

The next CTE page will feature Fraser High

CPC & CTE: The key to reviving America's engineering and manufacturing sector

How long has American and, in particular, Michigan engineering and manufacturing dominated the globe? The knowledge and skills of Michigan's residents have led the world for more than half a century. We tipped the scales in favor of the Allies in World War II, ensuring the defeat of the Axis forces. We followed up by rebuilding Europe and Japan. We assisted the country in defeating the Soviet Union in the Cold War. We did all of this while still providing for the material wants and needs of the American people.

This half century of engineering dominance gave birth to many American icons. Michigan companies like General Motors, Chrysler, Ford, Kellogg, and Whirlpool went on to become household names.

Many American icons were born right here in Macomb County, where American engineering and manufacturing became synonymous with imagination, inventiveness, craftsmanship, and quality.

Perhaps the most important of all the American icons born in the past half a century is the driving force behind those skills and knowledge: Career and Technical Education (CTE.)

CAREER PREP CENTER BUCKS THE TREND

Fashion, music and diets are all driven by trends. Education can also fall victim to the "everyone else is doing it" trap. Sometimes trends are followed out of necessity, but often they are followed out of fear of being



Richard Swords, medical machining instructor explains the Makino CNC Mill to Simone Woods, a student in both Pre-engineering and medical machining.

wrong or not fitting in. About five years ago, manufacturing classes in Macomb County high schools began closing. That quickly became the trend. Only a few are left standing.

One of the best is in Warren Consolidated Schools at the Career Preparation Center. Closing the manufacturing course was never an option.

"When everyone else is doing it, don't," said Mr. Jim Mandl, pre-engineering and CAD instructor. "We saw the enrollment dropping, decided to study why it was dropping and determine what we could do to reverse it." Mandl said. Mandl and the administration met with advisory individuals and toured manufacturing companies that were thriving in a sluggish economy.

The conclusion of the study

was simple — modernize. "We saw what a modern facility should look like. We enlisted the help of business partners to transform our shop from a relic into a modern, high-tech, 21st century lab," Mandl said.

With the help of Fitzpatrick Manufacturing and Fitz Rite Products, Single Source Technologies, and Makino Inc., the transformation has been a success! The shop was gutted, reconfigured, painted, and outfitted with new equipment including a \$250,000 Makino CNC Mill.

Mr. Richard Swords — with more than 25 years of experience as a master instrument maker and bioengineer, with a career profile that includes Henry Ford Hospital, The Detroit Medical Center, Wayne State University, Kresge Eye Institute and Karmanos Cancer Center — was hired as instructor.

"I believe the students of CPC should focus on providing for the needs of the future. The future in manufacturing is in the medical field," Swords said.

"The aging baby boom generation is beginning to retire. As that happens, they are going to be consumers of medical devices and items to assist them in their everyday lives as they age," Swords added.

Students in the new Medical Machining course are learning to create those tools for medicine.

They are learning to create internal and external fixators which are designed to keep broken bones from moving during the healing process. They are learning to create droids that can be used in surgery. Stu-

dents are also learning basic mechanical drawing, basic electronics and human skeletal structure.

"I prefer hands-on learning," said Kevin Papak, a junior in the medical machining class. "I'm really learning to use the tools — the right way — to create devices that will help people," he added.

Students learn to use manual machines as well as computer-assisted machines in the medical machining class.

"My students are taking a huge step forward towards careers in medical manufacturing, bioengineering, medical service and/or entrepreneurship, all of which are integral parts of restructuring Michigan's economy to meet the demands of the future," Swords said.



The 2011 Real World Design Challenge state championship team at the National Air and Space Museum in Washington D.C., with Jim Mandl, CPC pre-engineering instructor.

PARTNERSHIPS

General Motors and Ford have partnered with their suppliers to make world-class vehicles for decades. However, partnership is not limited to industry alone. CPC is partnering with industry and higher education to provide the best possible advantage to the students of Warren Consolidated Schools.

New in the Career and Technical Education arena for 2012 is a collaborative endeavor pairing Career Preparation Center students with Macomb Community College instructors. Mr. Gary Walters and Mr. Jim Carlson will lead a group of approximately 25 CPC students in a dual enrollment course that builds on Macomb's already established Electric Vehicle Institute.

Students from the pre-engineering and medical machining courses at CPC will be challenged to design and build electric wheelie cars — single person, two wheeled vehicles that use electric power for balance and drive. The students will learn about battery power, dynamic breaking, conservation of energy, and the product development process. Time will be split between CPC classrooms and the Electric Vehicle Institute at Macomb.

"The course is set up as a hybrid," said Jim Carlson, product development instructor at Macomb. "Part of it will be taught at MCC, part will be taught at CPC, and part will be taught using Angel, Macomb's online course delivery system," Carlson added. Upon successful completion of the dual-enrollment course, the students will earn credit for PRDE-2000 — "Product Development Process" — at Macomb Community College.

Many manufacturing and design professionals have donated time, funds, and equipment to ensure the success of all CPC programs. This is especially true of the pre-engineering and medical machining courses at CPC.

"Single Source Technologies worked with Machino to deliver a \$250,000 Makino CNC Mill at a fraction of the retail price," said Jim Mandl. Fitz Rite Products and Fitzpatrick Manufacturing donated the tooling needed to run the Machino mill. "I am a loyal supporter of the CPC because I believe in what they do," Mike Fitzpatrick said.

Many industry professionals have attended meetings at CPC as advisors on curriculum and

technology used in the courses.

