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Submarine building 101

Presentation and research projects prepare students for future as engineering leaders

By Mike Horan

Utica High Schools Arrow Editor-in-Chief

After weeks of research, planning and practicing her presentation to the class, senior engineering student Kathryn Thudium anxiously waited for her instructor's critique.

Students in the inaugural Engineering Technology class at Utica High School had been studying minority scientists and engineers, and Thudium chose Amelia Earhart, while her classmates chose people like Grace Hopper, the Navy's first computer engineer, or Ellen Richards, the first woman admitted to the Massachusetts Institute of Technology.

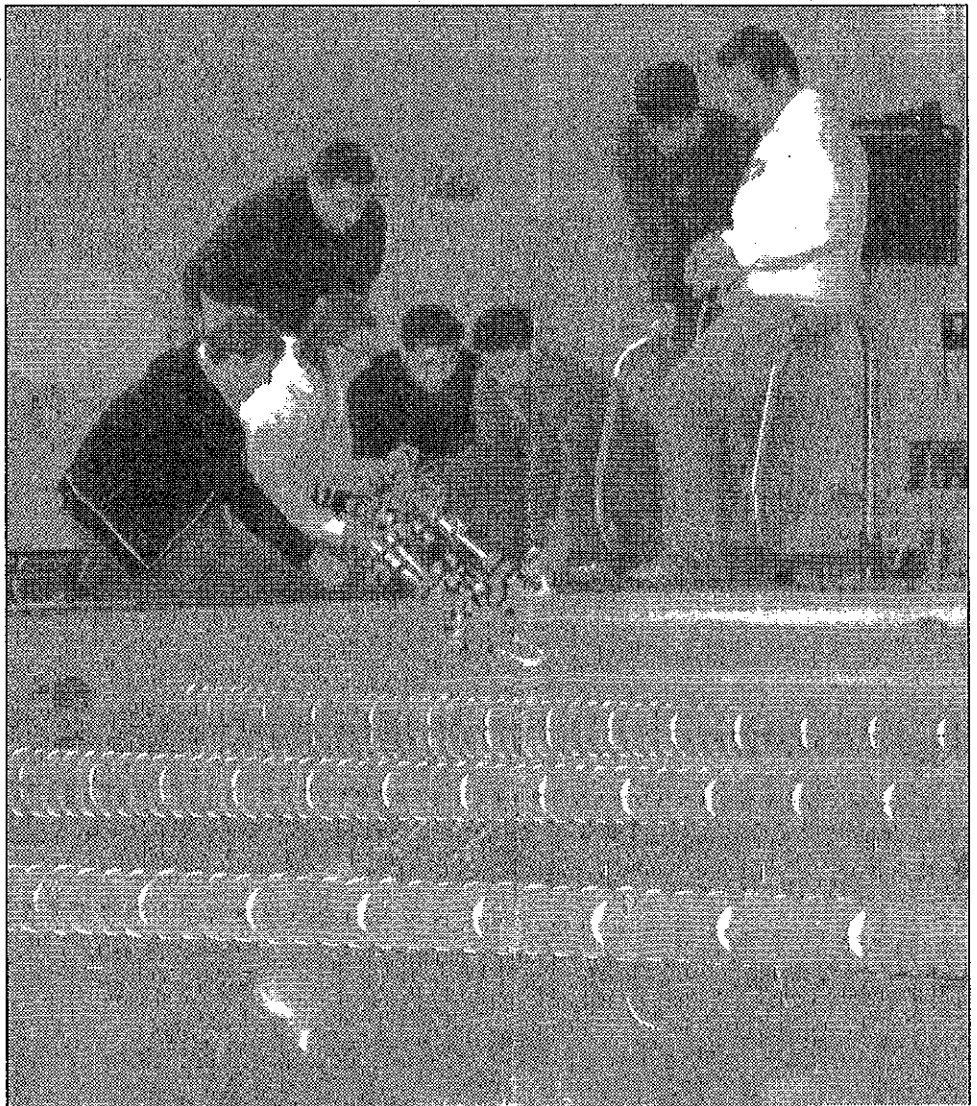
"Our teacher graded our presentations on actual content and he was really picky," Thudium said, "but it taught us a lot because we got to understand how people used their education for the economy or for their community."

According to engineering teacher and former systems engineer Geoffrey Clark, presentation skills are important for future engineers to master.

"Engineers have to be able to give presentations to higher management," Clark said. "It's essential for them to be able to talk to the average person and be comfortable talking."

