Advancing AI Education: Curriculum Development in Florida's Two-Year State Colleges for Student Career Advancement

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ABSTRACT

The State of Florida is home to 28 state and community colleges, collectively serving over 640,000 students. Within the Florida College System (FCS), these institutions play a crucial role in providing higher education to more than 22 million Florida residents. This session will specifically highlight the advancements in AI curriculum across Florida's two-year colleges and their collaborative interrelationships with Florida's System of four-year/ upper division State Universities in developing a comprehensive AI educational framework.

As advancements in AI continue to reshape fields such as science, engineering, medicine, and the humanities, higher education institutions are strategically positioned to cultivate student competencies and skills in AI. Florida's state colleges are dedicated to equipping students with essential knowledge in artificial intelligence, neural networks, machine learning, and data science. These programs aim to prepare students not only for immediate employment in AI-related careers but also for continued education at state universities in advanced AI disciplines.

The state colleges in Florida are at the forefront of adapting to AI technology and preparing students for a future increasingly reliant on AI skills. While specific AI degree programs may not yet be widespread, these initiatives are integrating AI into various courses and disciplines.

The presentation in the session will highlight recent advancements in AI at these state colleges and their connections with the Florida State University System.

I. INTRODUCTION

America is at a critical juncture in terms of advancing science, technology, engineering, and mathematics (STEM) education across the increasingly diverse student population in postsecondary classrooms. The explosive research and development taking place in areas such as Artificial Intelligence (AI), data analytics, cybersecurity, supply chain, alternative energy, Internet of Things(IoT) and biotechnology, to mention a few, are key to America advancing its positional strength in world affairs, national defense and security, educational systems across the life span, economic growth and development, and health and human welfare[1]-[4]. Simultaneously, AI advancements are already transforming all aspects of society, and every sector of finance, health care, energy, national security, technology development, as well as America's educational system[5], [6].

AI's potential in various sectors is expected to profoundly shape the future of industries and the workforce, offering remarkable possibilities for innovation and economic growth. One of the most significant areas of impact is the business sector, where AI is anticipated to revolutionize operations by automating repetitive tasks. This will allow human workers to focus on more strategic, creative, and value-driven activities. As AI optimizes business processes, companies can achieve greater efficiency, reducing operational costs while boosting innovation [6].

In healthcare, AI's potential to enhance patient care is becoming increasingly apparent. AI-assisted diagnostic tools, personalized treatment plans, and predictive analytics for patient outcomes are expected to improve overall healthcare delivery. This could not only help doctors make more accurate decisions but also reduce healthcare costs, thus improving accessibility. AI's ability to create personalized therapies and targeted interventions holds the promise of better outcomes for patients, especially in underserved communities [7].

In the education sector, AI has the potential to transform learning methodologies by creating highly personalized learning experiences. Adaptive learning technologies could help tailor education to meet the individual needs of students, providing them with customized resources and feedback. This can help bridge educational gaps and allow students to progress at their own pace, improving overall academic performance and engagement [8]. NSF initiatives such as Improving Undergraduate STEM Education (IUSE) has provided a valuable venue for faculty across disciplines to address ways in which AI can impact gateway courses such as College Algebra.

According to recent International Data Corporation (IDC) research, AI's integration into business will inject an estimated $19.9 trillion into the global economy by 2030, contributing up to 3.5% to global GDP [9]. This massive economic impact highlights AI’s significant role in shaping the future of global economies. AI will not only drive productivity but also create new opportunities, with the technology projected to generate new jobs and sectors that did not exist before. The integration of AI into businesses is expected to be widespread, with nearly 70% of firms expected to adopt AI technologies by 2030, according to McKinsey [7].

This broad adoption of AI across industries will inevitably result in changes in the job market. The AI-driven transformation will likely lead to the displacement of some jobs, particularly those that involve routine, manual tasks. However, AI is also expected to generate new employment

opportunities. A World Economic Forum report predicts that by 2025, AI and automation will create 97 million new jobs globally. These will primarily be in fields like AI development, machine learning engineering, and data science, along with roles focused on overseeing AI systems and ensuring they align with ethical and regulatory standards [10].

Business leaders are already recognizing the importance of AI for the future of their operations. 98% of executives agree that AI is a crucial component of their businesses, underscoring the strategic importance of embracing AI in order to remain competitive [7]. As AI continues to evolve and become an integral part of everyday operations, it is expected that its' influence will be as transformative to the global economy as the internet and electricity were in their times. In fact, many experts argue that AI's widespread application could reshape national economies and global competition, leading to a new era of business practices, consumer interactions, and societal advancements. All of these current, fast-paced changes in industry and government operations are challenges that post-secondary institutions are addressing as they increase their courses offerings in areas directly related to AI, Data Science, IoT, as well as the myriad of related technology-driven curricular opportunities for students. By strategic integration of AI across all degree programs at the state college and university levels, students will be better prepared for the rapidly changing workplace. In fact, some suggest that Moore's Law is no longer applicable.

AI is set to be a game-changer, offering new economic opportunities and efficiencies, as well as expanding the types of jobs and sectors available in the workforce. However, as with any technological revolution, there will also be challenges, particularly regarding the ethical use of AI, job displacement, and ensuring that the benefits of AI are accessible to all. By understanding and preparing for these shifts, society can maximize the potential of AI for positive transformation in the coming decades.

