

College of the Canyons Implements Robotics into Welding Technology Program

The institution takes on robotic programming training to meet industry demands and open the job market for welding students

BY ROLINE PASCAL

In the 1800s, Santa Clarita Valley was home to cowboys, Native Americans, and sodbusters. In fact, its western history of outlaws, gold rushes, as well as oil booms and busts is one of the valley's biggest claims to fame. However, a transformation from dusty fields for sodbusters to a developing suburbia emerged, and in 1967, the residents wanted a college to call their own. That year they voted overwhelmingly to make it happen. Thus was born the Santa Clarita Community College District and its campus, College of the Canyons (COC), which would go on to become one of the fastest-growing community colleges in California.

College of the Canyons officially opened, in a Newhall Avenue bungalow, on September 22, 1969, but it would soon find a new home. On October 5, 1970, the college's first on-campus classes began. At the start of the second academic year, more than 1200 people were attending classes. It was a strong indicator of the growth that was to come.

A Welding Program is Born

College of the Canyons has built a reputation for student success since first opening its doors in 1969. In fact, the college ranks among the best in California for student completion rates. It had become abundantly clear that COC had a vital purpose. The vocational-technical building, which would house career technical education (CTE) programs such as welding, opened to some 500 students in the fall of 1975.

A collective decision by the district



Fig. 1 — Department Chair Tim Baber heads the welding technology program, a cornerstone of COC's career technical education program.

to open a welding program to afford students an in-demand occupation learning opportunity was developed, and in the late 1970s, the welding technology program was born.

The welding program, which was headed by sole faculty member Jack Compton, was housed within an existing Automotive Technology program that was eventually cancelled. This cancellation opened more lab space, which Compton used to expand the program.

Welding has been a cornerstone of the school's CTE program for more than 30 years — a symbol of the college's commitment to fostering regional economic development on numerous levels. The welding technology program offers courses that range from introductory to technologically

advanced welding processes used in today's industry.

Led by Department Chair Tim Baber, the college's welding program strives to provide a number of industries — construction, aerospace, fabrication, piping, petrochemical, motorsports, repair and maintenance, shipbuilding, and heavy equipment — with skilled welders trained in the latest welding techniques, on the newest equipment — Fig. 1.

Welding technology students can earn an associate of science degree and a certificate of achievement, both with four emphasis options to choose from, as well as two additional certificates of specialization. The certificate of achievement in welding technology program can be completed in 18 months. This 18-month program is an effective way to enter into today's automation industry. It requires the completion of 30 units, with students choosing from various emphases, including combination welding, industrial welding, metal fabrication, or pipefitting and robotics. Students who want to earn an associate of science degree take an additional 30 units in general education courses. After completing 50% of the course and having good standing, they are eligible to seek assistance in securing an internship through the Cooperative Work Experience Education program offered at the college.

"The college has a solid relationship with local employers. The Santa Clarita area is comprised of all sorts of manufacturing from medical device to aerospace...we have established welding internships with several companies," said Baber. "I've seen the num-



ber of inquires to my office from local companies looking for welders increasing almost on a weekly basis. When a company approaches me for welders, I immediately involve our Career Services department.”

Students also have the opportunity to complete the program in less than one year. This is the fast track of earning a certificate of specialization for shielded metal arc welding (SMAW) or robotic welding automation. They can learn to weld structural steel or gain the technical and applied skills required to perform advanced programming and operational tasks for robotic welding. Both specializations require 16.5 units to graduate.

College of the Canyons offers a multitude of programs ranging from conventional welding processes to robotic and laser technology, including SMAW, flux cored arc welding (FCAW), gas metal arc welding (GMAW), gas tungsten arc welding (GTAW), laser beam welding (LBW), and the recently added robotic gas metal arc welding (robotic GMAW) — Fig. 2.

Introducing Robotic Welding

In the last ten years, the robotics industry has grown faster than expected. Driven by industry demands, welding robots have been the subject of a lot of attention. With the current welder shortage issues in the United States, manufacturers are looking at implementing robotic welding to combat the job shortages within the industry while creating new jobs centered around programming and robot maintenance. This has led to the necessity of robot programming training, and COC’s welding program is one of the few programs that has taken on the responsibility.

“The idea to implement a robotics program at COC generated from the continual feedback we received from our advisory board members starting in 2008. In turn, I applied for a California State Chancellor’s Office Industry Driven Regional Collaborative grant in 2009 to create such a program,” explained Baber.

The college was not awarded the grant that year, so Baber resubmitted the same proposal the following year, and the program was awarded \$350,000 to build a robotics program. With additional funding, two Lincoln Electric System 5 robotic cells and four Lincoln Electric Robotic Welding Edu-

Fig. 2 — Welding students micro-laser weld aluminum joints.



Fig. 3 — A and B — Class participants perform programming tasks during a basic robotic welding class.



Fig. 4 — COC's 10,000-sq-ft facility includes a metrology and metal fabrication lab. Pictured is the photo equipment housed with the metal fabrication lab.

cation Cells were added. These robotic welding training systems help students learn how to perform automated GMAW as well as allow instructors to teach programming in the classroom and then move through a standard doorway to the lab for welding.

