

**BOARD OF HIGHER EDUCATION
REQUEST FOR BOARD ACTION**

NO: BHE 25-20

BOARD DATE: December 3, 2024

**APPROVAL OF LETTER OF INTENT OF BRISTOL COMMUNITY COLLEGE TO AWARD THE
ASSOCIATE OF APPLIED SCIENCE IN APPLIED ARTIFICIAL INTELLIGENCE AND
AUTHORIZATION FOR FAST TRACK REVIEW**

MOVED: The Board of Higher Education (BHE) has evaluated the Letter of Intent of **Bristol Community College** to award the **Associate of Applied Science in Applied Artificial Intelligence** and has determined that the proposal aligns with BHE criteria. Accordingly, the BHE authorizes the Commissioner to review the program and to make a final determination on degree granting authority pursuant to the Fast-Track review protocol.

VOTED: Motion approved and advanced to the full BHE by the Executive Committee on 11/25/2024; and adopted by the BHE on 12/3/2024.

Authority: Massachusetts General Laws Chapter 15A, Section 9(b); AAC 18-40

Contact: Richard Riccardi, Sc.D., Deputy Commissioner for Academic Affairs and Student Success

BOARD OF HIGHER EDUCATION
December 3, 2024
Bristol Community College
Letter of Intent
Associate of Applied Science in Applied Artificial Intelligence

DEGREE TITLE ABSTRACT ON INTENT AND MISSION OF PROGRAM

Bristol Community College proposes a new Associate of Applied Science in Applied Artificial Intelligence to prepare students for professional entry-level positions as Artificial Intelligence practitioners, developers, and specialists in the transformative field of applied artificial intelligence. Students will master theoretical concepts of machine learning, computer vision, natural language processing, programming, and data analytics. Students will receive extensive hands-on learning opportunities and develop Artificial Intelligence projects from conception to deployment, using Artificial Intelligence virtual tools to solve business problems across various industries that streamline efficiency while addressing ethical considerations inherent in Artificial Intelligence project lifecycles.

The proposed Associate of Applied Science in Applied Artificial Intelligence program was approved by Bristol Community College's Board of Trustees on May 6, 2024. The LOI was circulated on September 13, 2024. No comments were received.

A. ALIGNMENT WITH MASSACHUSETTS GOALS FOR HIGHER EDUCATION

Address Gaps in Opportunity and Achievement in Alignment with Campus-Wide Goals

Bristol Community College has four pillars in their Strategic Plan 2020-2024. The president has approved the following goals for the 2023-2024 Academic Year which align with the pillars:

Pillar 1 - Academic Innovation

1. Align Program and Curriculum to Labor Market Data and their identified skill sets.
2. Develop a plan that outlines the processes and systems needed to support an adult learner model.
3. Develop a more consistent, robust online learning experience for our students.

Pillar 2 - Equity and Student Success

1. Develop and implement a recruitment strategy to increase the application rates, hiring and success of minority employee candidates within the college.
2. Increase the success rates of our African American and LatinX students in Gateway Courses by 2%.
3. Develop and launch a professional development plan centered around equitable pedagogy and high impact practices.

Pillar 3 - Organizational Excellence

1. Align our Information Technology Systems to reduce risk and meet the strategic needs of the college.
2. Create a more productive and supportive working environment for our employees.
3. Align college resources to our strategic priorities.

Pillar 4 - Partnerships

1. Increase strategic partnerships with each of our campus locations.
2. Develop a plan that supports the growth and success of our College Access Program.
3. Increase alumni engagement.

The proposed Applied Artificial Intelligence program was designed to support the goals of the college. It will be the first such program in the Commonwealth of Massachusetts Community College system. (*Pillar 1, Goal 1*). The technical infrastructure will be available online and supported by campus Information Technology Services. Students will have access to cutting-edge technology 24/7 and will only be required to have access to a computer and the Internet to participate successfully, both of which the college will provide to students at no extra cost (*Pillar 2*). The proposed degree program will also benefit from strategic partnerships with industry and the support of a new Center for Cybersecurity and Artificial Intelligence on their Fall River campus (*Pillar 4, Goal 1*).