II. AI: PAST, PRESENT & FUTURE

Artificial Intelligence (AI) has various definitions. To many, AI refers to machines that think, understand language, and solve problems, and gaining popularity with ChatGPT. Scientifically, AI is a computer system capable of tasks associated with intelligence.

John McCarthy and Marvin Minsky first defined AI in a 1956 Rockefeller Foundation proposal [11]. In the 1940s, researchers sought to mimic the human brain, developing hardware and later software models of biological neurons. McCulloch and Pitts published the first study on neural networks in 1943 [12], and Hebb's 1949 learning law laid the groundwork for neural network training algorithms [13]. By the 1950s-60s, researchers combined biological and psychological insights to create the first artificial neural network (NN) [14], [15]. However, due to NN limitations pointed out by Minsky [16], research declined between 1960-1980. The discovery of multi-layer network training methods in the 1980s revived interest in NNs.

AI's resurgence results from three factors: (a) High computational demand in gaming led to advanced graphics processors, accelerating neural network training. (b) Widespread networking created vast datasets, fueling machine learning progress. (c) Access to large datasets allowed researchers to refine older neural network models. In 2012, Nvidia's GPU-powered multilayer network excelled in an image recognition competition [16]. Hinton and his students' algorithm [16] was pivotal in modern AI development. Hinton's contributions [16]-[19] have driven AI's success in image recognition, speech processing, and natural language understanding, transforming industries like healthcare, finance, and autonomous systems.

John J. Hopfield and Geoffrey Hinton won the 2024 Nobel Prize in Physics for foundational work in artificial neural networks. Their research demonstrated how machine intelligence emerges from physical systems, revolutionizing AI. Hinton's deep learning breakthroughs enabled AI advances in autonomous vehicles, virtual assistants, and medical imaging, while Hopfield's networks applied physics to memory and computation. These advancements are reshaping higher education, requiring institutions to integrate AI, neural networks, data science, and cybersecurity into curricula to prepare graduates for future careers in emerging technologies.

III. AI & HIGHER EDUCATION INSTITUTIONS

Currently, researchers and authors have published a plethora of papers and reports related to AI opportunities, guidance with the application of AI, and challenges with implementing AI at all post-secondary levels [22]-[26]. This recognition has resulted in a recent 2025 report by USDOE [27] entitle by "*Navigating Artificial Intelligence in Postsecondary Education: Building Capacity for the Road Ahead*" which presents comprehensive guidance related to AI application in education, and its transformative impact including opportunities that AI brings to teaching,

learning, and administration-while also addressing the challenges institutions must overcome to implement AI responsibly and equitably.

AI has the potential to revolutionize education by making it more personalized and efficient. Through adaptive learning systems, AI can customize educational content to suit the unique needs of each student, helping them learn at their own pace. Predictive analytics tools can identify students who may be at risk of academic failure and provide timely interventions to improve outcomes. Additionally, administrative processes such as admissions, enrollment, and grading are being streamlined with AI-powered automation, allowing institutions to allocate resources more effectively and focus on strategic goals.

Despite these advancements, the report identifies significant challenges that institutions need to address. Ethical concerns are at the forefront, particularly with issues like data privacy, algorithmic bias, and transparency in AI systems. For example, biased AI algorithms trained on incomplete or skewed data can perpetuate inequities in areas such as admissions decisions or learning outcomes. Furthermore, many faculty and staff lack the skills and training needed to effectively integrate AI technologies into their teaching and administrative work. This ‘faculty and instructor skills’ gap presents a barrier to the widespread adoption of AI.

Equity is also a critical issue. Access to AI tools and resources is not uniform across educational institutions, which leads to disadvantaged students often lacking access to the technology and/or support needed for them to benefit from these innovations. Without careful planning, AI could unintentionally exacerbate existing disparities in higher education. To prevent this, institutions must prioritize inclusivity and develop strategies that make AI accessible to all students, regardless of their socioeconomic background or abilities.

To successfully navigate these complexities, the report emphasizes the importance of proactive measures, including capacity building, policy development, and interdisciplinary collaboration. Institutions must create an environment where AI is used thoughtfully, ethically, and inclusively to improve educational outcomes and administrative efficiency while addressing the societal implications of these technologies.

Five Key Recommendations

The following recommendations are based on two DOE reports [27],[36] related to AI and future teaching and learning for the higher education institutions.

Enhance Faculty and Staff AI Skills and Application across Domains:

Institutions should provide training and professional development (PD) programs to improve AI literacy among all levels of educators (e.g., instructors, adjuncts, faculty) and administrators. These PD programs should focus on how to use AI tools effectively in the classroom including how to systematically study the impact of their use on students' sense of efficacy, interest, and sense of belonging. And for administrative purposes, postsecondary institutions need to address equal distribution of application and resources across programs as well as ethical challenges. Empowering staff with the knowledge to implement AI systems will ensure a smoother transition and maximize their impact.

Implement Ethical Oversight Structures:

Institutions need to establish governance frameworks that prioritize ethical AI use. Policies should focus on protecting student privacy, ensuring fairness, and maintaining transparency in AI decision-making processes. Oversight committees or dedicated task forces can be created to monitor AI implementations, identify potential risks, and provide guidance on ethical dilemmas.

Develop Collaborative Partnerships:

Building partnerships with technology companies, research institutions, and policymakers is critical for staying ahead of AI advancements. These collaborations can provide access to cutting-edge tools, foster innovation, and facilitate knowledge-sharing to address challenges associated with AI integration. Such partnerships can also ensure that institutions remain aligned with industry best practices and emerging standards.

