# TENNESSEE HIGHER EDUCATION COMMISSION

**REGULAR CALENDAR ITEM:** II.F.

**MEETING DATE:** May 16, 2024

**SUBJECT:** New Academic Program
University of Tennessee, Knoxville
Applied Artificial Intelligence, Bachelor of Science (BSAAI)
CIP Code: 11.0102 (Artificial Intelligence)

**ITEM TYPE:** Action

**ACTION RECOMMENDATION:** Approval

## PROGRAM DESCRIPTION

The University of Tennessee, Knoxville (UTK) proposes a 120-credit hour, Bachelor of Science (BSAAI) in Applied Artificial Intelligence. The proposed program is designed to provide training in foundational artificial intelligence (AI) concepts, data sources, and tools across multiple disciplines. Additionally, the program will prepare students for careers in emerging AI-related positions across a multitude of industries. Graduates of the proposed program will have a blend of technical prowess and interdisciplinary acumen and will be well-equipped to influence the emerging workplace applications of AI.

The proposed Applied Artificial Intelligence, BSAAI will leverage UTK's existing and new industry relationships to provide students with hands-on experience in the field. The proposed program will be delivered in a hybrid format, and the campus plans to expand to a fully online option in the future to provide flexibility for students. All students will complete six (6) to 12 hours in research, service, or internships to strengthen employability. The Applied Artificial Intelligence program is designed to accommodate transfer students from Tennessee community colleges and will offer a flexible curriculum, allowing students to pursue in-depth training in areas of interest.

## INSTITUTIONAL GOVERNING BOARD APPROVAL

The proposed Applied Artificial Intelligence, BSAAI program was approved by the University of Tennessee Board of Trustees on February 29 – March 1, 2024.

## PROPOSED IMPLEMENTATION DATE

August 1, 2024

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

The proposed Applied Artificial Intelligence, Bachelor of Science aligns with the State Master Plan for Higher Education by responding to a growth in AI-related jobs and the need to "interact with artificial intelligence using critical thinking, data analysis, and diverse communication skills." The program aligns with a strategic mission from the State Master Plan to develop graduates who are technically skilled, ethically aware, and socially responsible by providing interdisciplinary instruction, emphasizing technical skills, and broader competencies and offering a foundational understanding of AI.

The program also aligns with UTK's mission by providing forward-looking and innovative academic offerings, reflecting the institution's commitment to stay at the forefront of technology and innovation. The Applied

Artificial Intelligence program is structured around hands-on and real-world experiences, which further UTK's strategic partnerships and innovative research. Finally, given the high demand for AI professionals, many graduates of the proposed program will remain in Tennessee following graduation, fulfilling UTK's mission to give back to the state through its alumni.

## CURRICULUM

The proposed program will consist of 120 credit hours of coursework and will be offered with both on-ground and online course options, with the intention of developing a fully online option in the future. The coursework will include 50-60 credit hours of general education requirements; 27 credit hours of core courses specifically tailored to the Applied Artificial Intelligence, BSAAI program, including two (2) capstone courses; and at least 15 credit hours of upper-division elective courses, allowing them to delve into the application of artificial intelligence technologies in their chosen field of interest. Following implementation, the program intends to add specific AI application tracks, such as data analytics, healthcare, finance, or robotics, to provide additional structure in the elective area. The program dedicates approximately 21 credit hours to allow students to take prerequisite courses for upper-division subjects while remaining within 120 hours. A total of 10 new courses will be developed for the program.

The proposed program and associated student learning outcomes (listed below) have been developed to meet the Data Science Council of America (DASCA) accreditation standards. Once the proposed program is approved and accredited by DASCA, UTK will initiate accreditation with the Artificial Intelligence Board of America (ARTIBA).

At the completion of the program, graduates will be able to:

- Demonstrate a comprehensive understanding of the core principles, algorithms, and models underpinning artificial intelligence.
- Be adept at applying AI techniques to solve real-world problems across diverse industries and disciplines.
- Possess the capability to evaluate the ethical, social, and legal implications of AI applications, ensuring responsible implementation.
- Exhibit proficiency in interdisciplinary collaboration, integrating AI knowledge with insights from fields such as business, social sciences, design, and more.
- Exhibit robust problem-solving skills, employing AI solutions creatively and effectively to address complex challenges.
- Showcase an ability to adapt to emerging AI trends, emphasizing the importance of lifelong learning in this rapidly evolving field.
- Acquire experience in AI research and development, cultivating a mindset of innovation and exploration.
- Be effective communicators, articulating complex AI concepts to both technical and nontechnical audiences.
- Through internships and practical projects, gain real-world experience that ensures job readiness upon graduation.