Program or Department Supports to Ensure Student Retention and Completion

The proposed degree program may be delivered 100% online or hybrid, with some classes having the face-to-face option. More than 50% of the credits in the degree program can be offered in a hybrid

modality. The intent is to make the proposed degree program as flexible as possible, catering to their students' diverse needs and preferences. Bristol Community College is an AWS Academic Partner, allowing access to advanced courses and labs in Artificial Intelligence, Cybersecurity, and Programming. Cisco and CompTIA provide important resources to Cisco and Net Academy, which support their networking and cybersecurity programs.

Bristol Community College provides the following support for online students:

1. Telephone, Walk-In, and Email IT support for all platforms
2. Mobile App with a community forum to answer common questions
3. Virtual tutoring
4. Virtual advising
5. Email and virtual (zoom) communication with faculty
6. Library Learning Commons
 - a. Most physical resources have an online corollary
7. Accessibility
 - a. All courses are required to meet minimum accessibility requirements
 - b. Online students who require accommodations can request this service through the Office of Disability Services
8. Student Wellness
 - a. The college provides online health resources, including Mental Health Counseling
9. Discrimination and Harassment
 - a. The college has prioritized equity and inclusion in all aspects of its operations. The college solicits student feedback regularly, and complaints are taken seriously. If students feel harassed or discriminated against based on a legally protected category, they can contact the Title IX Coordinator.

In-person support

- Computer Information Systems/ Computer Information Technology program supports— Computer Information Systems faculty employ several tutors and supplemental instructors each semester to help students with their learning needs. These supports are in-person and available online.

Alliances and Partnerships with PK-12, Other IHE's, Community Employers

Bristol Community College has designed the proposed degree program for early college partnerships, articulations to 4-year institutions, and opportunities for regional and employer engagements. Their Career Vocational Technical Education (CVTE) supports high school students in eligible Career, Vocational, and Technical education programs. The CVTE Program connects dual enrollment eligible students through aligned coursework, programs, and related activities. Bristol Community College continues to add and develop early college partnerships aligned with the Massachusetts Early College program to gain access to the Artificial Intelligence curriculum. Bristol Community College is expected to develop working articulation agreements with 4-year partners with bachelor's and master's programs in data science and artificial intelligence, such as UMass Dartmouth and Bridgewater State University. Much of the coursework required by 4-year partners, including programming, mathematics, and general education courses, can be completed affordably at Bristol Community College, and is aligned and latticed with Bristol Community College's Mass A2B Computer Science Transfer program.

Bristol Community College works with multiple partners across the education, healthcare, manufacturing, finance, and technology sectors. Bristol Community College will seek to build upon well-established business partnerships as the workforce returns to Bristol Community College to reskill and upskill through new Artificial Intelligence programs. Their partners include (but are not limited to): MassHire New Bedford, Bay Coast Bank, Southcoast Hospitals, and New Bedford Robotics. Bristol Community College is also developing an interdisciplinary advisory board for STEM that integrates their proposed degree program into their established programming, cybersecurity, and computer networking degrees. With the addition of the MBTA commuter rail less than 1 mile from Bristol Community College's Fall River campus, Bristol Community College will extend their students and partnerships to leading technology companies in Boston and the surrounding technology corridors.

Relationship to MassHire Regional Blueprints

According to the Southeast Region Labor Market Blueprint (2018) and the 2019-2020 Blueprint Update Final (2020), professional, scientific, and technical services are the second-priority industry for the region.

The market demand for Artificial Intelligence specialists and Artificial Intelligence developers is growing rapidly. According to Lightcast, Generative Artificial Intelligence is the top emerging digital skill in demand in the United States (2024).

References

Commonwealth of Massachusetts. (2020). 2019-2020 Blueprint update final.

<https://www.mass.gov/service-details/view-your-regions-blueprint>

Commonwealth of Massachusetts. (2018). Southeast region labor market blueprint. Mass.Gov.