Ensure Equal Access to AI Resources:

To prevent AI from widening educational inequalities, institutions must focus on making AI tools and resources available to all students. This includes providing financial support for students from low-income backgrounds, ensuring accessibility features for students with disabilities, and offering training programs to help all students become proficient in using AI technologies. Grant opportunities such as NSF S STEM, if awarded to an institution, can offer

scholarships to high-financial need low-income students to complete their AA, BS or even MS degree in areas such as AI or Data Science.

Promote Interdisciplinary Innovation:

Higher education institutions should encourage interdisciplinary programs and research that combine AI with ethics, social sciences, and the humanities. This approach will prepare students and researchers to critically analyze the broader societal implications of AI and develop solutions that prioritize ethical considerations alongside technological advancements.

By addressing these recommendations, postsecondary institutions can harness the full potential of AI to improve education, enhance equity, and ensure responsible use of this transformative technology. In the next section, the instructional and learning activities associated with AI at Florida's State Universities and State Colleges are examined.

IV. FLORIDA HIGHER EDUCATION SYSTEM

Florida is the 4th largest postsecondary education system in US. The State University System (SUS) of Florida is comprised of 12 public universities with an enrollment of more than 430,000 students. The system offers Bachelor's (BA, BS), Master's (MS, MA), and Doctoral Degrees (PhD, EdD) in a plethora of a STEM disciplines. The Florida College System (FCS) consists of 28 Community and State Colleges serving more than 640,000 students. The primary missions of the FCS include (1) providing lower-level undergraduate instruction, and awarding associate degrees (AA, or AS), (2) providing student access to Florida's SUS for pursuing an advanced degree, and (3) promoting economic development for the state within each FCS institution.

IV.1- Florida State University System

The Florida State University System (SUS) is a network of 12 public universities that provides accessible and high-quality education to residents of Florida. Governed by the Florida Board of Governors, SUS plays a central role in fostering academic excellence, innovation, and economic development across the state. Each institution within the system has its unique mission and areas of expertise, collectively serving over 400,000 students annually.

The SUS includes prominent universities such as the University of Florida (UF) and Florida State University (FSU), both nationally recognized for their academic programs, research

initiatives, and athletic achievements. Other notable institutions include Florida Atlantic University, Florida International University (FIU), University of Central Florida (UCF), and Florida Gulf Coast University (FGCU), each contributing to Florida's diverse higher education landscape by offering a wide range of undergraduate, graduate, and professional degree programs.

A key focus of the SUS is affordability and accessibility, with programs such as Bright Futures Scholarships and financial aid initiatives to ensure that higher education remains attainable for Florida residents. Additionally, the system emphasizes workforce development by aligning academic programs with the state's economic needs, particularly in areas like STEM, healthcare, and education, and also requiring students to register online for access to HANDSHAKE, a tool used by students for both job searches and job preparedness. Research is another cornerstone of SUS, with universities driving innovation through cutting-edge projects funded by state, federal, and private-sector partnerships. Here again, many partnerships (e.g., FAU – Next Era Energy-FPL) enhance faculty preparedness to use AI-tools while also providing student career opportunities (e.g., paid internships)

IV.2. Florida State College System

The Florida State College System (FSCS) consists of 28 public colleges that provide affordable, high-quality education to a diverse student population across the state. These colleges offer a wide range of academic programs, including associate degrees, limited BA and BS degrees, vocational/industrial certifications, and workforce training, with an emphasis on accessibility and preparing students for both higher education and direct entry into the workforce. The FSCS serves as a vital part of Florida's educational landscape, offering opportunities for students to gain foundational skills, transfer to four-year institutions, or enter the job market with specialized training.

In addition to its academic offerings, the FSCS focuses on workforce development, aligning its programs with the state's economic needs, such as healthcare, technology, and manufacturing. Many colleges within the system provide dual enrollment options, allowing high school students to earn college credits and get a head start on their higher education journey. Additionally, the system offers a range of financial aid programs, including scholarships and grants, to ensure that education is accessible to students from various backgrounds.

The Florida State College System is committed to helping students achieve their educational and career goals, with a strong focus on academic excellence, student success, and community engagement. By providing flexible learning options, including online, fully online, and evening courses, FSCS colleges cater to working adults, non-traditional students, and those looking to advance their careers. Through its comprehensive programs and partnerships, the FSCS plays a key role in supporting the state's workforce and contributing to Florida's economic growth.

V. AI Activities prominent within the FL State University System (SUS)

The Florida State University System (SUS) is actively integrating artificial intelligence (AI) across its institutions to advance research, enhance education, and address workforce needs. Recognizing the transformative potential of AI, SUS universities are incorporating this technology into various academic programs, research initiatives, and community partnerships to remain at the forefront of innovation. These activities not only contribute to academic excellence but also help position Florida as a leader in AI-driven industries.

1. *AI-Focused Academic Programs*:

SUS universities have introduced degree programs, certifications, and courses centered on AI and machine learning. Institutions such as the University of Florida (UF) and Florida International University (FIU) offer specialized programs designed to equip students with AI skills that are increasingly in demand across industries like healthcare, finance, and technology. For example, UF launched an AI university-wide initiative, integrating AI into its curriculum to prepare students in all disciplines for careers influenced by AI advancements.