## PROGRAM PRODUCTIVITY

Projections for the Applied Artificial Intelligence, BSAAI program estimate that 15 students will enroll in the first year, with total enrollment of 50 by year five. The program will graduate its first students in year four.

| | 2024-25 | 2025-26 | 2026-27 | 2027-28 | 2028-29 |
|---|---|---|---|---|---|
| **Enrollment** | 15 | 25 | 35 | 40 | 50 |
| **Graduates** | -- | -- | -- | 10 | 17 |

## PROGRAM DUPLICATION

No public institutions in Tennessee offer a freestanding undergraduate program in Applied Artificial Intelligence. However, The University of Tennessee, Knoxville, Tennessee Technological University, and the University of Memphis offer undergraduate degrees and/or graduate certificates in Computer Science or Data Science with a concentration in AI. Several public and private institutions offer courses in Artificial Intelligence and Machine Learning, including East Tennessee State University, Middle Tennessee State University, Tennessee State University, Belmont University, Christian Brothers University, Rhodes College, and Vanderbilt University.

## STUDENT DEMAND

In July 2023, UTK distributed an online survey to 3,716 undergraduates in the Tickle College of Engineering. Of the 536 respondents, approximately 34 percent (178) indicated that they would have been extremely interested in the proposed program, had it been available when they selected their major. Additionally, 41 percent of the respondents (213) expressed considerable interest in pursuing a human-robot interaction concentration or major, while 26 percent (132) indicated that they would have selected a concentration or major in AI for cybersecurity.

## OPPORTUNITIES FOR PROGRAM GRADUATES

Current and projected demand for employees with skills in AI are strong in the region and beyond. Lightcast analysis of job postings from July 2022 to June 2023 in the Southeast region returned more than 200,000 ads seeking employees with AI skills, and 106,382 ad postings were for AI positions. A study commissioned by UT's Office of Research, Innovation, and Economic Development, and executed by Boston Consulting Group found there was a 40 percent compound annual growth rate in AI-related job postings since 2019. Jobs identified in the UT study include manufacturing and materials, transportation and logistics, health, information technology, agriculture and farming, energy, and hospitality and entertainment. Furthermore, an analysis by Lightcast projects the regional (Tennessee and neighboring states) trends for target occupations from the proposed degree to increase by 16 percent in the region from 2022-2027. This equates to an increase of approximately 55,000 jobs.

Letters of industry support indicate a willingness to provide internships, sponsor capstone projects, and hire graduates. Letters were received from multiple organizations including CGI Federal, Eonix Energy, Reelay Meetings, Inc., RobotLAB, NellOne Therapeutics, Inc., Philips Research, Atmosera, and Advai, Ltd. The proposed program will strengthen existing ties with industry partners like Oak Ridge National Laboratory, as well.

## INSTITUTIONAL CAPACITY TO DELIVER THE PROGRAM

Eighteen existing faculty are anticipated to contribute to the proposed program. These faculty are at various ranks and come from various colleges at UTK, which is reflective of the program's interdisciplinary nature. The program anticipates hiring a program director (to be shared with the proposed Data Science, Bachelor of Science, which is also in the College of Emerging and Collaborative Studies (CECS)), several full-time lecturers, and undergraduate graders. The proposed program will also utilize two (2) existing UTK faculty as CECS faculty fellows each year. These faculty fellows will contribute to curriculum development, teaching, and program service. In addition, the program will have a coordinator, internship coordinator, a full-time

director of advising, and a Director of Partnerships and Economic Engagement, all of which will be shared across several CECS programs.

Existing space in the Claxton Education Building will be used for the proposed program, and renovations are underway to create faculty office space as well as an Applied AI Living and Learning Lab, which will allow students and instructors to test innovative ideas for teaching and learning in an immersive fashion. Renovations are expected to be complete by the end of the Spring 2024 semester.