<https://www.mass.gov/service-details/view-your-regions-blueprint>

Ellingrud, K., Sanghvi, S., DAndona, G.S., Chui, M., White, O., & Hasebe, P. (2023). Generative AI and the future of work in America. McKinsey Global Institute.

<https://www.mckinsey.com/mgi/our-research/generative-ai-and-the-future-of-work-in-america>

Lightcast. (n.d.). The LIGHTCAST Digital Skills Outlook 2024. <https://lightcast.io/resources/research/the-lightcast-digital-skills-outlook-2024#free-report>

Duplication

No comparable associate degree programs exist in Bristol Community College’s economic region or the Commonwealth of Massachusetts. Several four-year colleges and universities in the state offer bachelor's degrees in Artificial Intelligence, which represent potential transfer partners. UMass Dartmouth is the most popular transfer destination for students, and they offer a Bachelor of Science in Computer Science with a concentration in Artificial Intelligence.

There are a few comparable associate degrees across the nation:

Institution and Location	Degree Name	Link
Miami Dade College	Associate of Science in Applied Artificial	https://www.mdc.edu/aicenter/appliedai/

	Intelligence	
Blue Ash College	Associate of Applied Science Degree in Artificial Intelligence	https://ucblueash.edu/academics/departments/math-physics-cs/artificial-intelligence-associate-degree.html
Bismarck State College	Associate of Science in Artificial Intelligence and Machine Learning	https://bismarckstate.edu/academics/programs/ArtificialIntelligenceMachine Learning/
Hillsborough Community College	Associate of Science in Artificial Intelligence	https://www.hccfl.edu/academics/subjects/information-technology/artificial-intelligence
Maricopa Community Colleges	Associate in Applied Science in Artificial Intelligence and Machine Learning	https://www.maricopa.edu/degrees-certificates/science-technology-engineering-mathematics/artificial-intelligence-machine-learning-3891-aas

Wayne Communit y College	Associate of Applied Science in Artificial Intelligen ce Engineer	https://waynecc.smartcatalogiq.com/2023-2024/general-catalog-and-student-handbook/programs-of-study/network-support-certificate/artificial-intelligence-engineer-aas/
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Innovative Approaches to Teaching and Learning

Bristol Community College will use innovative learning approaches that are emerging industry-wide. Coursework will be delivered using hybrid and online learning modalities, including integrative virtual workspaces where the instructor, student, and artificial intelligence tools collaborate to deliver student learning outcomes. Since workforce development is the goal of this proposed degree program, virtual workspaces will also allow businesses to directly participate within these workspaces for frictionless opportunities for internships and experiential learning. In addition, the goal of this proposed degree program is that of a practitioner – training students to work in business settings on the best ways to leverage Artificial Intelligence.

Their coursework is predominantly project-oriented, allowing students to tackle real-life business problems. This interdisciplinary approach spans various verticals such as healthcare, finance, manufacturing, and technology. For instance, a student might be tasked with a project involving data analysis from a business social media feed, using natural language processing techniques to derive business intelligence. This real-time modification of marketing strategies for a business is just one example of the high-impact learning experiences integrated into our courses, demonstrating the versatility and applicability of the proposed degree program.

Bristol Community College is poised to achieve a significant milestone in 2024, becoming an NSA-approved Cybersecurity Center of Academic Excellence in Cyber Defense (CAE-CD). This recognition underscores their commitment to maintaining a leading position in Artificial Intelligence and cybersecurity

education. Research indicates Artificial Intelligence will revolutionize the cybersecurity and digital forensics industry with Artificial Intelligence-enhanced cybersecurity tools. Their cybersecurity and Artificial Intelligence programs will be closely aligned, enabling students to work on cybersecurity projects through the CAE-CD center and vice versa. This integration ensures that their students are well-prepared for the future of these industries.

Finally, the proposed degree program will include micro-credentials for students in other majors and working professionals. Micro-credentials will stack directly into the Artificial Intelligence certificate and then into the proposed degree program. Possible micro-credentials include Fundamentals of Artificial Intelligence, Artificial Intelligence for Business, and Artificial Intelligence for Paralegal.