2. *Research and Innovation in AI:*

SUS universities are driving groundbreaking research in AI. The University of Florida has invested heavily in its AI ecosystem through partnerships, including a significant collaboration with NVIDIA, which resulted in the establishment of one of the nation's most powerful AI supercomputers. These research efforts span diverse applications, from healthcare diagnostics and environmental sustainability to autonomous systems and smart city solutions.

3. *Workforce Development and Industry Partnerships:*

Recognizing the growing demand for AI professionals, SUS institutions are aligning their programs with industry needs. Partnerships with private companies, state agencies, and nonprofit

organizations enable the development of training programs and internships to build a skilled AI workforce. The University of Central Florida (UCF), for instance, collaborates with regional employers to design programs that address the specific needs of Florida's industries, such as AI in cybersecurity and advanced manufacturing.

4. AI Challenges and Ethical Issues

While Florida's state college system recognizes the importance and necessity of AI integration, the system also acknowledges the many challenges that must be addressed. The process of AI integration requires a clear understanding of its associated issues and a comprehensive, yet dynamic, plan, as the benefits, challenges, and consequences are complex, often underestimated, and in many cases, unknown [37][38]. Presently, Florida's state college system is vigorously establishing AI programs and certifications, with what has been viewed as a very rapid expansion, especially in the curriculum space [39].Yet, as might be expected, the increasing application and integration of AI has prompted various issues, some new and some lingering, across the spectrum of factors associated with technology use in classroom learning. These include how to address the rapid technological advancements within the curriculum and ensure faculty possess the necessary technical expertise, as well as how to integrate AI directly into Florida's existing curriculum. Another concern is how to modernize infrastructure to support AI adoption while managing budgetary constraints. Additionally, faculty must be engaged in professional development to enhance their readiness for AI integration, while teacher resistance and autonomy concerns must also be addressed. Finally, new policies must be developed to ensure responsible AI implementation and compliance [40],[41]. Further, there are issues associated with AI itself, including its vastly expanding iterations, increased potential, expanded applicability, and potential challenges with its use. Clearly, the expansion of AI leaves educators with no choice but to embrace it, but with a clear sense of purpose, an understanding of how it will shape students' futures, and a recognition that a future dominated by AI will significantly depart from our current understanding of education [39].

Universities across the state are focusing on key ethical concerns such as algorithmic bias, data privacy, transparency, accountability, and the societal impact of AI, aiming to create guidelines and educational programs that promote fairness, inclusivity, and ethical decision-making in AI applications. For example, The University of Florida (UF) is proactively engaging with the

ethical dimensions of AI. UF's AI initiative includes a focus on AI ethics, exploring critical issues related to privacy, bias, and fairness. The university offers courses designed to help both students and professionals identify and navigate ethical challenges arising from AI applications, thereby promoting responsible AI development and deployment [42],[43]. As another example, UCF has developed an open-source AI model designed to assist underserved hospitals by analyzing medical images, generating detailed reports, and integrating multimodal data to improve diagnostic accuracy [44]. As AI continues to shape the future, Florida's education system is committed to embracing it with a clear sense of purpose—ensuring that students and professionals are equipped to navigate the evolving AI landscape responsibly and ethically.

Table 1- AI Major Activities at Florida State University System (SUS)

Institution	Academic Program in AI	Research & Other Activities
University of Florida (UF)	*-Master of Science in Artificial Intelligence (MSAI)* *-Offers undergraduate courses in AI*	*-AI Research Grants($10M)* *-AI Catalyst Fund*
Florida State University (FSU)	*-Bachelor of Science in Computer Science with AI Specialization*	*-Department of Energy Grants ($9M)* *-AI4Food Initiative($150K)*
University of South Florida (USF)	*-Master of Science in Artificial Intelligence and Robotics*	*-AI research across multiple disciplines* *-AI-powered tools*
Florida Atlantic University (FAU)	*-Master of Science in Artificial Intelligence (MSAI)*	*-AI for Biomedical Applications:* *-AI for Cybersecurity (NSF)* *-AI in Robotics*

Florida International University (FIU)	*-Master of Science in Computer Science with AI Specialization*	*-AI Center of Excellence* *- Department of Defense* *-NSF Grant for AI in Building* *-Design NIH MIRA Grant for Machine Learning*
University of Central Florida (UCF)	*-Master of Science in Computer Science with AI Track*	*-AI for Natural Language* *-AI in Smart Cities* *AI for Autonomous Military Vehicle* *-AI in Cybersecurity* *-AI for Drug Discovery*
Florida Gulf Coast University (FGCU)	*-Bachelor of Science in Computer Science with AI Focus*	*- NSF grant: AI for Autonomous Robotics* *-DOE grant: AI in Renewable Energy Optimization*

Through these activities, the Florida SUS is fostering innovation, preparing students for AI-driven careers, and contributing to the state's economic and technological advancement. By prioritizing education, research, and community engagement, SUS is ensuring that Florida remains competitive in an increasingly AI-driven world.

VI. AI Activities at Florida State Colleges

Florida State Colleges are increasingly integrating artificial intelligence (AI) into their academic programs, research efforts, and workforce development initiatives to align with the state's growing technological needs. While each of the 28 colleges within the Florida State College System (FSCS) may have unique AI-related activities, several common trends highlight the system's commitment to AI adoption and innovation.

VI.1 AI Curriculum and Training Programs:

Many Florida State Colleges are incorporating AI-related courses into their curriculum, providing students with foundational knowledge in AI, machine learning, and data science.

