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EV Apprenticeship Programs Continuation

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Community College of Allegheny County

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Safety21
Community College of Allegheny County
Annual Report 2024-2025

EV Technician Apprenticeship Program Launch

During the 2024–2025 program year, the Community College of Allegheny County (CCAC) successfully launched the first registered EV Technician Apprenticeship program in the United States, marking a significant milestone in workforce development for the transportation sector. This initiative was developed in close partnership with the German American Chamber of Commerce (GACC) and Pittsburgh-area automotive dealerships, with the curriculum rooted in the German Dual System of Vocational Education.

The apprenticeship program enrolled its first cohort of working technicians in Spring 2025. These students attend evening classes twice a week at CCAC's West Hills Center, with instructional costs supported by dealership sponsorship. The program design emphasizes real-world application and includes hands-on training with high-voltage EV components using Lucas Nuelle training equipment, procured through joint funding from GACC and other partners.

CCAC faculty, including Dr. Justin Starr and Professor Robert Koch, collaborated extensively with German counterparts to ensure that best practices from the European apprenticeship system were integrated into the new U.S.-based model. The initial implementation has been met with high praise from students, employers, and faculty. In recognition of its success, CCAC is already planning to convert the noncredit apprenticeship into a for-credit certificate program as part of the College's formal governance process.

Orbital Logistics Research through SSEP

The project also enabled continued participation in the Student Spaceflight Experiments Program (SSEP), with CCAC supporting two new teams of students exploring topics in orbital supply chain and microgravity experimentation. These experiments—designed to study the behavior of slime molds and the growth of crystalline structures in space—were reviewed by a panel of commercial aerospace professionals from Astrobotic and NASA. Although only one of the experiments successfully launched to the International Space Station (ISS) due to supply chain delays affecting SpaceX resupply missions, both were lauded for scientific rigor and innovation.

The flown experiment was transported aboard SpaceX CRS-30, marking another high-profile example of community college students directly engaging in cutting-edge aerospace research. The second experiment is slated for launch in 2026. Students involved in this program gain valuable insight into the constraints of orbital logistics, experiment design for microgravity, and long-term implications for space-based supply chains.

CCAC remains committed to the SSEP program and has expanded outreach efforts through patch design contests, attracting participation from regional high schools and Career and Technology Centers. These efforts continue to increase STEM awareness among pre-college audiences while strengthening CCAC's pipeline of future students.

Technology Transfer through Industry Internships

Another major focus of the project was student engagement in applied research and technology transfer. With Safety21 support, CCAC facilitated student internships at local technology firms, enabling participants to contribute to the commercialization of AI-driven transportation solutions.

One student interned with Realbotics, where they helped integrate AI-based path planning algorithms into a mobility scooter platform. This work applied robotics concepts developed in CCAC's Connected Vehicle Sensors Lab and culminated in a commercially released product for individuals with limited mobility.

Another set of students worked with ClearObject, an industrial AI firm, on the development of a machine learning-based defect classification system for sewer inspections. Their involvement ranged from training data pipelines to evaluating classification performance. This collaborative effort resulted in deployment of an AI-enhanced inspection platform currently in use by municipal utilities and contractors.

These internships exposed students to the business side of technology development, including market fit analysis, prototype validation, and customer feedback loops. For many participants, this marked their first professional experience in a research-to-commercialization environment and reinforced the value of combining technical skills with entrepreneurial thinking.

Robotic Safety Systems Textbook Publication

In addition to these project activities, Dr. Starr finalized and released his textbook, Robot Safety Systems: An Applied Approach, co-authored with Realbotics CEO and CCAC adjunct faculty member Christopher Quick. The book synthesizes insights from Mobility21 and Safety21 projects and presents a comprehensive guide to safety frameworks for autonomous systems, including autonomous vehicles, UAVs, mobile robots, and industrial robotics.

Published by CRC Press in late 2024, the book is now in use at multiple academic institutions and has been endorsed by industrial partners such as Festo Didactic and Universal Robots. It is particularly valuable in academic settings that prepare students for careers in automation, robotics, and intelligent systems design.

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16. Abstract

CCAC is proposing continuing development of the first EV Technician apprenticeship program in the country, based on standards developed by the German government and a consortium of European automakers. Specifically, CCAC proposes to add several trainers developed by Lucas Neulle for working on HV battery systems, PHEV systems, and support a visiting instructor from Germany to provide guidance on labs for alternative fuel vehicle curriculum and on-the-job training programs. We will also support student teams focused on orbital logistics for the Student Spaceflight Experiment Program, design a series of computer vision labs for technician education programs using Arduino hardware, and support student participation in aftermarket EV training programs, as a model for continuing education for existing mechanics and independent repair shops. As part of this effort, CCAC will work closely with the German American Chamber of Commerce to ensure that the EV Technician Apprenticeship program is registered with the PA Department of Labor and Industry. We will also publish and codify our AI general education materials developed in the last year of this program as open educational resources for adoption by other two-year colleges.

This project will create several frameworks for workforce development as well as freely available curriculum for technician education. As AI and AV technology continues to advance at a rapid pace, it is critical to integrate technician education - beyond automotive technologies. In the Greater Pittsburgh Area, manufacturing technicians report working alongside autonomous transportation systems and using large language models to complete their daily work. Integrating modules on AI and releasing these modules to the public will enable other community colleges and institutions of higher education to adopt these programs without incurring the costs of development. By using apprenticeship programs to implement these programs, we expect to have a direct impact on employers and manufacturers in the regional economy, ensuring impacts extend beyond education. Additionally, actually launching the EV Technician apprenticeship program will provide a first for Pittsburgh and Safety21 on the national scale – it will be the first registered EV apprenticeship program in the United States.

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