B. ALIGNMENT WITH CAMPUS STRATEGIC PLAN AND MISSION

There is an emerging need in the digital economy for workers who can use Artificial Intelligence as practitioners, specialists, and developers. Studies show that automation will replace categories of workers and augment the work activities of others. Over the next six years, the demand for salespersons, administrative assistants, cashiers, and other repetitive types of occupations will shrink by 11.8 million workers in the U.S., according to McKinsey Global Institute (Ellingrud et al., 2023). People earning \$30-40K per year are 10-14x more likely to need to change jobs or careers. Within the manufacturing sector, production jobs will shrink and be replaced by workers who need more technical and digital skills. Many employers are making major digital transformations within resilient and growing categories such as traditional STEM fields. In addition to STEM, business, legal, and the creative arts community will require reskilling.

As noted above, the proposed degree program is aligned with several pillars of their Strategic Plan:

1. Academic Innovation
 - a. Develop a range of credentials (degree, certificate, micro-credentials) aligned with the institutional mission to provide accessible, innovative, and inclusive education that prepares students to navigate and succeed.
2. Equity and Student Success
 - a. All students will be able to participate with computers and Internet access, which the college provides.

3. Partnerships
 - a. New pathways for Bristol alumni to return to Bristol Artificial Intelligence programs for Artificial Intelligence reskilling.
 - b. Enhanced early college pathways with area high school partners to access Artificial Intelligence curriculum and dual enrollment opportunities.
 - c. An advisory board consisting of key partners, including MassHire and anchor institutions in manufacturing, healthcare, and technology.
 - d. The new Center for Academic Excellence in Cyber Defense (CAE-CD) will also support students and faculty.

Goals and Objectives (Form B)

Students will:

1. Apply machine learning algorithms using popular programming languages.
2. Analyze visual data using computer vision algorithms.
3. Interpret human language data using natural language processing techniques.
4. Create actionable insights from complex data sets using data analytics.
5. Evaluate the ethical implications of Artificial Intelligence solutions.

C. ALIGNMENT WITH OPERATIONAL AND FINANCIAL OBJECTIVES OF INSTITUTION

Enrollment Projections (Form C)

The proposed degree program is projected to initially enroll 24 full-time and 20 part-time students, with steady growth to a program size of 60 full-time and 50 part-time students by year 5, as shown on Form C. The proposed degree program would also transition existing students into this program at a modest growth rate, starting with 24 full-time and 29 part-time continuing students in year 1 with three times those numbers in five years. Given the market for this proposed degree program in Artificial Intelligence, the enrollment and subsequent retention projections are reasonable and achievable.

Resources and Financial Statement of Estimated Net Impact on Institution (Form D, Appendices)

This proposed degree program leverages the existing infrastructure which minimizes expenses and maximizes revenue, which is expected to grow significantly over the five years of the budget. The initial year of the program yields a relatively small loss due to the initial investment in faculty and other non-instructional costs. When enrollments reach the targets for year 4, the revenue generated from this proposed degree program will be able to cover the costs of hiring an additional faculty member dedicated to the proposed degree program. Even with this additional cost, the proposed degree program is estimated to bring in over \$1 million in revenue by year 5 which would be double the costs in that year.

STAFF REVIEW AND VALIDATION

Staff thoroughly reviewed the LOI proposing full degree granting authority for the **Associate of Applied Science in Applied Artificial Intelligence** program submitted by **Bristol Community College**. Staff validate that the **LOI** includes all data required by the Massachusetts Board of Higher Education. Staff recommendation is for BHE authorization for the Commissioner to review the program pursuant to the Fast-Track review protocol.

