

# For Hire: Hands-on Problem Solvers

*Employers who need workers with a welder's hands and an engineer's mind can find them at Pennsylvania College of Technology*

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*Student Matt Keller, Cogan Station, Pa., is developing his skills for shielded metal arc welding in the overhead position.*

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**BY MARY RUTH JOHNSEN**



*Fig. 1 — Student Derek Weeks of Floyd, Va., prepares for an orbital weld. Weeks entered Penn College in part because it offered small class sizes. He expects to graduate this spring.*

A healthy dose of hands-on training, small class sizes, a setup that makes it easy for students to move from the associate to the bachelor's degree program, and instructors with work experience in their field and close ties to industry are the hallmarks of the welding program at Pennsylvania College of Technology, Williamsport, Pa.

Those are the attributes that prompted student Derek Weeks (Fig. 1) to seek a bachelor of science degree through the school's Welding and Fabrication Engineering Technology program. Weeks had completed a welding certificate program at a community college near his home in Floyd, Va., then entered a large university in another state in hopes of becoming an engineer. Auditorium-style classes filled with several hundred students weren't to his liking, however, so he began looking for a smaller school. He transferred to Pennsylvania College of Technology after touring the campus and meeting the welding instructors. Weeks is currently chair of the school's American Welding Society Student Chapter and expects to receive his B.S. degree this spring.

"I like the smaller class sizes," Weeks explained. "The average in my welding classes is 15 and the others have up to 20. You really get to know the teachers, and I like the mix of theory and practical."

"The uniqueness of our program is that students can start in the two-year program and easily transfer to the four-year program with no interruptions (2+2)," explained Assistant Professor Robert Vaughn. "Also, we emphasize a very strong hands-on approach to welding engineering technology."

## Penn College

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*Fig. 2 — Student Terry Bly, Jr., Milton, Pa., uses a teach pendant to set up a robot for welding.*

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Pennsylvania College of Technology, commonly known as Penn College, was founded in 1989 as an affiliate of The Pennsylvania State University. However, its roots go back to 1914 when a small high school industrial shop began offering adult education and training programs. Many of the first students to enroll were disabled World War I veterans seeking retraining. In 1941, the Williamsport Technical Institute was formally established, training workers to meet defense industry needs and later training returning World War II vets. The school became Williamsport Area Community College in 1965, and was the foundation for Penn College.



The school, which bills itself as "Pennsylvania's premier technical college," offers 36 baccalaureate degrees, 61 associate degrees, 10 two-year certificate programs (including welding), 3 one-year certificate programs, and 4 other types of associate programs. Enrollment for the Fall 2004 semester was 6358 students, of whom 65% are male and 35% female. More than 90% of the students come from Pennsylvania; however, according to Welding Department head Michael Nau, the welding programs draw students from all over the Northeast.



## Welding at Penn College

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*Fig. 3 — Student Phillip Henney, Huntington, Pa., CNC plasma arc cutting.*

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Besides the two-year welding certificate, the school offers an associate of applied science degree in Welding Technology and a bachelor of science degree in Welding and Fabrication Engineering Technology

(BWE). Currently, 5 full-time and 9 part-time instructors offer welding instruction to 126 full-time and 7 part-time students, Nau said. Fifty-two of those students are working toward a bachelor's degree.

No matter which program students are in, Nau said, "They get the same amount of welding time." During the first two years, the programs vary by the number and types of general education courses required rather than differences in the welding curricula, he explained. During the second two years of the baccalaureate program, students take engineering-related courses such as Engineering Economics, Computer Solutions of Engineering Problems, and Manufacturing Process and Organization. Having the students from each program take the same welding courses makes for easier scheduling and for better use of lab facilities and instructor time, Nau explained.

Classes for full-time welding students run from 8:00 a.m. to noon and from noon to 4:00 p.m., with four welding classes running at the same time. Classes for students in related majors taking welding courses are offered in the evening, Vaughn explained.

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*Fig. 4 — Student Matthew Keller, Cogan Station, Pa., set to watch an orbital weld.*

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Lab facilities include 24 oxyfuel stations, 48 stations for shielded metal arc and gas tungsten arc welding, and 24 stations for gas metal arc and flux cored arc welding (see lead photo). Additional equipment includes two robot cells, a CNC plasma arc cutting machine, and equipment for orbital and submerged arc welding — Figs. 2-6.

The school also offers instruction in destructive and nondestructive testing. Students learn dye penetrant, magnetic particle, ultrasonic, and radiographic testing.

