The NTCC Engineering Program

The engineering program at Northeast Texas Community College has come a long way in the last four years, with student enrollment growing significantly each semester.

“Our division of math, physics and engineering collaborate with biology, chemistry, and computer science to offer an engineering program that prepares students for successful transfer to a baccalaureate program,” said Dr. Paula Wilhite, Division Chair for Mathematics, Physics, and Engineering.

The division offers three degrees; Associate of Science in Engineering, Associate of Science in Mathematics, and Associate of Science in Physics. These three degree programs each have a full complement of courses that support the first two years of education. In particular, the engineering program offers a full comprehensive plan for freshman and sophomore-level courses. The recommended curriculum includes an additional two to three courses to prepare students for junior level instruction in engineering.

Dr. Wilhite said the program began making dramatic changes in 2011, the first year she took the mantle of division chair, and the year that Dr. Mark Bouwens accepted his current position of associate professor of physics.

Soon after Dr. Bouwens arrived on campus, the program started down a new pathway,” she said. Bouwens has two master’s degrees; Master of Science in Applied Mathematics and Master of Science in Physics, and a Ph.D. in Physics.

One of the challenges that the college had faced before the changes was students enrolling who weren’t calculus ready their first semester.

“For many of them, it wasn’t until their sophomore year that they enrolled in the gateway courses for engineering. They took the advanced calculus-based physics class and maybe some programming classes, chemistry and good strong general education, but when they transferred, they would be again at the entry point to enroll in additional lower division courses such as intro to engineering classes at the university level,” she said.

In the Fall 2011 semester, there were eight students enrolled in the calculus-based physics course. “That enrollment number is how we measure the strength of enrollment in engineering because that is the gateway class into all of the courses that follow. This semester (Fall 2015), we had 40 students enrolled in the gateway courses of engineering. I still get a chill saying that. We are so excited, and people ask, ‘What’s

changed? Have the students changed? Has the program changed? Has the placement change?' And the answer is 'Yes, Yes, and Yes,' to all of these questions," Dr. Wilhite said.

She said the program has changed because the enrollment has changed and the enrollment has changed because the placement has changed.

"We are working much harder at the first semester on campus to search out students that are calculus ready. We make sure that if they are interested in engineering, we place them in Calculus I and Calculus-based Physics courses," Dr. Wilhite said.

That success has also led to the addition of the Engineering Graphics I course, an Introduction to computer-aided drafting, taught by Kenneth Irizarry who holds a Master of Science in Engineering and is a professional engineer.

"He is our first professor of engineering, and he comes to us from Texas A&M University-Texarkana," Dr. Wilhite said. "He has done consultant work for well over 20 years and has teaching experience at several levels."

The program has been able to add Engineering Mechanics I: Statistics and Engineering Mechanics I: Dynamics, two courses that the college previously combined with little success in enrollment numbers. Now the statics portion is taught in the fall semester, and the dynamics portion is taught in the spring semester with enrollment up from five students a year ago to 15 students in 2015.

"Roy Hodson, a part-time engineering faculty member, who taught these courses for the past two years, deserves a lot of credit for what has happened," Dr. Wilhite said.

Hodson is a professional civil engineer who has a Bachelor of Science degree in civil engineering and a Master of Science degree in construction management.

Bouwens said the credentials of the full-time and part-time faculty were key to the success of the engineering program.

"We have very qualified people. We have doctors in education and math, Ph.Ds. in physics, professional engineers. We have a very good reputation, and I think a lot of people didn't realize the quality we have here," Dr. Bouwens said.

He said he and Dr. Wilhite spent a lot of time going to area high schools to educate students and faculty about what NTCC has to offer in its engineering department.

"It has grown and grown and is snowballing now. It's an easy sell," he said.

Many of the students they've attracted are at the top of their classes and capable of the doing the work required in advanced physics and calculus.

"We have an extraordinarily low attrition rate: 3 out of 31 last year," Dr. Bouwens said.

The faculty also spends time counseling students to help guide them in their engineering path.

"We've got them for two years, and progressively we get them where they need to be so when they walk out of here they are ready for their junior year," he said. "I'd put them up against anybody at the university."

The department's goals are to continue increasing enrollment and increase scholarship opportunities for students who plan to major in engineering. The division would also like to broaden the summer internship program.

"One of our recent graduates had a summer internship for two years with TxDot in civil engineering. We would like to expand that to other areas locally so students can stay home but also get meaningful work experience," Dr. Wilhite said.

The engineering students are also benefiting from a project Bouwens spearheaded. He and a team of students are building a a 33 TFLOP supercomputer with 320 gigabyte RAM, a 180 terabyte storage cluster, and 56 gigabyte high-speed InfiniBand network. Students will use the computer to conduct high precision numerical analysis calculations, simulations, and generate 3D electron orbital and molecular models. Students in advanced classes will be able to use the supercomputer to conduct physics and chemistry research.

For the past two years, the department has hosted an Engineering Roundtable featuring esteemed speakers in education and the engineering field. Michael Zarcone, an NTCC freshman during the March 2015 roundtable, said it was a great learning experience.

"To have the opportunity to converse with professionals in the same field of study as me was invaluable to my confidence. From what I learned at the Roundtable, I am confident that I have chosen a wonderful career path that will challenge me every step of the way," Zarcone said.