Form A: LOI Undergraduate Program Curriculum Outline

Required (Core) Courses in the Major (Total # courses required = 14)		
Course Number	Course Title	Credit Hours
CAI 101	Introduction to AI Concepts	3
CAI 120	Machine Learning Foundations	4
CAI 121	Introduction to Computer Vision	4
CAI 122	Introduction to Natural Language Processing	4
CAI 123	Introduction to Data Analytics	4
CAI 270	Capstone Course in Applied AI	4
CIS 120	Programming: Logic, Design, and Implementation	3
CIS 153	Python	3
ENG 101	Composition I: College Writing	3
ENG 102	Composition II: Writing about Literature	3
MTH 119	Fundamentals of Statistics	3
SOC 212	Sociology of Social Problems	3
PHL 152	Ethics	3
INT 210	Experiential Education I	3
	Sub Total Required Credits	47
Elective Courses (Total # courses required = 4) (attach list of choices if needed)		
SCI	4-Credit Science Elective	4
COM 104/114	Fund of Public Speaking – or – Professional Speaking	3
MTH 131/172	Elements of Coll Math – or – Precalculus with Trig	3/4
MTH 132/214	Calc for Applications – or – Calculus I	3/4
	Sub Total Elective Credits	13-15
Distribution of General Education Requirements		# of Gen Ed
Attach List of General Education Offerings (Course Numbers, Titles, and Credits)		Credits

Arts and Humanities, including Literature and Foreign Languages	12
Mathematics and the Natural and Physical Sciences	10-12
Social Sciences	3
Sub Total General Education Credits	25-27
Curriculum Summary	
Total number of courses required for the degree	18
Total credit hours required for degree	60-62
Prerequisite, Concentration or Other Requirements:	

Form B: LOI Goals and Objectives

Goal	Measurable Objective	Strategy for Achievement	Timetable
Develop recruitment procedures and meet enrollment targets	Meet enrollment targets. Use timelines and benchmarks in coordination with Admissions and Marketing	Assigned to Program Coordinator and Admissions and Marketing.	On-going with regular review
Maintain high quality faculty teaching	Review of syllabi and course materials. Regular communication with faculty.	Assigned to Program Coordinator. Use resources provided by CITE Lab and Lash Center for Teaching and Learning. Offer professional development.	On-going, with continuous review
Develop, offer, and assess effectiveness of all courses and programs.	All courses in program offered. Student success rate at or above institutional average. Collect artifacts to evaluate program learning outcomes	Assigned to Program Coordinator. Assess through program review process, student and partner feedback.	On-going through program review cycle.
Successful outcomes for graduates	Graduates transfer or obtain relevant employment within one year of graduation.	Assigned to Program Coordinator and Alumni relations.	Annual

Form C: LOI Program Enrollment

	Year 1	Year 2	Year 3	Year 4	Year 5
New Full-Time	24	30	38	48	60
Continuing Full-Time	17	21	27	34	43
New Part-Time	20	25	32	40	50
Continuing Part-Time	29	37	46	58	73
Totals	90	113	143	180	227

Form D: LOI Program Budget

One-time/ Start Up Costs	Cost Categories	Year 1	Year 2	Year 3	Year 4	Year 5
	Full Time Faculty (Salary & Fringe)	100,240	100,240	100,240	200,480	200,480
	Part Time/ Adjunct Faculty (Salary & Fringe)		9,000	9,000	9,000	9,000
	Staff	200	200	200	200	200
	General Administrative Costs	1,100	1,100	1,100	1,100	1,100
	Instructional Materials, Library Acquisitions	1,000	1,000	1,000	1,000	1,000
	Facilities/Space/ Equipment	5,500	5,500	5,500	5,500	5,500
	Field & Clinical Resource					
	Marketing					
	Other (Specify) Tutoring, non-program instructional costs	100,240	100,240	100,240	200,480	200,480
	TOTAL EXPENSES	208,280	217,280	217,280	417,760	417,760

One-time/ Start Up Support		Annual Income				
		Year 1	Year 2	Year 3	Year 4	Year 5
	Revenue Sources					
	Grants					
	Tuition	14,688	48,816	61,776	77,760	98,064
	Fees	134,028	445,446	563,706	709,560	894,834
	Departmental	8,024	26,668	33,748	42,480	53,572
	Reallocated Funds					
	Other (specify)					
	Total Revenue	156,740	520,930	659,230	829,800	1,046,470