

**DATE:** November 18, 2021

**SUBJECT:** New Academic Program  
Tennessee State University  
Data Science, Master of Science  
CIP Code: 30.7001 (Data Science, General)

**ACTION RECOMMENDED:** Approval

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**PROGRAM DESCRIPTION**

Tennessee State University (TSU) proposes a Master of Science (MS) in Data Science which will be offered completely online and consist of 30 credit hours (six core courses and four electives). The proposed program was developed in response to the growing need locally, nationally, and globally for data science professionals and will provide students a thorough foundation in computer science, mathematics, and statistics. Upon completion of the program, graduates will have a blend of theory and practice regarding computer science and applied mathematics and the ability to extract information from large datasets.

**INSTITUTIONAL GOVERNING BOARD APPROVAL**

The proposed Data Science, MS program was approved by the Tennessee State University Board of Trustees on March 11, 2021.

**PROPOSED IMPLEMENTATION DATE**

Fall 2022

**ALIGNMENT WITH STATE MASTER PLAN AND INSTITUTIONAL MISSION/STRATEGIC PLAN**

The proposed program aligns specifically with the Future of Work section of the 2020 Tennessee Higher Education Master Plan, which calls for increasing the opportunities for “Computer Science and Data Analytics” course offerings. The proposed program will provide graduate students an opportunity in data science regardless of their undergraduate major or program of study while also providing exposure to artificial intelligence.

The proposed program aligns with TSU’s 2020- 2025 Strategic Plan to “attract, prepare, and graduate scholars to change the world” which focuses on increasing graduate enrollment and expanding online academic programs that address the diverse needs of students. The proposed Data Science, MS program is aligned with TSU’s mission to provide affordable and accessible educational programs.

## **CURRICULUM**

The proposed program will be offered completely online, consisting of 30 credit hours, and include a data science capstone course. Additionally, TSU will offer an optional campus immersion which will allow up to three courses (nine credit hours) to be taken on campus.

Student learning objectives for the proposed Data Science, MS program will focus on analyzing complex data science problems, developing computing-based solutions, and developing effective communication skills. Furthermore, graduates from the proposed program will be expected to demonstrate professional growth evidenced by measurable development activities and leadership roles.

## **PROGRAM PRODUCTIVITY**

The proposed Data Science, MS program anticipates a combination of full-time and part-time students and projects an initial enrollment of 30 students, increasing to 72 students by year five. Attrition rates are calculated at 10 percent. The proposed program projects a consistent 27 graduates per year starting in year four.

	<b>2022</b>	<b>2023</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>
<b>Enrollment</b>	30	57	70	72	72
<b>Graduates</b>	--	14	25	27	27

## **PROGRAM DUPLICATION**

Currently, there are three graduate level Data Science programs in Tennessee: University of Memphis, Lipscomb University, and Vanderbilt University. Additionally, East Tennessee State University and Middle Tennessee State University are in the process of developing Data Science, MS programs. Several public institutions offer similar degrees. For example, UT Knoxville offers a Master of Science in Business Analytics and Austin Peay State University offers an online graduate certificate in Data Science.

## **EXTERNAL JUDGEMENT**

An external review of the proposed program was conducted during a virtual institution site visit on November 24, 2020. Dr. Philip Bourne, Founding Dean for the School of Data Science and Professor of Biomedical Engineering at the University of Virginia served as the external reviewer for the proposed program. The site visit included meetings with campus administrators, faculty, prospective students, and community partners.

Dr. Bourne made a recommendation for approval of the proposed program and stated: “The program is needed, and a very healthy workforce pipeline can be established, perhaps bringing qualified scientists to the TSU region. The private sector, state and local government folks interviewed were highly enthusiastic about the launch of the program and so they should be.”

## **STUDENT DEMAND**

Tennessee State University conducted two surveys: one with current students (n=26) and one with alumni (n=40). Responses from both surveys demonstrated an overwhelming perception of a need for the proposed program (students: 96 percent; alumni: 85 percent). The survey results also identified 65 percent of the current undergraduate surveyed students would be interested in the proposed Data Science MS program. Lastly, responses from both groups indicated a preference for an online program (students: 65.4 percent; alumni: 87.5 percent).

## **OPPORTUNITIES FOR PROGRAM GRADUATES**

Graduates from the proposed program will be qualified for employment in various data science areas and prepared to pursue doctoral degrees in Data Science or related fields. The field of Data Science is relatively new but growing quickly. The US Bureau of Labor Statistics (BLS) projects Data Science to continue to be among the fastest growing occupations for the near future. Glassdoor ranked data scientist as the best job in America for four years in a row from 2016 – 2019. Additionally, according to the Tennessee Department of Economic and Community Development's LEAP 2019 report, computer and math was identified as a priority occupational group and STEM occupations were identified as high-wage jobs with significant openings in Tennessee creating significant job opportunities for graduates of the proposed program.

Letters of support for the proposed program were provided by the Tennessee Department of Finance and Administration, HCA Healthcare, Greater Nashville Technology Council, Deloitte, Pace Consulting, and Lockheed Martin.

## **INSTITUTIONAL CAPACITY TO DELIVER THE PROGRAM**

The proposed program will be housed in the College of Engineering and will include faculty from Computer Science, Mathematical Sciences, Engineering, Agriculture, and Business. Highly qualified experts in Data Science from major IT companies will be recruited to serve as adjunct faculty. The proposed program will utilize existing courses and will require the development of 11 new courses. Three adjunct faculty members will be hired each semester starting in year one. TSU is committed to hiring additional faculty if enrollment numbers exceed initial projections.