“What makes us stand out from other welding programs is the curriculum we offer using the latest technology equipment. We are fortunate to have an administration that promotes faculty to be innovative and entrepreneurial. I also believe we have been successful with the support from our industry partner Lincoln Electric,” said Baber.

The additional leveraged funding allowed faculty to attend training at both Lincoln Electric and FANUC robotics, which in turn allowed Baber and COC to create the robotic welding program that includes three levels of courses that lead to a certificate of achievement award.

“The impact of adding robotics to our program is still evolving. I say this because of the audience or level of students we are serving. Our first two cohorts of students were made up of students currently in the program who were just curious or perhaps from other programs like engineering,” said Baber.

Robotic welding training is commonly used for high-production appli-

cations and requires in-depth knowledge surpassing conventional welding. In robotic GMAW, the teach pendant is used for programming and the controller facilitates the entire robot application — Fig. 3. Enrollments in the robotics program tend to fluctuate each semester. Baber acknowledges that attracting and retaining new students can be challenging.

“A student should have some knowledge of welding prior to taking our robotics courses and assigning a prerequisite GMAW course would be a likely tool to use. However, this limits the overall course enrollment to a great extent,” said Baber. “In order to address this situation, the robotics curriculum includes training for hands-on GMAW in addition to training on our Lincoln Electric VRTEX® 360 virtual welders.”

He is also looking to address the length of time to complete the program, including course offerings under five weeks in lieu of a full 17-week format.

The Facility

College of the Canyons became an American Welding Society (AWS) approved Testing Center (ATC) for the Certified Robotic Arc Welding (CRAW) certification in 2018, making the college one of seven programs in the na-

tion, and the only one in California, to have this status.

To become an ATC, a facility must prove that it has the necessary facilities, equipment, and support personnel. A Certified Robotic Arc Welding Technician (CRAW-T) is required to administer the CRAW test and conduct the necessary destructive testing of the hands-on test sample. According to Baber, the college is working to begin offering CRAW seminar/exams this year.

The facility takes up about 10,000 sq ft of space. There are 34 multi-process welding booths, 11 GTAW booths, six robotic welding cells, 15 Nd:YAG laser welding machines, a metrology lab, and a fully appointed metal fabrication lab — Fig. 4.

The facility also serves as a license agency for the Department of Building Safety for welder certification testing.

“Students appreciate being able to train and take their certification test at the same facility. In addition, I feel that our robust SENSE-aligned curriculum and advanced technology equipment is second to none in comparison to other programs in our immediate area.” Several instructors have extensive industry experience and hold current CWI/CWE status.

Baber himself is an AWS Certified Welding Inspector (CWI), Certified Welding Educator (CWE), and CRAW-T.

What's to Come?

Baber gave a glimpse of the next steps for the college's welding robotics program, such as developing a new course for online programming and a

marketing plan.

"I'm currently in the process of developing a course to add to the robotics program for offline programming (WeldPro™). This will allow students to create, modify, and test run pro-

grams they develop outside of class, which will improve their proficiency in robotic programming," he said.

Additionally, the program is planning on increasing its social media marketing to cast for a wider web of students. [WJ](#)

For more information about the welding technology program, contact Department Chair Tim Baber, Tim.Baber@Canyons.edu, or (661) 362-3062.

Welding Program Is Attracting the Next Generation of Skilled Talent

The shortage of a skilled manufacturing workforce is not news to those in industry. One reason for the shortage is that public misperceptions of advanced manufacturing has led young people entering the workforce to choose other career paths. College of the Canyons' welding technology program and Tim Baber are working to change the image of manufacturing and prepare youth for careers in advanced manufacturing.

The program offers Nuts, Bolts, & Thingamajigs® (NBT) summer manufacturing camps to students age 12 to 16, where campers have the opportunity to see manufacturing up close. They work in a real-life welding and metal fabrication laboratory using many of today's common welding processes, including virtual reality welding. They also cut, drill, and shape metal into various projects.

"Summer Nuts, Bolts, & Thingamajigs® manufacturing camps are big in our program. We have been offering NBT summer camps for over five years now," said Baber.

The NBT camps serve many different purposes, but most importantly, they provide high school students with a one-week opportunity to learn about manufacturing. Baber has served on the Fabricators & Manufacturers Association Certified Education Center council for several years.

"Running the NBT camps has served our program well over the years as we have former NBT students enrolling in our programs as a result of



A Boy Scout completes his Welding Merit Badge using flux cored arc welding.

their experiences. Our high schools now expect us to run NBT camps," he said.

The program also has a fully appointed Welding Roadshow trailer that is taken to on-campus and outside local career day events. The trailer contains multiprocess welding machines, a plasma arc cutting machine, and a Lincoln Electric Robotic Welding Education Cell and virtual reality welding machine.

"This trailer allows us to bring welding to junior high and high school campuses and expose students to welding," said Baber. "Students are ex-

posed to not only the hands-on aspect of welding, but more importantly, the career opportunities now available.

The trailer helps us create a potential feeder of future students."

Additionally, faculty members from the college's welding technology department regularly host "Welding Merit Badge" events designed to introduce The Boys Scouts of America (BSA) to the world of welding while helping Scouts earn their merit badges (see photo). In 2016, COC was named the Community Organization of the Year by the BSA Western Los Angeles County Council.

ROLINE PASCAL (rpascal@aws.org) is assistant editor of the Welding Journal.