

STCC's Internet of Things Certificate prepares students for evolving field

SPRINGFIELD – Nicholas Bishop doesn't have to be at home to turn on his air conditioning or interact with his home's systems. He can adjust the temperature with an app on his smartphone, check on his solar collectors or interact with his electric car and he can do so whether he's on vacation or at work at Springfield Technical Community College (STCC).

Bishop is using Internet of Things (IoT) technology when he's controlling everyday objects through the Internet. He even has an app to monitor his electric vehicle from afar.

"You almost can't buy anything today without it," Bishop said, noting that he recently purchased a window air-conditioning unit that is accessible through the Internet.

Bishop not only uses the technology; he is the lab technician for a new and innovative certificate program at STCC called Internet of Things.

The program may be the only one of its kind in the nation, said Gary Mullett, a professor in the Electronic Systems Engineering Technology program. STCC is accepting applications for classes, which begin in the fall.

While there are a couple of graduate-level programs in the country, Professor Mullett wasn't aware of any other certificate program offered at the community college level.

The STCC program will prepare students to work in "smart" buildings, where energy and lighting is controlled through the internet, and in medical facilities where machines are connected to networks, among other locations with IoT technology. Students also will study how the technology applies to motor vehicles, security systems, environmental monitoring, smart manufacturing and smart homes.

"STCC is a leader in this field," said Mullett, who is principal investigator for a three-year \$599,388 National Science Foundation grant to develop "The Internet of Things



Turley Publications Photo courtesy of James Danko

Edward Bigos, chair of the Electronic Systems Engineering Technology program at STCC, helps Springfield Public Schools teachers who received IoT training in July. They are Stephanie Methe, left, and Sandra Lambert.

Education Project" to bring IoT learning into secondary schools. In July, teachers from area schools received training at STCC.

Edward Bigos, chair of the Electronic Systems Engineering Technology program and one of the IoT instructors, helped create the curriculum. While the program will be taught at the STCC campus, Mullett and Bigos hope to someday take the program online, which will open up classes to anyone regardless of their location. Bigos describes the IoT program at STCC as a field of study that falls between electronics and information technology.

"IoT goes right through the middle," Bigos said. "It involves computer technology. It involves sensors, actua-

tors, and electronics. This could be for people with an electronics background and interest in building connected things. They might like IT, but want to work with their hands more."

Bigos said more and more businesses are using IoT, particularly in the medical field where devices that keep people alive are connected to the Internet. Medical professionals can monitor a patient through the Internet, but if security is breached someone not authorized can take control of a machine and potentially cause harm.

"There's a lot of commercial equipment that isn't secure," Bigos said.

The potential of being hacked is a serious problem facing businesses and private citizens who have IoT devices

in their homes or in their cars. A hacker could access a camera inside a home or a computer system in a vehicle.

Other examples of potential nightmarish cybersecurity breaches include toys with IoT technology. Hackers have been able to access the toys to communicate with children or to collect private information.

Students who complete STCC's one-year IoT certificate program will be prepared to evaluate commercial products and help companies develop and implement security strategies. Businesses need to hire IoT technicians who can look under the hood and find potential security problems with their technology.

Businesses will also need trained IoT technicians who can help maintain equipment that is run with technology manufacturers no longer support. Automotive, building management, manufacturing, HVAC, health care, and civil engineering professionals may use the certificate program to extend their knowledge to integrate the Internet of Things into their professions.

An electronics professional with an understanding of electronic devices and sensors should consider enrolling in the IoT certificate program to expand their knowledge to include network communications, network security and IT tools and services.

An information technology professional should consider enrolling in the IoT certificate program to expand their knowledge to include sensor networks, IoT security and the best practices to securely integrate IoT devices into information technology networks.

Additionally, students from STCC in Biomedical Engineering Technology, which prepares students to repair and maintain medical equipment, or other health industry related programs may opt to continue their education and expand their knowledge of IoT systems with a certificate in the Internet of Things.