



## TENNESSEE HIGHER EDUCATION COMMISSION

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REGULAR CALENDAR ITEM: IV. A.

**MEETING DATE:** May 19, 2022

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

**ITEM TYPE:** Action

**ACTION RECOMMENDATION:** Approval

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### PROGRAM DESCRIPTION

East Tennessee State University (ETSU) proposes an Applied Data Science, Master of Science program which will promote data literacy across many of ETSU's disciplines, while providing students in the major with comprehensive, in-depth training in data science. The program was created in response to the growing importance of data science and the needed ability to navigate, analyze, and synthesize large data sets in technology, industry, health services, and administration sectors.

The proposed multidisciplinary program will rely on collaboration between ETSU's College of Arts and Sciences, College of Business and Technology, and Graduate School and is designed to meet the high-demand industry need for graduates to manage and manipulate massive, potentially complex datasets, analyze their content, and effectively communicate these analyses.

The program will include both in-person and online options and will be delivered in two tracks, a practicum track with a six-credit applied practicum where students engage in detailed industry projects, and a thesis track, pairing a three-credit internship with a six-credit thesis. Program graduates will have developed expertise in applying state-of-the-art mathematical, statistical, and computational science-based approaches to large scale and complicated industry datasets.

### INSTITUTIONAL GOVERNING BOARD APPROVAL

The proposed Applied Data Science, MS program was approved by the East Tennessee State University Board of Trustees on February 19, 2021.

### PROPOSED IMPLEMENTATION DATE

Fall 2022

### CURRICULUM

The proposed Applied Data Science, MS program consists of 39 credit hours including data science core courses, a student selected focus area, and either an industry practicum, or internship and thesis. The program's core includes courses such as artificial intelligence, machine learning, and cloud computing. Courses are designed to teach students how to select and use statistical techniques to infer knowledge from

data; use a variety of software applications and programming languages to carry out analyses; and apply them to the most common domains of inquiry.

At the completion of the program, graduates will meet the following Program Learning Outcomes, which have been mapped to specific courses:

- Use state-of-the-art mathematical, statistical, and computational-science-based approaches to help collect, process, administer, and curate collections of data.
- Use appropriate methods from mathematics, statistics, and computational science to address questions about the content and relevance of these datasets.
- Generate or modify algorithms/techniques for implementing these methods, as required by the problem at hand.
- Give methodologically sound and effective presentations of these results and the techniques used to obtain them to various audiences, orally, visually, and in written formats.

Delivery of the proposed Applied Data Science, MS program requires the development of two new courses.

**PROGRAM PRODUCTIVITY**

Enrollment projections estimate that twelve students will enroll in the Applied Data Science, MS in its first year, with enrollment growing to 48 students by year five. The program expects that one quarter of enrolled students will be part-time, completing the program in four years, while the remaining full-time students are expected to complete the program in two years. Seven graduates are projected in year two with 19 graduates projected by year five. An 11 percent attrition rate is anticipated.

	<b>2022-23</b>	<b>2023-24</b>	<b>2024-25</b>	<b>2025-26</b>	<b>2026-27</b>
<b>Enrollment</b>	12	28	36	44	48
<b>Graduates</b>	-	7	11	15	19

**EXTERNAL JUDGEMENT**

An external review of the proposed program was conducted during a virtual site visit on February 8, 2022, by Dr. Gordon Erlebacher, Program Director of the Interdisciplinary Data Science Program and Professor and Chair of the Department of Scientific Computing at Florida State University. The site visit included meetings with campus administrators, faculty, prospective students, and industry partners.

Dr. Erlebacher highly recommended the approval of ETSU’s Applied Data Science, MS program, stating that “the proposed program is essential to Tennessee’s future prosperity and competitiveness,” and pointing out that “the program is novel, operating across two colleges ... the curriculum structure and the two internship courses [are] designed to ensure that students pair up with industry experts to gain hands-on knowledge from practitioners in the field.”

**OPPORTUNITIES FOR PROGRAM GRADUATES**

Data science is a fast-growing field that has been identified as a high-need industry area. At present, the demand for data scientists exceeds the supply and data science fields continue to grow. Glassdoor listed data science in the top three of the top fifty professions from 2018 to 2022. These data reflect projections about opportunities in the sector, including those by the U.S. Bureau of Labor Statistics which identified data science as one of ten occupations with the fastest projected employment growth between 2020 and 2030.

Graduates of the ETSU Applied Data Science, MS program will be positioned for employment in a variety of data science and data analyst positions in technology, industry, health-services, administration, and other arenas. Letters of support for the proposed program were provided by Ballad Health, Eastman Chemical Company, Oak Ridge National Laboratory, Chick-fil-a, Inc., and Consolidated Nuclear Security at Y-12 Consolidated Security Complex.

**PROGRAM COSTS**

The proposed one-time and recurring expenditures for the Applied Data Science, MS program are listed in Table 1. The largest expenditures include \$10,000 per year to support the cloud computing required for student progression in the program; a \$10,000 stipend for the program director; and the costs associated with graduate assistants (three in year 1 and progressing to six in years 2-5).

**Table 1: Estimated Costs to Deliver the Proposed Program**

<b>One-Time Expenditures</b>						
<b>Category</b>	<b>Planning</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Accreditation						
Consultants	\$1,500			\$4,000		
Equipment						
Information Technology						
Library						
Marketing	\$200					
Facilities						
Travel						
Other						
<b>Total One-Time Expenditures</b>	<b>\$1,700</b>			<b>\$4,000</b>		
<b>Recurring Expenditures</b>						
<b>Category</b>	<b>Planning</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Accreditation						
Consultants		\$200	\$200	\$200	\$200	\$200
Equipment						
Information Tech	\$5,000	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000
Library						
Marketing						
Facilities						
Travel	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000	\$4,000
Other: Program Director & Graduate Assistants		\$65,557	\$119,974	\$120,283	\$120,601	\$120,929
<b>Total Recurring Expenditures</b>	<b>\$9,000</b>	<b>\$79,757</b>	<b>\$134,174</b>	<b>\$134,483</b>	<b>\$134,801</b>	<b>\$135,129</b>
<b>Grand Total (One-Time and Recurring)</b>	<b>\$10,700</b>	<b>\$79,757</b>	<b>\$134,174</b>	<b>\$138,483</b>	<b>\$134,801</b>	<b>\$135,129</b>

## **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.