"I have been an industry advisor to the pre-engineering course at CPC for the past 9 years," said Scott Altman, design engineer for Sumitomo Electric Wiring Systems. "I've seen a real effort from the instructor to provide the best technologies and opportunities to the students."

"Mandl's students are not only prepared for work, but they are prepared for college, and that is very important," Altman concluded.

JOBS, JOBS, JOBS

As we head into an election year, the mantra we are sure to hear is "Jobs, jobs, jobs!" At CPC, students get them! For many, many years, engineering and manufacturing companies have hired CPC students as co-ops and as full-time employees after graduation.

Fitzpatrick Manufacturing and Fitz Rite Products are just two of those companies. Owned and operated by Mike and Dean Fitzpatrick, for the past 20 plus years, they have provided career opportunities to countless students from the CPC machining class.

"I continue to be impressed with the caliber of student they turn out," Mike Fitzpatrick said. "Being involved with CPC allows me to contribute to the community and, in turn, allows me to select pre-screened and pre-trained individuals which ultimately results in a good deal for the student and for my company," he concluded.

Gentz Industries actively seeks students from the CPC pre-engineering class to fill its design and drafting positions each year. "The entire drafting department at Gentz is staffed by my former students," Mandl said.

Gentz Industries has established an outstanding reputation in providing intricate, high-precision engine components to the aerospace industry for over 50 years. "I started working at Gentz in 2008 as a co-op student," said Cassie Zalupski, a graduate of the CPC Pre-Engineering program. "I was a junior in high school," "I have been working there ever since."

The demand for qualified workers in engineering and manufacturing in Macomb County continues to grow. However, qualified candidates are proving hard to find.

"I have had a few meetings in the past month with new in-

dustry partners and it is the same story: they are in dire need of young designers to fill positions, but can't seem to find any," Carlson said. "Tool design is in demand just as much as product design," Carlson added. As a result, General Motors has reestablished its co-op program with Macomb Community College after an 18 year hiatus.

"It's getting harder and harder to find qualified people," said Joe Heilig, a studio engineer at General Motors and a member of the CPC advisory board. "It proves that programs like these, at the high school level, are incredibly important. They get young people excited about careers in engineering and they help to fill a need for the local economy."

Upon completing the first year of the MCC Product Design program, students have the opportunity to work for GM as a co-op. Students who enroll in the CPC-MCC dual enrollment course get a head start on that first year!

SUCCESS BREEDS SUCCESS

We have all heard the old adage: competition can only make you stronger. In the pre-engineering course at CPC, competition is a requirement. When Jim Mandl changed careers nine years ago, from engineering to teaching, he listed a few items that he thought were important for students to learn in addition to curriculum. First on the list: competition.

"I wanted my students to understand that they will spend the rest of their lives competing, so the earlier they get used to it, the better," Mandl said. He made industry-judged competitions a required part of the course. "I went to every networking event I could find in my first year teaching," Mandl said. "My goal was to find competitions for my students to participate in," he added. Participation is a footnote to the success the CPC pre-engineering students have had in competition.

Mandl's students have excelled in every competition they have entered Michigan Industrial Technology Education Society (MITES), American Society of Body Engineers (ASBE), Extreme Re-Design, and Real World Design Challenge (RWDC).

"I have the Bo Schembechler sign on my classroom wall: Those Who Stay Will Be Champions," Mandl said. "It's there for a reason," he added.

Mandl's students have won the Regional Grand Award at MITES seven out of eight years, and the State Grand Award three times. In 2008, he placed 22 students in the top 30 of the ASBE competition. He had an international champion in Extreme Redesign in 2006. He led his students to back-to-back Real World Design Challenge state championships in 2010 and 2011.

"We went out to Washington D.C. in April and placed fifth in the country in Real World Design Challenge and won the award for best presentation," said Mike Sukiennik, now a

graduate of the program. "The experience of that competition was one I will never forget — the best of my high school years," Sukiennik said. "I really learned a lot from it and know it prepared me for college and my future career," he concluded.

Competition participation is a large part of the second year of the two-year CPC pre-engineering program. "I have noticed that the first year students always come back with a hunger," Mandl said. "Seeing their older classmates succeed makes want to succeed," he added.

Some students return for the second year of the program specifically for the opportunity to compete.

"I heard about the RWDC team winning two years ago.



Kevin Papak, CPC medical machining student, assembles an external fixator on a skeleton, simulating the process of setting a severely broken wrist for healing.

Then I got to witness the team win last year," said Alex Blaqui-ere, a second year pre-engineering student. "The success of the teams from the last two years encouraged me to take a lead role in RWDC this year with enthusiasm and a real will to succeed."

TOOLS AND KNOWLEDGE FOR TODAY... SKILLS FOR TOMORROW

The secret to any economic recovery lies with engineering and manufacturing. We have to engineer and manufacture products that the American consumer desires. We have to foresee the problems and challenges of the future and tackle them with the same determination that Henry Ford, Walter Chrysler, Harvey Kellogg and Louis and Emory Upton did.

The great American icon of Career and Technical Education will prove to be the catalyst for Michigan's economic revival. It helps to engage students in learning by putting subject content into a real-world context.

Through Career and Technical Education, the students of the Warren consolidated School's Career Prep Center are being provided with tools and knowledge for today. They will graduate with the skills needed to solve tomorrow's engineering and manufacturing problems in Michigan and beyond. They are the key to reviving America's engineering and manufacturing sector.

MAKING THE **Connection**

to Career Technical Education

For more information about CTE at the high school level contact the Macomb Intermediate School District.



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Macomb Career and Technical Education Administrators Association

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