These courses are designed to prepare students for careers in tech, healthcare, and other industries increasingly reliant on AI technologies. Additionally, some colleges are offering specialized certifications in AI, programming, and data analysis, aimed at equipping students with the practical skills needed to thrive in an AI-driven economy.

VI.2 Workforce Development and Partnerships with Industry

Florida State Colleges focus on bridging the gap between education and industry needs. Colleges partner with local businesses, tech companies, and government agencies to create AI-focused training programs that cater to the state's economic demands. This collaboration ensures that students receive industry-relevant education and practical experience in AI applications, such as in healthcare, cybersecurity, and advanced manufacturing.

VI.3 Support for Tech and Innovation Centers:

Several colleges within the system are establishing innovation hubs or technology centers focused on AI research and development. These centers often collaborate with private industry and research institutions to promote AI innovations, provide resources for startups, and foster an entrepreneurial ecosystem. For example, some colleges have introduced AI labs that allow students and faculty to experiment with AI technologies and contribute to the development of AI solutions in real-world settings.

VI.4 AI for Workforce Readiness and Retraining:

Recognizing the impact of AI on the job market, Florida State Colleges are investing in programs designed to help workers reskill or upskill in response to the increasing demand for AI expertise. These programs target both traditional students and working adults seeking to transition into AI-related fields. They offer flexible learning options, including online courses, to accommodate individuals looking to improve their employability in AI-focused sectors.

VI.5 Research and Development in AI

Some Florida State Colleges (such as BC) are engaging in AI research through partnerships with universities and private companies. These efforts often focus on using AI to solve real-world problems, such as improving healthcare delivery, enhancing energy efficiency, and supporting public safety. Students and faculty collaborate on AI research projects that have practical applications, advancing both academic knowledge and community solutions.

Below is an overview of notable two-year colleges offering relevant AI programs.

Miami Dade College (MDC): As the largest state college in Florida, serving over 92,000 students, MDC has received approval to launch Florida's first Bachelor of Science in Applied Artificial Intelligence in 2024. The college has also introduced an Associate in Science in Applied Artificial Intelligence and two new College Credit Certificates in AI for the fall term. Both degrees are among the first of their kind in the nation, supported by two state-of-the-art AI Centers equipped with the latest technology. Below are the details of the programs:

Bachelor of Science in Applied Artificial Intelligence

This advanced program focuses on building intelligent systems through coursework in machine learning, natural language processing, deep learning, and applied decision-making.

- *COP 2800 – Data Structures and Algorithm*
- *COP 2830 – Introduction to Artificial Intelligence*
- *COP 2831 – Machine Learning*
- *COP 2832 – Natural Language Processing*
- *COP 2833 – Robotics*
- *COP 2834 – Deep Learning: Explores advanced deep learning architectures and their applications.*
- *COP 2835 – AI Ethics and Society: Examines the societal impacts of AI technologies and ethical considerations in their development and deployment.*
- *COP 2836 – AI Capstone Project: Provides an opportunity to work on a comprehensive AI project, integrating knowledge from the program.*

Associate in Science in Applied Artificial Intelligence

This degree program offers technical knowledge of AI tools and their real-world applications.

- *COP 1000 – Introduction to Programming Concepts: Introduces basic programming concepts and problem-solving techniques.*
- *COP 2800 – Data Structures and Algorithms: Focuses on data organization and algorithm design, essential for AI development.*
- *COP 2830 – Introduction to Artificial Intelligence: Provides an overview of AI principles, including search algorithms and knowledge representation.*
- *COP 2831 – Machine Learning: Explores machine learning algorithms and their applications in various domains.*
- *COP 2832 – Natural Language Processing: Covers techniques for enabling machines to understand and process human language.*
- *COP 2833 – Robotics: Introduces the fundamentals of robotics, including design, programming, and control systems.*

College Credit Certificate in Artificial Intelligence Practitioner

This six-course program prepares students for careers in AI, focusing on practical applications and industry-relevant skills.

- *CAI 1001C – AI Thinking: Introduces the fundamentals of AI, including its history, applications, and ethical considerations.*
- *PHI 2680 – AI & Ethics: Explores the ethical implications of AI technologies and their impact on society.*
- *GEB 1432 – Applied AI in Business: Examines how AI is utilized in business settings to enhance decision-making and operational efficiency.*
- *CAI 2100C – Machine Learning Foundations: Provides a foundational understanding of machine learning algorithms and their applications.*
- *CAI 2300C – Deep Learning: Delves into advanced deep learning techniques and their practical applications.*
- *CAP 2000C – AI Capstone Project: Allows students to apply their AI knowledge in a real-world project, demonstrating their proficiency.*

College Credit Certificate in Artificial Intelligence Awareness

A three-course program suited for individuals interested in gaining foundational knowledge of AI concepts and applications.

- *CAI 1001C – AI Thinking*
- *COP 1000 – Introduction to Programming Concepts*
- *COP 2830 – Introduction to Artificial Intelligence*

Palm Beach State College (PBSC): PBSC has expanded its offerings in information technology and health sciences by adding, (e.g., 2024), programs in AI, cybersecurity, and medical imaging. These new degree and certificate programs are at the forefront in preparing students for high-demand careers and provide working professionals with opportunities to gain additional credentials or pivot to new career paths.