The proposed program will offer specialized supports for students, including a program director, tailored academic advising, technical workshops and seminars, internship and research opportunities, and peer support and study groups. Other campus-based resources include the AI Tennessee Initiative, the Writing Center, the Stat Lab, The Math Place, and a number of supports in place for all UTK undergraduates.

## EXTERNAL JUDGEMENT

An external review of the proposed program was conducted during a virtual site visit on November 20, 2023 by Dr. Kenneth R. Fleischmann, Professor and Director of Undergraduate Studies in the School of Information at the University of Texas at Austin. The site visit included meetings with campus administrators and faculty from UTK, as well as current UTK students and industry partners.

Dr. Fleischmann "wholeheartedly" recommended approval of the proposed program, noting that it is "extremely exciting and timely," and that he is "confident that this program will be successful and that it will be effective in serving the state of Tennessee and the world." Dr. Fleischmann added that graduates of the program "will be highly in demand and very employable", and that the interdisciplinarity of the program "will help to equip graduates [with the skills] to sustain long and successful careers." Finally, Dr. Fleischmann was complimentary of the university's commitment to the proposed program, noting "[t]he strengths of the program are a testament to the extremely strong and innovative leadership at all levels."

## ASSESSMENT AND POST-APPROVAL MONITORING

An annual performance review of the proposed program will be conducted for the first five (5) 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. If benchmarks are not met during the monitoring period, the Commission may recommend that the institutional governing board terminate the program.

## PROGRAM COSTS AND REVENUE

The proposed one-time and recurring expenditures for the Applied Artificial Intelligence, BSAAI program are listed in Table 1. Projected revenue is displayed in Table 2.

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

| *Estimated Costs to Deliver the Proposed Program* | | | | | | |
|---|---|---|---|---|---|---|
| **One-Time Expenditures** | | | | | | |
| **Category** | **Planning** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** |
| Faculty & Instructional Staff (Faculty Lead) | $10,000 | | | | | |
| Accreditation | | | | | $21,900 | $15,900 |
| Consultants | $2,000 | | | | | |
| Equipment | | | | | | |
| Information Tech | | | | | | |
| Library | | | | | | |
| Marketing | | | | | | |
| Facilities | $62,006 | | | | | |
| Travel | | | | | | |
| Other | | | | | | |
| *Total One-Time Expenditures* | *$74,006* | *$0* | *$0* | *$0* | *$21,900* | *$15,900* |
| **Recurring Expenditures** | | | | | | |
| **Category** | **Planning** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** |
| Faculty & Instructional Staff* | $105,600 | $218,264 | $286,772 | $359,135 | $313,788 | $346,950 |
| Non-instructional Staff** | | $45,200 | $52,524 | $92,676 | $107,248 | $121,873 |
| Graduate Assistants | | | | | | |
| Accreditation | | | | | $715 | $715 |
| Consultants | | | | | | |
| Equipment | | $500 | $500 | $500 | $500 | $500 |
| Information Tech | | $500 | $500 | $500 | $500 | $500 |
| Library | | | | | | |
| Marketing | | $2,000 | $2,000 | $2,000 | $1,000 | $1,000 |
| Facilities | | | | | | |
| Travel | | | | | | |
| Other | | | | | | |
| **Total Recurring Expenditures** | **$105,600** | **$266,464** | **$342,296** | **$454,811** | **$423,751** | **$471,538** |
| **Grand Total (One-Time and Recurring)** | **$179,606** | **$266,464** | **$342,296** | **$454,811** | **$445,651** | **$487,438** |

** This includes the Program Director, Faculty Fellows (beginning in Year 2), and lecturers.*

*** This includes the student graders, lab assistants, program coordinator, and internship coordinator (beginning in Year 3).*

## Table 2: Projected Revenue

| Projected Revenue | | | | | | |
|---|---|---|---|---|---|---|
| **Category** | **Planning** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** |
| Tuition | | $47,682 | $120,794 | $295,628 | $451,390 | $597,614 |
| Grants | | | | | | |
| Other | | | | | | |
| **Total Revenues** | **$0** | **$47,682** | **$120,794** | **$295,628** | **$451,390** | **$597,614** |