addition to meeting the requirements for admission to either institution, the student must meet the following requirements.

- Freshman Admission: 3.0 high school GPA and 20 ACT Composite and 22 ACT Math sub score;
- Transfer Admission: 2.0 cumulative higher education (excluding credit for remedial and developmental courses) and grades of "C" (2.0) or higher in all math, science, and major course work is required for transfer credit.

The student must earn at least 32 semester credits at Tennessee Technological University and 32 semester credits at East Tennessee State University. The institution where the initial application is filed will serve as the course registration and financial aid point each semester although admissions, advisement and all records will be kept jointly.

### Projected Program Enrollment and Productivity

The assumptions for program enrollment were based on a number of data sources including enrollment trends for the TTU engineering degree production, ETSU Pre-Engineering program, and a review of other BSE programs that have been developed in the past 10 years. The numbers presented in the table below represent both TTU and ETSU joint enrollment for the proposed Engineering BS program.

| Year | Full-Time Enrollment | Part-Time Enrollment | Total Headcount | Graduates |
|------|----------------------|----------------------|-----------------|-----------|
| 2016 | 12                   | 20                   | 32              | --        |
| 2017 | 18                   | 24                   | 42              | --        |
| 2018 | 40                   | 48                   | 88              | --        |
| 2019 | 58                   | 60                   | 118             | 10        |
| 2020 | 75                   | 60                   | 135             | 22        |

**1.1.20D FACULTY:** Faculty for the proposed BSE program will hold joint appointments at Tennessee Technological University and East Tennessee State University. Faculty teaching in the program will be approved by the Administrative Council. Faculty credentials will be reviewed by this group every six years, ensuring faculty preparation and research. This six-year review period is consistent with ABET accreditation requirements. Faculty promotion and tenure will be awarded by the faculty member's hiring institution.

To meet program teaching requirements, TTU will add one faculty member to the current list of 13 TTU faculty who will be teaching in the program. For ETSU, the program will utilize the six Engineering Technology faculty to support the program. In order to meet the new courses offered in engineering at ETSU, one new faculty member will be added in each of the first three years of program implementation.

**1.1.20E LIBRARY RESOURCES:** The existing library print, electronic, and database resources are sufficient to support this proposed degree at both institutions. Students enrolled in the joint degree will have access to libraries at Tennessee Technological University and East Tennessee State University.

**1.1.20F ADMINISTRATION/ORGANIZATION:** At Tennessee Technological University, the proposed joint program will be offered through the College of Engineering. At East Tennessee State University, the program will be offered through the College of Business and Technology, Department of Engineering Technology, Digital Media and Surveying. Each campus will provide a program director to facilitate administration of the program.

Governance for this proposed joint Engineering BS program will consist of an Administrative Council, Co-Program Directors and an Advisory Board.

The Administrative Council will be composed of the Dean of Engineering or equivalent administrator at each institution, the two Co-Program Directors, and three faculty members from each institution for a total of 10 members. The Administrative Council will propose a curriculum that will meet accreditation criteria; review and approve credentials of faculty; develop common course schedule; and monitor learning outcomes.

A Program Director on each campus will provide day-to-day program oversight and will visit partner campuses to interact with students and faculty twice each semester.

An Advisory Board consisting of area employers will provide guidance in the definition of program curriculum, as well as information about the performance of program graduates. Nominations for the Advisory Board will be made by the deans of the participating institutions and approved by the Administrative Council.

**1.1.20G SUPPORT RESOURCES:** At both institutions, students will have access to a wide range of support resources, including advising from program directors and mentoring support from faculty. Students will also have access to mentoring opportunities through the Advisory Board.

**1.1.20H FACILITIES AND EQUIPMENT:** Current engineering labs and classrooms are adequate to support the proposed program at TTU. At ETSU, expansion of classrooms in Wilson-Wallis Hall, remodel office space for new faculty and update equipment in distance education classrooms will be needed. Both universities have strong instructional technology resources and numerous computer labs dedicated for engineering students.