1. Applied Artificial Intelligence – Associate in Science (A.S.)

- **Program Overview**: This A.S. degree focuses on building knowledge of AI fundamentals and applying them to manage AI project lifecycles. The curriculum includes opportunities for internships and industry networking, preparing students to design and implement AI solutions responsibly.
- **Course Highlights**:
  - *CAI 1001: Artificial Intelligence (AI) Thinking*
  - *CAP 2048: AI Robotics and Automation*
  - *CAI 2002: Applied Machine Learning*
  - *CAI 2003: Advanced AI Programming*

2. Artificial Intelligence Awareness – College Credit Certificate (CCC)

- **Program Overview**: This certificate provides an understanding of computer applications, programming fundamentals, and introduces students to AI concepts.
- **Course Highlights**:
  - *CGS 1100: Introduction to Computer Applications*
  - *COP 1000: Introduction to Programming Concepts*
  - *CAI 1001: Artificial Intelligence (AI) Thinking*

3. Artificial Intelligence Practitioner – College Credit Certificate (CCC)

- **Program Overview**: This certificate delves into data science tools, machine learning foundations, natural language processing, and computer vision.
- **Course Highlights**:
  - *CAI 2002: Applied Machine Learning*
  - *CAI 2003: Advanced AI Programming*
  - *CAP 2048: AI Robotics and Automation*

- **Broward College:** Broward College is incorporating AI into its curriculum through programs in computer science and related fields, including an AI certification program focused on hands-on training for careers in AI.
- **Tallahassee Community College:** This institution offers workforce training programs that include courses related to AI and data science as part of its Applied AI offerings.
- **Valencia College:** Located in Orlando, Valencia College provides associate degrees in technology-related fields, allowing students to enroll in courses such as Introduction to AI and Conversational AI.
- **Hillsborough Community College (HCC):** Offering more than 12 courses in AI and machine learning, HCC provides an Associate in Science (A.S.) degree with a specialization in Artificial Intelligence.
- **Eastern Florida State College (EFSC):** EFSC focuses on generative AI and actively implements AI-related tools to promote learning while encouraging faculty to responsibly incorporate AI into academic work.
- **St. Petersburg College (SPC):** The College offers several courses related to Artificial Intelligence (AI) through its Computer and Information Technology programs.
- **College of Central Florida (CF):** CF offers a variety of courses related to Artificial Intelligence (AI) across different disciplines.

- **Indian River State College (IRSC)**: The College offers several Artificial Intelligence (AI) courses and programs designed to equip students with the necessary skills and knowledge in this field.

Table 2- AI Major Activities at Florida State Colleges

State College	Program/Instructional activities in AI	Other AI activities
Miami Dade College (MDC)	*-BS in Applied AI* *-AS in Applied AI* *Certificate in AI Practitioner* *-College Credit Certificate in Artificial Intelligence Awareness*	*-National Applied Artificial Intelligence Consortium (NAAIC)* *-Artificial Intelligence for All Grant (NSF- $!M)* *-AI Center Development* *-Integration of AI in Education and Operations*
Broward College	*-Artificial Intelligence for Business (CAP4612C)* *-Artificial Intelligence (AI) for the Workplace Artificial Intelligence and Machine Learning* *-Introduction to AI* *-Data Analytics & AI*	*-Artificial Intelligence Laboratory Development* *-Panel Discussion on AI's Future* *-AI-Focused Educational Resources*
Palm Beach State College (PBSC)	*-Applied Artificial Intelligence Associate in Science* *-AI Certification* *-Artificial Intelligence (AI) Thinking (CAI1001)*	*-Faculty Training in AI Integration* *-Federal Funding for AI and VR Training* *-STEM Expo: Bits, Bytes & Beyond*
Hillsborough Community College (HCC)	*- Associate Degree in AI* *-Certificate in Artificial Intelligence Practitioner*	*-AI Incubator Network Grant* *-Financial Technology Program in AI* *-AI Chatbot Implementation*
Florida State College at Jacksonville (FSCJ)	*-AS in Applied AI* *-Introduction to AI course* *-AI and Machine Learning*	*-AI Machine Learning Bootcamp* *-Artificial Intelligence Pedagogy Certificate* *-AI Resources for Faculty*

College of Central Florida (CF)	*-A+ Fundamentals (CET 1278)* *-Digital Art (ART 1201C)*	*-AI Pedagogy Resources for Faculty* *-Corporate Training in AI*
St. Petersburg College (SPC)	*-CAI 1000: Introduction to Artificial Intelligence* *-CAI 1002: Artificial Intelligence Responsible Use Practitioner*	*-Geospatial/Artificial Intelligence (AI) STEM Training Program* *-Funding for AI and Semiconductor Training*
Valencia College	*-AI 2000: Introduction to Artificial Intelligence* *-CAP 2000: Machine Learning Essentials*	*-Presidential Commission on AI* *-AI in Higher Education Conference*
Tallahassee Community College (TCC)	*-Applied Artificial Intelligence Associate of Science Degree* *-Introduction to Artificial Intelligence*	*-AI Adventures: Intro to Machine Learning (Youth Program):* *-High-Technology Lab Classrooms*
Indian River State College (IRSC)	*-Certification: Smart Automation, AI and Robotics* *-DIG 3703: Modeling and Simulation Principles*	*-AI & Education Lib Guides* *-STEAM Talk: Robots and AI - The Past, Present, and Future*

Clearly, AI activities at Florida State Colleges are diverse and focused on providing students with the skills, knowledge, and experience necessary to succeed in an increasingly AI-driven workforce. By combining academic offerings, workforce training, and collaborative research, Florida's state colleges are playing a crucial role in supporting the state's technological advancement and economic growth. In addition, because of statewide articulation agreements, the programs offered by the State Colleges that lead to an AA degree are easily transferable to the State University System, making higher educational opportunities (e.g., BS, MS and PhD) in AI accessible to many more students.