## **ASSESSMENT AND 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, institutional governing board, and THEC 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 staff. If benchmarks are not met during the monitoring period, the Commission may recommend that the institutional governing board terminate the program. If additional time is needed and requested by the institutional governing board, the Commission may choose to extend the monitoring period.

**Tennessee Higher Education Commission  
Appendix A: THEC Financial Projections Form  
Tennessee State University  
Master of Science in Data Science**

Seven-year projections are required for doctoral programs.  
Five-year projections are required for baccalaureate and Master's degree programs.  
Three-year projections are required for associate degrees and undergraduate certificates.  
Projections should include cost of living increases per year.  
Planning year projections are not required but should be included when appropriate.

	Planning Year	Year 1	Year 2	Year 3	Year 4	Year 5
<b>I. Expenditures</b>						
<b>A. One-time Expenditures</b>						
New/Renovated Space <sup>1</sup>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Equipment	\$ -	\$ -				
Library	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Consultants	\$ 5,000		\$ -	\$ -	\$ -	\$ -
Travel	\$ -	\$ -				
Other	\$ -	\$ 15,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000
<b>Sub-Total One-time</b>	\$ 5,000	\$ 15,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000
<b>B. Recurring Expenditures</b>						
<b>Personnel</b>						
<b>Administration</b>						
Salary	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Benefits	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Sub-Total Administration</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Faculty</b>						
Salary	\$ -	\$ 60,000	\$ 61,800	\$ 63,654	\$ 65,564	\$ 67,531
Benefits	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Sub-Total Faculty</b>	\$ -	\$ 60,000	\$ 61,800	\$ 63,654	\$ 65,564	\$ 67,531
<b>Support Staff</b>						
Salary	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Benefits	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Sub-Total Support Staff</b>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Graduate Assistants</b>						
Salary	\$ -	\$ 18,000	\$ 18,540	\$ 19,096	\$ 19,669	\$ 20,259
Benefits	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Tuition and Fees* (See Below)	\$ -	\$ 10,635	\$ 10,954	\$ 11,283	\$ 11,621	\$ 11,970
<b>Sub-Total Graduate Assistants</b>	\$ -	\$ 28,635	\$ 29,494	\$ 30,379	\$ 31,290	\$ 32,229
<b>Operating</b>						
Travel	\$ -	\$ -	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000
Printing	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Equipment	\$ -	\$ -	\$ 30,000	\$ 30,000	\$ 30,000	\$ 30,000
Other	\$ -	\$ -				
<b>Sub-Total Operating</b>	\$ -	\$ -	\$ 40,000	\$ 40,000	\$ 40,000	\$ 40,000
<b>Total Recurring</b>	\$ -	\$ 88,635	\$ 131,294	\$ 134,033	\$ 136,854	\$ 139,759
<b>TOTAL EXPENDITURES (A + B)</b>	\$ 5,000	\$ 103,635	\$ 141,294	\$ 144,033	\$ 146,854	\$ 149,759

**\*If tuition and fees for Graduate Assistants are included, please provide the following information.**

Base Tuition and Fees Rate	\$ -	\$ 10,635.00	\$ 10,954.05	\$ 11,282.67	\$ 11,621.15	\$ 11,969.79
Number of Graduate Assistants	-	1	1	1	1	1

	Planning Year	Year 1	Year 2	Year 3	Year 4	Year 5
<b>II. Revenue</b>						
Tuition and Fees <sup>2</sup>	\$ -	\$ 265,875	\$ 520,317	\$ 631,830	\$ 662,406	\$ 682,278
Institutional Reallocations <sup>3</sup>	\$ 5,000	\$ (162,240)	\$ (379,023)	\$ (487,797)	\$ (515,552)	\$ (532,518)
Federal Grants <sup>4</sup>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Private Grants or Gifts <sup>5</sup>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Other <sup>6</sup>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<b>BALANCED BUDGET LINE</b>	\$ 5,000	\$ 103,635	\$ 141,294	\$ 144,033	\$ 146,854	\$ 149,759

**Notes:**

**(1) Provide the funding source(s) for the new or renovated space.**

**(2) In what year is tuition and fee revenue expected to be generated? Tuition and fees include maintenance fees, out-of-state tuition, and any applicable earmarked fees for the program. Explain any differential fees.**

Tuition will be generated as follows. Year-1: 20 FT and 10 PT students; Year-2: 38 FT and 19 PT students; Year-3: 42 FT and 28 PT students; Year-4 and Year-5: 42 FT and 30 PT students in each year.  
There are no additional fees for the proposed program.

**(3) Identify the source(s) of the institutional reallocations, and grant matching requirements if applicable.**

The program is expected to be self-sufficient with tuition revenue generation.

**(4) Provide the source(s) of the Federal Grant including the granting department and CFDA(Catalog of Federal Domestic Assistance) number.**

No federal grants are expected for the first 5 years.

**(5) Provide the name of the organization(s) or individual(s) providing grant(s) or gift(s).**

Even though we may get some donations and gifts (in terms of hardware) from our industry partners, they are not listed as they are not guaranteed at this point.

**(6) Provide information regarding other sources of the funding.**

No other sources are expected.