**1.1.20I NEED AND DEMAND:** Graduates from the proposed joint Engineering program will provide employers needed skills across many technical and manufacturing areas. The BSE graduate will be considered a “generalist” who has a distributed skill set across many engineering and management disciplines. The multi-disciplinary nature of this proposed program will allow graduates to serve the needs of the state in general manufacturing, technical services, construction and management of complex technical processes and programs.

In January 2009, the Tennessee Career Cluster Report projected an increased growth in STEM-related jobs throughout the state with engineering and technology showing the highest projected growth among STEM related areas. The estimated new jobs in these areas will not be met by the number of projected graduates currently in the State of Tennessee.

**1.1.20J NO UNNECESSARY DUPLICATION:** Currently, there are three Bachelor of Science Engineering programs in the State of Tennessee (UT Chattanooga, UT Martin, and Union University), all of which have specific concentration areas associated with them, as opposed to being a truly “general” engineering degree. The proposed program is unique for engineering programs in the state. Tennessee Technological University and East Tennessee State University will share resources to expand offerings at both sites without duplication. This sharing will provide more faculty and resources for students than could be offered by a single university alone.

**1.1.20K COOPERATING INSTITUTIONS:** N/A

**1.120L DIVERSITY AND ACCESS:** Both TTU and ETU aspire to be institutions that celebrate diversity by welcoming all students, faculty and staff as respected and valued participants in the educational missions of the institutions. The proposed program will provide access to areas of the state not currently served by an engineering program and through distance education make it accessible to counties with limited higher education opportunities.

**1.1.20M ASSESSMENT/EVALUATION AND ACCREDITATION:** TTU and ETSU will jointly apply for accreditation from the Association Board for Engineering and Technology (ABET) for the proposed BSE degree. ABET accredits programs with joint degrees from two or more universities. Currently, ABET accredits three joint undergraduate engineering programs in the United States. This accreditation is separate from any other engineering program accreditation a university may hold. All Engineering disciplines, Engineering Technology, and Computer Science programs at the respective institutions are ABET accredited.

ABET requires a program to produce graduates before applying for accreditation. TTU and ETSU anticipate the first graduates in 2019, with a projected ABET site visit occurring in 2020.

**1.1.200 EXTERNAL JUDGMENT:** External review of the proposed program was conducted during an institution site visit on October 25-28, 2015. Dr. Manohar Kulkarni, Assistant Chair of Mechanical Engineering at Northwestern University, served as the external reviewer. He stated that the proposed program was “academically rigorously with adequate consideration being given to the assessment and ABET accreditation aspects.” Dr. Kulkarni highlighted the following strengths of the proposed joint program:

- Engineering Technology experiences at ETSU and the various discipline specific engineering program experiences at TTU are complementary to the proposal.
- Adequate space and physical capacity to successfully implement the program; and
- Excellent student support services and mentoring practices on both campuses.

**1.1.20P COST/BENEFIT:** The proposed joint BSE program will be funded through additional tuition revenues generated by the program with institutional reallocation of funds needed for the first two years to support initial implementation of the program. Beginning in year three, the joint program will make a positive financial contribution to both institutions. Allocations of fee revenues have been outlined in a Memorandum of Understanding between both institutions.

**1.1.30 POST APPROVAL MONITORING:** An annual performance review of the proposed program will be conducted for the first five years following program approval. The review will be based on benchmarks established in the approved proposal. At the end of this period, the campus, governing board and Commission staff will perform a summative evaluation. The benchmarks include, but are not limited to, enrollment and graduation, program cost, progress toward accreditation and other metrics set by the institution and agreed upon by governing board and Commission staff. If benchmarks are not met during the monitoring period, the Commission may recommend that the governing board terminate the program. If additional time is needed and requested by the governing board, the Commission may choose to extend the monitoring period.