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Program

# Electronics buys robot arm to develop new class

Chip Cody, associate professor/chair, electronics, demonstrates the capabilities of electronics' new robot arm.

**Using a \$25,000** Perkins grant, JCCC's electronics department purchased a programmable six-degree-of-freedom robot arm to teach students how robots are used in industry.

Faculty will receive training on the machine this spring with the goal of developing an industrial robot class by fall 2010. JCCC already offers an elective, *Electronics 127 – Robots for Humans*, which serves as an introduction to the growing field of robotics. An industrial robot class would teach students how to build, program, test and maintain robots in industry – everything from car manufacturing to automated self-checkouts.

“Robots are good candidates for jobs that are either too dangerous for humans or highly repetitive and monotonous,” said Chip Cody, associate professor/chair, electronics. “Robots are accurate. They do exactly what you tell them to do every time. They never get tired, bored or call in sick.”

JCCC's robot features base, waist, shoulder, elbow, wrist and hand rotation – referred to as the six axes of freedom. Weighing several hundred pounds, the machine looks like a giant popcorn cart constructed with a quarter-inch steel working surface and requiring a double-wide door for access to the electronics lab.

As in the *Robots for Humans* class, students in the proposed class would learn about the robot's hardware, things like sensors and actuators, and enough software programming language to teach the robot a task.

Cody explains that programming involves coordinating the axes of motion and that can be accomplished in two ways — either by means of a microprocessor or by taking the robot manually through an operation and having its sensors store the action in its computer.

“A robot senses the outside world, and based on what the sensor tells it, it takes action,” Cody said. “A robot constantly goes through a sense-react-sense loop. Students work with small kits in the 127 class, but this is the first time the college has had an industrial-strength machine.”

Interest in robots has been generated by students who have participated in high school robotics competitions such as FIRST (For Inspiration and Recognition of Science and Technology) founded by Segway inventor Dean Kamen. Students with those experiences want to progress from JCCC's *Microprocessors* class to the robot class where the microprocessors serve as the robot's “brain.”

Cody says there is a demand for graduates with two-year electronic degrees to work in industry to maintain robots.

“Robots are here to stay. That's the wave of the future,” Cody said. “They may not all look like C-3PO, but they are everywhere – from assembly lines to NASA's Mars Exploration Rover Project.”



The robot arm will have broad application.