Engineering students have also presented information about topics ranging from energy conservation to creating a pizza production line, and Thudium, whose father is an engineer, agrees that the presentation skills she's learned will help her in the future.

"We work a lot on presentations and research because it's important to be able to present your ideas well," Thudium said, "or people won't understand them. You have to be



confident in your presentation, no matter what."

As the class has moved toward the end of the first semester, engineering students have been utilizing their skills in Physics and Mathematics to build a remote-controlled underwater vehicle. This project is supported by Michigan Technological University's Enterprise program. The Enterprise program is one option MTU engineering students use to complete their required capstone design experience. The Utica High engineering technology class is one of only three high school programs in the state of Michigan currently partnering with MTU on this initiative.

In December, Clark and two other UCS teachers, Henry Ford II High School's Scott Spry and Stevenson High School's Mike Garcia, all former engineers, went to Great Lakes Water Studies Institute at Northwestern Michigan College for a weekend training session where they assembled a model of a submarine. They also received the necessary equipment for Utica to build its own submarine.

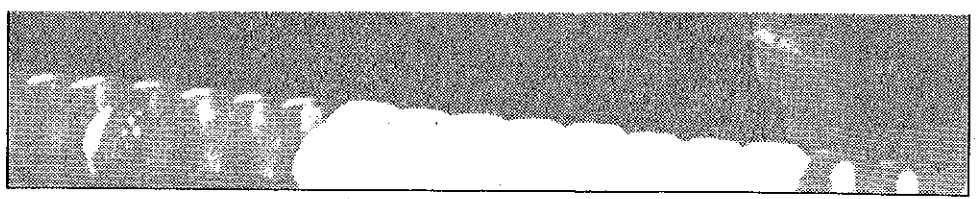
"We have a submarine that Mr. Clark built," Thudium said. "We're going to fine-tune that one, and then we'll expand our own ideas and build our own."

A team consisting of 15 to 25 students from Utica High and Ford II will use their skills in blueprint reading, pneumatics, buoyancy, 3-D modeling, system integration, and fabrication to build the submarine. Different groups will help out with various jobs, depending on which skills they have been assigned.

"Scott Spry and his mechatronics students will be a big help because they will be helping with the electrical design and control," Clark said.

At Ford II, mechatronics students have been preparing for their portion of the project by researching how to waterproof electronics.

"You're obviously dealing with a different



After working on their underwater Remote Operated Vehicle (ROV) in Utica High's engineering technology class, seniors Alex Baril, Katie Thudium, Allen Kirma, Travis Koss, Kyle Gill and Dan Helou prepare to submerge the ROV robot for the first time as teacher Geoff Clark looks on. Helou was controlling the vehicle through the tether. The students will compete in April as part of the MATE ROV regional competition.

environment when you're putting something under the water," Spry said, "so the students are doing whatever they can to make sure they build something that's waterproof."

Once they've tackled the water issue, students will develop a control system for the vehicle.

"It's important that they optimize what the robot will have to do under water," Spry said. "The control system will be designed to best fit the tasks it will be required to perform."

Students said they are excited for the new, hands-on experience.

"I'm excited because I get to help design the sub," senior Kyle Gill said, "because it's a lot more interesting than my other classes."

Ideas for the submarine were generated during meetings throughout the first months of the school year. Students talked about the parts and materials they would need and the different control systems they could use.

According to Clark, students will build several models to test theories, but they will choose one final project to build a submarine.

"We've been working on a design that will work," Gill said. "Mr. Clark has been having us redesign until we get it right."

Students are hoping to complete it in the next month or two, and they plan to enter it into a national competition that will take place in April. The best machine will be chosen

based on factors of performance and control.

Utica's engineering technology program was collaboratively designed by Michigan Technological University, Macomb Community College and Utica Community Schools to provide a solid foundation for students pursuing engineering and technical professions after graduation. The curriculum was designed to enlighten students to many different engineering disciplines, not just those commonly known and seen locally. In addition, this program will have a strong work-based learning component. Students will be able to communicate with engineers locally, regionally and globally through options such as videoconferencing, cyber-mentoring, job shadowing and internships. "Since the curriculum for the engineering and mechatronics classes was written with college professors from Macomb Community College and Michigan Technological University," UCS CTE Administrator Scott Palmer said, "students can receive articulated college credit when they complete the program and fulfill specific requirements."

Clark's main goal in his class is to not only influence students to follow a career in engineering, but also to help better their futures.

"I want to teach students to become engineering leaders," Clark said, "not just engineers."

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