So what is Welding and Fabrication Engineering Technology? According to the Penn College catalog, this career "is structured to support welding and joining operations where engineers pass plans and projects to mid-management personnel who must carry out the planning, organization, and delivery of manufacturing projects. Emphasis is on developing skills needed to lead projects and interface with engineering and development teams. Students have the opportunity to prepare for careers in mid-management and supervisory positions, as well as technical positions, sales, service, or research."

The stated goals for the program are to prepare students to

- "solve manufacturing problems using computer hardware and software.
- "solve manufacturing problems using scientific principles and methodology.
- "demonstrate knowledge of safety and health in the occupation and in personal life.
- "demonstrate knowledge of the impact and linkage of technology as a cultural universal.
- "analyze and solve manufacturing problems of an economic, technical, organization, and design variety.
- "analyze and recommend solutions of manufacturing problems of a moral, ethical, and legal nature.
- "contribute to an industrial design team in the design, redesign, and upgrade of products to achieve improved manufacturability, aesthetics, and function.
- "solve welding design and materials joining problems with accepted methods, processes, and techniques to meet industrial standards.
- "demonstrate knowledge of legal and ethical behavior governing the engineering technologist.
- "demonstrate skill in accepted welding and materials joining processes.
- "demonstrate knowledge and skill in interpreting and using organizational economic and managerial techniques to promote profit, product, or service quality and institutional stability.
- "demonstrate proficiency in welding automation, principles of fabrication, and process integration."



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*Fig. 5 — Students Joshua Good of Tyrone, Pa., and Wesley Kinley of Cogan Station, Pa., prepare for submerged arc welding.*

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During their senior year, BWE students can either take an internship or perform what the instructors call a "capstone" project. The welding faculty must okay each project, which must result in a usable item. Students draw blueprints, order materials, and build the project. Students can team up if they plan to develop a large item, Nau said. For example, two students this semester are designing and building a lift table to carry metal into a shear in the welding lab.

Approximately half the students find an internship and half undertake a project, Nau said. "I was fortunate enough to get an internship," Weeks said. He worked in research and development at the Naval Surface Warfare Center in

Maryland helping, in part, to design an inert shielding gas system for friction stir welding. Research was "interesting and new," he recalled. "I'd like to get a job in that field."

Nau and Vaughn have seen the number of students taking welding at Penn College double over the past few years. Enrollment in each program has risen, but the bachelor's program has seen the greatest growth. "We're almost to our cut-off point for Fall 2005 already," Nau said. Why has it grown? The availability of good paying jobs is one reason, the instructors believe.

"There's a tremendous niche for these people," Vaughn said. They have "the ability to perform many of the welding processes, which enables them to develop training programs, along with the capability for critical analysis of problem areas within manufacturing."

## Career Placement

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*Fig. 6 — Student Andrew Michalov, Sussex, N.J., performing an end prep operation to prepare tubing for welding.*

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Although BWE students are finding jobs in a wide variety of industries, Vaughn said, primary the past few years has been power generation, transportation, and agriculture. The robots are a plus for the program, Nau explained, because they have helped students get jobs with companies such as Case New Holland and Harley Davidson that utilize a large amount of robotic welding.

"We have more requests for our welding students across the welding curriculum than we can fill at this time," Vaughn said. "Students have maintained a 100% placement rate in the past years." Data collected in 2002 and 2003 showed 100% placement of the bachelor's degree grads in jobs directly related to their welding studies. The lowest reported salary was \$28,000 and the highest was \$70,000. Average salary was \$49,500. Forty-five percent of students receiving associate degrees in welding during that same time period continued their education; the other 55% were placed in jobs directly related to their studies. The lowest wage reported for those grads was \$25,000 and the highest \$41,000, with the average being \$35,333.

Most of the two-year students return to the geographic area they came from, Vaughn said. About half of the bachelor's degree students return to their home locations; the other half relocate throughout the eastern United States.

Students get help in finding jobs through the college's Career Services center, through the welding faculty who have strong industry ties, and with the help of former students. Nau said as the school's welding graduates have become established in industry, they've become a source for jobs for newer grads.

In anticipation of his graduation, Weeks has begun his job search. Reflecting on his time at Penn College, Weeks said that while he'd like to see a few changes to the program such as the acquisition of advanced welding equipment like laser beam cutting and welding machines, on the whole he's satisfied with his Penn College experience. "It's a good college," he said. "I've enjoyed the time I've been here. I got to work with a lot of good students and teachers. The teachers are very knowledgeable."

(Additional information on the Pennsylvania College of Technology and its welding programs can be found online at [www.pct.edu](http://www.pct.edu).)