VII. Summary Reflections: Florida's AI Ecosystem

Boosting America's technological leadership [26, 27, 28] is an issue of great importance given that the nature and pace of global competition in AI and China's openly stated goals of world dominance in AI and quantum computing, along with its investments and its increasing talent pool in AI. A major goal for the US, generally speaking, and more specifically for Florida, is to continue to advance its postsecondary initiatives in AI. Specifically, Florida has established an initial infrastructure [29] designed to boost widespread integration, use, and development of AI in undergraduate and graduate programs (e.g., institutional Quality Enhancement Programs (QEP focused on AI such as the University of Florida; Miami State College BS in AI), to increase resources, funding, and offering attractive statewide programs necessary to recruit many more Florida students from the large talent pool that already exists across Florida's many postsecondary institutions. These focused actions will enable Florida to contribute to making America the technological leader.

Further, given that AI systems are becoming more ubiquitous and leading to massive advances across all industries, research endeavors, services, product development, and literally part of the lives of millions of people, the need for advancing AI across the broader computer science landscape [30, 31] is a requirement that necessitates greater attention to resources and the preparedness of an AI-CS highly skilled workforce. Evidence presented in this paper as to the scope and variety of resources (i.e., certificates, degrees, apprenticeships workforce development and career opportunities) across Florida's postsecondary institutions demonstrates that Florida is positioned to move forward in addressing and contributing to the national landscape in advancing and addressing the many AI challenges.

Finally, the State of Florida with its many AI programs and initiatives, as highlighted in this paper, has demonstrated that engaging in (a) statewide, government, and industry/research-based funding, (b) advocating for universities and state colleges to host postsecondary-industry advisory boards, and (c) increasing the number and variety of Florida's growing workforce development initiatives have all contributed to advancing AI programs throughout the State, creating a College -University ecosystem. This robust industry-academic landscape is essential

for Florida to maintain high quality AI programs while also supporting both the needed research and the generation of new ideas to advance AI. [32, 33, 34,35].

VIII- References

1. Department of Labor, Bureau of Labor Statistics; Projections overview and highlights, 2023–2033, https://www.bls.gov/opub/mlr/2024/article/labor-force-and-macroeconomic-projections-overview-and-highlights-2023-33.htm [Access Date: January 14, 2025].

2. Department of Labor, Bureau of Labor Statistics; Employment in STEM occupations, August 2024; https://www.bls.gov/emp/tables/stem-employment.htm [Access Date; January 14, 2025].

3. United States Census Bureau: The Intersectionality of Sex, Race, and Hispanic Origin in the STEM Workforce, https://www.census.gov/library/working-papers/2019/demo/SEHSD-WP2018-27.html; [Access Date January 14, 2025;].

4. United States Census Bureau: Disparities in STEM Employment by Sex, Race, and Hispanic Origin, https://www.census.gov/library/publications/2013/acs/acs-24.html; [Access Date: January 14, 2025].

5. Department of Labor, Bureau of Labor Statistics; Occupational Outlook Handbook; 2024; https://www.bls.gov/ooh/ [Access Date: January 14, 2025].

6. Accenture. (2020). AI: Built to Scale. Retrieved from https://www.accenture.com/us-en/insights/artificial-intelligence

7. McKinsey Global Institute. (2021). The future of work after COVID-19. McKinsey & Company. Retrieved from https://www.mckinsey.com/business-functions/organization/our-insights/the-future-of-work-after-covid-19

8. EdTech Magazine. (2022). How AI is Transforming Education. Retrieved from https://edtechmagazine.com/higher/article/2022/01/how-ai-transforming-education

9. IDC. (2021). Artificial Intelligence in Business: A $19.9 Trillion Opportunity. International Data Corporation. Retrieved from https://www.idc.com

10. World Economic Forum. (2020). *The Future of Jobs Report*. Retrieved from https://www.weforum.org/reports/the-future-of-jobs-report-2020.

11. McCarthy, M. Minsky, M. Rochester & C. Shannon. " Artificial Intelligence Coined at Dartmouth". 1956.

12. McCulloch, W.W. & Pitts, W. A Logical Calculus of Ideas Imminent in Nervous Activity, Bull. Math. Biophy., 5, 115, 1943.

13. McClelland, J. L. & Rumelhart, D. E. The PDP Research Group, Parallel Distributed Processing Explorations in the Microstructure of Cognition, Vol. 2: Psychological and Biological Models, MIT Press, MA, 1986.

14. Rosenblatt, F., Principles of Neurodynamics, Spartan Press, Washington, DC, 1961.

15. Minsky, M. & Papert, S. (1969). Perceptron: An Introduction to Computational Geometry, MIT Press, MA.

16. Krizhevsky, A., Sutskever, I., & Hinton, G. E. (2012). ImageNet Classification with Deep Convolutional Neural Networks. Advances in Neural Information Processing Systems (NeurIPS), 25, 1097-1105.

17. Hinton, G. E., & Parker, D. (1986). *Learning representations by back-propagating errors*. *Neural Computation*, 1(3), 441-453.

18. Hinton, G. E., Osindero, S., & Teh, Y. W. (2006). A fast learning algorithm for deep belief nets. Neural Computation, 18(7), 1527-1554.

