

Teacher: Jeff Broschart

Course: Energy and Power

School: Randolph Technical Center, Elkins, West Virginia

Principal: Donald Johnson

Energy and Power Projects: A Springboard Into Real Life

Now that he has taught all four courses in the Advanced Career (AC) Energy and Power curriculum, career-technical instructor Jeff Broschart of Randolph Technical Center in Elkins, West Virginia, can see how much his students have matured from course to course. “They have the depth of knowledge to be self-starters when they graduate,” Broschart said. “They are really focused on the future, whether it is college, the military or a career.”

A veteran of 24 years in the electrical technology teaching field, Broschart is a master trainer in the AC curriculum developed by SREB and West Virginia to prepare students for postsecondary education and the workplace. “The four Energy and Power courses represent everything I’ve wanted to do in the classroom but couldn’t do, because it wasn’t included in the course work,” Broschart said.

Seniors taking the fourth course — advanced science and engineered systems — in February 2014 were learning to make different types of electromagnets to complete a project on maglev trains. These magnetic levitation transportation systems are being developed in other parts of the world; they use magnetic force rather than wheels and axles to “float” trains smoothly and rapidly above the rails.

All students in Course 4 have had the three previous Energy and Power courses — energy and power foundations, energy transmission and distribution, and electronics and control systems. This springboard into real life is preparing them to “start on their own when they go to work,” Broschart said. “They will be far ahead of many other graduates seeking jobs.”

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Reading and Writing

Students read technical and science articles in publications and on the Internet to inform their design for the assigned project. They also keep a record of their learnings in their journals. “I’ve been able to help them with spelling and sentence structure,” Broschart said in describing the English/language arts aspects of the course.

SREB

Advanced
Career

Students in Course 4 learn about multiple sources of energy, engineered systems, societal impact and the business of energy. In delving deeply into the vital field of energy and power, they study advanced concepts in steam energy, carbon sequestration — the capture and storage of carbon dioxide — and alternative forms of fuel in transportation and environmental compliance.

Course 4 also calls for mentors to guide students and to review and critique their work. Broschart plans to involve a retired science teacher, some power company employees and a retired engineering instructor as knowledgeable adults to support the students in developing their projects.

Wind Energy

After completing a project on energy storage in Course 3, which focuses on electronics and control systems, one student chose wind energy as the subject of her required high school senior project. In Course 3, students built batteries with various materials — including dirt. “The dirt battery worked pretty well,” Broschart said.

Randolph Technical Center enrolls 596 students in grades nine through 12 from two feeder schools and Elkins High School, which adjoins the center. Students take four core courses in 90-minute blocks. Most students in the Energy and Power sequence will be double completers after majoring in two career-tech pathways.

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“Our AC students are eager to learn and to apply what they have studied in other courses,” Broschart said. Students tell him, “I had this in math, and now I see why I learned it.”

Broschart considers the LabVIEW software in Course 3 to be his greatest challenge so far. “The students are more familiar with computers than I am,” he admitted. “I only had a week of training to absorb what I needed to know,” Broschart said. LabVIEW, together with a project-based curriculum and equipment, creates fully integrated technology platforms for showing students real-world lab experiences.



BUILD: Working on heat exchanger

Vocational Director/Principal Donald Johnson has been “super supportive” of the AC curriculum, Broschart said. “He gives me time to go to trainings and meetings and gets whatever we need for the courses. He offers open-door support for the AC curriculum.”

When Broschart teaches Course 2 to new and continuing AC teachers at the summer 2014 training institute at Marshall University, he will describe the power inverter his students built. “I will tell them how the students learned to convert energy from a car battery to a house current that will operate a kitchen blender,” he said. That illustration should attract the attention of AC teachers and potential teachers as they prepare to build the high-tech skills of their students.

For information on the AC projects at Randolph Technical Center, contact Jeff Broschart at jbroscha@access.k12.wv.us.

For information on adopting this AC curriculum or others available in fall 2014, visit sreb.org/AC or contact: Gene Bottoms, SREB Senior Vice President at (404) 875-9211 or gene.bottoms@sreb.org, Marna Young at marna.young@sreb.org or Jim Berto at james.berito@sreb.org.