19. Hinton, G. E., LeCun, Y., & Bengio, Y. (2018). Deep learning. Nature, 521(7553), 436-444.

20. Official Nobel Prize Announcement (2024): Nobel Prize in Physics 2024

21. Nature's Coverage of the 2024 Nobel Prize in Physics: https://www.nature.com/collections/ehbjaifcgc?utm_source=chatgpt.com

22. Katsamakas, E., Pavlov, O. V. & Saklad, R. (2024). "Artificial Intelligence and the Transformation of Higher Education Institutions," arXiv. Available: https://arxiv.org/abs/2402.08143

23. V. Diaz. (Feb. 2024). "Exploring the Opportunities and Challenges with Generative AI," EDUCAUSE Review. Available: https://er.educause.edu/articles/2024/2/exploring-the-opportunities-and-challenges-with-generative-ai.

24. Maggioncalda, J. (March, 2024)."How AI Can Address Critical Challenges Facing Higher Education," EdSurge. Available: https://www.edsurge.com/news/2024-03-29-how-ai-can-address-critical-challenges-facing-higher-education

25. Researchers at NORC at the University of Chicago, "Artificial Intelligence in STEM Higher Education: Opportunities and Challenges," NORC, 2024. Available: https://www.norc.org/research/library/artificial-intelligence-in-stem-higher-education.html

26. Various Authors, "Artificial Intelligence in Higher Education: Challenges and Opportunities," ResearchGate, 2024.

https://www.researchgate.net/publication/359080609_Artificial_Intelligence_in_Higher_Education_Challenges_and_Opportunities

27. U.S. Department of Education, "Navigating Artificial Intelligence in Postsecondary Education: Building Capacity for the Road Ahead," 2025.

28. National Artificial Intelligence Research and Development Strategic Plan. A Report by the Select committee on Artificial Intelligence of the National Science and Technology Council. (2023, May).

29. Southworth, J., Migliaccio, K., Glover, J., Glover, JN, Reed, D,. McCarty, C., Brendemuhl, J. & Thomas, A. (2023). Developing a model for AI across the Curriculum: Transforming the higher education landscape via innovation in AI literacy. *Computers and Education: Artificial Intelligence*. 4

30. Aiken, A., Jensen, D., Gill, C., Gropp, W., Harsha, P., Mosley, B., Reed, D., & Regli, W. (2024-2025). *Reclaiming the Future: American Information: Technology in an Era of Global Competition*. CRA Quadrennial Paper.

31. Hagar, D. G., Bryant, R., Horvitz, E., Mataric, M. & Honavar, V. (2017). Advances in Artificial Intelligence require progress across all of computer Science. https://cra.org/ccc/resources/ccc-led-whitepapers/.

32. Boules N., Douglas K., Feldman S., Fix L., Hager G., Halpern B., Hebert M., Lopresti D., Mynatt E., Rossbach C., & Wright H.V. (2016). The Future of Computing Research: Industry-Academia Collaborations, Version 2: A white paper prepared for the Computing Community Consortium committee of the Computing Research Association. https://cra.org/ccc/resources/ccc-led-whitepapers/.

33. Patel S., Rexford J., Zorn B., & Morrisett G. *Evolving Academia/Industry Relations in Computing Research. (2019)*. https://cra.org/ccc/resources/ccc-led-whitepapers/.

34. Gil, Y., Selman, B., et al. Executive Summary: A 20-Year Community Roadmap for Artificial Intelligence Research in the US. Computing Community Consortium (CCC) and the Association for the Advancement of Artificial Intelligence (AAAI). (2019, August).

35. National Artificial Intelligence Research and Development Strategic Plan. *A Report by the Select committee on Artificial Intelligence of the National Science and Technology Council*. (2023, May).

36. Department of Education Report Office of Educational Technology "Artificial Intelligence and the Future of Teaching and Learning: Insights and Recommendations"- May 2023; Retrieved on Feb. 2025 from https://digital.library.unt.edu/ark:/67531/metadc2114121/

37. Chen, W., Liang, Y., & Liang, D. (2020). "Artificial intelligence in education: A review of the literature." Educational Technology Research and Development, 68(1): 65-83.

38. Yang, Y., & Chen, Y. (2020). "The integration of artificial intelligence in education: A systematic review." Journal of Educational Technology Development and Exchange, 3(1): 1-17.

39. Humphries, J., & Smith-Burrell, R. (2024). Navigating challenges: AI education in state and community colleges. Presented at the annual conference of Teaching and Learning with AI: Presentations, 53. https://stars.library.ucf.edu/teachwithai/2024/monday/53.

40. Partridge, H., & Piccoli, G. (2018). "Artificial intelligence in education: Opportunities and challenges." Journal of Educational Technology Development and Exchange, 1(1): 1-15.

41. Wu, Q., & Liang, Y. (2019). "A review of artificial intelligence in education technology." Journal of Educational Technology Development and Exchange, 2(1): 1-16.

42. University of Florida AI Initiative. *AI Ethics at UF*. University of Florida. Retrieved from https://ai.ufl.edu/about/ai-ethics.

43. University of Florida News. (2022). *UF joins global collaboration for human-centered AI development.* University of Florida. Retrieved from https://news.ufl.edu/2022/11/rome-ethics.

44. Duryea, E. (2025, January 28). *UCF Helps Develop AI Tool That May Assist Underserved Hospitals*. University of Central Florida News. Retrieved from https://www.ucf.edu/news/ucf-helps-develop-ai-tool-that-may-assist-underserved-hospitals/